Section:	Tab 8	**Page No.:**	4
Topic:	First nation energy efficiency		
Subtopic:	Level of effort regarding first nation energy efficiency		
Issue:	Additional detail required		

PREAMBLE TO IR (IF ANY):

Manitoba Hydro states that it "…is working with 54 first nation communities to implement energy efficiency measures…."

QUESTION:

What does "is working with" mean?

RATIONALE FOR QUESTION:

These data are necessary to assess the level of engagement that Manitoba Hydro is pursuing with first nation communities. The request can be distinguished from MMF and GAC IRs given its specific First Nations focus.

RESPONSE:

Manitoba Hydro is working with First Nation Communities through a number of initiatives using a partnership approach. The partnership approach has been quite successful as more First Nation communities are capturing more energy efficient opportunities, more employment opportunities are created within the communities and the partnership is resulting in a more positive relationship between participating First Nation Communities and Manitoba Hydro.

Under the First Nation Power Smart (FNPS) Program, Manitoba Hydro has a dedicated Energy Advisor working exclusively with First Nation communities. To date, the Energy Advisor has contacted all First Nation Communities to discuss participation and through the program, a total of 1431 homes in 39 communities have been retrofitted with additional insulation and a number of low cost energy efficient measures. Houses with adequate

insulation are provided with basic energy efficiency measures, such as LEDs, showerheads, faucet aerators, pipe wrap, window kits and draft stoppers. The Energy Advisor generally works with the housing manager within each community to identify eligible homes and members of the community are hired to undertake the work. Manitoba Hydro pays for all costs, including labour, for undertaking the work. Manitoba Hydro provides assistance and program support based upon each community's project timelines and interest.

The following table provides the participation to date under the First Nations Power Smart Program and an estimate of remaining homes to be retrofitted with insulation and/or provided with low cost energy efficient measures.

First Nations Power Smart Program	Completed Homes as of December 2014	Qualifying Homes Insulation	Remaining Homes	Low Cost Measures
Barren Lands First Nation(Brochet)	55	55	0	56
Beren's River First Nation	0	62	62	261
Birdtail Sioux First Nation(Beulah)	20	20	0	100
Black River First Nation(O'Hanley)	68	68	0	117
Bloodvein First Nation	0	33	33	180
Brokenhead Ojibway Nation (Scanterbury)	66	85	19	87
Buffalo Point First Nation	0	0	0	19
Bunibonibee Cree Nation (Oxford House)	0	86	86	416
Canupawakpa Dakota First Nation	36	36	0	76
Chemawawin Cree Nation (Easterville)	45	45	0	277
Cross Lake First Nation	76	160	84	781
Dakota Plains First Nation	0	20	20	68
Dakota Tipi First Nation	20	20	0	20
Dauphin River First Nation (Gypsumville)	0	0	0	50
Ebb & Flow First Nation	20	30	10	395
Fisher River Cree Nation (Koostatak)	59	70	11	401
Fox Lake First Nation (Gillam)	0	0	0	64
Gamblers First Nation (Binscarth)	13	13	0	24
Garden Hill First Nation (Island Lake)	0	96	96	461

First Nations Power Smart Program	Completed Homes as of December 2014	Qualifying Homes Insulation	Remaining Homes	Low Cost Measures
God's Lake First Nation	28	55	27	269
Hollow Water First Nation (Wanipigow)	0	35	35	176
Keeseekoowenin Ojibway Nation (Elphinstone)	47	57	10	106
Kinonjeoshtegon First Nation (Jackhead)	0	15	15	88
Lake Manitoba First Nation (Dog Creek)	0	27	27	224
Lake St. Martin First Nation	0	0	0	29
Little Grand Rapids First Nation	0	44	44	235
Little Saskatchewan First Nation	0	0	0	93
Long Plain First Nation	78	86	8	311
Manto Sipi Cree Nation (God's River)	13	35	22	103
Marcel Colomb First Nation (Lynn Lake)	0	0	0	29
Mathias Colomb Cree Nation (Pukatawagan)	10	70	60	373
Misipawistik Cree Nation (Grand Rapids)	25	50	25	195
Mosakahiken Cree Nation (Moose Lake)	29	29	0	123
Nisichawayasihk Cree Nation (Nelson House)	19	19	0	496
Northlands Dene First Nation (Lac Brochet)	47	47	0	141
Norway House Cree Nation	15	95	80	1135
O-Chi-Chak-Ko-Sipi First Nation (Crane River)	9	9	0	120
Opaskwayak Cree Nation	55	95	40	469
O-Pipon-Na-Piwin Cree Nation (South Indian Lake)	20	20	0	154
Pauingassi First Nation	0	20	20	130
Peguis First Nation	100	190	90	705
Pinaymootang First Nation (Fairford)	0	30	30	327
Pine Creek First Nation (Camperville)	46	46	0	182
Poplar River First Nation (Negginan)	14	50	36	203
Red Sucker Lake First Nation	0	41	41	199
Rolling River First Nation	10	30	20	132

First Nations Power Smart Program	Completed Homes as of December 2014	Qualifying Homes Insulation	Remaining Homes	Low Cost Measures
Roseau River Anishinabe First Nation	42	42	0	146
Sagkeeng First Nation (Fort Alexander)	0	131	131	659
Sandy Bay Ojibway First Nation	10	60	50	549
Sapotaweyak Cree Nation	61	61	0	207
Sayisi Dene First Nation (Tadoule)	27	27	0	91
Shamattawa First Nation	15	75	60	156
Sioux Valley Dakota Nation	0	70	70	364
Skownan First Nation	44	44	0	97
St. Theresa Point First Nation	0	106	106	557
Swan Lake First Nation	0	4	4	132
Tataskweyak Cree Nation (Split Lake)	9	74	65	361
Tootinaowaziibeeng First Nation (Valley River)	46	46	0	43
War Lake First Nation	0	0	0	30
Wasagamack First Nation	0	49	49	260
Waywayseecappo First Nation	80	100	20	371
Wuskwi Sipihk First Nation (Birch River)	8	8	0	41
York Factory First Nation	46	52	6	74
Total	1431	3043	1612	14738

Manitoba Hydro is also pursuing the possibility of installing drain water heat recovery systems in some homes within First Nation communities. The First Nations Energy Advisor will work with each community to determine where the drain water heat recovery systems may be useable and if so, installed if the First Nation Community is interested.

Through the Community Geothermal Program, Manitoba Hydro is partnering with AKI Energy and participating First Nation communities to install geothermal heating and cooling systems. AKI Energy is a social enterprise organization established to assist First Nation communities with pursuing energy efficient opportunities and is primarily funded by Manitoba Hydro. The Community Geothermal program takes a customized approach with each participating First Nation community. Under the program, members of the community are provided training and subsequently, these community members install the geothermal

systems. Since the launch of the program, 45 members of the First Nation communities have been trained on how to install and maintain geothermal systems. Four First Nation communities (Pequis First Nation, Fisher River First Nation, Long Plains First Nation and Sagkeeng First Nation) are currently working with Manitoba Hydro and AKI Energy on this community energy efficient initiative. See Manitoba Hydro's response to MKO – Coalition I-1 b) for the number of geothermal installations. The geothermal installations are funded through a combination of incentives and the use of the PAYS financing program.

Manitoba Hydro is also partnering with Pequis First Nation to undertake a solar hot water heating pilot. Under the pilot, twenty solar hot water heating systems will be installed in 2015 with homes being targeted which have higher water heating energy consumption. Members of the First Nation Community again are trained and are installing the systems. Performance monitoring will occur over the 2015 year to assess product performance and validate energy savings. The solar hot water heating system installations are funded through a combination of incentives and the use of the PAYS financing program.

Manitoba Hydro also integrates energy efficiency into ongoing business discussions with First Nation communities as part of the Corporation's overall business activities. For example, as part of the discussions with Cross Lake First Nation related to reconciliation, Manitoba Hydro provided a presentation on Power Smart and promoted the concept of a partnership to develop a comprehensive energy efficient plan for their community.

Section:	Tab 8	**Page No.:**	4
Topic:	First nation energy efficiency		
Subtopic:	Level of effort regarding first nation energy efficiency		
Issue:	Additional detail required		

PREAMBLE TO IR (IF ANY):

Manitoba Hydro states that it "…is working with 54 first nation communities to implement energy efficiency measures…."

QUESTION:

Provide, in detail, by year for each of the past five years, preferably in Excel format, data regarding specific actions undertaken by Manitoba Hydro in regards to first nation energy efficiency, including:

i. funding provided by initiative;
ii. incentives provided;
iii. number of participants;
iv. types of measures installed, and the number of each type;
v. estimated savings per participant.

RATIONALE FOR QUESTION:

These data are necessary to assess the level of engagement that Manitoba Hydro is pursuing with first nation communities. The request can be distinguished from MMF and GAC IRs given its specific First Nations focus.

RESPONSE:

Please see the tables below regarding specific actions undertaken by Manitoba Hydro's First Nations Power Smart Program in regards to First Nation energy efficiency.

Fiscal Year	b.i) Funding for Labour	b.ii) Incentive funding (Insulation, Basic Measures and Shipping)	b.iii) Participants	b.v) Estimated savings per participant (kW.h)
2010/11	38 350	129 266	133	3912
2011/12	140 600	225 529	244	3038
2012/13	226 957	218 073	319	4592
2013/14	186 770	282 889	374	3176
2014/15 up to Dec 31, 2014	145 400	174 998	332	2873

b.iv)

Measures	2010/11	2011/12	2012/13	2013/14	2014/15 (April-October)
Insulation (Homes Completed)	133	244	319	374	230
CFLs					
23watt	399	732	957	1122	690
13watt	399	732	957	1122	690
Showerheads	266	488	638	748	460
Kitchen Aerators	133	244	319	374	230
Bathroom Aerators	266	488	638	748	460
Fridge Freezer Card	133	244	319	374	230
Caulking Tubes	133	244	319	374	230
Caulking Guns	133	244	319	374	230
Packages of Electric Socket Gaskets	133	244	319	374	230
Packages of Electric Socket Caps	133	244	319	374	230
Pipe wrap for Hot Water Tanks	399 metres	732 metres	957 metres	1122 metres	690 metres

In November of 2014, window kits were added in place of caulking tubes and guns along with LEDs which replaced CFLs.

Measures	**2014/15 (Nov - December 2014)**
Insulation (Homes Completed)	102
LEDs	408
Showerheads	204
Kitchen Aerators	102
Bathroom Aerators	204
Window Kits	306
Fridge Freeze Card	102
Package of Electric Socket Gaskets	102
Package of Electric Sockets Caps	102
Pipe wrap for Hot Water Tanks	306

The providing table provides data on Manitoba Hydro's Community Geothermal Program in First Nation communities.

	i. Funding Provided (Total $ Loaned)	**ii. Incentives Provided**	**iii. & iv. Number of Participants & Measures Installed**	**v. Savings per Participant (kW.h)**
			Geothermal Heat Pumps	
2010/11	N/A	N/A	N/A	N/A
2011/12	N/A	N/A	N/A	N/A
2012/13	N/A	N/A	N/A	N/A
2013/14	$1,050,241	$182,508	84	13,463
2014/15*	$1,048,438	$156,172	117	13,463

*Up to December 31, 2014 and inclusive of new homes

The following table data associated with Manitoba Hydro's Power Smart for Business Programs in First Nation communities.

i. Not Applicable to the Power Smart for Business programs.

ii. to v. See chart below.

	ii. Incentives Provided	iii. Number of Participants	iv. Measures Installed	v. Savings per Participant (kW.h)
2010/11				
Commercial Building Envelope	$11,583	1	Windows	23,988
Commercial Lighting	$10,695	2	T8 lighting systems, LED exit signs	30,465
2011/12				
Commercial Building Envelope	$1,175	1	Insulation, windows	11,232
2012/13				
Commercial Building Envelope	$58,950	1	Insulation, windows	422,075
Commercial Geothermal	$20,532	1	Geothermal heat pump system	513,999
Commercial Lighting	$51,528	6	T8 lighting systems, T5 lighting systems, LED fixtures, LED exit signs, LED lamps, occupancy sensors, CFL hard-wired	33,645
2013/14				
Commercial Lighting	$7,700	5	T8 lighting systems, T5 lighting systems,	14,170
2014/15*				
Commercial Lighting	$8,050	2	T8 lighting systems, T5 lighting systems, LED fixtures, LED exit signs	17,705

*Up to December 31, 2014

Section:	Tab 8	**Page No.:**	4
Topic:	First nation energy efficiency		
Subtopic:	Level of effort regarding first nation energy efficiency		
Issue:	Additional detail required		

PREAMBLE TO IR (IF ANY):

Manitoba Hydro states that it "…is working with 54 first nation communities to implement energy efficiency measures…."

QUESTION:

Please outline any barriers identified by Manitoba Hydro in delivering programming to First Nations. Please explain how Hydro intends to address these barriers including barriers, if any, related to substandard housing.

RATIONALE FOR QUESTION:

These data are necessary to assess the level of engagement that Manitoba Hydro is pursuing with first nation communities. The request can be distinguished from MMF and GAC IRs given its specific First Nations focus.

RESPONSE:

Manitoba Hydro is aware of the following barriers in delivering programming to First Nations and has customized the First Nations Power Smart Program to specifically address these barriers.

- Lack of funds can be a barrier for First Nation Communities to complete energy efficiency upgrades. The First Nations Power Smart Program recognizes this and provides all energy efficiency measures at no cost to First Nations. For other opportunities such as geothermal heating and cooling systems and solar hot water tank systems, a combination of incentives and the use of the PAYS financing program are used to cover the project costs.

- The completion of participant applications for individual homes can be cumbersome when completing multiple energy efficiency upgrades at one time. To address this, the Manitoba Hydro works directly with the First Nation Community by obtaining a Band Council Resolution and agreement on homes to be provided energy efficiency upgrades. This removes the requirement for individual applications.

- Having a dedicated First Nations Energy Advisor mitigates many barriers associated with the administrative process of retrofits. This provides First Nation Communities with a direct point of contact to address any upfront questions, an Advisor throughout the process to explain the program in detail, assist with acquiring supplier quotes, transportation logistics, training for installation of materials, inspection once work is completed and assistance with invoicing along with general follow ups through the process to ensure energy efficiency upgrades are completed.

- As with any energy efficiency opportunities, awareness and education are key to ensure market acceptance. Through the dedicated First Nations Energy Advisor, community presentations on energy efficiency are provided on request where general Power Smart tips and programs are provided.

- Geothermal systems are complex and expensive systems to install. To address this barrier, Manitoba Hydro is funding the AKI Energy, a social enterprise, to work closely with First Nation communities in providing the necessary training and coordination of the community based program.

Section:	Tab 8	**Page No.:**	4
Topic:	First nation energy efficiency		
Subtopic:	Level of effort regarding first nation energy efficiency		
Issue:	Additional detail required		

PREAMBLE TO IR (IF ANY):

Manitoba Hydro states that it "…is working with 54 first nation communities to implement energy efficiency measures…."

QUESTION:

Please indicate whether Hydro tracks First Nation participation in Neighbours Helping Neighbours. If yes, please provide First Nation participation rates for the last three years.

RATIONALE FOR QUESTION:

These data are necessary to assess the level of engagement that Manitoba Hydro is pursuing with first nation communities. The request can be distinguished from MMF and GAC IRs given its specific First Nations focus.

RESPONSE:

The Neighbours Helping Neighbours Program is available for all Manitobans including First Nation customers. The Salvation Army administers the Neighbours Helping Neighbours Program and does not track First Nation participation for those receiving NHN asssistance.

Section:	Appendix 8.1	**Page No.:**	33
Topic:	Affordable Energy Program		
Subtopic:	Customer arrears		
Issue:	Programs to assist customers in arrears		

PREAMBLE TO IR (IF ANY):

The Affordable Energy Fund, and the Affordable Energy Program, are designed to encourage "…energy efficiency and conservation through programs and services for rural and northern Manitobans, low income customers and seniors…." This question should be read with GAC/Hydro 1-41 through 1-49. It has a specific First Nation focus.

QUESTION:

Provide historical data on bill payment issues for each of the past three years, including:

a) What fraction of residential customers are in arrears on their bills?

RATIONALE FOR QUESTION:

Information on customer arrears and the extent to which the Affordable Energy Programs are available to customers who are challenged in meeting their utility bill payments is important in assessing the success of the programs. The IR can be distinguished from GAC 1-41 – 1-49 given its distinct First Nations focus.

RESPONSE:

Please refer to Manitoba Hydro's response to MMF/MH-I-45m.

Section:	Appendix 8.1	**Page No.:**	33
Topic:	Affordable Energy Program		
Subtopic:	Customer arrears		
Issue:	Programs to assist customers in arrears		

PREAMBLE TO IR (IF ANY):

The Affordable Energy Fund, and the Affordable Energy Program, are designed to encourage "…energy efficiency and conservation through programs and services for rural and northern Manitobans, low income customers and seniors…." This question should be read with GAC/Hydro 1-41 through 1-49. It has a specific First Nation focus.

QUESTION:

Provide historical data on bill payment issues for each of the past three years, including:

b) What fraction are in arrears more than 90 days?

RATIONALE FOR QUESTION:

Information on customer arrears and the extent to which the Affordable Energy Programs are available to customers who are challenged in meeting their utility bill payments is important in assessing the success of the programs. The IR can be distinguished from GAC 1-41 – 1-49 given its distinct First Nations focus.

RESPONSE:

Please see the tables below.

Residential Customers in 90+ Day Arrears as a Percentage of Residential Customers			
Month	**2012**	**2013**	**2014**
January	n/a	2.69%	2.51%
February	2.75%	2.93%	2.74%
March	2.61%	3.05%	2.94%
April	2.74%	2.98%	3.05%
May	2.52%	2.81%	2.81%
June	2.57%	2.75%	2.69%
July	2.62%	2.70%	2.63%
August	2.45%	2.60%	2.63%
September	2.54%	2.51%	2.54%
October	2.40%	2.13%	2.16%
November	2.36%	2.11%	2.32%
December	2.82%	2.47%	2.55%

First Nation Residential Customers in 90+ Day Arrears as a Percentage of Residential Customers			
Month	**2012**	**2013**	**2014**
January	n/a	0.74%	0.70%
February	0.74%	0.80%	0.74%
March	0.79%	0.89%	0.79%
April	0.85%	0.90%	0.80%
May	0.80%	0.95%	0.78%
June	0.79%	0.98%	0.69%
July	0.83%	0.95%	0.68%
August	0.84%	0.99%	0.65%
September	0.85%	0.88%	0.57%
October	0.78%	0.73%	0.49%
November	0.76%	0.70%	0.51%
December	0.83%	0.72%	0.56%

Section:	Appendix 8.1	**Page No.:**	33
Topic:	Affordable Energy Program		
Subtopic:	Customer arrears		
Issue:	Programs to assist customers in arrears		

PREAMBLE TO IR (IF ANY):

The Affordable Energy Fund, and the Affordable Energy Program, are designed to encourage "…energy efficiency and conservation through programs and services for rural and northern Manitobans, low income customers and seniors…." This question should be read with GAC/Hydro 1-41 through 1-49. It has a specific First Nation focus.

QUESTION:

Provide historical data on bill payment issues for each of the past three years, including:

c) What demographic information, if any, does Manitoba Hydro collect on customers who are in arrears? What insight can Manitoba Hydro provide into the magnitude of the arrears issue in Northern First Nations or all First Nations?

RATIONALE FOR QUESTION:

Information on customer arrears and the extent to which the Affordable Energy Programs are available to customers who are challenged in meeting their utility bill payments is important in assessing the success of the programs. The IR can be distinguished from GAC 1-41 – 1-49 given its distinct First Nations focus.

RESPONSE:

Manitoba Hydro does not collect demographic information on customers in arrears. See Manitoba Hydro's response to MMF/MH-I-45m which provides insight into the magnitude of arrears among all First Nation customers and Manitoba Hydro's response to MKO/MH-I-3a-h which provides insight into the size of areas in First Nations located in the North.

Section:	Appendix 8.1	**Page No.:**	33
Topic:	Affordable Energy Program		
Subtopic:	Customer arrears		
Issue:	Programs to assist customers in arrears		

PREAMBLE TO IR (IF ANY):

The Affordable Energy Fund, and the Affordable Energy Program, are designed to encourage "…energy efficiency and conservation through programs and services for rural and northern Manitobans, low income customers and seniors…." This question should be read with GAC/Hydro 1-41 through 1-49. It has a specific First Nation focus.

QUESTION:

Provide historical data on bill payment issues for each of the past three years, including:

d) What is the annual magnitude of the utility's credit and collection costs?

RATIONALE FOR QUESTION:

Information on customer arrears and the extent to which the Affordable Energy Programs are available to customers who are challenged in meeting their utility bill payments is important in assessing the success of the programs. The IR can be distinguished from GAC 1-41 – 1-49 given its distinct First Nations focus.

RESPONSE:

Residential collection activities are part of the services provided by several Divisions at Manitoba Hydro including Business Support Services, Consumer Marketing & Sales, Customer Service Operations (South), and Customer Service Operations (Winnipeg & North).

Electric Credit and Collection Costs ($1000s)

	2012	2013	2014
Collection Expenses *	266	195	259
Labour	8,518	6,395	5,082
Overhead	1,448	1,599	1,271
Total Collection Costs*	**10,232**	**8,188**	**6,612**

*Collection Expenses exclude Bad Debt Expense

Section:	Appendix 8.1	**Page No.:**	33
Topic:	Affordable Energy Program		
Subtopic:	Customer arrears		
Issue:	Programs to assist customers in arrears		

PREAMBLE TO IR (IF ANY):

The Affordable Energy Fund, and the Affordable Energy Program, are designed to encourage "…energy efficiency and conservation through programs and services for rural and northern Manitobans, low income customers and seniors…." This question should be read with GAC/Hydro 1-41 through 1-49. It has a specific First Nation focus.

QUESTION:

Provide historical data on bill payment issues for each of the past three years, including:

e) What is Manitoba Hydro's arrears policy?

i. Does Manitoba Hydro have any programs to help customers who are in arrears get up to date?
ii. At what point, and under what circumstances, does Manitoba Hydro shut off power to customers in arrears?

RATIONALE FOR QUESTION:

Information on customer arrears and the extent to which the Affordable Energy Programs are available to customers who are challenged in meeting their utility bill payments is important in assessing the success of the programs. The IR can be distinguished from GAC 1-41 – 1-49 given its distinct First Nations focus.

RESPONSE:

i. Please refer to Manitoba Hydro's response to GAC/MH-I-50 for Manitoba Hydro's arrears policy.

Please refer to Manitoba Hydro's response to MMF/MH-I-34 and GAC/MH-I-42 for a discussion on the programs and initiatives Manitoba Hydro has in place to reduce the number of residential disconnections for nonpayment.

ii. Please refer to Manitoba Hydro's response to GAC/MH-I-3 outlining the process followed assuming an energy bill is issued and no payment or payment arrangement is made throughout the entire process.

Section:	Appendix 8.1	**Page No.:**	33
Topic:	Affordable Energy Program		
Subtopic:	Customer arrears		
Issue:	Programs to assist customers in arrears		

PREAMBLE TO IR (IF ANY):

The Affordable Energy Fund, and the Affordable Energy Program, are designed to encourage "…energy efficiency and conservation through programs and services for rural and northern Manitobans, low income customers and seniors…." This question should be read with GAC/Hydro 1-41 through 1-49. It has a specific First Nation focus.

QUESTION:

Provide historical data on bill payment issues for each of the past three years, including:

f) Does Manitoba Hydro permit customers in arrears to participate in energy efficiency programs. If not, why not?

RATIONALE FOR QUESTION:

Information on customer arrears and the extent to which the Affordable Energy Programs are available to customers who are challenged in meeting their utility bill payments is important in assessing the success of the programs. The IR can be distinguished from GAC 1-41 – 1-49 given its distinct First Nations focus.

RESPONSE:

DSM is a key component of Manitoba Hydro's overall strategy in assisting customers with managing their energy bills, minimizing arrears and bad debt, lowering the number of disconnects and other business activities such as meeting the future energy demands of the province at the lowest cost. All Manitoba Hydro customers, including those in arrears, are eligible to participate in Manitoba Hydro's incentive-based Power Smart programs, such as

the Water & Energy Saver, Home Insulation, Residential LED lighting, Refrigerator Retirement, and Affordable Energy Programs.

For financing programs, such as the Power Smart Pay-As-You-Save (PAYS) Financing, Power Smart Residential Loan or Residential Earth Energy Loan, customers are required to be in good standing. These programs offer loans which require payment of an additional sum of money over and above the customer's energy bill. The rationale for limitations placed on participation in financing initiatives where additional debt is incurred is consistent with good business practices associated with providing financing to customers.

Section:	Appendix 8.1	**Page No.:**	33
Topic:	Affordable Energy Program		
Subtopic:	Customer arrears		
Issue:	Programs to assist customers in arrears		

PREAMBLE TO IR (IF ANY):

The Affordable Energy Fund, and the Affordable Energy Program, are designed to encourage "…energy efficiency and conservation through programs and services for rural and northern Manitobans, low income customers and seniors…." This question should be read with GAC/Hydro 1-41 through 1-49. It has a specific First Nation focus.

QUESTION:

Provide historical data on bill payment issues for each of the past three years, including:

g) Does Manitoba Hydro target any energy efficiency programs to customers in arrears? If not, why not?

RATIONALE FOR QUESTION:

Information on customer arrears and the extent to which the Affordable Energy Programs are available to customers who are challenged in meeting their utility bill payments is important in assessing the success of the programs. The IR can be distinguished from GAC 1-41 – 1-49 given its distinct First Nations focus.

RESPONSE:

Customers in arrears are considered a key target market for Manitoba Hydro's Affordable Energy Program. The Program targets customers both directly through marketing efforts and indirectly through the Corporation's Credit & Recovery Services and other generic opportunities which may provide marketing leads.

On the direct marketing front, the Affordable Energy Program utilizes an auto dialer call campaign which specifically calls customers who are in arrears. The purpose of this campaign is to contact, inform and encourage customers to participate in the Affordable Energy Program. The Affordable Energy Program also targets customers receiving Neighours Helping Neighbours assistance by following up with those who have received assistance to encourage participation.

Customers who are in contact with Credit & Recovery Services are advised of the Neighbours Helping Neighbours Program, general Power Smart programs and the Affordable Energy Program. An Affordable Energy package of information is sent to customers who may qualify. The Corporation also pursues numerous other leads to encourage customers to participate in the Affordable Energy Program (e.g. recently a customer sent an email to Manitoba Hydro's President regarding an arrears concern and within 24 hours, a member of the Affordable Energy team contacted the customer and her landlord for participation in the program).

Section:	Appendix 8.1	**Page No.:**	33
Topic:	Affordable Energy Program		
Subtopic:	Customer arrears		
Issue:	Programs to assist customers in arrears		

PREAMBLE TO IR (IF ANY):

The Affordable Energy Fund, and the Affordable Energy Program, are designed to encourage "…energy efficiency and conservation through programs and services for rural and northern Manitobans, low income customers and seniors…." This question should be read with GAC/Hydro 1-41 through 1-49. It has a specific First Nation focus.

QUESTION:

Provide historical data on bill payment issues for each of the past three years, including:

h) Given the identified magnitude of the arrears problem in Northern First Nations, what new programs does Hydro propose with regard to addressing arrears and making energy efficiency programming accessible.

