CAC/CENTRA II-45

Reference: **PUB/Centra I-6.**

Preamble: **Table 1 provides certain data points which are used to derive a forecast of Canadian 3 month T-bill rates for certain periods.**

Table 2 provides certain data points which are used to derive a forecast of Canadian 10 year + bond yield rates for certain periods.

CAC wishes to better understand the methodology employed in deriving these forecasts.

CAC observes that in Table 1 there are no 1Q 2014 values ascribed to CIBC, Laurentian, National Bank, Bank B, Scotia Bank, and would like to understand how the Fiscal 2013/14 T-bill rate forecast addressed the missing data points.

CAC also observes that in Table 2 there are no 1Q 2014 values ascribed to Desjardins, Laurentian, National Bank, and Scotia Bank, and there are no 1Q 2015 values ascribed to TD Bank and Conference Board, and would like to understand how the Fiscal 2013/14 and Fiscal 2014/15 10 year + Canada rate forecasts addressed the missing data points.

a) **Other than providing for the averaging of 10 year and 30 year bond yields to arrive at a 10 year + forecast rate, was the same methodology applied in converting the relevant data points found in the various forecasts supplied in**

attachment 1 used to derive the T-bill forecast in Table 1 and the Canada yield forecast in Table 2?

b) If the reply to "a" above is other than a full confirmation, please explain the reasons for the differences in methods applied.

c) Did the Infometrica contribution to the calculation of the average forecast T-bill rate for 2013/14 of 1.30% include, the values 1.80 for 2Q 2013, 1.80 for 3Q 2013, 1.80 for 4Q 2013 and 2.80 for 1Q 2014, and no other values.

d) If the reply to "c" above is other than a full confirmation, please explain the reasons for including or excluding other values and identify those values.

e) Did the Desjardins contribution to the calculation of the average forecast T-bill rate for 2013/14 of 1.30%, include the values 1.00 for 2Q 2013, 1.03 for 3Q 2013, 1.10 for 4Q 2013 and 1.55 for 1Q 2014, and no other values.

f) If the reply to "e" above is other than a full confirmation, please explain the reasons for including or excluding other values and identify those values.

g) Please explain the method of calculation of the average forecast T-bill rate for 2013/14 of 1.30%, for each of the "end period" forecasters for which there is no value indicated for 1Q 2014.

h) Did the Infometrica contribution to the calculation of the average forecast 10 year + rate for 2014/15 of 3.20% include, the values 3.60 for 2Q 2014, 3.60 for 3Q 2014, 3.60 for 4Q 2014 and 4.30 for 1Q 2015, and no other values.

i) If the reply to "h" above is other than a full confirmation, please explain the reasons for including or excluding other values and identify those values.

j) Did the TD Bank contribution to the calculation of the average forecast 10 year + rate for 2014/15 of 3.20% include, the values 2.99 for 2Q 2014, 3.11 for 3Q 2014, 3.23 for 4Q 2014 and, and no other values?

k) If the reply to "j" above is other than a full confirmation, please explain the reasons for including or excluding other values and identify those values.

l) Do the Fiscal 2013/14 and 2014/15 T-bill and 10 year + values, respectively 1.30, 2.10, 2.55 and 3.20, represent calculations rounded to the nearest 5 basis points, and if so, please provide the calculated values before rounding.

ANSWER:

Response to parts (a) and (b):

Please see the response to PUB/Centra II-141(b) for a description of the adjustments made to the interest rate forecasts.

Response to parts (c), (d), (e), (f), (h), (i), (j) and (k):

Centra confirms parts (c), (e), (h), and (j).

Response to part (g):

For 2013/14, the fiscal year forecast of the short and long term rates are derived from the average of all available quarterly forecasts for the period 2013 Q2 to 2014 Q1. Forecasters that do not provide a 2014 Q1 forecast still contribute to the calculation of the 2013/14 fiscal year rate by providing forecasts for Q2, Q3 and Q4 of 2013.

Response to part (l):

The fiscal year rates noted in Tables 1 and 2 of PUB/Centra I-6 were rounded to the nearest 5 basis points, as follows:

	Short Term		Long Term	
	Forecast	**Forecast (rounded to 5 basis points)**	**Forecast**	**Forecast (rounded to 5 basis points)**
2013/14	1.32	1.30	2.54	2.55
2014/15	2.10	2.10	3.22	3.20

CAC/CENTRA II-46

Reference: **PUB/Centra I-6.**

Preamble: **Table 1 provides certain data points which are used to derive a forecast of Canadian 3 month T-bill rates for certain periods.**

Table 2 provides certain data points which are used to derive a forecast of Canadian 10 year + bond yield rates for certain periods.

CAC wishes to better understand the methodology employed in deriving these forecasts.