RATIONALE FOR QUESTION:

Information on customer arrears and the extent to which the Affordable Energy Programs are available to customers who are challenged in meeting their utility bill payments is important in assessing the success of the programs. The IR can be distinguished from GAC 1-41 – 1-49 given its distinct First Nations focus.

RESPONSE:

The First Nations Power Smart Program, offered under the Affordable Energy Program, has and continues to work directly with First Nation Communities to make energy efficiency upgrades regardless of arrears. Qualifying homes receive free insulation and free basic energy savings measures such as energy efficient lighting, showerheads, faucet aerators, window kits and draft stoppers. The work associated with installing these measures is

achieved by employing local members of the community. All First Nation Communities are eligible for these upgrades with progress in each community primarily dependent on each community's priorities and timelines.

Section:	Appendix 8.1, section 1.3	**Page No.:**	9
Topic:	Affordable Energy Program		
Subtopic:	Proposed participation details 2014/15-2028/29		
Issue:	Multi-residential participation		

PREAMBLE TO IR (IF ANY):

Manitoba Hydro projects 24,025 cumulative retrofits for the Affordable Energy Program for the period 2014/15-2028/29.

QUESTION:

Describe any program efforts within the Affordable Energy Program to provide energy efficiency services to multi-unit residential housing.

RATIONALE FOR QUESTION:

These data are necessary to assess the level of engagement that Manitoba Hydro is pursuing with lower income customers.

RESPONSE:

The Affordable Energy Program targets lower income customers who occupy single detached and multi attached homes including townhouses, row houses, and tri and four-plex houses along with mobile homes on a permanent foundation. Lower income tenants living in multi-unit residential housing have limited economic energy efficient opportunities.

All customers, including lower income tenants living in multi-unit residential housing, are eligible to participate in the residential LED Lighting Program. Manitoba Hydro is exploring options where some LED lighting could be provided in an economic manner to lower income tenants living in multi-unit residential housing.

Benefiting all tenants, property managers can access the entire suite of commercial Power Smart programs which includes but is not limited to incentive programs for: insulation;

windows; heating, ventilation and air conditioning; and common area lighting. Multi-unit residential properties are also eligible for the free direct installation of low flow kitchen and bathroom faucet aerators and showerheads under the Water & Energy Saver Program. To ensure multi-unit residential housing property managers are taking full advantage of the suite of commercial Power Smart programs, Manitoba Hydro has fostered a long-term relationship with the Professional Property Managers Association of Manitoba to provide targeted promotion of program offerings and services. Power Smart sales representatives service this sector offering face-to-face meetings with property managers, conducting walkthroughs of properties to help identify energy savings opportunities, as well as providing assistance throughout the entire process including program application submission to final incentive payout.

Section:	Appendix 8.1, section 1.3	**Page No.:**	9
Topic:	Affordable Energy Program		
Subtopic:	Proposed participation details 2014/15-2028/29		
Issue:	Multi-residential participation		

PREAMBLE TO IR (IF ANY):

Manitoba Hydro projects 24,025 cumulative retrofits for the Affordable Energy Program for the period 2014/15-2028/29.

QUESTION:

How many of the 24,025 cumulative retrofits, by year, will be for multi-residential units?

RATIONALE FOR QUESTION:

These data are necessary to assess the level of engagement that Manitoba Hydro is pursuing with lower income customers.

RESPONSE:

Manitoba Hydro's Affordable Energy Program does not have cumulative retrofit projections for multi-residential units. As indicated in Manitoba Hydro's response to MKO-COALITION/MH-I-3a, Manitoba Hydro is exploring opportunities for multi-residential units.

Section:	Appendix 8.1, section 1.3	**Page No.:**	9
Topic:	Affordable Energy Program		
Subtopic:	Proposed participation details 2014/15-2028/29		
Issue:	Multi-residential participation		

PREAMBLE TO IR (IF ANY):

Manitoba Hydro projects 24,025 cumulative retrofits for the Affordable Energy Program for the period 2014/15-2028/29.

QUESTION:

Provide the expected savings, by year, for multi-residential units within the Affordable Energy Program.

RATIONALE FOR QUESTION:

These data are necessary to assess the level of engagement that Manitoba Hydro is pursuing with lower income customers.

RESPONSE:

Manitoba Hydro's Affordable Energy Program does not have projections for expected savings for multi-residential units. As indicated in Manitoba Hydro's response to MKO-COALITION/MH-I-3a, Manitoba Hydro is exploring opportunities for multi-residential units under the Affordable Energy Program.

Section:	Tab 8	**Page No.:**	1
Topic:	2013-2014 Power Smart Results		
Subtopic:	2013-2014 Power Smart Annual Review		
Issue:	Detailed 2013/14 results were not provided		

PREAMBLE TO IR (IF ANY):

QUESTION (Revised):

Please provide the 2013-2014 Power Smart Annual Review once it is finalized.

RATIONALE FOR QUESTION:

These data are necessary to conduct analyses of Power Smart progress, and to review trends between historic reported performance and projected future performance.

RESPONSE:

The 2013/14 Power Smart Annual Review is not yet finalized. The report will be filed with the PUB once it is finalized and has gone through the required approval process.

Section:	Tab 8	**Page No.:**	8
Topic:	Cumulative energy savings		
Subtopic:	Measure expiration		
Issue:	Treatment of measures that reach end of life		

PREAMBLE TO IR (IF ANY):

In Figure 8.1, Manitoba Hydro presents a graphical representation of the electric energy savings from the Power Smart portfolio. It is not clear from the illustration how Manitoba Hydro accounts for savings from measures that reach the end of their in-service lives during the time period that is represented.

QUESTION:

Do the cumulative savings data shown in Figure 8.1 account for the expiration of savings due to measures reaching the end of their in-service lives within the represented time frame?

RATIONALE FOR QUESTION:

It is not clear from the data and explanations provided whether Manitoba Hydro is simply adding annual incremental savings for each year in Figure 8.1 and in other graphs, or properly accounting for measure expiration. Failing to account for measure expiration would overstate the benefits of the portfolio.

RESPONSE:

Figure 8.1 does not account for the expiration of savings due to measures reaching the end of their measure lives. The figure assumes that all measures (except measures under the Fridge Retirement Program) are reinstalled at the end of their measure lives. Recognizing the reinstallation of measures provides a more accurate representation of impacts on future domestic load.

Although reinstallation is assumed when looking at the persistence of energy savings, it should be noted that calculations of program cost-effectiveness do not assume the savings

associated with a full level of reinstallation of measures. Including full reinstallation would artificially inflate the benefits of DSM programs and the resulting economic metrics.

Section:	Tab 8	**Page No.:**	8
Topic:	Cumulative energy savings		
Subtopic:	Measure expiration		
Issue:	Treatment of measures that reach end of life		

PREAMBLE TO IR (IF ANY):

In Figure 8.1, Manitoba Hydro presents a graphical representation of the electric energy savings from the Power Smart portfolio. It is not clear from the illustration how Manitoba Hydro accounts for savings from measures that reach the end of their in-service lives during the time period that is represented.

QUESTION:

If the answer to question 1) above is no, provide a revised graph that does account for measure expiration.

RATIONALE FOR QUESTION:

RESPONSE:

The request posed would require a complete recreation of the graph in order to remove the reinstallation of measure. This would require and extensive amount of time and work and which would not be completed within the time allowed to respond to both rounds of information requests. Please see the response to MKO/COALITION-I-5a which discusses the assumption associated with Figure 8.1.

Section:	Tab 8	**Page No.:**	8
Topic:	Annual incremental energy savings		
Subtopic:	Detailed program level performance data		
Issue:	Historic data are not provided in detail		

PREAMBLE TO IR (IF ANY):

QUESTION:

Provide, by program, by year, preferably in Excel format, the following historical data for each of the past five years of Power Smart implementation as well as for the current year to date:

a. Number of participants;
b. Total number of measures installed, by measure type;
c. Total program annual incremental savings claimed, by measure type;
d. Average number of measures installed per participant, by measure type;
e. Weighted average measure life, per program;
f. Average annual incremental savings per participant;
g. Annual program budget, both total and by category, including incentives, utility administration, marketing, evaluation, etc.;
i. Provide definitions explaining the costs that are included in each category;
h. Average total project cost per participant;
i. Average utility administrative cost per participant;
j. Average incentive per participant;
k. Provide, by program, by year, preferably in Excel format, the same data sets as described above, but for each future year of Power Smart implementation, from test year 2014/15 through 2028/29.

RATIONALE FOR QUESTION:

Detailed program level data are necessary in order to perform analyses of Manitoba Hydro's proposed energy efficiency performance in the test years and through 2028/29.

RESPONSE:

As per PUB Order 33/15, no response is required for this Information Request.

Section:	Appendix 8.1	**Page No.:**	18
Topic:	Savings from Codes and Standards		
Subtopic:	Calculation of savings		
Issue:	Savings calculation methodology		

PREAMBLE TO IR (IF ANY):

Manitoba Hydro expects to achieve significant savings through codes and standards efforts.

QUESTION:

For each codes and standards category, provide a detailed methodology explaining how the savings anticipated by Manitoba Hydro are calculated.

RATIONALE FOR QUESTION:

The appropriateness of program administrator claimed savings for codes and standards activities is an emerging area in North American energy efficiency program regulation. Given that there is not yet an industry standard approach in this area, it is important to know the assumptions behind Manitoba Hydro's savings methodology and to understand the magnitude of savings derived from each initiative.

RESPONSE:

As per PUB Order 33/15, no response is required for this Information Request.

Section:	Appendix 8.1	**Page No.:**	18
Topic:	Savings from Codes and Standards		
Subtopic:	Calculation of savings		
Issue:	Savings calculation methodology		

PREAMBLE TO IR (IF ANY):

Manitoba Hydro expects to achieve significant savings through codes and standards efforts.

QUESTION:

Are Manitoba Hydro's expected savings from codes and standards equal to the full value of the savings that are estimated to accrue for all of its customers due to these enhanced codes and standards?

RATIONALE FOR QUESTION:

The appropriateness of program administrator claimed savings for codes and standards activities is an emerging area in North American energy efficiency program regulation. Given that there is not yet an industry standard approach in this area, it is important to know the assumptions behind Manitoba Hydro's savings methodology and to understand the magnitude of savings derived from each initiative.

RESPONSE:

As per PUB Order 33/15, no response is required for this Information Request.

Section:	Appendix 8.1	**Page No.:**	18
Topic:	Savings from Codes and Standards		
Subtopic:	Calculation of savings		
Issue:	Savings calculation methodology		

PREAMBLE TO IR (IF ANY):

Manitoba Hydro expects to achieve significant savings through codes and standards efforts.

QUESTION:

Provide the annual incremental savings by year for each codes and standards initiative for which savings are anticipated to be claimed for test years 2014/15-2028/29, preferably in Excel format.

RATIONALE FOR QUESTION:

The appropriateness of program administrator claimed savings for codes and standards activities is an emerging area in North American energy efficiency program regulation. Given that there is not yet an industry standard approach in this area, it is important to know the assumptions behind Manitoba Hydro's savings methodology and to understand the magnitude of savings derived from each initiative.

RESPONSE:

Pursuant to PUB Order 33/15, no response is required to this Information Request.

Section:	Appendix 8.1	**Page No.:**	18
Topic:	Savings from Codes and Standards		
Subtopic:	Calculation of savings		
Issue:	Savings calculation methodology		

PREAMBLE TO IR (IF ANY):

Manitoba Hydro expects to achieve significant savings through codes and standards efforts.

QUESTION:

Manitoba Hydro references offsetting 66% of the estimated electric load through its programs. What fraction of that 66% is expected to come from codes and standards savings?

RATIONALE FOR QUESTION:

The appropriateness of program administrator claimed savings for codes and standards activities is an emerging area in North American energy efficiency program regulation. Given that there is not yet an industry standard approach in this area, it is important to know the assumptions behind Manitoba Hydro's savings methodology and to understand the magnitude of savings derived from each initiative.

RESPONSE:

As per PUB Order 33/15, no response is required for this Information Request.

Section:	Appendix 8.1	**Page No.:**	i
Topic:	Cost-effectiveness		
Subtopic:	Estimated electric savings		
Issue:	Sufficiency of proposed savings		

PREAMBLE TO IR (IF ANY):

Manitoba Hydro reports that the electric portfolio has a TRC of 2.2, which would suggest that ample cost-effective savings in addition to those proposed are available.

QUESTION:

Provide, in detail, the methodology of all tests used to determine cost-effectiveness of energy efficiency opportunities for the proposed 2014/15-2028/29 programs.

RATIONALE FOR QUESTION:

Additional cost-effective opportunities could reduce consumer bills and defer growth-based infrastructure improvements, potentially at a much lower cost to ratepayers.

RESPONSE:

Pursuant to PUB Order 33/15, no response is required to this Information Request.

Section:	Appendix 8.1	**Page No.:**	i
Topic:	Cost-effectiveness		
Subtopic:	Estimated electric savings		
Issue:	Sufficiency of proposed savings		

PREAMBLE TO IR (IF ANY):

Manitoba Hydro reports that the electric portfolio has a TRC of 2.2, which would suggest that ample cost-effective savings in addition to those proposed are available.

QUESTION:

Provide the assumptions and values used for each test, and if not the same for each test indicate which assumptions are used in each, including:

i. Avoided costs by year (indicate whether they are in real or nominal dollars)
   1. avoided energy costs (by year)
   2. avoided capacity costs (by year)
   3. avoided transmission and distribution system costs (by year)
   4. non-energy benefits adders (if used)
   5. price suppression effects (by year – if used)
   6. risk mitigating benefits of efficiency
   7. energy line loss factor (please explain if Ameren assumed an average line loss or a marginal line loss factor)
   8. peak line loss factor (please explain if Ameren assumed an average line loss or a marginal line loss factor at peak)
   9. avoided carbon emissions
   10. other avoided environmental compliance costs

ii. The discount rate used (indicate whether it is in real or nominal dollars)

iii. Assumed inflation rate

RATIONALE FOR QUESTION:

Additional cost-effective opportunities could reduce consumer bills and defer growth-based infrastructure improvements, potentially at a much lower cost to ratepayers.

RESPONSE:

Pursuant to PUB Order 33/15, no response is required to this Information Request.

Section:	Appendix 8.1	**Page No.:**	i
Topic:	Cost-effectiveness		
Subtopic:	Estimated electric savings		
Issue:	Sufficiency of proposed savings		

PREAMBLE TO IR (IF ANY):

Manitoba Hydro reports that the electric portfolio has a TRC of 2.2, which would suggest that ample cost-effective savings in addition to those proposed are available.

QUESTION:

Provide, in an Excel file, the following inputs used by Manitoba Hydro for cost-effectiveness screening of its 2014/15-2028/29 programs:

i. For each measure or measure bundle in each program:

ii. Average per unit kWh savings
   1. Average per unit peak kW savings
   2. Average per unit savings of gas and/or other fuels
   3. Any other per unit savings assumptions (e.g. water savings)
   4. Average per unit measure costs
   5. Average measure life
   6. Number of participants by year
   7. Net-to-gross assumptions
   8. Any other assumptions used in screening

iii. For each program:
   a) Total non-incentive costs

RATIONALE FOR QUESTION:

Additional cost-effective opportunities could reduce consumer bills and defer growth-based infrastructure improvements, potentially at a much lower cost to ratepayers.

RESPONSE:

Pursuant to PUB Order 33/15, no response is required to this Information Request.

Section:	Appendix 8.1	**Page No.:**	i
Topic:	Cost-effectiveness		
Subtopic:	Estimated electric savings		
Issue:	Sufficiency of proposed savings		

PREAMBLE TO IR (IF ANY):

Manitoba Hydro reports that the electric portfolio has a TRC of 2.2, which would suggest that ample cost-effective savings in addition to those proposed are available.

QUESTION:

Explain the level at which testing is done (portfolio, sector, program, or measure)

RATIONALE FOR QUESTION:

Additional cost-effective opportunities could reduce consumer bills and defer growth-based infrastructure improvements, potentially at a much lower cost to ratepayers.

RESPONSE:

Pursuant to PUB Order 33/15, no response is required to this Information Request.

Section:	Appendix 8.1	**Page No.:**	i
Topic:	Cost-effectiveness		
Subtopic:	Estimated electric savings		
Issue:	Sufficiency of proposed savings		

PREAMBLE TO IR (IF ANY):

Explain the level at which testing is done (portfolio, sector, program, or measure)

QUESTION:

If more than one test is used to determine cost-effectiveness, how are the results of the different tests compared and used to determine whether a program or portfolio meets the cost-effectiveness requirements?

RATIONALE FOR QUESTION:

Additional cost-effective opportunities could reduce consumer bills and defer growth-based infrastructure improvements, potentially at a much lower cost to ratepayers.

RESPONSE:

Pursuant to PUB Order 33/15, no response is required to this Information Request.

Section:	Appendix 8.1	**Page No.:**	i
Topic:	Cost-effectiveness		
Subtopic:	Estimated electric savings		
Issue:	Sufficiency of proposed savings		

PREAMBLE TO IR (IF ANY):

If more than one test is used to determine cost-effectiveness, how are the results of the different tests compared and used to determine whether a program or portfolio meets the cost-effectiveness requirements?

QUESTION:

Explain, in detail, the process by which Manitoba Hydro determined not to pursue additional cost-effective savings for its customers for the 2014/15-2028/29 time frame?

RATIONALE FOR QUESTION:

Additional cost-effective opportunities could reduce consumer bills and defer growth-based infrastructure improvements, potentially at a much lower cost to ratepayers.

RESPONSE:

Pursuant to PUB Order 33/15, no response is required to this Information Request.

Section:		**Page No.:**	
Topic:	Power Smart Programs		
Subtopic:	Evaluation reports		
Issue:	Access to evaluation reports		

PREAMBLE TO IR (IF ANY):

As program administrators seek to improve program performance they may conduct both internal evaluations of programs and/or contract with independent evaluators to conduct formal process and impact evaluations. These reports may provide useful information in determining the extent to which programs are maximizing their benefits to ratepayers.

QUESTION:

Provide all internal or third-party evaluation reports that have been conducted of any of the Power Smart Programs over the past five years, especially where those reports focus on the Affordable Energy Program.

RATIONALE FOR QUESTION:

Evaluation reports can provide important data regarding the success of programs and of the opportunities for improvement. These reports can help determine the appropriateness of Manitoba Hydro's proposed Power Smart programs. The question has a broader focus than GAC 1-35 in that it includes more than AEF question and seeks external as well as internal evaluations.

RESPONSE:

Internal program evaluations are performed on an annual basis at the end of each fiscal year with the results aggregated and reported in the Power Smart Annual Review. The latest evaluated results are provided in Appendix 8.2.

An internal Affordable Energy Program (AEP) Process Review was completed in 2014. See the response to GAC/MH-I-55d.

A third-party review of the Affordable Energy Program was completed in 2015. A copy of the report is attached.

Manitoba Hydro has engaged external firms to conduct impact evaluations of three additional DSM programs covering each customer sector as follows:

- Residential - Home Insulation Program;
- Commercial - Building Envelope Program; and
- Industrial – Performance Optimization Program.

Work on the three evaluations is underway with final reports expected to be recived over the next few months.

External Review of the Affordable Energy Program

PREPARED BY:
DUNSKY ENERGY CONSULTING

SUMMERHILL GROUP

Submitted to:
Cheryl Pilek, Manager, Power Smart Planning, Evaluation & Research
Colleen Galbraith, Program Manager, Affordable Energy Unit

Manitoba Hydro

March 3rd, 2015 – **FINAL REPORT**

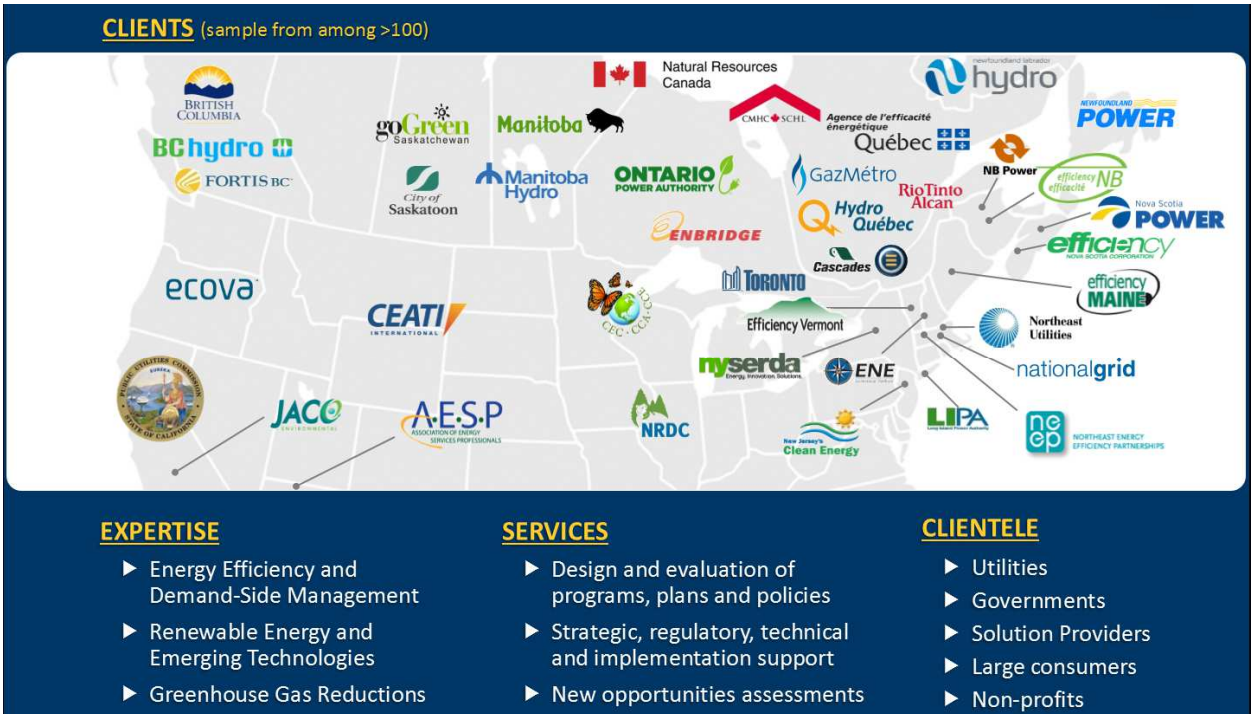
dunsky ENERGY CONSULTING

Summerhill

50 Ste-Catherine St. West, suite 420, Montreal, Québec, Canada H2X 3V4 | T. 514.504.9030 | F. 514.289.2665 | info@dunsky.ca
www.dunsky.ca

ABOUT **DUNSKY ENERGY CONSULTING**

Dunsky Energy Consulting is specialized in the design, analysis, implementation and evaluation of energy efficiency and renewable energy programs and policies. Our clients include leading utilities, government agencies, private firms and non-profit organizations throughout North America.



To learn more, please visit us at www.dunsky.ca.

ABOUT **SUMMERHILL**

Summerhill designs and implements energy efficiency programs and engagement strategies for utilities, retailers, property management groups, corporations and industry associations. We specialize in interacting with participants using innovative approaches that achieve measurable results. Our goal is to bring enthusiasm, insight, and innovation to help our clients engage their customers in order to build stronger relationships and encourage better choices.

For over 15 years, Summerhill's service offerings have included:

- Design and implementation of customized mass-market consumer facing environmental programs
- Creation and delivery of employee engagement, stakeholder engagement and environmental education programs
- Product, industry and customer trends research enabling informed decisions
- Content development of environmental and sustainability marketing materials
- Strategic consulting & development integrating business and sustainability

We are based in Toronto, with offices in Regina, Halifax, and Washington, D.C., employing over 50 full-time staff and more than 800 part-time ambassadors that support our program delivery across Canada.

See www.summerhill.com for more.

ACKNOWLEDGEMENTS

In preparing this report, the Dunsky Team benefitted from the extensive collaboration, insights and experience of Cheryl Pilek and Colleen Galbraith, of Manitoba Hydro, as well as their colleagues and staff.

The project manager, Martin Poirier, would also like to thank Megan Bennett and Lenard Hart of Summerhill, as well as François Boulanger and Mariangiola Fabbri of Dunsky Energy Consulting, for their participation to this project. We are also thankful for the insights gained from our discussions with the staff and representatives of BC Hydro, Action for Boston Community Development (ABCD), Efficiency Maine, the Maine Housing Authority, NYSERDA, the Saskatchewan Housing Corporation, as well as from our interviews with AEP's stakeholders and program participants.

TABLE OF CONTENTS

1. INTRODUCTION

1.1 PROJECT SCOPE

The scope of this study is to review the program design of the Affordable Energy Program (AEP), to examine lessons that can be learned from best practices and leading programs in North America, to identify opportunities for program improvement, and to advise on the framework and methodologies for both impact evaluations and cost-effectiveness analysis.

This program review focused on two levels of assessment: (1) a high-level, strategic review, and (2) a more detailed, process-related analysis. It covered the following topics: flow of program processes and program delivery channels, marketing and expectations of participation levels, accessing lower income customers in rental properties, incentive levels including customer co-payment levels, hurdle rates used in assessing measures and cost-effectiveness.

1.2 METHODOLOGY

The project's activities consisted of a jurisdictional scan, to learn from other low income program's experience in the U.S. and In Canada, followed by the review of the AEP itself. The review team also examined closely Manitoba Hydro's cost-effectiveness framework and impact evaluation methodology for this program. Our methodology for each these project activities is described in the following sub-sections.

1.2.1 METHODOLOGY - JURISDICTIONAL SCAN

Considering the large number and variety of low income programs available in Canada and the U.S. and in order to provide Manitoba Hydro with a meaningful review, programs were chosen according to the following criteria:

- **General**:
  - Balanced representation Canada – USA
  - Program's availability to owners and tenants
  - Type of building (e.g. social housing, multifamily)

- **Best-in-Class**:
  - Innovative programs
  - Participation and savings (expected or achieved)
  - Programs have been previously identified as champions (e.g. ACEEE)

- **Similarities with Manitoba**:
  - Fuel mix
  - Winter peak regions
  - Programs include reserve/aboriginal communities
  - State ownership.

The following ten programs, in eight jurisdictions (three in Canada and five in the U.S.), were selected and reviewed:

- Energy Saving Kit (British Columbia)
- Energy Conservation Assistance Program (British Columbia)
- PG&E Assistance Programs (California)
- Home Energy Assessment (Massachusetts)
- Low Income Multifamily Energy Retrofits (Massachusetts)
- Low Income (Home) Energy Assistance Program (Maine)
- NHSAVES@Home with Home Energy Assistance (New Hampshire)
- EmPower for Residents (New York)
- Save-ON-Energy HOME ASSISTANCE Program (Ontario)
- Home Energy Improvement Program (Saskatchewan)

For each program reviewed in this project, our research team used several data collection methods, including a literature review, a review of programs' documentation and website, requests for information (through e-mail and phone), and phone interviews with program representatives. For each program, information was gathered and organized around seven key program elements: program process and delivery models, marketing strategies, participation levels, rental properties, payment of measures costs, hurdle rates and cost-effectiveness.

Detailed info on each program and jurisdiction is presented in Appendix A, and the list of all interviews conducted in Appendix B.

1.2.2 METHODOLOGY - AEP PROGRAM REVIEW

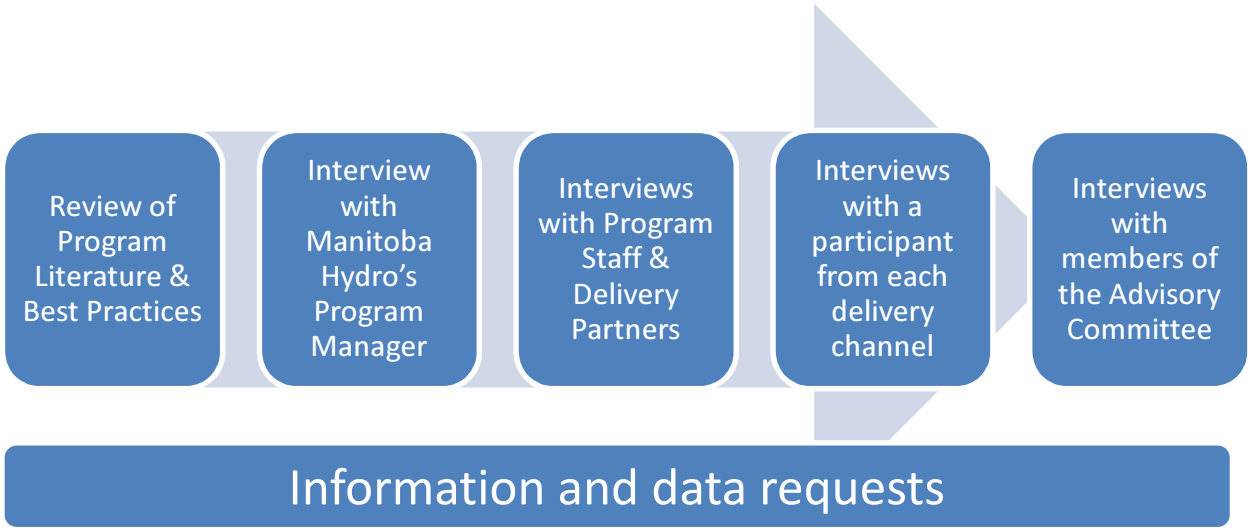
The Dunsky and Summerhill team reviewed and analysed the current AEP documentation, and conducted interviews and information requests with the program manager and program staff to gather all relevant information on the program.

Group leaders in the identified delivery channels were surveyed to identify any program barriers and opportunities they directly experienced or that were experienced by members of their group. In addition, surveys were conducted with past AEP participants to identify the factors that motivated them to participate and the channels they used to access the program.

As part of this analysis, the Dunsky Team examined specific program design parameters such as measures span, customer co-payments, and bill assistance initiatives.

Our early findings and recommendations were discussed and tested during an internal Dunsky – Summerhill brainstorming session. This session was also an opportunity to explore other program improvement opportunities. We finally sought inputs from AEP Advisory Committee members before presenting our findings to Manitoba Hydro.

Figure 1.1 – Review Process



1.2.3 METHODOLOGY - EVALUATION FRAMEWORK REVIEW

Our team reviewed the AEP evaluation plan, collected and analyzed AEP energy savings calculation spreadsheets (insulation, heating systems and combined measures), reviewed algorithms documented in the Evaluation Plan and the energy savings calculation spreadsheets, and requested and reviewed additional information on assumptions and data sources.

These program assumptions were compared with other programs' technical reference manuals, savings assumptions, and evaluation processes. Our review included the evaluation methodologies, savings assumptions, results reporting, and cost-effectiveness calculations. We devoted specific attention to

assessing the program's cost-effectiveness framework at a higher level, with a view to identifying opportunities to improve its accuracy and usefulness.

2. REVIEW OF LOW INCOME PROGRAM BEST PRACTICES

In order to provide Manitoba Hydro with an overview of current best practices for low income programs across North America, the research team selected and reviewed ten Low income programs in eight jurisdictions (three in Canada and five in the U.S.). For each program, information was gathered and organized around seven key program elements: program process and delivery models, marketing strategies, participation levels, rental properties, payment of measures costs, hurdle rates and cost-effectiveness.

In the section below we present common best practices, as well as the key learnings associated to each of the key program elements.

2.1 SELECTED PROGRAMS

After considering about 40 programs in 18 jurisdictions (8 Canadian Provinces and 10 U.S. States), the research team selected the ten programs listed in table 2.1 below.

Table 2.1 - List of Selected Programs

JURISDICTION	PROGRAM NAME
British Columbia	1. ENERGY SAVING KIT
	2. ENERGY CONSERVATION ASSISTANCE
California	3. ENERGY SAVINGS ASSISTANCE
Maine	4. MULTIFAMILY ELECTRIC HEAT AND LOW INCOME
Massachusetts	5. MASS SAVE INCOME ELIGIBLE PROGRAMS
	6. LOW INCOME MULTI-FAMILY ENERGY RETROFIT
New Hampshire	7. NHSAVE@HOME WITH HOME ENERGY ASSISTANCE
New York	8. NYSERDA EMPOWER
Ontario	9. OPA SAVE-ON-ENERGY HOME ASSISTANCE PROGRAM
Saskatchewan	10. HOME AND RENTAL REPAIR

Each selected jurisdiction is briefly presented below, while a more detailed description of the key program elements is available in appendix A.

2.1.1 BRITISH COLUMBIA

In 2007, the Provincial Government of British Columbia set out a plan to meet 50% of its future resource needs through energy conservation by 2020. Considering that 15-20% of its customers are designated low income, BC Hydro put in place two Power Smart programs specifically for low income households:

- Energy Saving Kits (ESK), launched in 2008, BC Hydro partnered with Fortis BC at the end of 2010. Custom kits were launched in 2014 to increase the amount of showerheads and window films distributed.
- Energy Conservation Assistance Program (ECAP), launched in 2010, BC Hydro partnered with Fortis starting in summer 2012, allowing a single application form per customer and the installation of the measures by a single contractor for both utilities at the same visit. While the program is offered province-wide, the service is limited in rural or remote areas (depending on accessibility and minimum participation levels)

Eligibility to these programs includes several factors like household income, account verification, and program funding.

2.1.2 CALIFORNIA

California presents a wide array of income-qualified energy assistance programs, providing discounts on electric and gas bills (CARE), special electric rates for limited-income households (FERA), no-cost weatherization services (ESAP) and administering the federal low income program (LIHAP[1])[2].

PG&E offers a portfolio of energy assistance programs to its customers[3], including CARE (California Alter Rate for Energy), FERA (Family Electric Rate Assistance), ESA (Energy Savings Assistance Program) and other financial assistance programs (LIHEAP and REACH[4]).

The Energy Savings Assistance Program is a “whole-house approach” program providing free energy education, weatherization measures and energy efficient appliances to reduce gas and electric usage. Almost one third of PG&E residential customers qualify for the ESA Program. Funded through a public purpose charge on customer utility bills, for the 2012-2014 cycle the program has a budget of

[1] Low Income Home Energy Assistance Program
[2] The list of all programs available can be found at http://www.cpuc.ca.gov/PUC/energy/Low+Income/
[3] The full list of assistance programs offered by PG&E can be found here: http://www.pge.com/en/myhome/saveenergymoney/financialassistance/index.page?
[4] Relief for Energy Assistance through Community Help

$469,207,675 and a home goal of 359,820 households. During the program cycle, PG&E aims at treating about 20% of 1.8 million low income customers[5].

2.1.3 MAINE

In Maine, several low income programs are administered by Maine Housing, the state's housing authority, including LIHEAP (assistance and emergency fuel), WAP (weatherization), Low Income Assistance Plan (LIAP) and Maine Housing's Central Heating Improvement Program (CHIP). Eligibility is based on the total household income (established by income eligibility guidelines or 60% of the state area median income, whichever is less). If eligible for LIHEAP, participants may also qualify for the other programs.

The Multifamily Electric Heat Low Income Program selected and reviewed for this report, is managed by Efficiency Maine, and focuses on a very specific market segment, the weatherization and installation of heat pumps for electric heated multifamily buildings. Efficiency Maine is also rolling out the same program for gas and one for single family homes and manages other low income programs, like the Food bank CFLs program.

2.1.4 MASSACHUSETTS

Massachusetts' local utilities and energy efficiency providers have joined with the Massachusetts Association for Community Action (MASSCAP) and Low income Energy Affordability Network (LEAN) to promote programs to qualifying low income households, targeting both single-family and multifamily households.

MASSAVE income-eligible programs for single-family households generally have multiple sources of funds, including the Federal government (the Department of Energy and the Department of Health & Human Services) and utilities across the state and are managed by the Department of Housing Community Development, with 23 regional non-profit and local government organizations. Together they form LEAN, and through LEAN, low income families may be eligible for a number of programs including[6]:

[5] "Providing Energy Savings Assistance to Low Income Customers" PowerPoint presentation for the Utility Energy Forum (2013)

[6] http://www.masssave.com/residential/home-energy-assessments/income-eligible-programs/income-eligible-programs

- Fuel Assistance: subsidies to reduce the price for energy services;
- Utility Discount Rates: discounted rates to lower energy bills[7]; and
- Payment Plans and/or Arrearage Management Programs: gas and electric utility providers work with customers to spread out payments on overdue portions of their bill. Many utility providers also offer an Arrearage Management Program, allowing past due balances over a certain amount to be forgiven if customers adhere to a structured payment plan.

The Low Income Multifamily Energy Retrofit Program (LIMF) is funded by the utilities and administered by LEAN. The program provides 100% incentives for comprehensive energy efficiency retrofits (both gas and electric) for multi-family residential units and post building assessment to identify opportunities. All applicants benchmark their energy usage in the first year using an online tool called "WEGOWise" (Water, Electricity, Gas, Oil) a utility tracking and energy benchmarking software.

2.1.5 NEW HAMPSHIRE

As part of the Restructuring Act[8], the electric utilities regulated by the Public Utilities Commission (PUC) have established a set of energy efficiency programs designed for statewide implementation. The "CORE Energy Efficiency Programs" are funded by the System Benefits Charge (~78% in 2013) and Regional Greenhouse Gas Initiative (RGGI) funds and implemented by New Hampshire utilities. In addition to the statewide programs, individual utilities also run specific programs.

For each dollar invested in the programs, the return for customers has been calculated at more than $6.

Among the programs available:

- Home Energy Assistance program, a "whole house" weatherization program, free of charge for participants;
- Electric Assistance Program (EAP), which helps eligible customers pay their electric bills (9% - 77% discount on monthly electric bills, depending on customer's gross household income and household size);
- WAP (Weatherization Assistance Program), a low income weatherization federal program (for which demand in NH is currently higher than the available funds); and
- Fuel Assistance Program (FAP), also federal, providing discounts on monthly electricity and gas bills.

[7] Note that customers qualifying for Fuel Assistance are automatically referred to local gas or electric utility for a bill discount

[8] Section 374-F:3 (X), http://www.gencourt.state.nh.us/rsa/html/xxxiv/374-f/374-f-mrg.htm

2.1.6 NEW YORK

NYSERDA offers several programs providing cost-effective home improvements:

- Assisted Home Performance with ENERGY STAR®: income-eligible households can receive a subsidy (Assisted Subsidy) representing up to 50% (up to $5000) of an approved energy efficiency project;
- Assisted New York ENERGY STAR Certified Homes: a $500 cash incentive to households meeting income-eligibility requirements; and
- EmPower New York: free energy efficiency improvements available to homeowners and renters

NYSERDA has also created the Low income Forum on Energy, which brings together organizations and individuals committed to addressing the challenges and opportunities facing low income New Yorkers.

Additional programs, not administered by NYSERDA, are also available in the state of New York:

- Low income Home Energy Assistance Program (HEAP), for financial assistance to eligible households to help pay for their home heating costs; and
- Weatherization Assistance Program (WAP), which assists income-eligible families and individuals by reducing their heating/cooling costs and improving the safety of their homes through energy efficiency measures.

2.1.7 ONTARIO

Several programs are available for low income residents in Ontario. Most programs are offered and managed directly by Ontario's gas and electricity utilities. Among others:

- Low Income Energy Assistance (LEAP), developed by the Ontario Energy Board (OEB) to assist low income customers with their energy bill payments. The program provides a one-time grant of up to $500 per year[9] to eligible customers having difficulty paying 'past due' electricity bills and it is not intended to provide regular or ongoing bill payment assistance;
- Home Winterproofing Program, provides insulation and draft proofing at no charge to eligible Enbridge Gas customers (homeowners);
- Save-ON-Energy Home Assistance Program (HAP), depending on the heating and housing type and the existing efficiencies, the program offers free home improvement to eligible participants;

[9] $500 in emergency assistance for electricity bills ($600 if electric heating) and $500 for gas bills. http://www.ontarioenergyboard.ca/OEB/Consumers/Consumer+Protection/Help+for+Low income+Energy+Consumers#leap

The Ontario Power Authority (OPA) funds the Save-ON-Energy Home Assistance Program for uptake across all Ontario Local Distribution Companies (LDCs). The program promotion and outreach is largely done through networking with social agencies and via word-of-mouth, with some LDCs also doing some targeted advertising. Recent improvements to the program include accepting applications from those living in on-reserve first nation's housing and the possibility for social housing providers to apply on behalf of all their residents (as a result, over participation by social housing complexes increased from about 20% to close to 70% of total participation).

The program still has some eligibility complications that restrict participation and benefits from flowing from landlords to low income tenants. It does, however, maximize participation by allowing everything from shallow to deep retrofit measures depending on the home and who owns it.

2.1.8 SASKATCHEWAN

The Home Repairs program is one of Saskatchewan Housing Corporation (SHC) programs designed to provide support and options for low income households in the province that might not otherwise be able to afford housing. The programs include capital rent subsidy, a partnership with Habitat for Humanity and the Home Repairs Program (available for renters and home owners).

The Home Repairs Program was redesigned in 2012 and offers higher assistance levels, increased eligibility, and shorter loan forgiveness periods. Although none of the SHC programs specifically targets energy conservation, home repairs can have the co-benefit of increasing energy efficiency for homes and apartments depending on the repair provided (i.e. insulation, higher efficiency furnaces). By design, this program has a quite limited number of participants.

2.2 IDENTIFIED BEST PRACTICES

Low income programs are largely present across the board, some date from the 1970's and 80's (like the U.S. Weatherization Assistance Program - WAP - and PG&E Energy Assistance Programs), while others are more recent. In the U.S., federal programs like WAP and LIHEAP generally provide base funding and are used as a leverage for local, state or other sources of funding.

Despite local and national differences, low income households face common barriers when it comes to energy programs: limited access to capital, split incentives (high share of rental units makes program participation more difficult due to landlords' lack of interest in investing in renovation), organizational practices (e.g. limited interest from contractors in serving low income households), higher levels of illiteracy and lower education, general distrusts towards financial institutions and utilities and language barriers (e.g. in particular in states with high immigrant population like California).

There are several benefits deriving from the successful design and implementation of low income programs, both for program participants and utilities. Among others: decreasing energy-use and energy

bills, improved comfort and safety, and access to essential public services are some of the main benefits for the participants while utilities would witness lower credit and collection costs, avoided service shut-off costs, reduced uncollectible accounts write-offs and improved customer relations.

Among the programs reviewed, a number of common best practices have been identified: most programs include different housing types, like single-family houses, multi-family buildings and mobile homes (e.g. BC, CA, ME, NY, OPA, SK), and rental properties (BC, CA, MA, NH, NY, ON, SK); best-in-class programs provide a comprehensive coverage of services and geographical areas (e.g. CA, MA, NY) and have established regular partnership to leverage funding and provide efficient and effective program delivery (e.g. MA, NH). In particular, in order to build trust and acquire legitimacy, several programs cooperate with other low income service providers and trusted social agencies which are active within the community and the targeted segment (e.g. MA, NY, OPA): for example, in the United States low income programs are often managed locally by Community Action Agencies, which also provide direct customer services for non-energy programs (e.g. NH, ME, NY).

A whole-house approach (e.g. CA, NH, NY), the use of sophisticated diagnostic and analytical tools (e.g. NY - BPI certified contractors and MA - online tracking and benchmarking software), joint with a comprehensive portfolio of services provided (programs often offer a broad range of measures, not targeted to one single technology) are also among identified best practices. In addition, programs are generally fuel neutral, cover multiple energy sources – gas, electricity, oil, etc. (e.g. BC, CA, NY) and provide flexible and diverse gas and electric measures (i.e. OPA, BC, MA).

Another feature characterizing best practices among low income programs is the adoption of innovative services and approaches, like delivering marketing material and services in multiple languages (in California communication regarding the available low income programs is provided in 9 languages, targeting specific segments of the community), engaging with social housing providers (accepted as program applicants in Ontario) and first nations communities (e.g. OPA, BC, MA, SK), including education as one of the key services provided (e.g. BC,CA, NH) and redefining the traditional low income household segment in favor of the inclusion of so-called limited-income customers (with eligible incomes set above the federal poverty guidelines).

2.3 OVERVIEW BY MAIN TOPICS

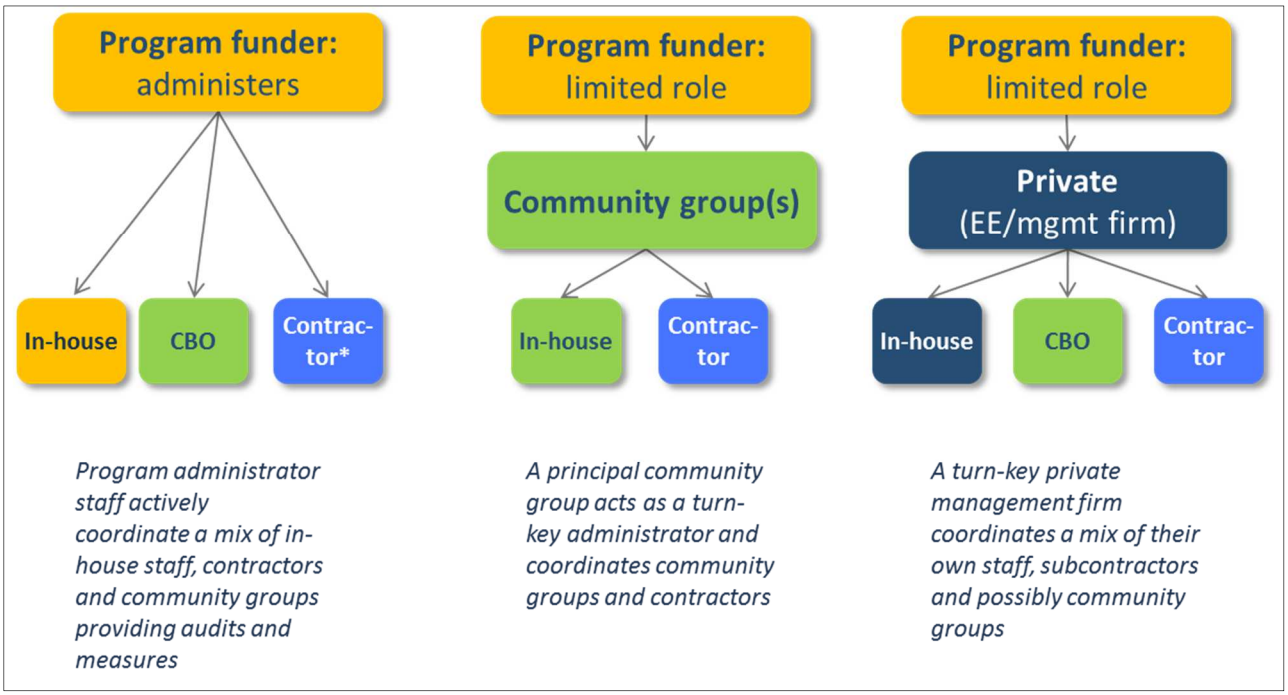
In this section, we present key learnings of our programs review by main topics, including program process and delivery models, marketing strategies, participation levels, rental properties, payment of measures costs and hurdle rates and cost-effectiveness. Key program elements are presented in further detail in Appendix A, with a summary table for each selected program.

2.3.1 DELIVERY MODELS

There are three common deliver models for low income programs (as illustrated in Figure 2.1). The role of the program funder varies according to the model, going from being an active player in the program coordination and administration to having a more limited role and delegating the program administration either to community group(s) or to an external private contractor. In the U.S. low income programs are often managed and administered by the Department of Housing Community Development and Community Action Agencies (CAA) in cooperation with regional non-profit and local government organizations.

With the exception of Saskatchewan, which manages the program entirely on its own, delivery is generally ensured in cooperation with external contractors.

Figure 2.1 - Program Delivery Models



2.3.2 PROGRAM PROCESS

Program processes are similar across the board: in most cases participants must complete an application (paper form or on-line); once the application is approved, the agency or utility manages the process and supports the participant until the measure is installed and verified (Figure 2.2).

Application forms can require household authorization to obtain household information and relevant energy usage data, the landlord's consent to participate to the program and the signature of the utility account holder. NYSERDA also accepts Utility or Agency referrals.

Figure 2.2 - Program Process

2.3.3 MARKETING STRATEGIES

Marketing activities differ largely according to program target, eligible participants and covered territory. Strategies include an increasing involvement of local communities and community centers to build trust among the targeted segment and the creation of local networks (e.g. MA Low income Energy Affordability Network - LEAN). Bill inserts, website and word-to-mouth (e.g. BC, OPA, NH) are among the most common marketing strategies, together with the increased use of social marketing tools (e.g. CA, MA, NY) and customer segmentation analysis and targeted mail (e.g. CA). Marketing is also used to leverage local governments and community organizations' programs (e.g. BC, CA, MA). In CA for instance, the Energy Savings Assistance program's (ESA) outreach team leverages various local government and community organizations' programs and knowledge of their communities to promote ESA and enroll customers.

Only a few programs do not have marketing activities, mainly due to limited participation targets (e.g. SK) or to a specific strategy (i.e. Efficiency Maine Multifamily Electric Heat is a highly directed program with no marketing or any other type of communication in place. Eligible participants are called directly by the program delivery agent and invited to participate.)

2.3.4 PARTICIPATION LEVELS

Not all programs are able to clearly assess their participation levels and targeted participation levels, as the total number of eligible customers is often not known. The participation is usually expressed in total number of customers served annually rather than the share of the total eligible customers. PG&E and OPA programs are the only programs with targeted participation levels: in its 2012-2014 program cycle, PG&E targets about 20% of 1.8 million low income customers, while OPA aims at participation levels reaching 10-12% of its eligible customers (estimated at about 15% of residential customers).

Efficiency Maine's Multifamily Electric Heat Program is the only exception: the program closed in June 2014 because all the eligible buildings were upgraded, reaching 100% of its targeted market.

2.3.5 RENTAL PROPERTIES

Overcoming the owner-tenant split incentive is one of the major barriers to low income programs. The selected programs present several strategies used to tackle this issue, according to the type of building involved.

For single-units, measures are generally free of cost for participants, landlord authorization may be required (e.g. BC Hydro ECAP, OPA). The need of an authorization may constitute a barrier to participation, especially if the consent is required for basic upgrades (i.e. for market rent properties, OPA requires the landlord consent even for light bulbs replacements and power bars).

For multifamily buildings, measures are generally free for tenants, landlord authorization might be required for certain measures (e.g. pipe wrap, insulation, and weatherization). Whole-building measures may be implemented on the entire building if a minimum share of the tenants are documented as eligible (e.g. NYSERDA requires at least 66% of LI tenants[10], who are eligible if they pay the utility bills). The OPA allows social housing providers to submit a single application for all their social housing units.

Engaging tenants and landlords remains challenging when they don't pay their utility bills.

2.3.6 PAYMENT OF MEASURES COSTS

For homeowners measures are usually free up to a certain limit (e.g. max $8,000 in NH, forgivable loans up to $23,000 in SK). Measures are generally free for tenants. Under certain conditions, landlord contribution may be required: NYSERDA for example requires a 25% contribution if the landlord is in charge of bill payment and/or the project is eligible for extra insulation and weatherization measures or fridge replacement in more than 5 units.

[10] Under certain conditions, NYSERDA allows measures to also be applied to single apartments.

In Saskatchewan, "rental property owners" (landlords) are required to contribute a minimum of 25% of the eligible repair costs and homeowners are responsible for all costs greater than the approved amount.

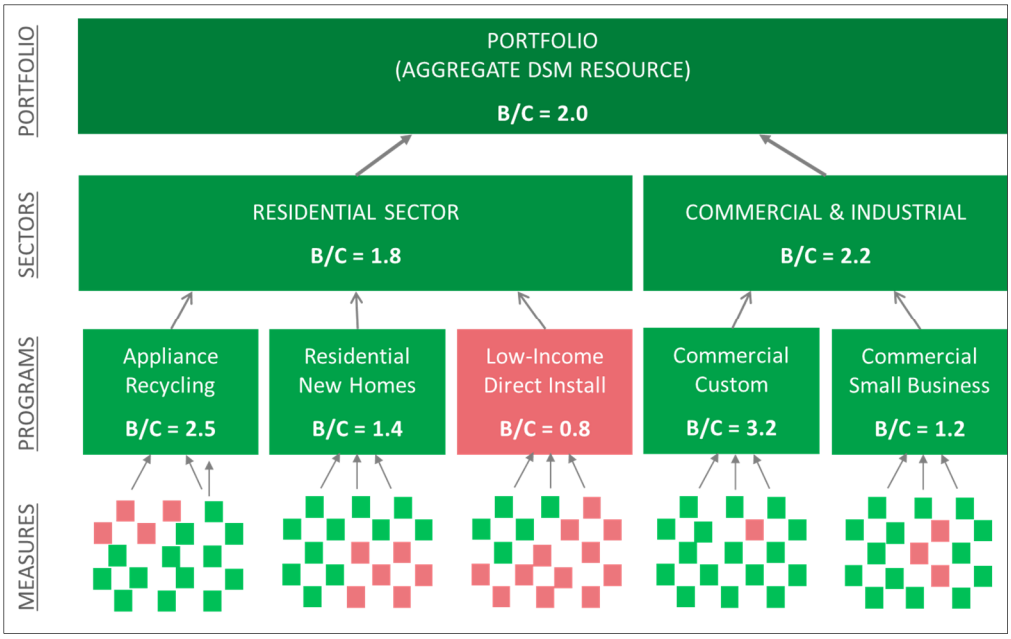
2.3.7 HURDLE RATES AND COST-EFFECTIVENESS FRAMEWORK[11]

Most programs undergo cost-effectiveness tests and/or regular evaluation. The only exception is Saskatchewan, where no cost-effectiveness test is required, since the Home and Rental program is not run by a utility, but through a social housing corporation. Cost-effectiveness screening can occur at different levels; higher-level screening usually helps meet cost-effectiveness thresholds (see Figure 2.3):

- Test is applied to all Low income programs combined (e.g. BC Hydro and MA Income Eligible programs) and, in certain cases, a benefit adder is allowed (i.e. in BC the provincial DSM regulations allows the program a 30% benefit adder)
- Test is only applied to the measure installed and/or retrofit project (e.g. OPA, MA Multifamily Retrofit)
- Test is done on the portfolio of residential programs (e.g. CORE Energy Efficiency Programs NH)

[11] In addition to the team's review of selected U.S. and Canadian programs, this sub-section draws info on other programs from this report: Peach, Gil. 2012. "The TRC and Low Income", Low income Subcommittee, NV Energy DSM Collaborative.