CAC observes that certain data points available in the various forecasts in Attachment 1 have not been included in Tables 1 and 2, including the CIBC forecast values for 1Q 2014, and the Conference Board values for 10 year + Canada bond yields for 1Q 2015.

CAC estimates that using the CIBC period end forecast T-bill rate for March 2014 would have allowed the inclusion of the value 1.33 for 2014 Q1, in Table 1, where no value now appears, and would have been included in the calculation of the 2013/14 Fiscal year forecast T-bill rate.

CAC estimates that using the Conference Board data points for 10 year and long Canada rates for 1Q 2015, would have allowed the inclusion of the value 2.41 for 2015 Q1 in Table 2, where no value now appears, and would have been included in the calculation of the 2014/15 Fiscal year

forecast 10 year + rate. CAC estimates that the exclusion of this 2.41 value may have increased the 2014/15 forecast 10 year + rate by 3.4 basis points, which after giving effect to rounding could have changed that 2014/15 forecast value by 5 basis points.

CIBC	4Q 2013	1Q 2014	Average	Source
T-bill	1.20	1.45	1.33	Attachment 1 Page 1 of 29
Conf. Bd	10 year	Cdn Long	Average	
1Q 2015	2.30	2.52	2.41	Page 27 of 29

a) Please confirm the calculation of the 1.33 value for the CIBC 1Q 2014 data point, or provide the corrected value.

b) Please confirm the calculation of the 2.41 value for the Conference Board 1Q 2015 data point, or provide the corrected value.

c) Please provide an update to Table 2 including a revised value for the 2014/15 Fiscal 10 year + rate, incorporating the 2.41 or other corrected value for the missing Conference Board 1Q 2015 data point.

ANSWER:

Response to parts (a) - (c):

Please see the response to PUB/Centra II-141(a) for Table 2. As described in Footnote 1 of that response, the fiscal year interest rates as originally calculated in response to PUB/Centra I-6 remain unchanged.

CAC/CENTRA II-47

Reference: **PUB/Centra I-6.**

Preamble: **Table 1 provides certain data points which are used to derive a forecast of Canadian 3 month T-bill rates for certain periods.**

Table 2 provides certain data points which are used to derive a forecast of Canadian 10 year + bond yield rates for certain periods.

CAC wishes to better understand the methodology employed in deriving these forecasts.

CAC also observes that certain values included in Tables 1 and 2, for which it cannot identify the data points available in the various forecasts in Attachment 1 which would appear to be required support the calculation of those values, including the CIBC period end values for Q1 through Q4 in 2014 in Table 2, and the National Bank values for Q2 through Q4 in Tables 1 and 2.

CIBC	4Q 2013	1Q 2014	Average	Source
10 year	2.60	2.65	2.625	Attachment 1
30 year	3.10	3.10	3.10	Page 1 of 29
		Avg	2.8625	

National	1Q 2013	2Q 2013	3Q 2013	4Q 2013
T-bill	0.94	1.05	1.57 ? 0.95	1.67
10 Year	1.65	2.10	?	2.40
30 Year	2.20	2.58	?	2.86

a) Please confirm that the average of the National Bank 1Q 2013 data point of 0.94, and the 2Q 2013 data point of 1.05, in each case for 3 month T-bills found on page 12 of 29 of Attachment 1 to PUB/Centra 1-6 would result in a 2Q 2013 period average value of 1.00 rather than the 1.31 value found for 2Q 2013 in Table 1, or if unable to confirm explain the calculation of the 1.31 value for that time period.

b) Please confirm that for the National Bank 3Q 2013 period average T-bill value to be 1.31, based on a 1.05 opening data point, the National Bank 3Q 2013 end period data point would need to be 1.57, or if unable to confirm please provide the alternative value and identify its source in Attachment 1.

c) Please confirm that for the National Bank 4Q 2013 period average T-bill value to be 1.31, based on a 1.67 end period data point, the National Bank 3Q 2013 end period data point would need to be 0.95, or if unable to confirm please provide the alternative value and identify its source in Attachment 1.

d) Please confirm that the average of the National Bank 1Q 2013 10 year and 30 year data points of 1.65 and 2.20, and the 2Q 2013 data points of 2.10 and 2.58, found on page 12 of 29 of Attachment 1 to PUB/Centra 1-6 would result in a 2Q 2013 period average 10 year + value of 2.13 rather than the 2.28 value found for 2Q 2013 in Table 2, or if unable to confirm explain the calculation of the 2.28 value for that time period.

e) Please provide the National Bank 3Q 2013 end period values for each of the 10 year and 30 year Canada rates which based on the 1Q and 4Q 2013 forecast values mathematically result in the average values of 2.28 for each of the 3Q and 4Q 2013 data points presented in table 2, or provide the methodology and supporting data points to arrive at the value 2.28 for each of the 2Q, 3Q and 4Q 2013 data points..

f) Please confirm that the correct value for the CIBC 1Q 2014 data point is 2.86, or provide the CIBC forecast data points that gave rise to the value 2.75.