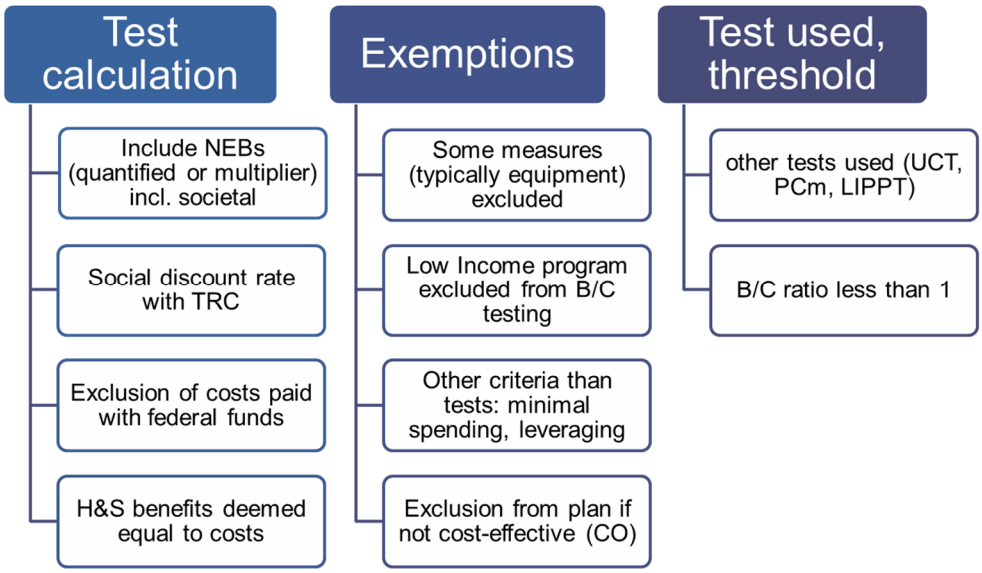
Figure 2.3 – Cost-Effectiveness Screening Level



Different tests are applied to assess the cost-effectiveness of low income programs: the most common are the Total Resource Cost Test (TRC), the Utility Cost Test (UCT) and the Participant Test (PT). There is a general leniency when it comes to low income programs. In the U.S., states that use the Total Resource Cost (TRC) as their primary test for cost-effectiveness testing either are not using the TRC for low income programs, or use a modified form of TRC. Modified TRC may include societal non-energy benefits (NEBs), or use a societal discount rate. Some states make adjustments to costs based on external funds received.

Non-energy benefits can either be included as dollars amounts, or as “adders” or “multipliers”. Adders can be as high as 25% of energy benefits (CO, NM). It is largely recognized that low income programs bring additional benefits such as reduced arrearages, service terminations and reconnections, health & safety, etc.; Massachusetts’ TRC, for example, specifically include some of these benefits.

Figure 2.4 – Adjustments to Cost-Effectiveness Framework for Low Income Programs



Valuing NEBs is not a simple task. PG&E in CA, for example, accounts for NEBs, but quality of life improvements (health, comfort, and safety benefits) are not properly accounted for. A Cost-effectiveness Working Group has been established to determine a list of health, comfort and safety criteria to be used to better account for quality of life improvements and environmental benefits.

The required B/C ratio varies depending if it is applied at measure, program or portfolio level and ranges between 0.25 to 1 or greater (according to the level of application). In NH the programs offered by the NH Electric and Gas Utilities must have a combined benefit-to-cost ratio for the residential sector programs of 1.0 or greater. If the B/C ratio is lower, there is no incentive associated with the program cost effectiveness performance metric. In CA, PG&E Energy Savings Assistance program's approval is based on the cost-effectiveness of the entire program; cost-effectiveness test is also used at the measure level (minimum B/C ratio of 0.25): in cases where the measure does not pass but provides a health or safety benefit, it may be kept in the program regardless of the test result.

In NY, NYSERDA's EmPower Program requires that the installed cost of each energy efficiency measure meet a savings-to-investment ration (SIR) of 1.1 or greater. Depending on the funding source, a TRC of 1.0 or greater may also be required for specific measures.

In CA, UCT and a modified participant test (MTP) are also used to determine which measures are included in the ESA program[12].

Exemptions may apply to cost-effectiveness requirements for specific individual measures (furnaces, water heaters) that are included in the program, even if they are not cost-effective. Finally, the whole low income program can also be exempted from cost-effectiveness requirements. In Colorado, if a low income program is not cost effective, it is delivered but removed from the DSM portfolio performance results so it does not lower the overall results.

As we can see, even though low income programs are subject to cost-effectiveness tests, as any other program, regulators and program managers recognize the broad range of benefits such programs bring in addition to energy savings, including: comfort, health & safety benefits, mitigation of rate increases for participating low income customers, reduction of customer arrearages and disconnects, environmental benefits, etc. The various types of adjustments to the general cost-effectiveness frameworks are meant to internalise those benefits, or at least to consider them indirectly by not unduly penalizing the low income programs.

[12] California recently moved away from the Low Income Public Purpose Test, which has been used since 2001.

3. PROGRAM OVERVIEW

3.1 GENERAL PROGRAM DESCRIPTION AND PROCESS

Manitoba Hydro's Affordable Energy Program (AEP) targets energy efficient opportunities in the lower income market sector of Manitoba. The AEP was introduced in December 2007 with insulation upgrades to attics, wall cavities and basements or crawlspaces. The program initially targeted homeowners of single and multi-attached dwellings, but additional program components were subsequently added:

- The furnace & boiler component was introduced on July 28, 2008. (On August 1, 2013 the furnace and boiler offering was modified to reduce the customer payment.)
- In 2013, AEP expanded the eligibility for participation to include tenants.

Targeted energy efficient upgrades include:

- Insulation upgrades
- Replacement of standard efficiency natural gas furnaces and boilers
- Energy efficient light bulbs
- Low Cost – No Cost measures (low-flow showerheads, pipe wrap insulation, faucet aerators, caulking and other minor draftproofing measures, etc.)
- Health & Safety measures (safety caps, carbon monoxide detectors)

Most measures, as well as home audits and one-to-one assistance, are provided for free to the customers. Furnace replacements are offered at a small co-payment with zero interest on-bill financing, while participants receive a grant for boiler replacements. Co-payments are further described in section 4.5.

Customers are eligible for the program based on income thresholds set by Statistics Canada's annual Low Income Cut Off (LICO) where AEP has increased the thresholds by an additional 25% (referred to as LICO 125), allowing more customers to qualify for the program. Table 3.1 indicates current[13] thresholds.

[13] These thresholds are updated annually.

Table 3.1 - AEP's LICO 125 Income Thresholds

Household size	Total Income[14]
1 Person	$29,826
2 People	$37,133
3 People	$45,650
4 People	$54,425
5 People	$62,863
6 People	$70,898
7 or more Persons	$78,934

Once eligibility has been established and a customer has been approved, a free energy audit by a Manitoba Hydro certified Energy Advisor is conducted to determine which upgrades are available. Free energy saving items, including low flow showerheads, caulking, faucet aerators, insulating pipe wrap, and energy efficient lighting, are installed or provided to the customer during the audit. Materials, installation and labour for qualifying insulation upgrades are free for qualifying customers.

Owners of homes with structural or health & safety issues are referred to the provincial assistance programs. First, the energy advisor and/or contractor identifies the issues, and then there is some coordination between the AEP project manager and provincial programs' employees to transfer the project. Homeowners come back to the AEP when the issues have been dealt with.

3.2 PARTICIPATION RATES AND SAVINGS

The program is forecasting an annual participation level of 2,093 participants for 2016/17, an increase over the historical participation levels (Table 3.2).

[14] Total income of household before deductions.

Table 3.2 – Historic and Forecasted Participation

	2007/08 to 2013/14	2014/15	2015/16	2016/17	TOTAL
Participants	8,072	2,155	2,180	2,093	14,500
Furnace	3,009	680	690	700	5,079
Boiler	75	15	15	15	120
Insulation	5,683	1,249	1,141	1,049	9,122

The annual participation rate[15] of 1.8% compares well to other low income programs[16]. The AEP is targeting homes that require significant upgrades, and this focus translates into higher participation from homes that have a standard furnace (3.4% target market/yr.) and poor/fair insulation levels (4.1%/yr.). It is estimated[17] that 25% of standard furnaces will have been replaced and 36% of homes with poor/fair insulation levels will have been upgraded by the end of 2016/17. Boiler replacement numbers are lower, with an annual replacement rate of only 0.9%, which is analyzed in further details in section 4.5.

Table 3.3 – Participation Rates

Component	Estimated Market	Total Participation Rate (end 2016/17)	Yearly Participation Rate (2016/17)
Total Participants	115,100 [18]	12.6%	1.8%
Furnaces	20,525	24.7%	3.4%
Insulation	25,298	36.1%	4.1%
Boilers	1,725	7.0%	0.9%

[15] AEP participants divided by total estimated low income market.

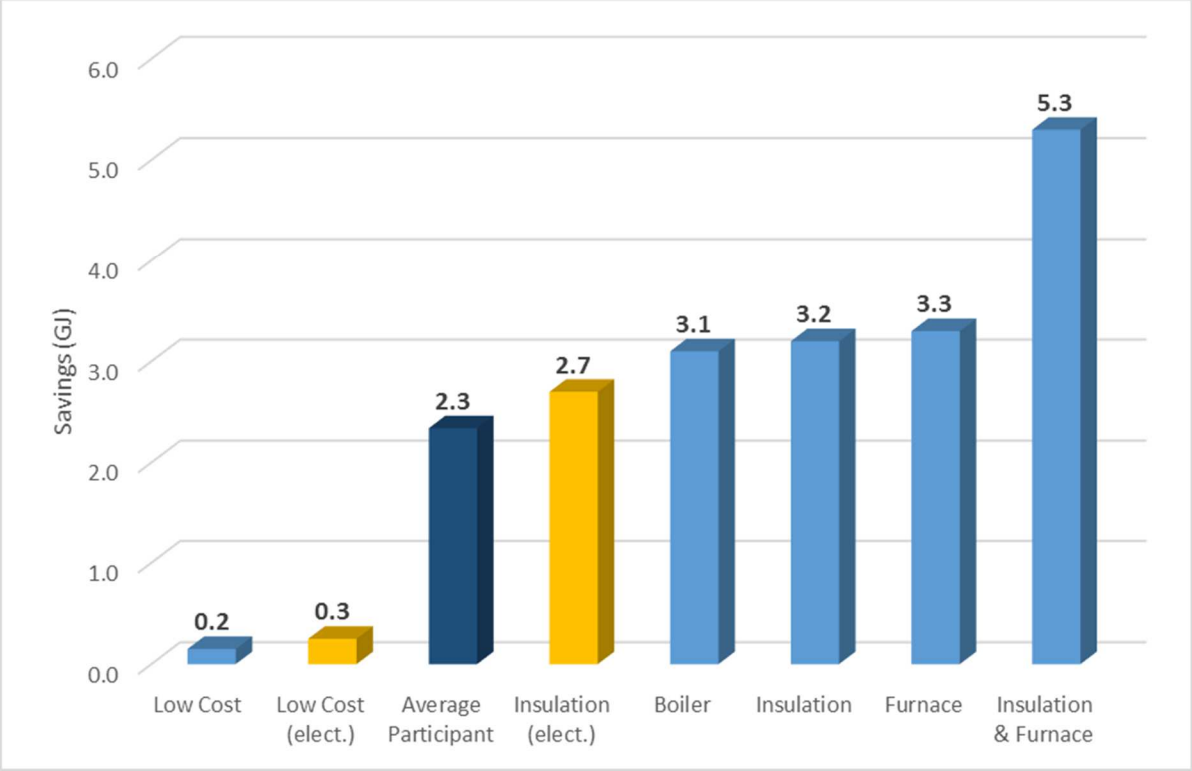
[16] According to a Dunsky review of leading programs (confidential), the best programs achieve an annual participation rate of 1% to 4%.

[17] The market size for furnace/boiler replacements and insulation upgrades has been estimated by Manitoba Hydro using self-reported information obtained through surveys, which can be unreliable especially for insulation levels.

[18] 105,100 homeowners and 10,000 renters

The AEP is achieving significant savings of 23.4 gigajoules[19] (GJ) per participant, which is about 20% of the consumption of an average home in Manitoba[20]. Savings for the subset of participants that receive heating equipment replacement and/or insulation upgrades are even higher, ranging from 27 to 53 GJ.

Figure 3.1 – Savings per Participant (GJ)



[19] All energy units have been converted in gigajoules to enable a direct comparison between electricity and natural gas savings. A gigajoule equals to 277.8 kWh, or 26.5 cubic meters of natural gas.

[20] Comparing the average savings of AEP with average consumption of AEP participant, or average low income households, would have been more appropriate. Unfortunately, this information is not available.

3.3 RESULTS BY CHANNEL

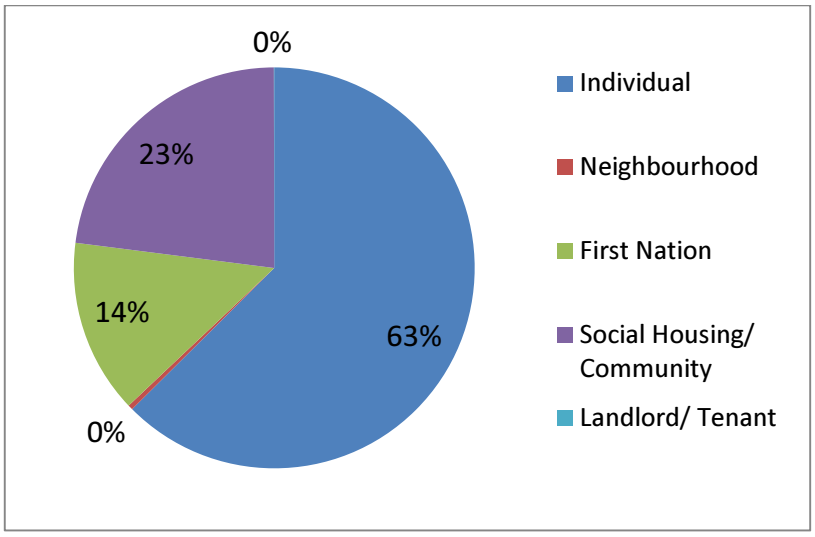
The Affordable Energy Program has four distinct delivery channels, each with tailored application processes, criteria for qualification and application and implementation processes, they include:

1. Individual (Rural and Urban);
2. First Nations;
3. Social Housing Providers and their tenants; and
4. Private Landlords and their tenants.

The Neighbourhood Power Smart channel is a fifth channel that is predominantly a recruitment and support pilot for the Individuals in the Brandon and William Whyte communities via a Community Canvasser.

As of August 31, 2014, AEP installations have been completed in a total of 9,012 homes in Manitoba. The majority (63%) of installations have come through the Individual channel followed by 23% through Social Housing Providers and their tenants, and 14% in the First Nations channel. Less than 1% of results have come into the program through the private Landlord /Tenant channel and the Neighbourhood channel to date (see Figure 3.2 below).

Figure 3.2 – Cumulative Results as of August 31, 2014 by Channel



The majority (74%) of installations have occurred in single detached homes. With 88% of the installations in multi-residential attached units completed within the social housing channel. Table 3.4 shows the breakdown of installation results by channel and by housing type.

Table 3.4 - Results by Channel

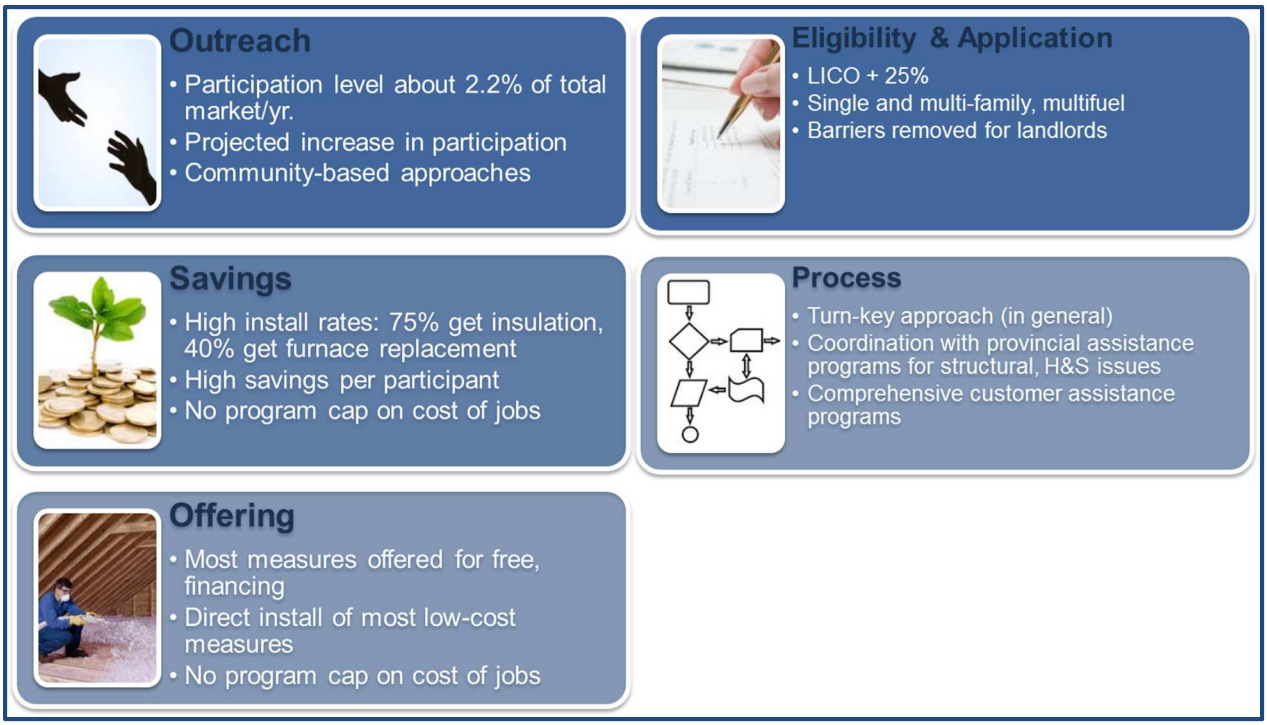
Channel	Single Detached	Multi-Attached	Mobile Homes	Cumulative
Individual	5,333	255	49	5,637
Neighbourhood	36			36
First Nation	1,266			1,266
Social Housing/ Community	30	2,039		2,069
Landlord/ Tenant	3	1		4
TOTAL	**6,668**	**2,295**	**49**	**9,012**

3.4 KEY STRENGTHS

Our high-level assessment of the Affordable Energy Program (AEP) is that the program is well managed and is achieving solid results. AEP is drawing from best practices in many aspects of its program design, including a generally turnkey approach, free energy efficiency measures (or small co-payment with no interest on-bill financing), direct install of low-cost measures during the audit, coordination with other low income programs, etc. Results in terms of participation rates, install rates and savings are strong. AEP also reaches to a large low income population by including both single and multi-family buildings, by using an adder of 25% on Low income Cut-Offs (LICOs) for eligibility and by offering both gas and electric saving measures.

AEP's key strengths are summarised in figure 3.3 below.

Figure 3.3 - Key Strengths of the AEP Program



4. PROGRAM REVIEW BY MAIN COMPONENT

4.1 OUTREACH / MARKETING

The AEP program has a strong marketing plan that includes a mixture of advertising tactics delivered across different types of media as well as community-based social marketing activities and targeted marketing strategies by channel. The table below lists the current and proposed marketing elements.

Table 4.1 – Current and Proposed Marketing Elements

CURRENT	PROPOSED
Media Buy & Advertising	
TV Bill Inserts Newspapers/ Print advertising including translated minority specific publications Billboard Advertising Transit Bus Shelters Convenience Store Signage	
Online	
Manitoba Hydro's Website including landing page rotating banner Social Media (Facebook and Twitter) and Facebook sponsored ads	You Tube or simple instructional videos on the website that describe the program's offerings, how one qualifies and the steps to apply would be a helpful resource for participants and a potentially valuable marketing piece for the program that could be easily shared
Outbound calling	
Direct calls to targeted customers (including Bill Assistance)	Continued and coordinated, data driven outbound calling to include mobile home residents and continue to leverage any outbound calling occurring for the Water & Energy Saver Program (WESP)
Community Approach	
Posters/ collateral at community centres, etc. Street -by - Street events with lead up marketing Neighbourhood Power Smart Project team marketers Approved Contractor Marketing Events in local shopping centers (i.e. Safeway) to distribute reusable shopping bags.	Decals for participating contractor vans/trucks

Table 4.1 – Current and Proposed Marketing Elements (*continued*)

CURRENT	PROPOSED
Landlords & Tenants	
Direct calls to landlords and property managers Direct letters / mailers to landlords and property managers Presentations & in-person meetings with Property Mgt & Landlord Associations	Leverage Property Mgt & Landlord Association newsletters and outreach channels to further reach tenants, landlords and property managers Tenant and landlord engagement through rental agencies and the Residential Tenancies Branch
Word of Mouth - Testimonials - Referrals	
Lawn signs for completed homes Program packaging that encourages customer to share their experience. Promotional reusable shopping bags	Referral program / mechanism (to be designed) Testimonials and/or case studies that provide personal insights from participants to be included in collateral and/or web (print or video) FAQs on the website
Social Housing Channel	
Coordinated events and outreach	

The internal Process Evaluation conducted by Manitoba Hydro reported in May 2014 how customers remembered first hearing about the program (see Table 4.2). The primary two tactics that dominated the response were bill inserts (33%) and word-of-mouth (31%). The cost analysis outlined below further demonstrates that these two specific tactics are also very cost effective (word of mouth being free to Manitoba Hydro). Testimonials, referrals and case studies may be effective content to add into the mix.

Table 4.2 - How Customers First Heard of AEP Program[21]

Marketing Tactic	2014
Insert in MB Hydro bill	33%
Recommendation from family, friend/ coworker	31%
Newspaper	19%
TV	12%
MB Hydro website	10%
Bus bench & Outdoor signage	9%
Letter or postcard/mail	4%

4.1.1 Marketing Cost Analysis

To understand the return on investment (ROI) and evaluate Manitoba Hydro's marketing costs, two components were evaluated:

1. The cost per view/piece; and
2. The % of the budget spent compared to the % of customer recall.

The cost-per-view analysis focused on the major advertising components in the marketing plan (bill inserts, newspaper, TV and outdoor signage) and estimated the associated cost per view or per piece, using budget and media cost data provided by Manitoba Hydro and impression data available online. An assumption that 50% of potential impressions were actually viewed by a customer was added to allow for the difference between promotional claims for ad revenue purposes and actual views. The results from this analysis show that bill inserts tend to be the most cost effective at $0.03 cost per piece. Outdoor signage was the most expensive per impression at $0.23 per view; however, it was also seen to be the most targeted of the media outreach, as this tactic can be appropriately narrowed to specific neighbourhoods. Similarly, print advertising is also seen as more costly, but can be used to reach more specific audiences based on geography or readership demographics (see Table 4.3). Note, this analysis is based on outreach alone, not uptake.

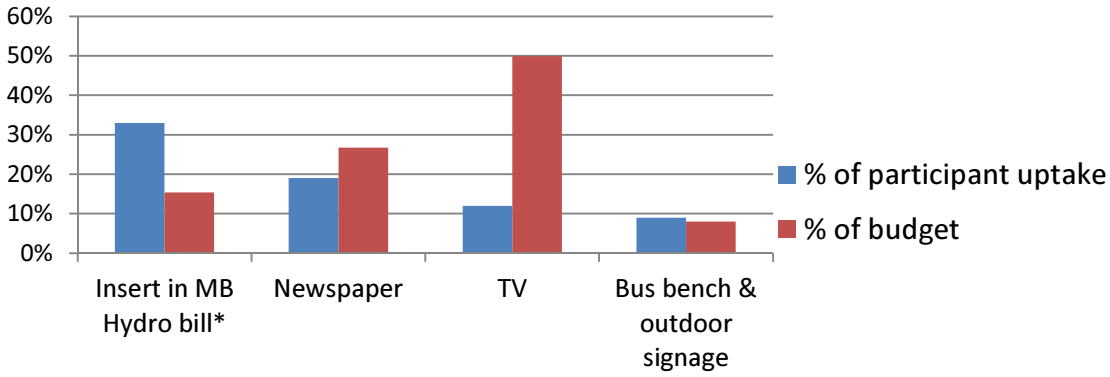
[21] Source: Affordable Energy Program, Process Evaluation, May 2014

Table 4.3 - Cost per View Analysis

Media Buy & Bill Inserts	Budget	Estimated views	Cost per piece / view
Insert in MB Hydro bill	$ 27,000.00	900,000	$ 0.03
Newspaper	$ 47,045.13	278,250	$ 0.17
TV	$ 87,891.06	949,500	$ 0.09
Outdoor signage	$ 14,045.00	61,885	$ 0.23

The following Figure 4.1 compares the percentage of marketing budget spent to the percentage of customers who recalled hearing about the program through that specific tactic. This analysis demonstrates the comparative value of the tactic based on the recall survey data. The results show for example that a bill insert is a relatively small percentage of the budget, yet accounts for the largest percentage of recall, therefore is of good value and should be continued. This analysis may also show that TV, while a cost effective way to reach many viewers, is not the most effective way to drive applications.

Figure 4.1 - Analysis of recall vs. budget



4.1.2 Additional Marketing Strategies and Tactics to Consider

The current marketing plan is very thorough as is; however, there are potential strategies and tactics that could be further leveraged to help increase successful uptake of the program, they are listed and described below.

TESTIMONIALS, CASE STUDIES, EXPANDED FAQS

A clear finding from the interviews conducted revealed that participants were skeptical that the offer is "too good to be true". Individuals might be more confident and ready to apply if they had more information about how the operations of the program might impact the routines of their daily life.

This content could come in the form of a short video, written testimonial from a past participant or through simple Frequently Asked Questions (FAQs) on the website that could be updated on a quarterly basis to reflect new FAQs that Manitoba Hydro staff is responding to.

Some of the questions that were suggested from our interviews with participants include for example:

- Will my family and I need to leave the home at any point and for how long?
- How many times will a contractor or auditor be in and out of my house? Which rooms?
- Is spray foam potentially hazardous to my health?
- There must be some limitations to the rules for this program – what should I know before? (i.e. what if pipes or electrical wires need to be moved, is this covered?)

Personal case studies could also be considered as they can include personal quotes that profile customer experiences, photos and video footage that customers can relate to in their homes or apartments. These case studies could be in a print or video format.

WORD OF MOUTH - REFERRALS

Leveraging the fact that 31% of customers reported hearing about the program through a personal connection, it may be worthwhile to further encourage participants to "spread the word" and refer a friend through a simple postcard that all participants receive that encourages them to tell a friend by passing on the card which has contact info for Manitoba Hydro's AEP team. Offering an incentive for referrals has been explored in other jurisdictions; however, the tracking operations are logistically difficult and have not proven to be overly successful to date. A simple "thank you" postcard with program details has worked in Ontario and should be explored for Manitoba.

OUTBOUND CALLING

Manitoba Hydro should continue coordinated, targeted and data driven outbound calling in 2015. Further to the outbound calling initiative to customers in arrears and those receiving Bill Assistance, including mobile home owners should be considered.

Coordinating outreach with other Power Smart programs and the data available through those programs is also an opportunity, such as leveraging any outbound calling occurring for the Water & Energy Saver Program (WESP). In 2012-2013, it was largely successful for the AEP program to collaborate with outbound calls for the Water & Energy Saver Program (WESP) as well as the Lower

Income Neighbourhood – Higher Natural Gas Consumption Calls[22] with a return of rate on applications of 19-25% for all leads generated through these targeted calls.