ANSWER:

Response to parts (a) - (f):

As National Bank did not provide a 2013 Q3 end period data point, the Corporation calculated the average of the 2013 Q1 and 2013 Q4 end period data to derive the 2013 Q2, Q3 and Q4 average period data points. For example, as shown in the following chart, for the National Bank T-Bill rate, the adjusted quarterly average forecast for 2013 Q1 was 0.96 (the average of 0.98 and 0.94) and the derived average for 2013 Q2, Q3 and Q4 was 1.31 (the average of 0.94 and 1.67).

	2012 Q4	2013 Q1	2013 Q2	2013 Q3	2013 Q4
T-Bill End Period	0.98	0.94	1.05		1.67
T-Bill Average Period	0.98	0.96	1.31	1.31	1.31

Utilizing the same approach, the Canadian long term interest rate (which averages the 10 year and 30 year long bond data points) from National Bank was as follows:

	2012Q4	2013Q1	2013Q2	2013Q3	2013Q4
10 Year Long Bond End Period	1.76	1.65	2.10		2.40
10 Year Long Bond Average Period	1.77	1.71	2.03	2.03	2.03

	2012Q4	2013Q1	2013Q2	2013Q3	2013Q4
30 Year Long Bond End Period	2.31	2.20	2.58		2.86
30 Year Long Bond Average Period	2.31	2.26	2.53	2.53	2.53

	2012Q4	2013Q1	2013Q2	2013Q3	2013Q4
Average of 10 and 30 Year Long Bond	2.04	1.98	2.28	2.28	2.28

An alternative approach would be to interpolate between the Q2 and Q4 end points to derive the 2013 Q3 end point, and then calculate average period data of all known or derived end

points. Under this approach, for the Canadian long term interest rate, the adjusted quarterly forecast from National Bank would have been as follows:

	2012Q4	2013Q1	2013Q2	2013Q3	2013Q4
10 Year Long Bond End Period	1.76	1.65	2.10	2.25	2.40
10 Year Long Bond Average Period	1.77	1.71	1.88	2.18	2.33

	2012Q4	2013Q1	2013Q2	2013Q3	2013Q4
30 Year Long Bond End Period	2.31	2.20	2.58	2.72	2.86
30 Year Long Bond Average Period	2.31	2.26	2.39	2.65	2.79

	2012Q4	2013Q1	2013Q2	2013Q3	2013Q4
Average of 10 and 30 Year Long Bond	2.04	1.98	2.13	2.41	2.56

When combining the National Bank forecast with the other forecast sources and rounding to the nearest five basis points, Centra can confirm that utilizing the alternative method would have resulted in the same forecasted short and long term interest rates for the 2012/13 and 2013/14 Test Years.

National Bank is considered by the Corporation to be an appropriate and credible forecasting source, and as noted in Footnote 9 of PUB/Centra II-141(b), the impact of any computational adjustments such as those for National Bank is normally immaterial to the Economic Outlook.

As noted in the response to PUB/Centra II-141(a), Centra also confirms that the 2014 Q1 data point for CIBC is 2.86.

CAC/CENTRA II-48

Reference: **PUB/Centra I-6.**

Preamble: **Table 1 provides certain data points which are used to derive a forecast of Canadian 3 month T-bill rates for certain periods.**

Table 2 provides certain data points which are used to derive a forecast of Canadian 10 year + bond yield rates for certain periods.

CAC observes that the preponderance of data points in Attachment 1 sources are quarterly data points, but certain annual data points available in the various forecasts in Attachment 1 have been included in Tables 1 and 2, including some identified as being sourced from Desjardins, CIBC and Infometrica.

CAC also observes that while quarter over quarter forecast interest rate changes are generally modest, the CIBC 4Q 2014 to 1Q 2015 ascribed change is 73 basis points, the HIS Global 4Q 2014 to 1Q 2015 ascribed change is 80 basis points and the 4Q 2014 to 1Q 2015 change is 70 basis points.

CAC wishes to better understand the methodology employed in deriving these forecasts, including the manner in which annual averages data points are ascribed to the first quarter of a year and its effect on the quality of the forecast.

a) Please explain the efficacy of using 3/4s of the annual average of one calendar year's forecast average interest rate, and ¼ of the annual average of the following calendar year's interest rate as a proxy for the interest rate of an offset fiscal year in market conditions where interest rates are forecast to be rising over time.

b) Please explain the efficacy of using 3/4s of the annual average of one calendar year's forecast average interest rate, and ¼ of the annual average of the following calendar year's interest rate as a proxy for the interest rate of an offset fiscal year in market conditions where interest rates are forecast to be falling over time.

c) In as much as Centra needs to forecast fiscal periods that are not coincident with the calendar year, why has Centra not preferred data sources that provide quarterly data points and excluded sources that supply annual data points requiring adjustment in its forecast methodology?

ANSWER:

Response to parts (a) - (c):

In response to changing market conditions, either rising and falling over time, the Corporation follows a regular review process as described in response to PUB/Centra II-141(b).

Annual calendar year information is adjusted to fiscal year information on a proportionate basis. For a discussion regarding the efficacy and integration of annual (12 month) and quarterly (3 month) data, please see the response to PUB/Centra II-141(b).

CAC/CENTRA II-49

Reference: **PUB/Centra I-6.**

Preamble: **Table 1 provides certain data points which are used to derive a forecast of Canadian 3 month T-bill rates for certain periods.**

Table 2 provides certain data points which are used to derive a forecast of Canadian 10 year + bond yield rates for certain periods.

CAC observes that the identities and input data for Bank A and Bank B are suppressed.

CAC also observes that the visible data points for 2Q and 3Q 2012 in Table 1 and Table 2 are equal in each column, in spite of the fact that some that some of the forecasts date from September 1, 11, 17, 18, 19 or 25, 2012, dates at which the average value would not have been known.

Based on data in Attachment 1, CAC estimates that the forecast values for 3Q 2012 in Table 2 would have been 2.14 for Desjardins, and, 2.04 for Laurentian, based on the respective September 1 and September 17th forecasts.

		2Q 2012	3Q 2012		2Q 2012	3Q 2012
Desjardins	**10 yr**	**1.74%**	**1.95%**	**Laurentian**	**1.74%**	**1.75%**
Desjardins	**30 yr**	**2.33%**	**2.55%**	**Laurentian**	**2.33%**	**2.35%**
			2.14%			**2.04%**

CAC wishes to better understand the methodology employed in deriving these forecasts, including when the methodology requires that actual data is substituted for forecast data points.

a) Please advise whether the data in the columns for 2Q and 3Q 2012 in Table 1 and Table 2 is actual data, or if unable to confirm provide the source and description.

b) If the data in the columns for 2Q and 3Q 2012 in Table 1 and Table 2 is actual data, and therefore not proprietary data of any bank or commercial forecaster, why are the values for Bank A and Bank B suppressed?

ANSWER:

Response to parts (a) and (b):

The data for 2012 Q2 and Q3 as shown in Tables 1 and 2 is actual data. For a discussion of Bank A and Bank B, please see the response to PUB/Centra II-141(a).

CAC/CENTRA II-50

Reference: CAC - CENTRA II-50

Preamble: Table 1 provides certain data points which are used to derive a forecast of Canadian 3 month T-bill rates for certain periods.

Table 2 provides certain data points which are used to derive a forecast of Canadian 10 year + bond yield rates for certain periods.

CAC observes that the identities and input data for Bank A and Bank B are suppressed.

CAC also observes that Bank A is identified as forecasting period average data and is aware that BMO provides forecasts of certain interest rates on a period average basis.

CAC observes that in the 2009/10 GRA, in CAC/MSOS/Centra 1-4, Centra declined to provide copies of the forecasts relied upon at that time, and in the May 1, 2009 reply to PUB/Centra 2-198, provided the names of forecasters included but chose not to link the forecaster's name to the values they had forecast. It was only in the June 1, 2009 revision of PUB/Centra 2-198 that Centra linked the names of the forecasters to the date of the forecast and forecast values.

CAC is aware that in the first week of October 2012 BMO published certain forecast T-bill and Canada bond rates up to and including 4Q

2013, forecasting among other things 4Q average T-bill rates of 1.26% and 4Q 10 year Canada bond rates of 2.11%.

a) Is Bank A, the Bank of Montreal, BMO Capital Markets, BMO Nesbitt Burns, or one of their related companies?

b) Please confirm that financial forecasts, of T-bill and Canada bond rates, from BMO related companies are readily available from sites including: http://www.bmonesbittburns.com/economics/rates/20130404/rates.pdf

c) To the extent that any portion of the forecast rates of Bank A and Bank B were in the public domain or readily available on the internet, please update Tables 1 and 2 of PUB/Centra I-6 to incorporate the data in the public domain or readily available, and provide the forecast document.

ANSWER:

Response to parts (a) - (c):

For a discussion of Bank A and Bank B, please see Centra's response to PUB/Centra II-141(a).

CAC/CENTRA II-51

Reference: **PUB/Centra I-6, PUB/Centra 2-198 June 1, 2009 Revision, in the 2009/10 Centra GRA.**

Manitoba Hydro transcript of its recent GRA, beginning at page 1103, where Mr. Schulz refers to an "internal debate on this, and as recently as just in the last number of weeks" related to "how best to assess the accuracy of these forecasters".