LANDLORD & PROPERTY MANAGEMENT OUTREACH BLITZ

The landlord channel to date has not had many completed installs (only four as of August 2014); however, given the new and revised eligibility requirements, there is consensus among those interviewed for this review that these changes will be well received by landlords and tenants and should result in an increase in applicants and participants.

It is recommended that Manitoba Hydro prioritize a strategic outreach blitz to landlords, property managers and their associations in early 2015. A blitz would include the following steps:

Figure 4.2 – Marketing Blitz Steps

The following list of property management and landlord associations is recommended to target with the above strategy. These associations produce newsletters, magazine content, social media outlets as well as email newsletters that can be helpful marketing tools to leverage.

- Professional Property Management Association, http://www.ppmamanitoba.com/
- Manitoba Landlords Association, http://manitobalandlords.ca/category/winnipeg-landlords/
- Real Estate Investment Groups:
    1. Exclusive Investor Club (http://www.meetup.com/ExclusiveInvestorClub/
    2. Sophisticated Property Investors Network (SPIN), https://www.facebook.com/StrategicPropertyInvestmentNetwork
- Winnipeg Rental Network, http://www.winnipegrentnet.ca/landlord-guide.cfm

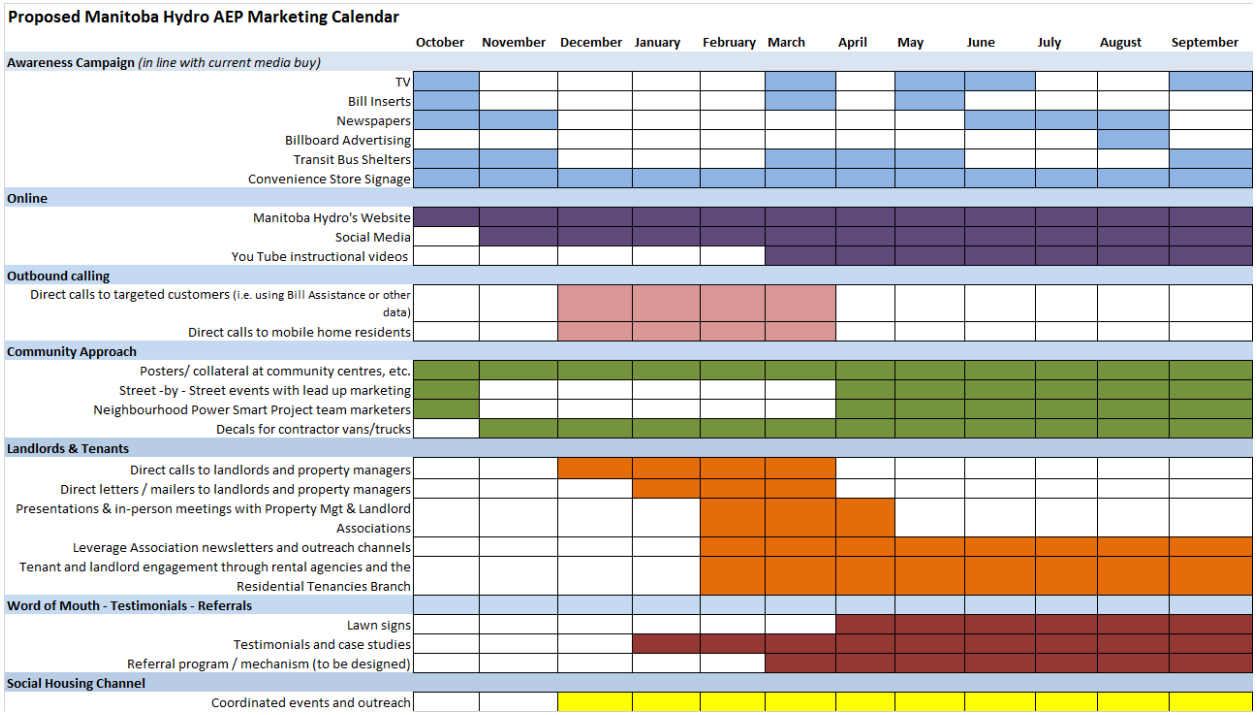
Manitoba Hydro should continue to reach out to and inform:

[22] Manitoba Hydro, 2013. Report on Lower Income Energy Efficiency Program and the Furnace Replacement Program for the Period Ending June 30, 2013.

- North End Community Renewal Corp, Tenant Landlord Corp., http://necrc.org/index.php/housing/program-activities/
- Residential Tenancies Branch, http://www.gov.mb.ca/cca/rtb/

Below is a marketing calendar that displays the current as well as the proposed marketing activity tactics in a calendar format.

Figure 4.3 – Proposed Marketing Calendar



4.2 ELIGIBILITY AND APPLICATION

For an individual home owner or home renter to be eligible for the AEP, the applicant must live year-round in a single detached home, semi-detached home (including townhouses, row houses, multiple houses), or a mobile home and earn below 125% of the Low Income Cut Off (LICO 125) threshold set by Statistics Canada based on household income and size. In July 2013, tenants and private landlords were added to the list of qualifying participants.

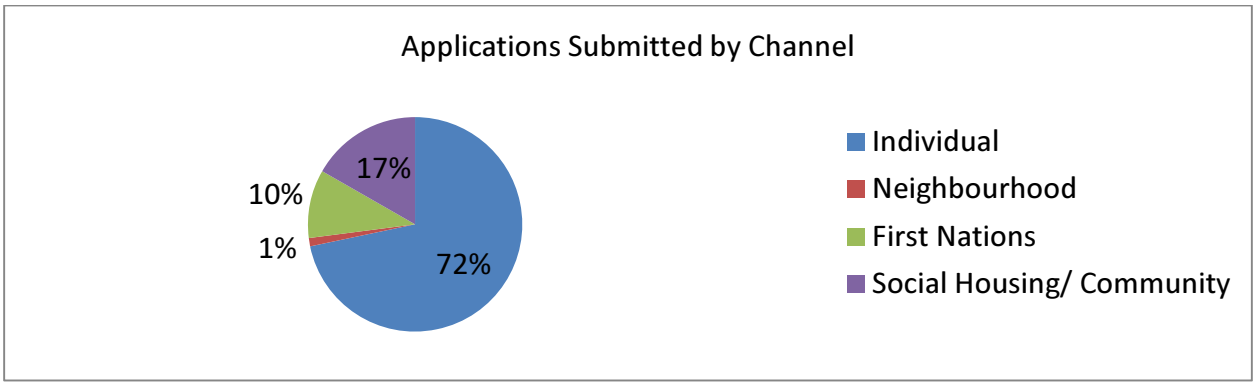
Application forms are available for download from the Manitoba Hydro website and an online application is in development and should be implemented in December 2014. Dedicated Manitoba

Hydro staff and a toll-free number are in place to assist and support customers through the entire application and to the completion of the program.

In July 2014, the Affordable Energy Program branded folder that was provided to the applicant was replaced with a simple brown envelope with instructions on the envelope to help better assist in organizing customer's documentation and next steps.

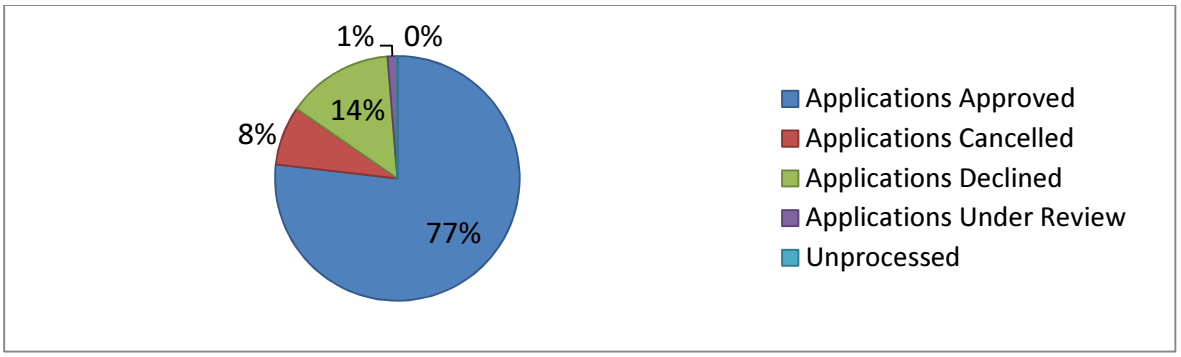
As of August 31, 2014 there have been over 12,000 applications submitted to date, the majority (72%) through the Individual Channel. See Figure 4.4 below for a breakdown of applications submitted by Channel.

Figure 4.4 - Applications Submitted by Channel



Within the Individual Channel, of the 8,930 application submitted, 77% of applications have been approved, 8% were cancelled, 14% were declined and 1% were under review at time of data collection (see Figure 4.5).

Figure 4.5 - Application Status within the Individual Channel



The high rate of application success (77%) is very strong. Applications are typically cancelled (approximately 8% of the time) when the applicant decides not to proceed with the application process or the applicant was missing the required signature or tax documents.

Manitoba Hydro has established processes for missing documents from customers and contractors including follow up with phone calls and voice messages, direct mail, and email if applicable. Follow ups are tracked in the database and reminders are set to trigger a follow up in the future if the customer/ contract has still not provided the missing documents.

The primary reason for an applicant to be declined (approximately 14% of the time) is because they do not meet the income qualification criteria. Other reasons for declining the application include situations where the home is not their primary residence, the home is not occupied (or under renovation), the home was built after 1999 or the application is for a property that has already been submitted. When declined, Manitoba Hydro refers the applicants to other Power Smart Programs.

Once the application is accepted and work begins, 82% of the projects in the individual channel are completed, 100% in the First Nation, 99% in the Social Housing and only 30% in the Neighbourhood Power Smart Project channel (see Table 4.4).

Table 4.4 - Percent of Applications Accepted and of Projects Completed as of August 31, 2014

Channel	% of Applications Accepted	% of Projects Completed
Individual (Includes landlords)	78%	82%
First Nation	100%	100%
Social Housing/ Community	100%	99%
Neighbourhood Power Smart Project	77%	30%

For the majority of channels, there is a very high level of both application acceptance and follow through to successful completion of the project. The outlier is the Neighbourhood Power Smart Project, with only 30% of projects completed of applications accepted. This may be attributed to the large influx of applications in the past six months and the fact that some customers are yet to select their contractor. To ensure this group of applicants successfully completes their projects, may require additional program support and facilitation to ensure applicants follow through (i.e. community canvasser).

The following section describes the processes within each delivery channel.

4.3 PROCESS

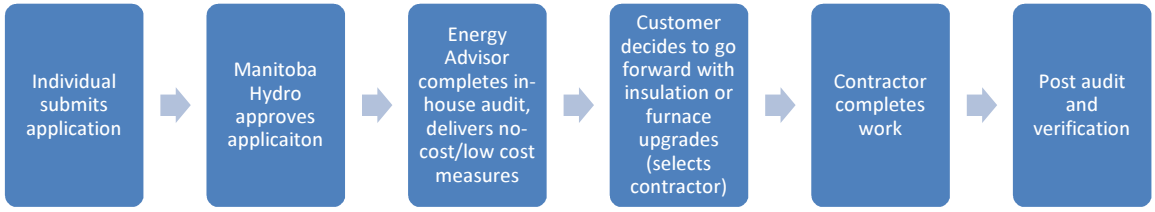
This section describes the overall processes involved in each delivery channel, highlighting opportunities and recommendations for program improvement.

4.3.1 Individual Channel

The individual channel is the primary delivery channel for the Affordable Energy Program, representing 63% of results and 72% of applications submitted.

The basic process for individuals participating in the program generally includes the following steps:

Figure 4.6 – Individual Channel Process

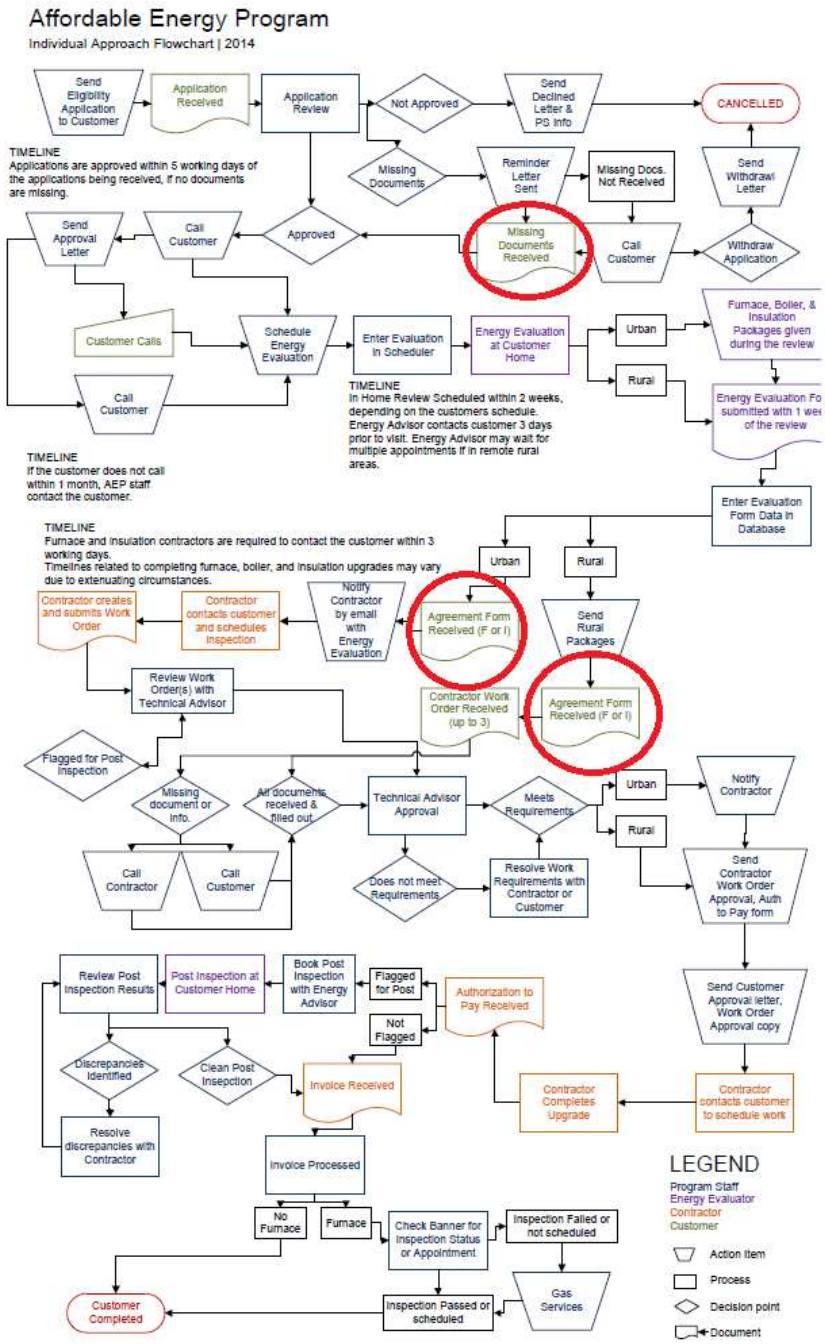


When reviewing the process for the individual channel, a few bottlenecks and challenges were identified (see Figure 4.7 for identification of where the bottlenecks exist in the current Individual Process Flow):

1. Applicants don't necessarily have, or are comfortable sharing, income tax information or SIN numbers.
2. Applicants have difficulty understanding the rules, requirements and application forms;
3. The Agreement Form that is provided to the participant during the in-home evaluation/audit – requires customer to select contractor and sign off. This step could be missed and may result in non-completion of project ; and
4. The suggested requirement for rural participants to get three (3) quotes – although not a program requirement – may still be a bottleneck to the application process.

Given these findings, there are a number of recommendations suggested below (Table 4.5) to help remove the potential bottlenecks in the process and ultimately increase the number of individual applications submitted, accepted and projects completed.

Figure 4.7 – Flowchart with Identified Bottlenecks[23]



[23] Source: AEP Process Review (2014).

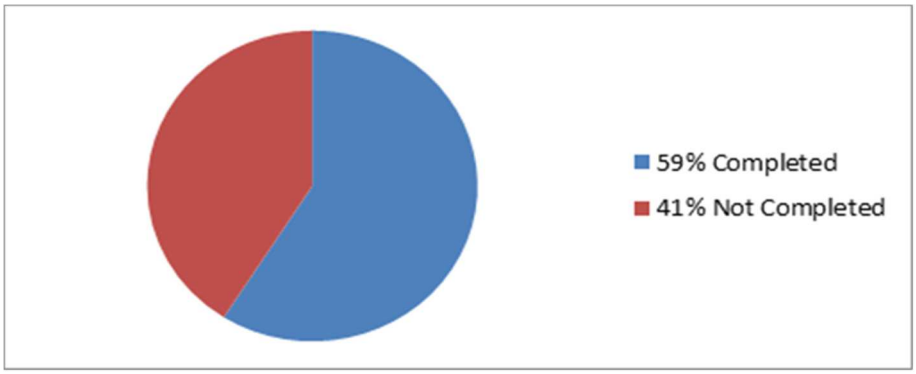
Table 4.5 - Recommended Improvements to the AEP Individual Process

Findings	Recommendations
1. Submitting tax forms / missing documentation	Consider allowing government issued forms instead of CRA, such as: Income Assistance, Disability, Guaranteed Income Supplement, Allowance for Seniors, Allowance for the Survivor, National Child Benefit Supplement
2. Program rules & application requirements are sometimes difficult for participants to understand	Consider expanding application material formats to include audio and video explanations with instructions. Continue and increase support and dialogue with each applicant by either Manitoba Hydro, or refer applicant to a community canvasser to facilitate them through the process from start to end. Continue to filter marketing materials and application documentation through a low income specialist to ensure language is accessible and appropriate.
3. Agreement Form signature on-site	On-site signature of Agreement Form – submitted to Energy Auditor on day of audit or add an automatic reminder call to the database to follow up with the applicant 1-2 weeks following the audit.
4. Rural requirement for three (3) contractor quotes	MH to work with contractors for rural quotes directly, continue to be lenient and supportive with applicants

4.3.2 First Nations Channel

There are 63 First Nation Communities in Manitoba and all of them have been approached and engaged by Manitoba Hydro's First Nations advisor to participate in the AEP. As of August 31, 2014, 1266 homes have received insulation upgrade in 37 communities.

Figure 4.7 – Percent of First Nation Communities Completed to Date



The Manitoba Hydro First Nations Power Smart Energy Advisor works with the individual housing managers within each of the First Nation Communities to identify which homes would benefit from an upgrade. The Housing Manager selects, based on their knowledge of the construction and insulation levels in the homes, the homes that qualify for insulation upgrades. Some communities have indicated they exceed the minimum insulation levels to be eligible, or they are currently addressing flood issues, so they are not participating. The Advisor does a walk-through of the homes when he visits the communities. There is no application process required.

The First Nations Housing Manager identifies the local labourer. Manitoba Hydro funds the training, labour and material for a community member to do the installation. Manitoba Hydro funds the supplier directly. It was noted in the research that it would assist the First Nation Housing Managers if Manitoba Hydro could provide an advance payment for the labour to assist with cash flow. Manitoba Hydro has a Band Council resolution agreement with each First Nation. This has successfully removed the paperwork and is a model that other Utilities are interested in learning more about.

Manitoba Hydro is currently finalizing a process to provide basic energy efficient upgrades to homes with sufficient insulation levels in First Nations Communities by employing local labour.

Manitoba Hydro is launching a Direct Install Program of low cost/ no cost measures in each of the First Nations starting November 2014. According to Manitoba Hydro, there are approximately 10,000 eligible homes.

There is currently no First Nations representative on the AEP Advisory Committee.

Recommendations:

1. Go forward with a direct install of low-cost, no-cost at all homes on the First Nations;
2. Consider an advance payment to the Bands to help with cash flow for the community labour; and
3. Consider inviting a First Nations representative to the Advisory Committee.

4.3.3 Social Housing Channel

Manitoba Hydro takes a unique approach to engaging the social housing sector. For single detached, attached (townhouses and row houses), and mobile homes that are managed by non-profit social housing providers, the housing provider simply needs to demonstrate that they only rent to low income tenants to apply to AEP and no individual applications from the tenants are required. The individual tenants living in Social Housing are not required to demonstrate or prove their income to Manitoba Hydro as they automatically qualify by living in social housing units.

The housing provider and Manitoba Hydro have a direct agreement that outlines what Manitoba Hydro provides and the housing locations. Manitoba Hydro reviews the properties in advance. This has been an efficient process to date with 100% of applications submitted approved and 99% of projects completed.

As of August 31, a total of 2,039 installs have been completed on attached homes and 30 installations completed in detached homes, accounting for 23% of the total results to date.

Social Housing authorities are represented on the AEP Advisory Committee.

OPPORTUNITIES TO CONSIDER

There are two opportunities to consider with respect to eligibility and design of the social housing channel for the AEP.

First, is to consider eligibility and upgrades for the multi-residential, apartment-style buildings that social housing providers manage (beyond row houses and townhouses). These buildings are currently eligible for upgrades through Manitoba Hydro's Commercial Lighting Program (CLP), and tenants can access the free Water & Energy Saver Program kits.

The AEP offer could be customized and based on more limited retrofit activity within suites. For example, direct install of the low-cost / no-cost measures in suites and boiler retrofits for apartment buildings. Installing low-cost measures for direct install may not be cost effective because it is fairly labour intensive, but it is worth exploring further.

The second opportunity is to continue to work and have discussions with Manitoba Housing on a case-by-case basis, to identify opportunities within their buildings (including multi-residential and apartment style). There is a precedent in both Ontario and Quebec for rate-payer utility programs to support upgrades in low income government funded social housing.

Recommendations:

1. Consider redesigning the eligibility criteria to include multi-residential and apartment-style commercial buildings that social housing providers manage (beyond row houses and townhouses) for certain measures (i.e. in-suite lighting direct install, and boiler upgrades);

2. Consider low cost measure direct install in all social housing units (regardless of which are receiving insulation upgrades); and

Continue exploring opportunities with Manitoba Housing, or some of their sponsored partners, to participate.

4.3.4 Landlord/Tenant Channel

The landlord and tenant channel was added to the program in July 2013. The upgrade offering is the same as the individual approach. Typically the landlord completes the application for the rental properties. Manitoba Hydro collects the income qualifying information directly from the tenants in a pre-paid/posted envelope.

The tenants are not required to pay their utility bill directly to Manitoba Hydro for the building to qualify for the program. If the tenant does pay the bill directly, then they directly realize the energy savings. If the bill is included with the rent, Manitoba Hydro asks the landlord to pass on the savings to the tenant; however, Manitoba Hydro does not have any enforcement jurisdiction in this matter as all rent regulations are administered through the Province of Manitoba – Residential Tenancy Branch (RTB).

Originally, the landlord needed to commit to rent to lower income tenants for 10 years, which was reduced to 5 years and now has been removed from the requirements altogether, as this was a significant barrier to entry for landlords and property managers. Currently the only requirement is that they can't sell the property within the first year, which is the same as the individual stream.

Similarly to the social housing channel, single detached, multi-attached, multi-residential (up to 4-plex), row homes and town homes qualify. Multi-residential apartment blocks that are bulk meter billed are excluded.

Marketing of the program currently targets landlords and tenants through bill inserts, the overall promotional campaign, some door-to-door canvassing.

There is landlord representation on the AEP Advisory Committee.

The table below highlights recommended changes to consider to the landlord channel, with the associated benefits and impacts.

Table 4.6 - Landlord Channel: Existing and Potential Strategies and their Impact

Potential additional strategies	Benefits & Impact
• Eligibility for multi-residential apartment buildings larger than 4-plexes could be considered, with limits placed on the retrofit activity, not the building eligibility (i.e. in-suite direct install lighting)	• This will help to reach even more building types, install more measures and reach more lower income customers who rent
• Increased targeted marketing to landlords and property mgt associations explaining recent changes to the program and ease of entry	• Increase uptake for landlords & multi-residential
• Direct Install for multi-residential low cost measures	• Install more measures, reach more tenants

4.3.5 The Neighbourhood Power Smart Project Channel

The Neighbourhood Power Smart Project channel was born out of a community-based approach which was originally an outreach strategy in which Manitoba Hydro worked with local community organizations, housing groups, associations, and MLAs to find opportunities and expand reach of the program.

Manitoba Hydro now provides funding to the North End Community Renewal Corporation and the Brandon Community Renewal Corporation so they can hire, train and manage local canvassers who do door-to-door outreach in the communities, attend local events, connect with local groups with the primary objective of marketing the program, and recruiting applicants.

The skill set required to do this work is unique – the canvassers require sales skill as well as the communication and social skill to build trust and establish a rapport with the target demographic.

The community canvassers help not only to sign up applicants, but support customers through the entire process (e.g. helping the applicant complete and submit the paperwork, attend the in-house energy audit to be there for additional support and assist the applicant with the follow up paper work required) and is a primary contact for the applicant when they have any questions or concerns about the work to be done on their home, contractors in their space, etc. This facilitation and support role is valuable for assisting customers and ensuring they complete the work on the projects.

The results to date for this channel are minimum compared to the other channels, with 36 single detached homes completed to date (<1% of total), and 111 applications received since November 2012.

The recent addition of the Street-by-Street events has resulted in 43 new applications being received since May 29, 2014 (38% of total program to date within the last three months).

Street-by-Street Approach

The Street-by-Street approach is a neighbourhood based outreach strategy. Manitoba Hydro selects specific blocks (50-60 homes each) within targeted communities to host a street event. Communities to select for the street-by-street approach are selected by looking at maps, consulting with community groups, looking at customer data and previous participation to identify which streets would benefit most from additional outreach.

Media and local community is contacted and notified in advance. During the street event the Manitoba Hydro program manager, staff, along with the local canvasser are in attendance, there is a branded tent, vehicles, staff are wearing t-shirts and have application forms on hand to help customers apply on the spot. According to the program manager, these events have helped to build momentum and drive word of mouth promotion. It is effectively using the community-based social marketing tactic of "your neighbours are doing it" to help build confidence and trust in the program.

Following the event, the program staff join the community canvasser to knock on doors in the neighbourhood. It has become a channel for Manitoba Hydro staff to connect with the customers and answer their questions first hand and help them to understand that the offer is true.

General Community Outreach

Recognizing the importance of leveraging as many organizations, networks and community touch-points as possible and that there is a need to move beyond the door-to-door canvassing, Manitoba Hydro is considering whether it makes sense to engage additional community groups further. In addition, they are working internally on a community strategy that includes working directly with community centers and doing pilot events at local grocery stores. For example, on the first Tuesday of every month the Safeway store in the William Whyte complex offers 10% discount off customers' grocery bill. Manitoba Hydro has leveraged this opportunity to connect with their target market by having staff on site handing out AEP reusable bags with program information.

Recommendations

1. Ensure through recruiting or training that partnering NGOs and community based organizations have the specific skills and expertise required to recruit and support (unique skill set – combination of sales experience and ability to relate to this specific community and demographic);

2. Engage and train social agencies and traditional poverty relief organizations who already work with target to sell program & support clients through the application (i.e. meals-on-wheels, senior orgs); and

3. Continue to participate in regular workshops/events to engage and update stakeholders working with lower income customers.

4.4 ENERGY EFFICIENCY MEASURES OFFERED

The AEP is offering a good range of energy efficient products and services, mainly covering heating equipment, building envelope, hot water and lighting (Table 4.7). Furthermore, the program management is seeking opportunities to expand the product list, the newest additions being drain water heat recovery and light-emitting diode lighting (LEDs).