Tab 4 page 2 of 7 which discusses an update of the spring Economic Outlook and a review of the IFF in the spring and summer forecasts resulting in an update "in the fall of 2012".

Preamble: **Tables 1 and 2 in PUB/Centra I-6 provide a list of 11 forecasters, including Bank A, Bank B, Desjardins and Laurentian and data derived from their forecasts, which were thought worthy to have data from their forecasts used as the inputs into the Centra interest rate forecast, but were not included in the list of worthy forecasters in the PUB/Centra 2-198 June 1, 2009 Revision.**

PUB/Centra 2-198 June 1, 2009 Revision, in the 2009/10 Centra GRA provides a list of 13 forecasters, including BMO Nesbitt and Spatial Economics who were at that time thought worthy to have data from their forecasts used as the inputs into the Centra interest rate forecast, and are no longer listed in Tables 1 and 2 in PUB/Centra I-6.

CAC wishes to better understand the timing, process and reasons for the inclusion of Bank A, Bank B, Desjardins and Laurentian and the removal of, BMO Nesbitt and Spatial Economics, from list of forecasters thought worthy to have data from their forecasts used as the inputs into the Centra interest rate forecast.

a) For each of Bank A, Bank B, Desjardins and Laurentian, please identify the date at which their data was first added to the Economic Outlook and interest rate forecasting sample group?

b) At the time each of Bank A, Bank B, Desjardins and Laurentian were added to the Economic Outlook and interest rate forecasting sample group, what other forecasters, if any, were considered for inclusion, but were not included?

c) Please identify the reasons for the selection of each of Bank A, Bank B, Desjardins and Laurentian, having particular regard to the frequency of their forecasts, the reliability or historic accuracy of their forecasts, the length of their forecast periods, the number of consecutive quarterly periods for which they provide estimates, and any other material factors.

d) For each of BMO Nesbitt and Spatial Economics, please identify the date at which their data was first removed from the Economic Outlook and interest rate forecasting sample group?

e) At the time each of BMO Nesbitt and Spatial Economics were removed from the Economic Outlook and interest rate forecasting sample group, what other forecasters, if any, were considered for removal, but were not removed?

f) Please identify the reasons for the removal of each of BMO Nesbitt and Spatial Economics having particular regard to the frequency of their forecasts, the

reliability or historic accuracy of their forecasts, the length of their forecast periods, the number of consecutive quarterly periods for which they provide estimates, and any other material factors.

g) Please identify whether the "internal debate" referenced by Mr. Schulz preceded or was subsequent to the dates at which each of Bank A, Bank B, Desjardins and Laurentian were included, and each of BMO Nesbitt and Spatial Economics were removed from the lists of worthy forecasters.

h) Between June 1, 2009 and the September and October 2012 forecast revisions, were there any forecasters added that were subsequently removed?

i) In observing that there were 13 worthy forecasters at the time of PUB/Centra 2-198 June 1, 2009 Revision, and there were only 11 worthy forecasters at the time of September and October 2012 forecast revision, CAC inquires as to whether Centra has formed or revised its view of the optimum number of forecasters to be included in the sample to obtain a robust forecast?

j) In observing that the presentation of the interest forecast data by the National Bank frequently is discontinuous, in that one of the quarterly data points is not provided [3Q 2013 is not reported in the forecast on page 12 of 29 of Attachment 1 to PUB/Centra I-6], and that discontinuity appears to require adjustments to the data [as seen in Tables 1 and 2 to PUB/Centra/ I-6], CAC enquires, what special features or forecast accuracy does the National Bank forecast possesses to merit its continued inclusion in the sample of source providers to overcome the discontinuity of data points, and through a period where other sources have been added and dropped?

ANSWER:

Response to parts (a) - (j):

For a discussion of Bank A and Bank B, see Centra's response to PUB/Centra II-141(a).

For a discussion pertaining to the utilized forecasters, please see Centra's response to PUB/Centra II-141(b).

For a discussion of the National Bank forecast, please see Centra's response to CAC/Centra II-47.

CAC/CENTRA II-52

Reference: PUB/Centra I-42

Preamble: The table in PUB/Centra I-42 provides certain data points showing the forecast, actual, and variance between forecast and actual interest costs for certain periods.

CAC observes that in each of the 4 years provided, forecast interest costs exceed actual costs. CAC calculates that the forecast interest costs exceeded actual costs in one year by approximately 23%, and in aggregate forecast interest costs exceeded actual costs by approximately $10 million.