Although the program offering is extensive, the reviewers have identified several additional measures that are worth considering. Because of the project's budget constraints, this is a fairly high level overview of potential opportunities, and further analyses would be required before including them in the program.

The main gap in the current offering is the lack of a good alternative for homes heated with electric baseboards. As we'll discuss further in a following section, the AEP is getting far less electric-heated participants than their actual market share, and savings per participant are also lower than for gas customers. Air source heat pumps are definitely worth considering as an addition to AEP's offering, both to increase participation rates and depth of savings for electric customers. Appliance replacement is part of other programs (e.g. OPA), and should be considered as a way to drive electrical savings cost effectively by utilizing the existing infrastructure in place for the Refrigerator Retirement Program.

Table 4.7 - Current AEP Offering and New Opportunities

End Use / Component	Actual Offering	Current Additions	Worth Considering
Heating equipment	Gas furnaces (AFUE 94%) and boilers, thermostats (with equipment replacement), fuel switching[24]		Air source heat pumps, furnace/boiler tune-ups, thermostats and controls
Building Envelope	Insulation upgrades, caulking (+caulking gun), window films		Blower-door assisted air sealing
Hot water	Showerhead and aerators, pipe wrap	Drain water heat recovery is waiting for approval and should be implemented in the near future	High efficiency water heaters
Lighting	CFLs (up to 6)	Light-emitting diode lighting (LEDs) are currently being distributed to AEP's energy advisors and will be available soon	
Appliances / Electronics	Fridge/Freezer removal (through Refrigerator Retirement Program)	Smart power strips are under consideration as a potential addition	Energy Star fridge/freezer replacement
Behavioral	Home audit and one-on-one assistance		Behavioral component
Misc. Measures	Safety caps, socket gaskets, fridge thermometer, window kits, carbon monoxide detectors (with furnace upgrades)		Carbon monoxide detectors (for all furnaces/boilers) and smoke detectors (as an health & safety measure)

[24] Although there is no fuel switching incentive per se, the program's offering for furnace replacement is also available to electric, oil, propane or coal customers that wish to switch fuel and are located in a gas territory. Households that do not have access to gas can opt for an electric furnace.

4.4.1 HEATING EQUIPMENT

Gas furnace replacement is an important measure for the program; 40% of all AEP participants (and 52% of gas heated participants) are receiving a new furnace through the program.

There is no equivalent offering for electric heated homes, except for switching to gas, which can be prohibitive if there is no ducting system in place (as is the case for homes with baseboard heating) and impossible if the home is not located within the gas service area. Electric low income customers represent 44% of the target market, but only 22% of AEP participants. While the higher price of electricity might have induced some improvements in building envelope compared to gas customers and thus reduced the potential for insulation upgrades, it is fair to assume that electric customer participation could be increased with a more appealing and comprehensive offering.

Air source heat pumps could help provide deeper savings and higher electric customer's participation. They could be offered on the same basis as furnaces, with fixed monthly payment representing a share of the total cost. Air source heat pump technology has evolved tremendously over the past decade, providing more efficient and reliable heat, especially for colder climates. Cold climate heat pumps have been or are being tested in places such as Yukon, Alaska and the U.S. Northwest[25]. The Canadian Centre for Housing Technology recently tested a cold climate air source heat pump using R-2000 test houses, and the ASHP was able to meet all heating demands even on the coldest day (average outdoor temperatures of -19^{o}C), with a system COP[26] of 1.5.

The Northeast Energy Efficiency Partnerships (NEEP) developed a cold-climate air source heat pump specification which goes beyond the current HSPF metric to help identify the best units for very cold climate applications. It should be noted that Manitoba Hydro is currently testing a heat pump that meets the specifications outlined by NEEP with results expected back once the heating season has ended.

As can be seen on figure 4.8, a Yukon market characterization study indicates that theoretically an ASHP specifically designed for cold climates can maintain a fairly high coefficient of performance even at very

[25] An important pilot project was conducted in the Northwest which included onsite metering, billing analysis, and lab testing. Lab testing compared well with actual field measured coefficients of performance (COPs) across a range of temperature conditions and largely validated that manufacturer ratings are accurate. With seasonal COPs ranging from 2.4 to 3.4 (average of 3), the inverter driven technology delivered high performance across the Northwest. (Ecotope Inc., 2014. Final Summary Report for the Ductless Heat Pump Impact and Process Evaluation, Northwest Energy Efficiency Alliance)

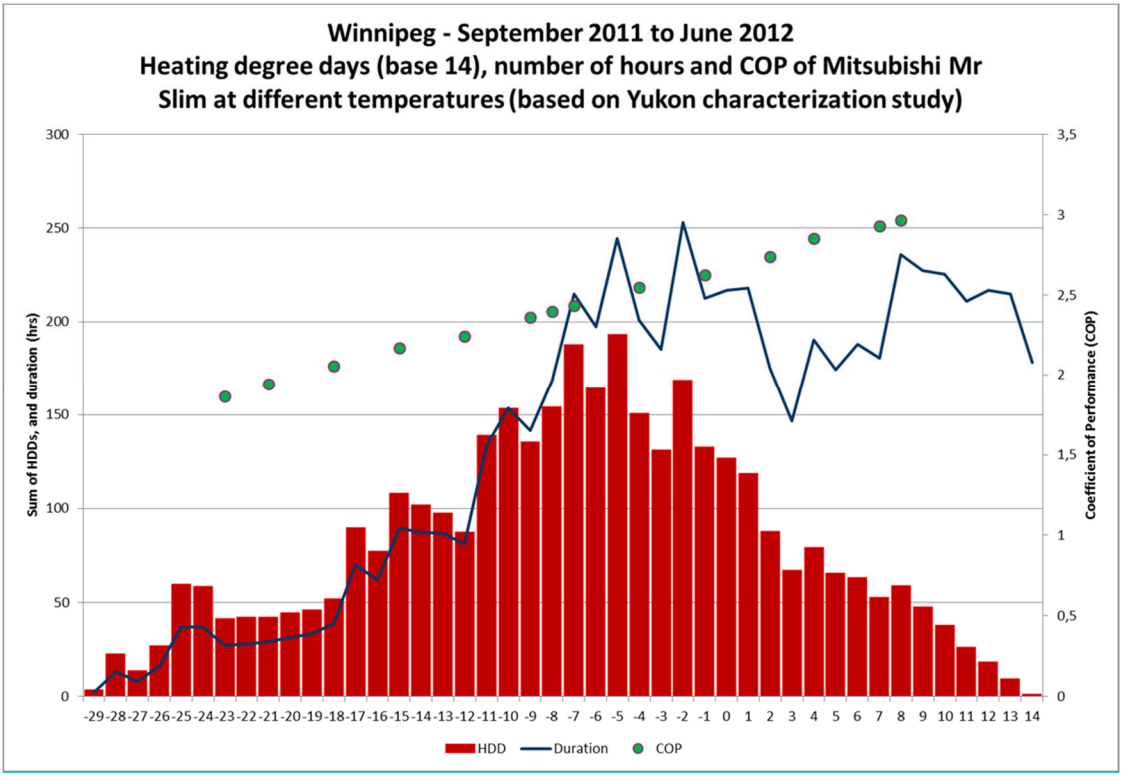
[26] COP values notably include electricity used by fans, which were operating continuously for ventilation. (CMHC, 2014. Performance Assessment of a Cold-Climate Air Source Heat Pump, Canada Mortgage and Housing Corporation)

cold temperatures (in this case, a COP around 2 at -20°C). Furthermore, the bulk of heating energy requirements actually happens at much higher temperatures during a typical winter. In Winnipeg, 75% of heating degree days (HDDs) occurs at temperatures above -12°C, at which the ASHP is even more efficient. Performance results from Manitoba Hydro's current field testing will verify to what extent savings estimates based on manufacturer-reported data are achieved.

At extremely cold temperatures, supplemental heating is required to ensure comfort. This heat can be supplied by existing baseboards or by an electric resistance in the ASHP itself. Areas where heat is not supplied by an ASHP head would also need supplemental electric heating. ASHPs procure little to no peak savings, but may be cost-effective on energy savings alone, depending on energy versus capacity avoided costs.

Ductless ASHPs also work better with homes that have an open interior configuration. For homes that do not have an open interior, which is the case for most of the low income homes in Manitoba, multi-head systems would be required to heat the entire home. This would lower the cost-effectiveness of the ASHP system.

Figure 4.8 – Cold-Climate Air Source Heat Pump Performance[27]



Manitoba Hydro is following this technology and has been field monitoring ASHPs (both conventional and cold climate design) to determine their seasonal efficiency and reliability in harsh operating conditions. Manitoba Hydro is currently monitoring the Mitsubishi Zuba-Central, and plans to test additional models in the near future. We recommend expanding the field monitoring to include models from several manufacturers, and choose those models that are particularly well suited for very cold climate operation.

Apart from electrically-heated homes, there is also a gap in the offering for households that do not replace their heating equipment, either because they are not opting for the AEP replacement offering or because their equipment does not qualify (already high efficiency, other fuels used). In these cases, tune-ups, thermostats and controls (e.g. boiler resets) could be provided[28]. Tune-ups, in particular, are a low-cost measure and are routinely offered by other low income programs. They can provide cost-

---

[27] Theoretical performance based on manufacturers' data.

[28] Electronic thermostats and controls are actually offered to participants that do replace their heating equipment.

effective energy savings and also make sure the equipment is working properly, procuring increased safety benefits and reduced future repair costs.

4.4.2 BUILDING ENVELOPE

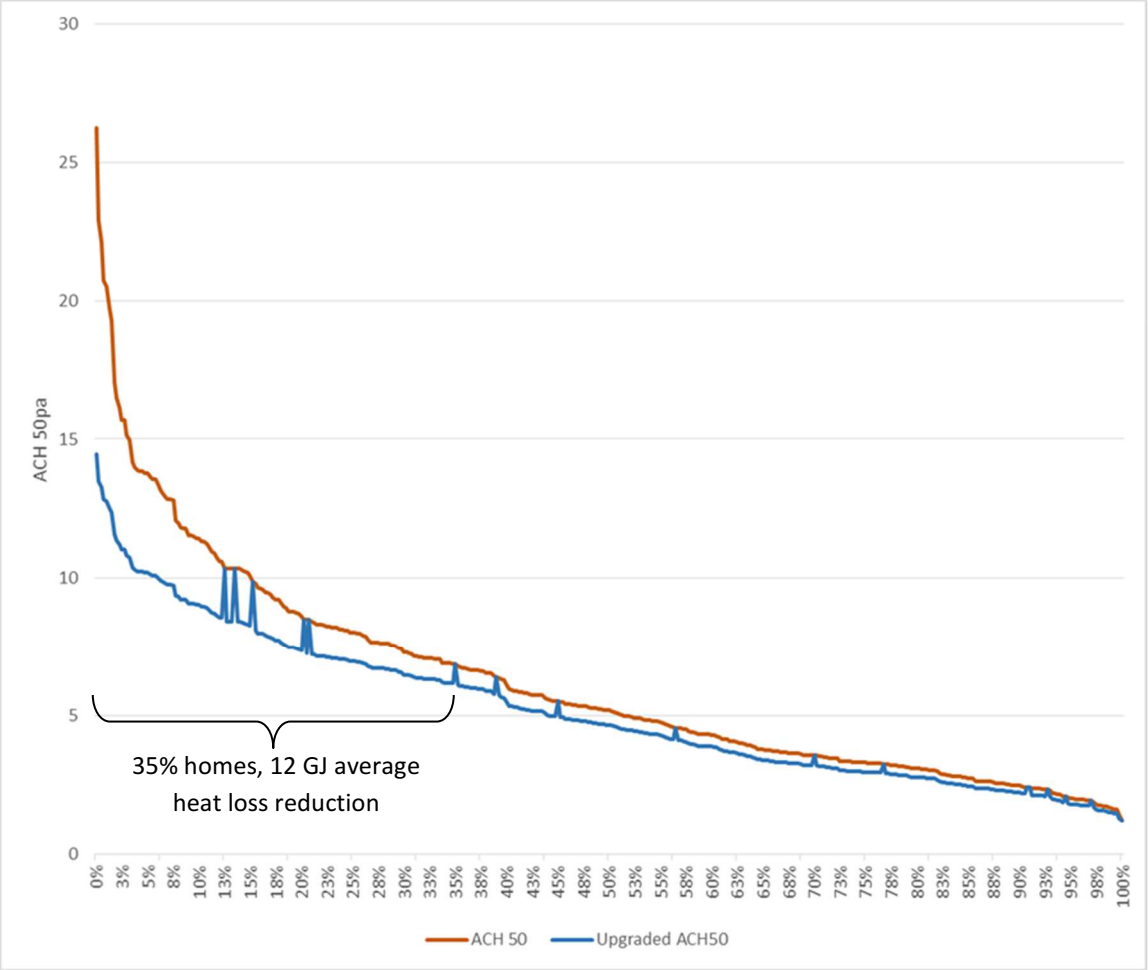
Insulation upgrades are available for homes with low attic insulation (R30 or less) or no wall/basement insulation. AEP is achieving a high rate of 75% of homes that receive some kind of insulation upgrade[29]. Attics are insulated to R50, walls to R12 and basements to R24. Other insulation upgrades can be accepted on a case by case basis, for example if the existing wall or basement insulation is poor and there is some opportunity to upgrade it. The average insulation upgrade costs $3,700 and the largest project so far cost $16,000. There is no program limitation on the size or cost of insulation jobs.

Professional draftproofing is currently limited to upgraded components. For example, if attic insulation is added, draftproofing will be conducted on the attic floor, but not on other components such as windows and basement headers. There would be an opportunity to expand draftproofing for houses with very high leakage. According to low income ecoENERGY air leakage reduction targets, the 35% leakiest homes could reduce heat losses by 12 GJ on average (Figure 4.8). Air leakage reduction obtained with professional blower-door assisted draftproofing can actually be much higher than these targets.

There are currently no blower door tests in the AEP programs. This can be an issue because leaky houses may be harder to identify. Draftproofing is also more efficient when conducted using a blower door unit to clearly identify the main sources of air leakage (which can fluctuate as draftproofing is performed). Finally, air leakage has to be monitored to ensure that draftproofing does not create new problems (excessive moisture, air quality, backdrafting). Adding blower door testing during the audit, retrofit and quality control phases would increase the program costs. This has to be balanced with the additional savings that professional blower-door assisted draftproofing would procure.

[29] Unfortunately, no breakdown by insulation component is available.

Table 4.8 – Actual and Potential Air Changes per Hour at 50pa (ACH50) of Low Income Homes in Manitoba (401 ecoENERGY files)



4.4.3 HOT WATER

The AEP is offering traditional low cost water saving and pipe insulation measures. Additional saving potentials could be tapped with more intensive measures. The AEP management is working to include drain water heat recovery and is waiting for approval. This measure is already accepted in the Power Smart program designed for electric customers in the able-to-pay market, and it can offer considerable savings especially for larger families. We strongly support the addition of this new measure. We recommend that training be offered by the program and be mandatory for participating contractors to ensure proper installation.

Efficient water heaters could also be considered, although these units usually experience high turnover rates because of short effective useful life (which means that a lot of them would have been replaced anyway).

4.4.4 LIGHTING

Compact fluorescent lighting (CFLs) has been offered for quite a while, at first with strong utility incentives, and now as a more mainstream lighting product. This new market baseline, combined with more stringent lighting efficiency regulations, has pushed innovative programs to turn to the next generation of efficient lighting, the light-emitting diode lighting (LEDs).

LEDs are more efficient than CFLs but also have a much longer useful life, present no disposal issues and operational restrictions in cold environments as CFLs do, and have a broader range of application. The higher upfront cost, which has already dropped dramatically, is expected to decline further over the next 15 years.

The review team are pleased to learn that the AEP is deploying LEDs and that they should be offered soon to AEP participants.

4.4.5 APPLIANCES / ELECTRONICS

Old refrigerator removal is currently offered to all Manitobans, including low income households, through the Refrigerator Retirement Program. The program offers free pickup of old units plus a $40 incentive. It is mostly targeting secondary units that do not need to be replaced. Utilizing the existing infrastructure to both remove and deliver new appliances, the AEP program could offer Energy Star appliance upgrades to low income households. Advances in refrigerator efficiency have created opportunities for upgrade replacements before end-of-life, especially in the low income market where units tend to be kept much longer. A co-payment and financing offering similar to what is in place for furnace replacements in the AEP program, could help pay part of the replacement costs.

Smart power strips are another opportunity to address the appliances and electronics end use. These strips help control phantom loads from peripheral devices such as printers, DVD players, and monitors by shutting down completely the power to those devices that would otherwise go in standby mode. This is done automatically by sensing the change in current draw from the main device (e.g. desk computer) using the “control outlet”. This is a relatively easy and cheap measure but should be put in place during the visit by the Energy Advisor to make sure it is installed properly and that energy benefits are maximised.

4.4.6 BEHAVIORAL COMPONENT

The AEP offers one-on-one assistance to program participants during the energy audit. While this certainly brings some savings from changes in consumption habits, the program could greatly benefit from a true behavioral component.

Studies have shown that low income consumption habits are very diverse, ranging from frugal lifestyle to over-consumption. A behavioral component would ensure that participating households are engaged in energy conservation. A behavioral component may include elements such as a home energy report, web-based interactive tools, goal setting and progress tracking, and tailored offerings to participating customers to really induce long-term changes in consumption patterns.

However, as there can be important fixed costs to set up such behavioral programs, the AEP participants alone would probably not be sufficient to bring cost-effective savings, but this component could be offered to other market segments as well.

4.4.7 MISCELLANEOUS MEASURES

Carbon monoxide detectors are provided as a health and safety measure to participants that receive a furnace replacement. Manitoba Hydro should consider extending this measure to all dwellings with gas combustion equipment in place, whether this equipment was installed with the AEP or not. Radon testing kits and smoke detectors could also be provided, and existing smoke detectors verified, for all participants. While these products and services bring no energy savings, some are common in low income programs as health and safety measures. Since AEP staff are visiting homes for outreach and audits anyway, these measures can be provided at lower incremental costs. Manitoba Hydro could partner with external organizations (e.g. provincial or federal agencies, fire departments, local governments, etc.) that are concerned with health and safety issues to cover these extra costs.

4.5 CO-PAYMENTS

Co-payments from low income participants are only required for furnaces and boilers. All of the other products and services are free of charge for the participant. This generally free offering is in line with best practices for low income programs.

The average natural gas furnace replacement costs approximately $3,600. Of this amount, $3,030 is being covered by the AEP and $570 by customer contributions through a $9.50 no interest monthly

payment over five years[30]. With current rates and estimated average savings for furnace replacements, this offering is cash-flow positive from day 1 for the participant[31]. Savings could be reduced by as much as 48% before the replacement would stop procuring net bill savings. This co-payment and built-in financing offering is well balanced, giving to participating customers the opportunity to replace their old heating equipment with a net benefit on their short-term bills.

Boiler replacement costs approximately $8,500, of which $3,000 is covered by the AEP through a grant. The participant must cover the remaining $5,500. There is no integrated financing offering, although financing is available through other programs targeting the "able-to-pay" market (Power Smart Residential Loan, Power Smart PAYS Financing). The share of the total cost that must be supported by the participant is much higher (about 58% for boilers versus 16% for furnaces). We have seen that the number of boiler replacements within the AEP is small. This may be explained in part by the fact that boilers could be kept much longer than furnaces, generating lower replacement rates, but the lower incentive and the lack of a tailored financing offer for low income customers may also explain these results.

Table 4.8 – Summary of Co-Payments in AEP

Measure	AEP Offering / Co-Pay	Comments
Furnace (94% AFUE)	Participant must pay $9.50/month during 5 years[32]	• Well balanced approach
Boilers (85% AFUE)	Participants receive a grant[33] of $3,000, must pay the balance of $5,500 (financing available through other programs)	• Consider simple financing plan in AEP as per furnaces • Incentive share of total cost is low
All other upgrades & audit	Free	• In line with best practices

[30] Manitoba Hydro's cost for offering the loan (approximately $60 for administration cost, plus the interest cost) is covered by the program.

[31] Bill savings are estimated at $219 / yr. for furnace replacement only, and $357 / yr. for furnace replacement and insulation.

[32] Down from $19 a month since August 2013.

[33] Up from $ 2,500 since August 2013.

4.6 CUSTOMER BILLING ASSISTANCE INITIATIVES

Manitoba Hydro's customer billing assistance initiatives include a broad spectrum of activities and strategies to support their customers who struggle with making timely payments. In 2009, a review of the Bill Assistance program was conducted. This report identified and described the activities listed below as key components of Manitoba Hydro's Bill Assistance program:

- Payment arrangements (162,000 payment arrangements totaling approximately $120 million are made annually[34]);
- Select your own payment date;
- Equal payment plan (29% of customers have taken advantage);
- Late payment charges may be reduced or waived;
- Alternative payment methods;
- Defer reconnection fee;
- Limits of disconnection;
- Crisis intervention (i.e. Neighbours helping Neighbours);
- Customer rebates & DSM;

In 2010, Roger Colton[35] identified rate affordability, arrearage management, crisis intervention, and energy efficiency as key areas of a program. Of these areas, Manitoba Hydro's Bill Assistance programs hit on all of these areas except rate affordability, which tends to work against energy efficiency and there is no clear precedent of success in Canada.

There is significant coordination between the Affordable Energy Program and Bill Assistance program including:

- Affordable Energy Program (AEP) staff follow up with former Neighbours Helping Neighbours participants on a weekly basis to help answer customer questions, while urging participation in AEP;
- A mandatory application to AEP is required by customers when seeking a grant and AEP staff follow up with grant recipients to apply to the program;
- Currently use the customer data and contact info from credit and billing to target customers for AEP. Some recent examples include a direct mailer letter to high consumption customers and the use of Credit's auto-dialer to reach customers in arrears with potential energy efficiency upgrades; and
- AEP staff worked with Credit and Recovery to develop criteria and questions that will be used to increase referrals to the Affordable Energy Program from customers who call into Credit and Recovery.

---

[34] Schedule A - Terms of Reference 038217, External Review of the Affordable Energy Program

[35] Colton, Roger, and Sheehan Fisher (2010). *Home Energy Affordability in Manitoba: A Low income Affordability Program for Manitoba Hydro.*

One recommendation for aligning AEP and Bill Assistance even more tightly would be to automatically enroll customers in AEP once they have been identified as challenged by paying bills or referred to NHN.

5. EVALUATION FRAMEWORK

This section deals with the evaluation of energy impacts and the cost-effectiveness framework. Manitoba Hydro is using, for the AEP, an evaluation plan that establishes algorithms and deemed savings to use to quantify energy savings. The reviewers conducted an in-depth review of these assumptions, as well as corresponding program documentation (e.g. cost-effectiveness calculations). These analyses are presented in sub-section 5.1.

Although savings for some specific measures might need to be adjusted, our assessment is that the overall level of savings seems reasonable. A potential weakness of AEP's approach is that these impact evaluations rely solely on deemed savings and algorithms. It would be recommended that these estimates be tested with hard data such as billing information to confirm the level of savings. Sub-section 5.2 proposes some complements to the current evaluation activities.

The last sub-section takes a look at the cost-effectiveness framework at a higher level and covers topics such as the choice of metrics, the hurdle rate and the inclusion of non-energy benefits.

5.1 SAVINGS ASSUMPTIONS

As we indicated earlier, our general assessment is that overall savings assumptions seem reasonable. Some measures could have greater savings (faucet aerators), while some could have their savings reduced (CFLs, to account for the new regulation), but these adjustments would likely counter-balance themselves to a certain point. Also, some factors seem to be accounted for, even though it is not explicitly included in the algorithms (e.g. adequate temperature balance point of heating degree days used for insulation upgrades). Table 5.1 presents detailed findings and recommendations for each AEP measure, and discussions on specific measure assumptions are presented in sub-sections afterwards. Our main recommendation is to better document some of the assumptions used in algorithms and some of the deemed savings.

Apart from savings, we note that lighting replacements (i.e. future avoided replacement costs of baseline lighting due to the longer effective useful life of efficient lighting) may not have been included in the cost-effectiveness analysis. It would be important to adjust the cost of efficient lighting downwards to account for this benefit, especially as the AEP is making the switch to LED lighting that have a very long useful life.

Table 5.1 – Review of Savings Algorithms and Assumptions

Measure and General Assessment	Remarks / Recommendations
Insulation Algorithm is of similar nature than other TRM's algorithms and can provide a reasonable estimate of energy savings. Several key factors are insufficiently documented. Assumed heating system efficiency need to be confirmed for natural gas and electric systems.	Several adjustment factors are applied, with insufficient documentation. Cumulative impacts of errors in those assumptions could be significant. **The adjustment factors used in the algorithm should be fully documented.** Natural gas heating system efficiencies are assumed to be 83%. Manitoba Hydro indicated that this assessment is specific to low income households. **The reviewer questions this assumption and recommends validating the AFUE of natural gas AEP participants.** The impact of heat pumps on the average electric heating system efficiency is not accounted for. **Manitoba Hydro should conduct an assessment of the distribution of electric heating system type within the AEP participants**. When comparing AEP's algorithm for insulation savings to other jurisdictions' TRM, the C-Factor seems a correction factor applied to the HDD times 24 hours. **The reviewer recommends to review and document the C-Factor/HDD relationship, and to modify the balance point temperature for the calculation of HDD as required.** See below for additional discussion.
Furnaces and Boilers Algorithm applied for furnaces and boilers savings is reasonable. Algorithm in the AEP Evaluation plan should be updated to reflect the actual algorithm applied for savings estimates. Heating system efficiencies (existing and upgrade) should be revised.	The algorithms presented in the AEP Evaluation Plan and the spreadsheet used to estimate energy savings differ considerably. **The AEP Evaluation Plan should be updated to reflect the actual algorithm used and to present the assumptions used in those calculations.** **Manitoba Hydro could increase the confidence in the energy savings estimates by including the climate region (North/South) in the assessment of the archetypes heating requirements.** Baseline system efficiencies are significantly lower than expected. **Manitoba Hydro should document the AFUE of the system being replaced and update this assumption accordingly.** **The AFUE assumption for new furnaces should be revised to 94%.** See below for additional discussion.