PUB Central I-42	2008/09	2009/10	2010/11	2011/12	Total
Interest on LT	13,753	14,305	14,142	14,390	56,590
Interest on ST	2,758	342	131	102	3,333
	16,511	14,647	14,273	14,492	59,923
Forecast					
Interest on LT	13,760	14,987	15,342	15,342	59,431
Interest on ST	4,384	912	1,719	3,530	10,545
	18,144	15,899	17,061	18,872	69,976
Variance					
Interest on LT	- 7	- 682	-1,200	- 952	-2,841
Interest on ST	-1,626	- 570	-1,588	-3,428	-7,212
	-1,633	- 1,252	-2,788	-4,380	-10,053
Variance as a % of actual					
Interest on LT	0%	5%	8%	6%	5%
Interest on ST	37%	63%	92%	97%	68%
Total	9%	8%	16%	23%	14%

CAC wishes to better understand whether the excess forecast interest costs are arising as a result of the forecast methodology, changes in the capital spending or debt levels.

a) In light of the fact that in each of the past 4 years forecast interest costs have exceeded actual interest cost by at least 8% and as much as 23% in one year, can Centra advise as to the level of excess or deficit in forecast accuracy which would warrant a change in the forecast methodology or sample of forecasters selected?

b) For each of the 4 annual forecasts of interest expense on long term debt, please quantify, the cause of the variance between actual and forecast, the effect, if any, of swaps, extensions or adjustments to the terms of existing issues, changes in estimated date of issue, principal amount, or interest basis [fixed or floating] of forecast issues, variance of market rate from the forecast rate, or deferral of issues related to changes in capital requirements from those forecast.

c) For each of the 4 annual forecasts of interest expense on short term debt, please quantify, the cause of the variance between actual and forecast, the effect, if any, of swaps, extensions or adjustments to the terms of existing issues, changes in estimated date of issue, principal amount, or interest basis [fixed or floating] of forecast issues, variance of market rate from the forecast rate, operation of any "true-up", or deferral of issues related to changes in capital requirements from those forecast.

d) Please advise the last financial period in which forecast interest costs were exceeded by actual interest costs.

ANSWER:

Response to parts (a), (b), (c) and (d):

Centra disagrees with the premise outlined in the preamble to this Information Request that variations between forecast and actual interest costs as shown in Centra's response to PUB/Centra I-42(b), arise as a result of the forecast methodology, changes in the capital spending or debt levels.

During the 2009/10 & 2010/11 Centra GRA, the global economy was in the midst of a financial crisis that led to a significant reduction in actual interest rates. Since that time, actual interest rates continue to decrease as the anticipated macro-economic recovery did not occur. The differences between forecast and actual interest costs are primarily associated with these significant financial market changes.

CAC/CENTRA II-53

Reference: **PUB/Centra I-42 and Schedules 5.8.2, 5.8.3 and 5.8.4 from the Centra 2009/10 GRA**

Preamble: **The table in PUB/Centra I-42 provides certain data points showing the forecast interest costs for certain periods.**

CAC observes that the forecast interest cost for long term debt for 2008/09 in Schedules 5.8.3, approximately agrees to that found in PUB/Centra I-42, but CAC calculates the values for the 2010/11 test year in schedule 5.8.4 from the Centra 2009/10 GRA, do not agree with the forecast found in PUB/Centra I-42.

CAC observes that Schedule 5.8.4 appears to forecast approximately $16,029,000 in long term debt interest resulting in unexplained variance is approximately $687,000 in 2010/11.

CAC wishes to better understand these differences in calculation.

a) **Please provide a reconciliation of these variances between the information in Schedules 5.8.3 and 5.8.4 from the Centra 2009/10 GRA, using a format similar to that found in lines 24 to 36 of Schedule 5.8.4.**

b) **Please identify the other factors, including change of issue size, coupon or yield to maturity, which gave rise to the variances in new or extended issues.**

c) Please confirm that Schedules 5.8.3 and 5.8.4 from the Centra 2009/10 GRA reported a forecast short term rate of 5.05% for 2009/10, and 5.60% for 2010/11, and provide the forecast short term rate for 2011/12 forecast in CGM08-01.

ANSWER:

Response to (a) & (b):

Centra observes that the schedules referenced in this Information Request were originally filed on January 20, 2009 as part of the 2009/10 GRA, as opposed to the updated Schedules filed on May 29, 2009 which were examined in detail at the 2009/10 GRA hearing.

Attached to this response, please find updated Schedules 5.8.3 and 5.8.4, together with Schedule 4.12.0 which summarizes total Finance Expense, filed on May 29, 2009, which reconciles to the information provided in response to Information Request PUB/Centra I-42(b) in this GRA.