Measure and General Assessment	Remarks / Recommendations
Combination of Insulation and Furnace Replacement Algorithm applied is deemed reasonable. Algorithm in the AEP Evaluation plan should be updated to reflect the actual algorithm used.	The algorithm applied for the calculation of energy impacts account for the specific home heating load, based on the heating system energy savings calculations, whereas the Evaluation Plan applies a uniform heating load in its calculation. **The Evaluation Plan should be updated to reflect the actual algorithm used to calculate the impacts of combined insulation and heating system upgrades.**
Air sealing Undocumented deemed energy savings.	The AEP evaluation plan presents an algorithm, comparing energy consumption pre and post upgrades, to calculate energy savings. The program assumes uniform, deemed savings for air sealing for all participants receiving insulation and/or heating system upgrades. Manitoba Hydro assumes that additional energy savings come from closing up the chimney during a furnace retrofit and additional draft-proofing above and beyond the insulation itself. The savings derived from air sealing is undocumented. **Manitoba Hydro should document the assumptions used to calculate the deemed savings for air sealing measures, and apply the savings to the appropriate measure (i.e. for heating systems improvement or insulation as appropriate).** **The AEP Evaluation Plan should state the deemed savings from air sealing measures.**

Measure and General Assessment	Remarks / Recommendations
Compact Fluorescent Lighting Algorithm is reasonable. Undocumented assumptions. Impact of federal regulations not included. Cost/benefits analysis should account for full measure life.	The algorithm applied for the calculation of energy savings from CFL is reasonable. However, there are several undocumented assumptions related to the hours of use and interactive effects factor. **The AEP Evaluation Plan should fully document the assumptions used in the energy savings calculation.** The impact of the federal regulation on General Purpose Lighting is not accounted for. The improvement in efficacy of incandescent light bulb should be included in the calculations. This would have a negative impact of around 35% on the energy savings. **The baseline wattage of bulbs should be updated to reflect the Federal regulation on General Purpose Lighting.** The impact of replacement costs in the cost-effectiveness calculations are probably not accounted for. The avoidance of annual replacement costs for incandescent bulbs should be included in the cost-effectiveness calculation. **The replacement cost of the baseline equipment over the duration of the conservation measure should be included in the cost-effectiveness analysis.**
Showerheads Algorithm is reasonable. Baseline information should be confirmed. The evaluation plan should present the deemed savings for faucet aerators and general methodology.	The algorithm used for the calculation of energy savings is reasonable. The baseline technology assumes a 2.4 USGPM showerhead. The reviewer considers this baseline flow rate as potentially high, and could potentially overestimate the energy savings. The algorithm applied assumes there is a single shower per household, potentially overestimating the energy savings. **Manitoba Hydro should validate the baseline assumptions for showerhead flow rates and the number of showers per household.**

Measure and General Assessment	Remarks / Recommendations
Aerators Algorithm is reasonable, but should be adapted to account for other factors. Key assumptions need to be documented. The evaluation plan should present the deemed savings for faucet aerators and general methodology.	The algorithm used for the calculation of energy savings is reasonable. The energy savings estimates should be updated to include a factor accounting for water that is used instantaneously (down-the-drain factor). Faucet aerators do not provide energy savings when faucet are used to fill a container or the sink. The algorithm assumes there are only two faucets in the household (one in the bathroom, and one in the kitchen). **The algorithm should be adapted to include a *Down-the-drain* factor to calculate energy savings from faucet aerators. The algorithm should be updated to reflect the number of faucets in a household.** Several key assumptions on faucet water use are insufficiently documented, leading to potential underestimation of energy savings. Manitoba Hydro's Assumptions indicates a 44.1 l/day/household water consumption from faucet. Other sources indicate a 84.8 l/day of *hot water* consumption at faucets. Other assumptions to be reviewed include the distribution of faucet water used between the kitchen and the bathroom as well as the proportion of hot water used. **Manitoba Hydro should review and document key assumptions for faucet water consumption.**
Pipe wrap Claimed savings are reasonable. Undocumented savings.	Energy savings from water heater pipe wrap are assigned a deemed value. There is no documentation for the energy savings associated with this measure, but it is comparable to values reported in other regions' TRMs. **Energy savings from water heater tank pipe wrap should be documented.**

Measure and General Assessment	Remarks / Recommendations
Peak Savings Coincident factors should reflect the specific end-use.	Peak capacity savings are calculated from a unique coincident factor for all measures in the program. Contribution to peak load reduction can vary significantly between measures, depending on the end-use – for example, a reduction in heating system consumption, which occur during the peak season, will have a higher coincident factor than savings that occur throughout the year such as lighting improvements. **Manitoba Hydro should document the peak coincident factors applied for the AEP project and assign values based on the end-uses affected by the conservation measures.**

INSULATION

The AEP Evaluation Plan applies a detailed engineering algorithm to estimate energy savings from insulation measures. Although the algorithm details differ from other jurisdictions' TRM, it has a similar nature as others found in the literature. The main differences are in the correction factors applied to estimate the energy savings.

The algorithm relies on several adjustment factors that are insufficiently documented:

- Air leakage factor
- C-Factor
- Construction factor
- R-Adjustment

Although individually the values seem reasonable, the review could not assess the cumulative impact of minor divergence between the assumed values and real-life situations. **The adjustment factors used in the algorithm should be fully documented.**

Natural gas heating system efficiencies used in insulation savings calculations are assumed to be 83%. Manitoba Hydro indicated that this assessment is specific to low income households. **The reviewer questions this assumption and recommends that the AFUE of natural gas AEP participants be validated.** A revision to the natural gas system efficiencies could positively impact the energy savings estimates.

Electric heating system efficiency is assumed to be 100% (baseboard heating). No provision for more efficient heating systems such as heat pumps has been included in the analysis. **Manitoba Hydro should conduct an assessment of the distribution of electric heating system type within the AEP participants**. A revision to the electric system efficiency could negatively impact the energy savings estimates.

The algorithm notably relies on the heating degree days (HDDs) to estimate energy savings. Manitoba Hydro applies Natural Resources Canada's definition of heating degree days based on a balance temperature of 18°C. This balance temperature has been considered as too high by several jurisdictions and utilities, and a balance point temperature of 15.5°C is being applied in several jurisdictions.

When comparing AEP's algorithm for insulation savings to other jurisdictions' TRM, the C-Factor seems a correction factor applied to the HDD times 24 hours. **The reviewer recommends to clarify and document the C-Factor/HDDs relationship, and to modify the balance point temperature for the calculation of HDDs as required.**

FURNACES AND BOILERS

The algorithms presented in the AEP Evaluation Plan and the spreadsheet used to estimate energy savings differ considerably. The AEP Evaluation Plan presents the energy savings as the difference between the consumption with a standard efficiency system and the consumption with a high efficiency system. The actual calculations for the energy savings are more detailed, and include several assumptions that need to be documented. **The AEP Evaluation Plan should be updated to reflect the actual algorithm used and to present the assumptions used in those calculations.**

The algorithm calculates the energy consumption of heating systems based on different heating requirement archetypes, by applying the system AFUE to the heating system requirement. The archetypes developed and used are deemed as sufficient. The reviewer has not evaluated the heating requirements of the archetypes.

Manitoba Hydro could increase the confidence in the energy savings estimates by including the climate region (North/South) in the assessment of the archetypes heating requirements. This would be a similar treatment as for the calculation of insulation savings.

The algorithm assumes uniform system efficiency of 60% for the systems being replaced. Although furnaces older than 20 years could have that level of efficiency, more recent conventional furnaces also eligible for replacement have an efficiency of 78%. **Manitoba Hydro should document the AFUE of the system being replaced and update this assumption accordingly.**

The algorithm assigns a 92% AFUE for the new furnaces installed, although the program installs furnaces with 94% AFUE. **The AFUE assumption for new furnaces should be revised to 94%.**

5.2 IMPACT EVALUATION

Manitoba Hydro conducts impact evaluation of the AEP on an annual basis. This evaluation is currently limited to a desk review of savings estimates using deemed savings and engineering algorithms.

There is a risk associated with using only savings estimates. Even the best engineering algorithms can't possibly account for all the factors that could have an impact on real life energy savings. For example, some low income households may manage electricity usage very aggressively by shutting down baseboard heating as they leave rooms. This would lead to much lower savings for some insulation jobs, but would not be accounted for by the algorithms[36].

Empirical impact evaluations, using real consumption data, would help ensure that savings estimates are in line with reality. Manitoba Hydro is currently working on billing analyses but hasn't completed any so far because of the difficulties associated with establishing a control group. We recognize that the low income population is not very large and difficult to identify before their participation to the AEP. However, it would be better in our view to conduct a billing analysis without a control group than having no analysis at all.

The control group's function is to account for unobservable influences on energy consumption. Presumably the greatest influence that can skew the results of an empirical study is the fact that people can invest in energy efficiency on their own even without participating to the program, and this effect would very likely be minimal or non-existent in a low income population. The main purpose of a first empirical evaluation would be to confirm the magnitude and reasonableness of savings estimates.

Another empirical mean of confirming savings for furnaces and boilers would be to conduct combustion tests before and after their replacement, to confirm starting and ending AFUE estimates. As we indicated, the AFUE estimate for existing equipment seems low, and this assumption might lead to slightly overestimated savings. Combustion tests, which include stack temperature and CO_2 level reading, would help confirm the magnitude of savings. These tests could be conducted before and after the installation of a new furnace or boiler.

5.3 COST-EFFECTIVENESS FRAMEWORK AND PROGRAM METRICS

Cost effectiveness screening and evaluation for AEP is conducted at the program level. On an annual basis, the program manager updates the program plan, reviewing measures offered by AEP, measures savings, incremental costs, program administrative costs and incentive levels. The overall cost

[36] We note that most of the low income ecoENERGY files have a modeled energy consumption that is higher than the real consumption.

effectiveness of the program is assessed at the end of each fiscal year. There is no screening of individual customer projects; when customers apply for the program and qualify based on their income levels, any qualifying measures are approved.

AEP reports and compares to plan on a myriad of metrics. For the cost-effectiveness tests only, Manitoba Hydro uses the Total Resource Cost (TRC) ratio and net present value (NPV), the Social Cost ratio, the Levelized Recource Cost (LRC), the Levelized Utility Cost (LUC), the Rate Impact Measure (RIM) ratio, the Net Utility Benefit (NUB) ratio, the Utility Net Present Value (Utility NPV), the Customer Payback, and the Participating Customer (PC) ratio and NPV. Table 5.2 presents a few of AEP's metrics.

Manitoba Hydro uses all the cost-effectiveness tests and other metrics in what is called a "balanced approach", meaning that no single test is used for screening and all test results are considered. This approach is used when developing programs for the mass market. The AEP, which was created to address the low participation levels of low income households, includes all measures that are available in the mass market retrofit programs, plus furnaces and boilers.

While this approach has its merits, it is difficult within this framework to assess the basis of measures selection / screening for the mass market, and its impacts on AEP's offering.

It can also be harder to make decisions such as including new measures that are not actually offered to the mass market, or accepting special projects (i.e. retrofit projects that are not fitting in AEP's specifications but would nevertheless be cost-effective[37]).

In our view, key metrics for the AEP would be (figure 5.1):

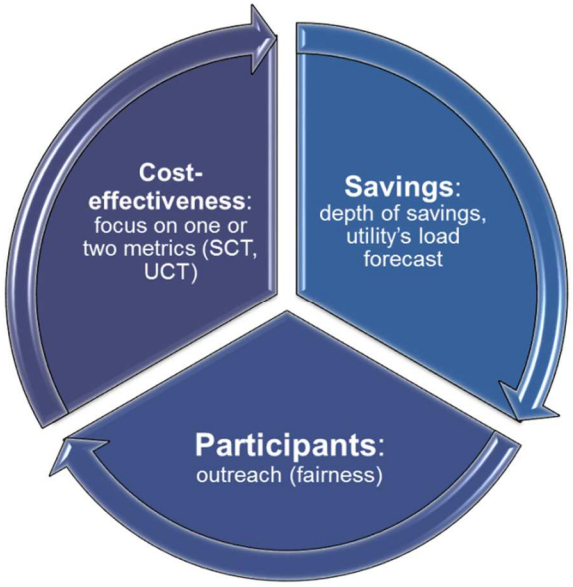
- **Participation**, a measure of the outreach the program achieved (and fairness to low income customers that pay for DSM activity through their rates);
- **Cost-effectiveness**, with a focus on one or two tests such as the Social Cost Test and the Utility Cost Test;
- **Savings**, both to evaluate the depth of savings by participant and the program's impact on the utility's load forecast.

[37] Walls and basements with low levels of insulation might be upgraded, even if the AEP normally only accepts uninsulated walls and basements. This is decided on a case-by-case basis, after talking with the contractor and evaluating savings that could be obtained. There is no formal cost-effectiveness testing.

Table 5.2 - AEP's Metrics (2012/13)

	Actual	Planned
Societal Cost (SC) Ratio	2.76	1.76
Net Utility Benefit (NUB) Ratio	0.85	0.50
Utility Net Present Value (Utility NPV)	($259,002)	$ (1,079,217)
Customer Payback (CP)	-	0.07
Participating Customer (PC) Ratio	2.82	2.14
Participating Customer (PC) NPV	$ 2,670,961	$ 1,984,423

Figure 5.1 – Key Metrics



Manitoba Hydro currently uses the weighted average cost of capital (WACC) as its hurdle rate (discount rate). The Public Utility Board asked whether a risk-free rate of return could be used when assessing low income DSM. As we've seen, a few jurisdictions are using a social discount rate with the TRC for their low income program, even though the more common practice is to use a single rate for each test (e.g. a utility might use the societal discount rate for SCT, and the WACC for TRC, regardless of the programs for which these tests are calculated).

In our opinion, the use of the Social Cost Test (with a risk-free societal discount rate) would be more appropriate for AEP[38] than modifying the TRC, as it would allow for a more comprehensive valuation of all the benefits this program brings to the Manitoban society (including societal benefits) while keeping a more coherent test calculation methodology across the DSM portfolio.

Benefits actually included in Manitoba Hydro's TRC are limited to measurable non-energy benefits (i.e. water savings). For its SCT, Hydro uses a 10% adder on energy benefits to account for unquantified societal benefits. There are a lot of benefits to account for in a low income program. On top of regular home retrofit benefits such as increased comfort, improved health, and greenhouse gas emission reductions, a low income program brings specific benefits such as better affordability, reduced arrears and disconnects, and reduced calls from customers. As we've seen, other jurisdictions are using adders as high as 25% for their low income program, or are quantifying and monetizing a broad range of non-energy benefits in their tests. Manitoba Hydro should consider using a higher non-energy benefit adder for the AEP.

[38] The use of the Social Cost Test doesn't need to be restricted to low income initiatives. Some leading jurisdictions are using the SCT for their whole portfolio.

6. MAIN FINDINGS AND RECOMMENDATIONS

Our high-level assessment of the Affordable Energy Program (AEP) is that the program is well managed and is achieving solid results. AEP is drawing from best practices in many aspects of its program design, including a generally turnkey approach, free energy efficiency measures (or small co-payment with no interest on-bill financing), direct install of low-cost measures during the audit, coordination with other low income programs, etc. Results in terms of participation rates, install rates and savings are strong. AEP also reaches to a large low income population by including both single and multi-family buildings, by using an adder of 25% on Low income Cut-Offs (LICOs) for eligibility and by offering both gas and electric saving measures.

The AEP program has a strong marketing plan that includes a mixture of advertising tactics delivered across different types of media as well as community-based social marketing activities and targeted marketing strategies by channel. The current marketing plan is very thorough as is. There are potential strategies and tactics that could be further leveraged to help increase successful uptake of the program.

For the majority of channels, there is a very high level of both application acceptance and follow through to successful completion of the project. When reviewing the process for the individual channel, a number of bottlenecks were identified that likely result in incomplete projects. Recommendations were suggested to help remove those potential bottlenecks and ultimately increase the number of completed projects.

The AEP is offering a good range of energy efficient products and services, mainly covering heating equipment, building envelope, hot water and lighting. Furthermore, the program management is seeking opportunities to expand the product list, the newest additions being drain water heat recovery and light-emitting diode lighting (LEDs). Although the program offering is extensive, the reviewers have identified several additional measures that are worth considering.

The main gap in the current offering is the lack of a good alternative for homes heated with electric baseboards. The AEP is getting far less electric-heated participants than their actual market share, and savings per participant are also lower than for gas customers. Air source heat pumps are definitely worth considering as an addition to AEP's offering, both to increase participation rates and depth of savings for electric customers. Appliance replacement is part of other programs and should be considered as a way to drive electrical savings cost effectively by utilizing the existing infrastructure in place for the Refrigerator Retirement Program.

Co-payments from low income participants are only required for furnaces and boilers. All of the other products and services are free of charge for the participant. This generally free offering is in line with best practices for low income programs. Boiler replacement uptake could benefit from a higher incentive level and integrated financing offering.

The reviewers conducted an in-depth review of savings assumptions, as well as corresponding program documentation. Our general assessment is that overall savings assumptions seem reasonable. Our main

recommendation is to better document some of the assumptions used in algorithms and some of the deemed savings.

Manitoba Hydro conducts impact evaluation of the AEP on an annual basis. This evaluation is currently limited to a desk review of savings estimates using deemed savings and engineering algorithms. There is a risk associated with using only savings estimates. Empirical impact evaluations, using real consumption data, would help ensure that savings estimates are in line with reality. Another empirical mean of confirming savings for furnaces and boilers would be to conduct combustion tests before and after their replacement, to confirm starting and ending AFUE estimates.

Our main recommendations to Manitoba Hydro are to:

1. Review the income eligibility paperwork required and consider allowing alternative government issued forms, instead of income tax CRA forms only.
2. Review the suggested improvements to the marketing plan and continue expanding the outreach to landlords and property managers specifically.
3. Consider eligibility for multi-residential and apartment buildings for both the landlord and social housing channel based on more limited retrofit activity (i.e. no insulation, but boilers).
4. Continue to engage and train social agencies and traditional poverty relief organizations who already work with low income customers to promote the program and support their clients through the application (i.e. meals-on-wheels, senior orgs) and continue to engage and update stakeholders working with lower income customers.
5. Align eligibility for bill assistance programs with AEP so that mandatory enrolment happens automatically once customers are identified as challenged by paying bills or referred to NHN
6. Review the current program offering and consider the addition of new energy efficiency measures, especially for electrically-heated homes.
7. Review some savings assumptions, as further detailed in section 5.1, and better document assumptions and deemed savings.
8. Add empirical evaluation and data collection methods (billing analysis, combustion tests) to actual evaluation activities to confirm savings estimates.
9. Consider using the SCT as the main cost-effectiveness tests, and review the benefits adder currently used for unquantified benefits.

APPENDIX A – PROGRAMS DETAILS

Detailed information about selected programs is presented below. Summary tables include the following elements: type of measure, eligibility criteria, targeted participants, type of building, innovation, program delivery, cost-effectiveness, and results.

BRITISH COLUMBIA

BC HYDRO ENERGY SAVING KIT		
Type of measure	FREE Energy Savings Kit offering simple ways to help save energy, reduce monthly bill, increase comfort • Compact fluorescent light bulbs (CFLs) • Weather-stripping • Fridge and freezer thermometers • A high efficiency showerhead • Faucet aerators (kitchen and bath), water heater pipe wrap	• Outlet gaskets • Window film • LED nightlight, fridge/freezer thermometers, • hot water temperature gauge, • $25 furnace filter coupon from Home Hardware *funded by Fortis BC, • Collateral set (Power Smart energy saving tips, referral card, survey, instruction manual).
Eligibility	BC Hydro customers who have a combined household income (which includes the income of every 18 years or older member in the household) must be below the Low income Cut-Off (LICO) as published by Statistics Canada. Proof of income required. Households (determined by service address) are not eligible to receive the program more than once every 10 years.	
Target	Homeowners, tenants and housing providers	
Type of building	Houses or apartment buildings, multi-fuel	
Innovation	Now includes kits for apartments and is available for housing providers. Customizable kits to help optimize uptake (i.e. asking how many showers, windows, etc.)	
Program delivery	Program is managed by BC Hydro and customer service and kit delivery are handled by their energy partner ecofitt. 1. Customer submits an online application, 2. BC Hydro program representative will follow up if required 3. Kits are delivered directly in the mail to the customer 4. Customer service and kit delivery is handled by their energy partner eco-fit	
Cost-effectiveness	The program needs to pass cost effectiveness but the provincial demand side management regulations allows the program a 30% benefit adder	
Results	Participation targets: 8,500 and 8,000 for 2014-2015 (declining since 15,000 participants peak in 2011) Over 70,000 kits distributed to date, approximately 35% market penetration Evaluation conducted in 2009 – 2010 fiscal year programs. The total (gross) estimated savings for vendor-assisted installations was approximately 359 kWh/year compared to 203 kWh/yr for self-installed kits (per kit)	

ENERGY CONSERVATION ASSISTANCE PROGRAM		
Type of measure	Personalized home energy evaluation, installation of energy saving products by a qualified contractor and personalized energy efficiency advice. 100% free for participants. Some homes may qualify for ENERGY STAR® refrigerator, attic, walls or crawlspace insulation. Evaluator reviews each home individually and determines which products the home is eligible to receive.	• Energy saving light bulbs • Faucet aerators for the kitchen and bathroom • Water-saving showerheads • Water heater pipe wrap • Door weather-stripping
Eligibility	• Combined household income (for every member of the household who is 18 years or older) below the Low income Cut-Off (LICO) as published by Statistics Canada.	• Eligibility for product installation is based on the existing efficiency of the participants' home, as well as a number of other factors, including heating fuel type.
Target	• Low income BC Hydro, FortisBC Gas and City of New Westminster account holders who are homeowners or tenants in a house. • Homeowners, renters, housing providers and aboriginal communities	
Type of building	• Detached houses, duplexes, townhouses and mobile homes, gas and electric mix • Apartments and condos are not eligible for the ECAP program. • Only electrically-heated or FortisBC gas-heated single family, townhomes and duplexes are eligible for insulation upgrades. Apartments, mobile homes and homes with other heating fuels are not eligible for insulation measures.	
Innovation	Partnership and coordinated efforts between BC Hydro and Fortis BC to allow for coverage for the program across the Province.	
Program delivery	• Program is managed by BC Hydro and the ECAP Contractor is Carillion Canada. • Application form, landlord consent form (if tenant is a renter) and the signature of the hydro account holder required to qualify 1. Paper application submitted to ECAP Program 2. Contractor visits are scheduled with the homeowner, first visit includes an audit/evaluation and install of eligible products. Multiple visits maybe required 3. If the home is eligible for advanced work, a work order for the eligible upgrades is created. Contractors or subcontractors would complete the upgrades on follow-up visits	
Cost-effectiveness	The program needs to pass cost effectiveness but the provincial demand side management regulations allows the program a 30% benefit adder.	
Results	Over 8,000 (as of June 2014) basic ECAP participants (approximately 40% of participation has come from nonprofit housing providers and 40% from aboriginal communities); 250 homes received insulation upgrades	

CALIFORNIA

PG&E ENERGY SAVINGS ASSISTANCE PROGRAM		
Type of measure	Provides prescriptive measures through a direct install program. Participants receive all feasible measures for which they qualify for free. Energy education Measures: Lighting (hard-wired Compact Florescent Porch Lights and Interior hardwire CFLs, screw-in CFLs, torchieres) • Occupancy sensors • Refrigeration replacement • Central and Window/wall A/C	• Central AC tune up • Furnace and water heaters repair-replacement (home-owners only) • Hot-water conservative measures (faucet Aerators, pipe wraps, low-flow showerheads/thermostatic valves, water-heater blankets) • Air Infiltration measures (caulking, door weather-stripping, outlet gasket, evaporative cooler covers, minor home repair) • Duct-testing and sealing • Attic insulation • Microwaves • Smart AC Fan delay relay with premium motor
Eligibility	Customers at or below 200% of federal poverty guidelines. Income adjustments for family size.	
Target	Owners and renters	
Type of building	Single-family, multi-family and mobile	
Innovation	Objectives: • **Reach all eligible low income customers** and give them the opportunity to participate in the LIEE program by 2020 • Increase collaboration among and leveraging of other low income programs and services • Aims at integrating LIEE programs with energy efficiency and other demand-side management programs	• Improve customer outreach by using **customer segmentation analysis and social marketing tools** (i.e. info available in 7 languages, multilingual television and radio campaigns, Bilingual (English/Spanish) bill inserts, multilingual collateral including door-hangers, postcards and one-page flyers, events and presentation, targeted direct mails, calls and text messages) • Develop **recognizable statewide branding** • Grow # of trained ESA program workforce
Program delivery	**Whole-neighborhood approach**: Outreach team leverages various local government and community organizations' programs and knowledge of their communities to promote the ESA Program and enroll customers. Program is managed by Richard Heath and Associates (RHA).	
Cost-effectiveness	2011: • TRCT 0.46 • UCT 0.58 • MPT 0.64	Current framework used to determine the cost-effectiveness of the ESA program does not adequately account for both energy savings and quality of life improvements, such as health, comfort, and safety benefits. 2015-17 cycle: ESA program cost-effectiveness Working Group to determine a list of health, comfort and safety criteria

Results	In 2012: 115,229 homes Savings: 37,48 GWh; 7,8 MW; 1,208,745 therms	Leveraging Success Evaluation: coordinate outside the IOU, including programs offered by the public, private, non-profit or for-profit, local, state, and federal government sectors (e.g. LIHEAP) that result in EE measure installations in LI households.

MAINE

MULTIFAMILY ELECTRIC HEAT AND LOW INCOME PROGRAM	
Type of measure	Weatherization and installation heat pumps (paid 100%)
Eligibility	Based on LIHEAP eligibility (resident's household size and income level)
Target	Owners
Type of building	Multifamily, Electric
Innovation	Focus on heat pumps Probably biggest (successful) cold-climate heat pump program in the country
Program delivery	• Conservation Services Group (CSG) delivery team to negotiate directly with property owners and installers + communication (highly directed program) • Cooperation with Statewide Maine Housing, Regional housing authorities and Department of Housing and Urban Development (HUD) who provided names of landlords • CSG would reach out to them directly (Direct call to owners), no marketing or other type of communication
Cost-effectiveness	Savings to investment ratio: 1.31
Results	•Estimated savings: annual average per unit 2600 kwh/y (26% reduction) •2200 units weatherized, 1900 installed heat pumps •3000 units in total •Program is closing because they upgraded all eligible buildings (18 months –1 January 2012 – 30 June 2014)

MASSACHUSETTS

MASS SAVE INCOME ELIGIBLE PROGRAMS	
Type of measure	• **Fuel Assistance Program** provides eligible households with help in paying winter heating bills to their oil, propane, wood or coal, gas or electric utility or source vendor. Special provisions are made for those households whose heat is included in their rent and those living in subsidized housing. • **Home Energy Assessment**: audit and direct install of CFLs, LEDs, fridge and RAC replacement • **Payment Plans** that help reduce arrearages for customers. If payments are made every month, the arrearage is reduced.
Eligibility	Fuel Assistance: Households with incomes up to 60% of estimated State Median Income are eligible for the Fuel Assistance Program, this qualifies participants for other income eligible programs. This year, LIHEAP will provide fuel assistance to low income households with annual incomes up to $61,664 for a family of four. Benefits vary depending on income levels.
Target	Homeowners and renters are both eligible for Fuel Assistance and other income eligible programs
Type of building	Single home (multi- fuel). Separate program exists for multi-family units.
Innovation	Collaborative approach between multiple utilities and community based organizations throughout the state to offer the suite of programs.
Program delivery	The fuel assistance program qualifies participants for the other income eligible programs. The Program receives federal funding and is managed by the DHCD in conjunction with 23 regional nonprofit and local government organizations.
Cost-effectiveness	All energy efficient measures are approved through a cost benefit ratio and must be cost effective
Results	In 2012-2013, Department of Housing Community Development served over 190,000 Massachusetts households through the fuel assistance program.