Response to (c):

The initial and updated forecasted short term interest rates (inclusive of the 1% Provincial Guarantee Fee) were as follows:

Forecast Short Term Interest Rate

	2009/10	2010/11	2011/12
CGM08 Initial Application January 20, 2009	5.05%	5.60%	5.60%
CGM08 Updated Application May 29, 2009	1.90%	3.00%	4.90%

CENTRA GAS MANITOBA INC.
13 Month Average Debt Financing

Schedule 5.8.3

($000'S)

2009/10 Test Year

May 29, '09

	Principal Balances Debt Code	Principal at Start of Year	Principal at End of Year	30 Apr-09	31 May-09	30 Jun-09	31 Jul-09	31 Aug-09	30 Sep-09	31 Oct-09	30 Nov-09	31 Dec-09	31 Jan-10	28 Feb-10	31 Mar-10	365 Monthly Average
		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]
6	CG 1	62,671	62,671	1,880,118	1,942,789	1,880,118	1,942,789	1,942,789	1,880,118	1,942,789	1,880,118	1,942,789	1,942,789	1,754,777	1,942,789	62,671
7	CG 4	18,077	0	542,316	560,393	542,316	560,393	560,393	542,316	560,393	542,316	560,393	560,393	506,162	542,316	18,028
8	CG 5 (EM 3 & 4)	75,000	0	2,250,000	2,325,000	2,250,000	2,325,000	2,325,000	2,250,000	2,325,000	2,250,000	2,325,000	2,325,000	1,575,000	0	67,192
9	CG 7 - (Refinance CG 3)	50,000	50,000	1,500,000	1,550,000	1,500,000	1,550,000	1,550,000	1,500,000	1,550,000	1,500,000	1,550,000	1,550,000	1,400,000	1,550,000	50,000
10	CG 8 - (CG 6 Extension)	30,000	30,000	900,000	930,000	900,000	930,000	930,000	900,000	930,000	900,000	930,000	930,000	840,000	930,000	30,000
11	New Issue March 2009	30,000	30,000	900,000	930,000	900,000	930,000	930,000	900,000	930,000	900,000	930,000	930,000	840,000	930,000	30,000
12	New Issue March 2010	0	30,000	0	0	0	0	0	0	0	0	0	0	0	30,000	82
13	New Issue (Refinance CG 5)	0	75,000	0	0	0	0	0	0	0	0	0	0	525,000	2,325,000	7,808
14	New Issue (Refinance CG 4)	0	20,000	0	0	0	0	0	0	0	0	0	0	0	20,000	55
16	Balances at April 1 and March 31	265,748	297,671													
18	Monthly Debt Balances Weighted by Day			7,972,434	7,308,182	7,072,434	7,308,182	7,308,182	7,072,434	7,308,182	7,072,434	7,308,182	7,308,182	6,075,938	4,965,105	
20	Average Monthly Debt Balance			265,748	265,748	265,748	265,748	265,748	265,748	265,748	265,748	265,748	265,748	265,748	266,778	265,835

	Financing Costs on Debt	Interest Expense Long Term	Short Term
27	CG 1	3,792	
28	CG 4	997	
29	CG 5 (EM 3 & 4)	4,212	
30	CG 7 - (Refinance CG 3)	2,253	
31	CG 8 - (CG 6 Extension)	1,890	
32	New Issue March 2009	1,470	
33	New Issue March 2010	0	
34	New Issue (Refinance CG 5)	371	
35	New Issue (Refinance CG 4)	3	
37	Provincial Guarantee Fee	2,657	
39	Sub-total of Debt Financing Cost	17,644	
41	Amortization of Redemption Premium	1,262	
43	Net Cost of Debt Financing	18,906	
45	Embedded Cost of Long Term and Short Term Debt	7.11%	1.90%

CENTRA GAS MANITOBA INC.
13 Month Average Debt Financing

Schedule 5.8.4

($000'S)