LOW INCOME MULTI-FAMILY ENERGY RETROFIT PROGRAM		
Type of measure	Prescriptive measures: • Air Sealing , Attic Insulation , Floor Insulation, Domestic Hot Water (DHW), Thermostats, Wall Insulation, Refrigerators, Electrical system considerations, Lighting upgrades	Custom measures: • Boiler replacement, Ventilation upgrade • All measures installed at no costs for participant
Eligibility	At least 50% of the development households have income at or below 60% of the Area Median Income.	
Target	Low income multi-family properties owned by public housing authorities, non-profit or for-profit organizations.	The program prioritizes developments with high-energy usage and developments where a planned renovation or energy upgrade offers a significant opportunity to obtain cost-effective energy improvements.
Type of building	One or more multi-family (5+ units) residential building, multi-fuel	
Innovation	Program requires that Applicants participate in benchmarking their building's energy usage and tracking usage post-improvements. The system used to do so is called WegoWise, an independently operated online tool specifically designed for affordable housing Applicants.	
Program delivery	The project is administered by LEAN and the projects (including assessments, analysis, assigning contractor, and QA) are managed by each utilities' lead vendor. Process from start to finish includes 6 steps.	1. Owner completes online application (ownership and building information). 2. Owner creates WegoWise account for benchmarking (building and energy usage data). 3. Program approves projects for building assessments. 4. Program gathers additional information if needed and completes building assessments. 5. Energy efficiency measures are selected based on cost-effectiveness, scope is approved and contractor is hired. 6. Energy work is completed (owner makes co-payment, if required).
Cost-effectiveness	The program funds only those projects that meet a cost-effectiveness test. Cost-effective measures are identified through a streamlined building energy assessment process and an evaluation protocol established under utility and energy efficiency service provider. Gas projects must cost no more than $14/therm saved (on average), Electric projects must have 5-7 year payback.	
Results	Program is 3 years old, with 339 projects completed to date in almost 30,000 units.	

NEW HAMPSHIRE

NHSAVES@HOME WITH HOME ENERGY ASSISTANCE		
Type of measure	• **Whole-house audit** • Incentives for **weatherization and learning** how to improve energy usage habits. • Up to $5,000 (increased to $8,000 in 2013-2014) in energy efficiency improvements to income-qualified households • All products and services provided by HEA are provided to qualified participants free of charge	Measures provided: • Air sealing • Health & safety measures (bathroom fans/vents, etc.) • Insulation • Lighting • Programmable thermostats • Refrigerators • Space heating equipment • Water heating equipment
Eligibility	• Eligibility includes customers who meet the eligibility criteria for Electric Assistance Program, Fuel Assistance Program, DOE Weatherization Program or anyone living in subsidized housing; determined by total household income and number of household members • Max gross household income established at 200% of the Federal Poverty Guideline (FPG)	• Electric or gas bill from one of the participating utility • Additional funds available to customers who qualify for the NH Weatherization Assistance Program. • Customers eligible for DOE Weatherization and who authorize data sharing between their Utility and CAA, will be eligible for funding from both programs
Target	Owners and tenants. Priority: electric heat (first priority) and high usage (second priority)	
Type of building	Single unit, electricity and gas.	
Innovation	Maximizing Potential Benefits To Income Eligible Customers Collaboration with the Community Action Agencies (CAAs) to bring more services to larger target audience	Marketing priority is based on electric heat and high usage, and then to all EAP participants
Program delivery	Administered by the five Community Action Agencies (CAA)	
Cost-effectiveness	Combined benefit-to-cost ratio for residential sector programs must be 1.0 or greater. TRC Benefit/cost, HEA programs: 1.21 – 1.62 (according to CORE plan 2013)	Utilities file periodic updates on the performance of the programs (including expenditures, resulting projected energy savings from implemented measures, and the number of customers served)
Results	Annual savings 956,949 kWh (in 2013) Program lifetime savings 12.6 GWh (2013 report) Participation 2012 (918): Multi-family 103, Statewide Single family 815	Participation 2013 (1,175): Multi-family 381, Statewide Single family 794

NEW YORK

EmPower NY		
Type of measure	**"Whole house" approach":** Home visit by BPI accredited participating contractors. EE measures installed: insulation, draft reduction, and upgraded lighting and replacement of inefficient refrigerators and freezers with ENERGY STAR certified models. Contractor may evaluate need for additional measures to reduce heating cost	Health and safety checks of carbon monoxide and smoke detectors, and more. Tips and strategies on how to better manage your energy usage on a daily basis Landlord investment may be required if EmPower is providing services to multiple units in a multifamily building.
Eligibility	Live in a building with 100 units or fewer. Eligible for regular HEAP benefits OR Participate in a utility payment assistance program OR	Household income is below 60% of the State Median Income. Must pay into SBC OR heat with oil, propane, kerosene, wood or coal.
Target	Homeowners or renters. Program covers fairly rural areas across NY state mostly owners (e.g. seniors low income owner)	70% owners – 30% renters (participate mostly because owner does not respond to NYSERDA solicitations)
Type of building	Electricity (incl. heating), Heating (oil, propane, kerosene, wood or coal)	
Innovation	Established reliable and qualified network of specialized contractors and agencies: • Accredited contractors (BPI) • QA and QC assured by independent inspectors	• Collaborative planning and on-going communications among key stakeholders. • More flexibility than Federal program, can choose different measures and champion energy innovation (educating people while doing work in their households)
Program delivery	• Honeywell International assists NYSERDA in running the EmPower New York program (energy efficiency professionals). They manage the process and send out qualified participating contractors. • Services provided by a BPI accredited contractor – 150 participating contractors in 2014 • New contractors can request waver for 6 months	• If approved, participant will be notified (within 4–6 weeks) and contacted by an accredited BPI contractor to schedule the energy assessment and upgrades. • Contractors perform final tests to ensure that the energy efficiency measures are performing exactly as they should • Quality Assurance and Quality Control inspectors work independently from participating contractors (QA by CSG)
Cost-effectiveness	Installed cost of each EE measure must meet an SIR of 1.1 or greater. Depending on the funding source, a TRC of 1.0 or greater may be required for specific measures. Program Evaluation currently on going.	

Results	Home provided with electric reduction measures saved an average of 1,172 KWh annually, or 13.1% of their electricity usage. Homes provided with home performance measures saved an average of 172 therms annually or 12.3% of their natural gas usage.	2010-2011: Served 11,277 homes with electric reduction services only, at an average cost of $866 and 4,076 homes with electric reduction and home performance (i.e., weatherization) measures, at an average cost of $3,126 per home. ~12,000 participants in 2013 (50% for improved insulation, 50% for electric reduction)

ONTARIO

HOME ASSISTANCE PROGRAM		
Type of measure	Program free to participants. Benefits are capped at $13,000 per home, and overall program average is closer to $500. Upgrades are based on an audited needs assessment. The program has two levels of home assessment: 1. Basic (plus or minus electric hot water measures) which includes lights, appliances, power bars, timers and hot water measure assessments and installs; and, 2. A weatherization audit, for electrically heated homes, which includes a simplified ecoEnergy home modelling audit to determine the TRC effectiveness of insulation and weatherization upgrades.	Measures include: • Compact fluorescent light bulbs(CFLs) - multiple varieties for virtually all domestic use • Smart timer power bar and block heater timers • Appliances – fridge, freezer, window a/c, and dehumidifiers • Hot water conservation measures (electric hot water) – aerators, showerheads, pipe wrap, tank wrap • Programmable thermostats (electric heat) • Insulation and draft proofing upgrades (low rise electrically heated homes) – batt, cellulous, and spray foam for basements, walls, headers, and attic
Eligibility	Combined household income (which includes the income of every 18 years or older member in the household) must be below 135% of Low income Cut-Off (LICO), as published annually by Statistics Canada (using local population criteria of urban areas of 500,000 or greater throughout the province). Applicants must either live in social housing, on a first nations reserve, or be listed as either first or second on the utility bill. HAP income eligibility is automatic with acceptance to other social program eligibility such as National Child Benefit Supplement (NCBS), Allowance for the Survivor, Guaranteed Income Supplement (GIS), Allowance for Seniors, Ontario Works (OW), Ontario Disability Support Program (ODSP), and the Low Income Energy Assistance Program (LEAP).	
Target	LDC customers in low income households, who rent or own, or live in low rise social housing, or are part of a first nation's reserve.	
Type of building	Homes, row houses, town homes, low rise apartments, and high rise apartment (except high rise social housing apartments)	
Innovation	The program is very inclusive, allowing more participation because it has differing participation levels (i.e. basic, extended and weatherization). This way few people are turned away from the program.	
Program Delivery	1. Customer submits an online application and gains support in process 2. A call centre rep schedules home installation appointment 3. Rep installs lights, power bars and hot water measures (electric hot water tanks only) and also assesses major appliances and models the insulation levels using HOT2000 (electrically heated homes only) to assess upgrade options 4. If eligible a second appointment scheduled for appliance delivery and potentially a third for home insulation upgrades. 5. Once complete a satisfaction survey is sent	

Cost-effectiveness	The program considered to be under funded, as installed pricing caps are sometimes below market purchase cost. Many utilities justify program on the social and community benefits, rather than purely on its conservation or demand savings. Program cost effectiveness assessment could be enhanced by a revision of its net to gross "free- ridership" calculations, as intuitively the low income sector should be significantly lower in free- ridership than the rest of the population.
Results	The program is on track to reach about 60,000 people province-wide over 4 years (currently at 50,000). Market uptake through word of mouth and earned media has driven stead participation increases. Revision of social housing application: now one single application by building manager for all units (increased # of participants). Estimated annual saving per participant are not clear but estimated average well above 1,500 kWh per participant.

SASKATCHEWAN

HOME AND RENTAL REPAIR PROGRAM		
Type of measure	**Rental Property Assistance:** • A forgivable loan to a maximum of $30,000 per unit in a multi-unit building, or $23,000 per unit for rooming house units or single family dwellings. • Rental property owners are required to contribute a minimum of 25 per cent of the eligible repair costs. **Home owner Assistance:** • A forgivable loan to a maximum of $23,000 to address health and safety standard issues and extend the useful life of the property by fifteen (15) years. • A maximum of $6,000 is available for emergency repairs.	Repairs to structural (including foundation), electrical (including knob and tube), plumbing, heating system, or for fire safety purposes. Relevant measures for energy efficiency include insulation replacement (i.e. if damage has been done by faulty roof), upgrades to high efficiency furnaces if they have been red-flagged by the gas utility. The homeowner is responsible for all costs greater than the approved amount.
Eligibility	**Home owner:** • The annual household income must be at or below the established income limits as determined by Saskatchewan Housing Corporation. • The property must be substandard or deficient and require major repairs or be lacking in basic facilities in at least one of these components structural, electrical, plumbing, heating system, or fire safety. **Rental:** • Applicants must keep rents affordable based on the Saskatchewan Housing Corporation rent schedule for the term of the loan. • Property must be below minimum health and safety standards to be eligible for funding.	
Target	Home Owner Applicants must own and occupy the property as their principal residence. Rental Applicants must own the property and house tenants with annual household income below the applicable income threshold as set by Saskatchewan Housing Corporation.	
Type of building	Single or multi-family, multi-fuel	
Innovation	Program offers generous forgivable loan amounts that cover comprehensive measures (broader than energy efficiency) including funding for emergency repairs during the winter.	
Program delivery	Program is managed by the Saskatchewan Housing Corporation. Applicants must complete a 7 page application. Once approval is granted, the homeowner must have all work completed within six months for health and safety repairs, and three months for emergency repairs.	
Cost-effectiveness	As this isn't a conservation demand management program, traditional cost-effectiveness is not calculated.	
Results	From 2011 to December 2013, approximately $17.2 million has been invested to assist in repairs to properties to meet health and safety standards.	

APPENDIX B – LIST OF INTERVIEWS

[NAMES OF INDIVIDUALS WERE REMOVED TO PRESERVE CONFIDENTIALITY]

Review of Manitoba Hydro's Affordable Energy Program:

1. Program Manager, Manitoba Hydro
2. Brandon Neighbourhood Renewal Corporation/ Brandon Energy Efficiency Program
3. North End Community Renewal Corporation
4. Community Canvasser, Brandon Neighbourhood Renewal Corporation
5. Executive Director, Social Enterprise Contractor
6. Rural participant, Portage La Prairie
7. Landlord
8. Social Housing provider
9. Individual participant
10. Housing Manager, First Nation
11. Advisory Committee Member
12. Advisory Committee Member
13. Advisory Committee Member
14. Advisory Committee Member
15. Advisory Committee Member

Review of other Low Income Programs:

1. Program Manager, Residential Marketing, BC Hydro, British Columbia.
2. Energy Programs Director, Action for Boston Community Development (ABCD), Massachusetts.
3. Project Assistant, Action for Boston Community Development, Massachusetts.
4. Residential Program Manager, Efficiency Maine, Maine.
5. Program Operations Manager, Energy and Housing Services, Maine Housing Authority, Maine.
6. Senior Project Manager, NYSERDA, New York.
7. Manager, Repair Grants, Saskatchewan Housing Corporation, Saskatchewan.

50 Ste-Catherine St. West, suite 420, Montreal, Québec, Canada H2X 3V4 | T. 514.504.9030 | F. 514.289.2665 | info@dunsky.ca
www.dunsky.ca

Section:		**Page No.:**	
Topic:	Baseline information on customer efficiency		
Subtopic:	Baseline studies		
Issue:	Current levels of efficiency of Manitoba Hydro customers		

PREAMBLE TO IR (IF ANY):

In determining the potential for Manitoba Hydro to improve savings, assumptions about the existing baseline levels of efficiency of customers are required.

QUESTION:

Provide any baseline studies regarding customer energy efficiency that have been conducted in the past five years, including the following :

a) Appliance saturation surveys that show the typical levels of appliance efficiency in customers' homes and businesses, including any crosstab information showing these data by income or other demographic information, region, building type,etc.;
b) Studies that show the saturation of electric heat and hot water in customers' homes, including the type of system (electric resistance, furnace, heat pump, etc) and any crosstab information showing these data by income or other demographic information, region, building type,etc.;
c) Studies that show information on the efficiency of customers' homes, including data on average age of homes, insulation levels, air tightness levels, heating system type and average efficiency, etc.;

RATIONALE FOR QUESTION:

Understanding Manitoba Hydro's baseline assumptions is necessary to determine the appropriateness of their Power Smart plan.

RESPONSE:

Further to PUB Order 33/15, no response is required for this Information Request.

Section:	Appendix 8.1	**Page No.:**	9
Topic:	Participation estimates		
Subtopic:	Eligible program markets		
Issue:	Magnitude of eligible energy efficiency markets		

PREAMBLE TO IR (IF ANY):

Manitoba Hydro indicates its estimate of cumulative participation in the table on p.9, but does not indicate the size of the eligible market.

QUESTION:

For each program in the table « Program Duration and Cumulative Participation » on p.9, provide the following :

a) Incremental annual participation by year, both historical and projected for 2014/15-2028/29;
b) The estimated size of the eligible market;
c) Explanation of how the eligible market is defined.
d) The fraction of the eligible market that the annual participation estimates represent.

RATIONALE FOR QUESTION:

In order to assess the likelihood of cost-effective opportunities beyond those proposed by Manitoba Hydro it is necessary to know the size of the potential participant pool.

RESPONSE:

Please see the attachment to this response.

MKO/Coalition/Hydro 1-11

Power Smart Programs	Definition of Eligible Market	Historical Market Penetration up to end of 2013/2014	Size of Eligible Market at Program Inception		2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29
RESIDENTIAL																			
Incentive Based																			
Home Insulation Program	All residential homes with electric heat built prior to 1999, less AEP market and homes with satisfactory insulation levels. Market size is further reduced annually by houses that are removed from the grid as a result of fire, demolition, or abandonment.	43.2%	25,819	Annual Program Participation	1,123	1,006	896	795	700	611	529	452	381	614	252	195	142	-	-
				Cumulative Market Penetration	47.5%	51.4%	54.9%	58.0%	60.7%	63.1%	65.1%	66.9%	68.3%	70.7%	71.7%	72.5%	73.0%	-	-
Water and Energy Saver Program	Eligible market is defined by the number of residential dwellings with electric water heaters who have not participated in the past.	17.4%	282,626	Annual Program Participation	9,838	9,838	9,838	-	-	-	-	-	-	-	-	-	-	-	-
				Cumulative Market Penetration	20.9%	24.4%	27.9%	-	-	-	-	-	-	-	-	-	-	-	-
Affordable Energy Program	Qualifying LICO_WPG_125 customers living in eligible homes that have not previously received upgrades through the program.	4.3%	50,099	Annual Program Participation	489	482	465	452	440	430	422	415	412	409	405	195	150	-	-
				Cumulative Market Penetration	5.2%	6.2%	7.1%	8.0%	8.9%	9.8%	10.6%	11.4%	12.3%	13.1%	13.9%	14.3%	14.6%	-	-
Refrigerator Retirement Program	All residential homes with a second fridge or freezer that is over 15 years old.	7.4%	344,000	Annual Program Participation	11,000	11,000	9,000	-	-	-	-	-	-	-	-	-	-	-	-
				Cumulative Market Penetration	10.6%	13.8%	16.4%	-	-	-	-	-	-	-	-	-	-	-	-
Residential LED Lighting Program	All residential screw-in and pin-based light sockets where LED bulbs can be used.	0.0%	17,196,985	Annual Program Participation	59,939	11,750	56,085	55,392	54,374	-	-	-	-	-	-	-	-	-	-
				Cumulative Market Penetration	0.3%	0.4%	0.7%	1.1%	1.4%	-	-	-	-	-	-	-	-	-	-
Community Geothermal Program	All residential First Nation homes (not including new homes or homes currently with a geothermal system).	0.6%	14,865	Annual Program Participation	300	425	500	725	575	500	325	325	325	325	-	-	-	-	-
				Cumulative Market Penetration	2.6%	5.4%	8.8%	13.7%	17.6%	20.9%	23.1%	25.3%	27.5%	29.7%	-	-	-	-	-
Customer Service Initiatives / Financial Loan Programs																			
Power Smart Residential Loan	All residential homeowners electric heat.	4.3%	175,000	Annual Program Participation	720	720	720	720	720	720	720	720	720	720	720	720	720	720	720
				Cumulative Market Penetration	4.7%	5.2%	5.6%	6.0%	6.4%	6.8%	7.2%	7.6%	8.0%	8.4%	8.9%	9.3%	9.7%	10.1%	10.5%
Power Smart PAYS Financing	All residential homeowners electric heat.	0.1%	175,000	Annual Program Participation	260	381	544	615	533	453	252	136	118	112	61	61	61	61	61
				Cumulative Market Penetration	0.2%	0.4%	0.7%	1.1%	1.4%	1.6%	1.8%	1.9%	1.9%	2.0%	2.0%	2.1%	2.1%	2.1%	2.2%
Residential Earth Power Loan[2]	Residential homes replacing their heating system & newly constructed homes.	0.6%	19,850 annual potential projects	Annual Program Participation	26	26	27	28	29	30	31	33	34	35	36	-	-	-	-
				Annual Market Penetration	0.1%	0.1%	0.1%	0.1%	0.1%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%				
				Cumulative Market Penetration	0.5%	0.5%	0.5%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	0.4%	-	-	-	-
COMMERCIAL																			
Incentive Based																			
Commercial Lighting Program	All potential commercial lighting projects in Manitoba.	25.0%	52,500	Annual Program Participation	820	860	869	752	770	578	548	518	482	454	234	162	24	123	120
				Cumulative Market Penetration	26.6%	28.2%	29.9%	31.3%	32.8%	33.9%	34.9%	35.9%	36.8%	37.7%	38.1%	38.4%	38.5%	38.7%	39.0%
LED Roadway Lighting Conversion Program	All roadway lighting in Manitoba	0.0%	129,550	Annual Program Participation	18,591	18,150	16,138	19,168	23,001	20,700	13,802	-	-	-	-	-	-	-	-
				Cumulative Market Penetration	14.4%	28.4%	40.8%	55.6%	73.4%	89.4%	100.0%	-	-	-	-	-	-	-	-
Commercial Building Envelope - Windows Program[1,2]	All existing elec-heated commercial buildings across all building sector types with renovation projects scheduled that year.	21.0%	188 annual potential projects	Annual Program Participation	66	68	70	72	73	74	76	77	78	80	82	83	84	86	88
				Annual Market Penetration	35.1%	36.2%	37.2%	38.3%	38.8%	39.4%	40.4%	41.0%	41.5%	42.6%	43.6%	44.1%	44.7%	45.7%	46.8%
				Cumulative Market Penetration	22.4%	23.8%	25.0%	26.1%	27.1%	28.0%	28.8%	29.6%	30.3%	31.0%	31.6%	32.3%	32.8%	33.4%	34.0%
Commercial Building Envelope - Insulation Program[1,2]	All existing elec-heated commercial buildings across all building sector types with renovation projects scheduled that year.	32.0%	125 annual potential projects	Annual Program Participation	80	81	83	85	87	89	91	93	95	97	98	99	100	102	104
				Annual Market Penetration	64.0%	64.8%	66.4%	68.0%	69.6%	71.2%	72.8%	74.4%	76.0%	77.6%	78.4%	79.2%	80.0%	81.6%	83.2%
				Cumulative Market Penetration	35.6%	38.5%	41.0%	43.3%	45.3%	47.1%	48.9%	50.5%	52.0%	53.4%	54.7%	55.9%	57.1%	58.2%	59.3%
Commercial Geothermal Program[2]	Electric heating replacement projects for existing electrically heated commercial buildings	6.6%	263 annual potential projects	Annual Program Participation	18	39	47	53	59	63	67	76	80	84	88	93	97	101	105
				Annual Market Penetration	6.8%	14.8%	17.9%	20.2%	22.4%	24.0%	25.5%	28.9%	30.4%	31.9%	33.5%	35.4%	36.9%	38.4%	39.9%
				Cumulative Market Penetration	6.6%	7.5%	8.5%	9.5%	10.6%	11.6%	12.5%	13.6%	14.6%	15.6%	16.6%	17.5%	18.5%	19.4%	20.3%
Commercial HVAC Program - Chillers[2]	All existing commercial buildings replacing their chiller system that year.	61.9%	14 annual potential projects	Annual Program Participation	10	10	11	11	11	11	12	12	-	-	-	-	-	-	-
				Annual Market Penetration	73.8%	68.3%	76.9%	78.9%	79.9%	82.0%	85.0%	88.1%							
				Cumulative Market Penetration	63.0%	63.4%	64.4%	65.5%	66.4%	67.4%	68.4%	69.5%	-	-	-	-	-	-	-
	All existing electrically-heated commercial			Annual Program Participation	5	7	8	10	11	13	14	15	16	17	-	-	-	-	-

MKO/Coalition/Hydro 1-11

Power Smart Programs	Definition of Eligible Market	Historical Market Penetration up to end of 2013/2014	Size of Eligible Market at Program Inception		2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29
Commercial HVAC Program - CO2 Sensors[2]	spaces with highly variable occupancy which are conducting renovations on their ventilation systems that year.	8.3%	19 annual potential projects	Annual Market Penetration	26.5%	36.5%	43.8%	53.0%	59.0%	65.9%	72.4%	79.1%	86.1%	91.1%					
				Cumulative Market Penetration	11.2%	14.7%	18.2%	22.0%	25.6%	29.1%	32.6%	36.1%	39.5%	42.8%	-	-	-	-	-
Commercial Custom Measures Program	This program is used to support any and all energy saving upgrades not addressed by the existing suite of programs. It serves as a catch-all for sometimes unique and unknown upgrades. As such, the program does not define the overall market and market penetration.	N/A	N/A	Annual Program Participation	10	11	11	13	14	14	15	15	16	17	18	18	19	23	24
				Cumulative Market Penetration	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Commercial Building Optimization Program	Existing commercial buildings larger than 50 000 square feet and between 2 to 25 years of age with direct digital control systems and functioning heating, ventilating, and air conditioning mechanical systems.	3.2%	470	Annual Program Participation	4	4	6	6	7	9	9	10	10	11	11	12	12	13	14
				Cumulative Market Penetration	4.0%	4.9%	6.2%	7.4%	8.9%	10.9%	12.8%	14.9%	17.0%	19.4%	21.7%	24.3%	26.8%	29.6%	32.6%
New Buildings Program[2]	New commercial buildings constructed in Manitoba.	3.4%	200 annual potential projects	Annual Program Participation	30	40	50	5	10	15	20	25	-	-	-	-	-	-	-
				Annual Market Penetration	15.0%	20.0%	25.0%	2.5%	5.0%	7.5%	10.0%	12.5%							
				Cumulative Market Penetration	5.3%	7.4%	9.6%	8.8%	8.5%	8.4%	8.5%	8.8%	-	-	-	-	-	-	-
Commercial Refrigeration Program	Commercial customers in Manitoba with refrigeration equipment, primarily grocery, retail, and convenience stores, where the opportunity for energy-saving upgrades offered through the program exists.	29.8%	4,475	Annual Program Participation	367	208	60	65	68	71	76	82	87	93	95	99	88	94	100
				Cumulative Market Penetration	38.0%	42.7%	44.0%	45.5%	47.0%	48.5%	50.3%	52.1%	54.0%	56.1%	58.2%	60.4%	62.4%	64.5%	66.7%
Commercial Kitchen Appliance Program	Commercial customers in Manitoba with electric steam cookers and/or spray valves (1.24 GPM or greater), primarily restaurants and foodservice establishments, where the opportunity for energy-saving upgrades offered through the program exist.	30.5%	35 steamers replacement projects per year, and starting in 2014/15 the market size was increased to include 598 spray valves.	Annual Program Participation	157	205	288	-	-	-	-	-	-	-	-	-	-	-	-
				Cumulative Market Penetration	26.2%	48.5%	78.2%	-	-	-	-	-	-	-	-	-	-	-	-
Network Energy Management Program	Number of networked personal computers in commercial & institutional buildings	1.5%	300,000	Annual Program Participation	3,009	5,006	7,005	9,004	11,026	-	-	-	-	-	-	-	-	-	-
				Cumulative Market Penetration	2.5%	4.2%	6.6%	9.6%	13.2%	-	-	-	-	-	-	-	-	-	-
Power Smart Shops	Small commercial customers in Manitoba (10,000 square feet or less), excluding national chains, where the opportunity for various water and energy-saving upgrades offered through the program exists.	0.0%	9,181	Annual Program Participation	N/A	108	367	529	580	616	-	-	-	-	-	-	-	-	-
				Cumulative Market Penetration	n/a	1.2%	5.2%	10.9%	17.3%	24.0%	-	-	-	-	-	-	-	-	-
Customer Service Initiatives / Financial Loan Programs																			
Power Smart for Business PAYS Financing	All commercial customers (electrical & gas)	0.0%	25,000	Annual Program Participation	12	16	15	10	10	10	10	10	10	10	10	10	10	10	10
				Cumulative Market Penetration	0.1%	0.1%	0.2%	0.2%	0.3%	0.3%	0.3%	0.3%	0.4%	0.5%	0.5%	0.5%	0.5%	0.6%	0.7%

Notes

1. The Commercial Building Envelope program participation reflects number of potential applications/projects to be submitted, which is a different number than participation based on sales defined as 100 square metres of window or insulation added.
2. Denotes programs where the eligible market for a given year is the number of replacement projects/retrofits due to a technologies end of life and therefore market penetration is calculated as an "in year" rate.

Section:	Appendix 8.1	**Page No.:**	31
Topic:	Conservation rates		
Subtopic:	Budget		
Issue:	Components of budget		

PREAMBLE TO IR (IF ANY):

Manitoba Hydro shows a cumulative utility cost of $34.1 million, but does not explain what this budget is for.

QUESTION:

Explain the components of the conservation rate budget, the implementation of the program, and the expected benefits that will accrue to the ratepayers from this utility investment.

RATIONALE FOR QUESTION:

It is unclear why this line item budget for conservation rates is included as a DSM utility investment.

RESPONSE:

Pursuant to PUB Order 33/15, no response is required to this Information Request.