2010/11 Test Year

May 29, '09

	Principal Balances Debt Code	Principal at Start of Year	Principal at End of Year	30 Apr-10	31 May-10	30 Jun-10	31 Jul-10	31 Aug-10	30 Sep-10	31 Oct-10	30 Nov-10	31 Dec-10	31 Jan-11	28 Feb-11	31 Mar-11	365 Monthly Average
		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]
6	CG 1	62,671	62,671	1,880,118	1,942,789	1,880,118	1,942,789	1,942,789	1,880,118	1,942,789	1,880,118	1,942,789	1,942,789	1,754,777	1,942,789	62,671
7	CG 7 - (Refinance CG 3)	50,000	50,000	1,500,000	1,550,000	1,500,000	1,550,000	1,550,000	1,500,000	1,550,000	1,500,000	1,550,000	1,550,000	1,400,000	1,550,000	50,000
8	CG 8 - (CG 6 Extension)	30,000	30,000	900,000	930,000	900,000	930,000	930,000	900,000	930,000	900,000	930,000	930,000	840,000	930,000	30,000
9	New Issue March 2009	30,000	30,000	900,000	930,000	900,000	930,000	930,000	900,000	930,000	900,000	930,000	930,000	840,000	930,000	30,000
10	New Issue March 2010	30,000	30,000	900,000	930,000	900,000	930,000	930,000	900,000	930,000	900,000	930,000	930,000	840,000	930,000	30,000
11	New Issue (Refinance CG 5)	75,000	75,000	2,250,000	2,325,000	2,250,000	2,325,000	2,325,000	2,250,000	2,325,000	2,250,000	2,325,000	2,325,000	2,100,000	2,325,000	75,000
12	New Issue (Refinance CG 4)	20,000	20,000	600,000	620,000	600,000	620,000	620,000	600,000	620,000	600,000	620,000	620,000	560,000	620,000	20,000
14	Balances at April 1 and March 31	297,671	297,671													
16	Monthly Debt Balances Weighted by Day			8,930,118	9,227,789	8,930,118	9,227,789	9,227,789	8,930,118	9,227,789	8,930,118	9,227,789	9,227,789	8,334,777	9,227,789	
18	Average Monthly Debt Balance			297,671	297,671	297,671	297,671	297,671	297,671	297,671	297,671	297,671	297,671	297,671	297,671	297,671

	Financing Costs on Debt	Interest Expense Long Term	Short Term
25	CG 1	3,792	
26	CG 7 - (Refinance CG 3)	2,253	
27	CG 8 - (CG 6 Extension)	1,890	
28	New Issue March 2009	1,470	
29	New Issue March 2010	1,425	
30	New Issue (Refinance CG 5)	3,563	
31	New Issue (Refinance CG 4)	950	
33	Provincial Guarantee Fee	2,977	
35	Sub-total of Debt Financing Cost	18,319	
37	Amortization of Redemption Premium	298	
39	Net Cost of Debt Financing	18,616	
41	Embedded Cost of Long Term and Short Term Debt	6.25%	3.00%

CENTRA GAS MANITOBA INC. **Schedule 4.12.0**
Finance Expense - 2006/07 to 2010/11

($000'S)
May 29, '09

		2006/07 Actual	2007/08 Actual	2008/09 Forecast	2009/10 Test Year	2010/11 Test Year
		[1]	[2]	[3]	[4]	[5]
6	Interest on Long Term Debt/Advances	13,762	13,547	13,760	14,987	15,342
8	Provincial Guarantee Fee on Long Term Debt	2,476	2,403	2,380	2,657	2,977
10	Amortization of Debt Discounts	1,692	1,253	1,256	1,262	298
12	Interest on Short Term Debt	3,349	4,665	4,384	912	1,719
14	Provincial Guarantee Fee on Short Term Debt	603	815	902	628	656
16	Interest on Common Assets	2,138	2,244	2,562	2,677	2,839
18	Interest on Inventory	24	32	24	25	27
20	Interest Capitalized	(1,958)	(3,270)	(3,101)	(2,253)	(2,862)
22	Other	9	22	58	97	21
24	Total Financing Expenses	22,095	21,711	22,225	20,992	21,017

CAC/CENTRA II-54

Reference: **PUB/Centra I-42, CGM08-1, page 22 to 25 in the Tab 3 attachments from the Centra 2009/10 GRA, and section 4.7 in Tab 4 of the application from the Centra 2009/10 GRA**

Preamble: **Centra indicates in PUB/Centra I-42, Finance Expense of 2009/10 of 20,992 and in CGM08-1, page 22 to 25 in the Tab 3 attachments from the Centra 2009/10 GRA, an amount of $24 million, and finally 24,656 in section 4.7 of Tab 4.**

Centra indicates in PUB/Centra I-42, Finance Expense of 2010/11 of 21,017 and in CGM08-1, page 22 to 25 in the Tab 3 attachments from the Centra 2009/10 GRA, an amount of $26 million, and, finally 25,237 in section 4.7 of Tab 4.

Centra indicates in PUB/Centra I-42, Finance Expense of 2011/12 of 23,376 and in CGM08-1, page 22 to 25 in the Tab 3 attachments from the Centra 2009/10 GRA, an amount of $26 million.

CAC would like to better understand these apparent inconsistencies.

a) **Please reconcile the 2009/10 finance expense numbers of $20,992, $24 million and $24,656 identified above.**

b) **Please reconcile the 2010/11 finance expense numbers of $20,017, $26 million and $25,237 identified above.**

c) Please reconcile the 2011/12 finance expense numbers of $23,367, and $26 million identified above.

ANSWER:

Response to (a), (b) and (c):

The 2009/10 & 2010/11 Centra GRA was filed in January 2009, and included CGM08-1 (pages 22 to 25 in the Tab 3 attachments) and Section 4.7 in Tab 4. Any variations between these numbers for the respective fiscal years were due to the rounding of CGM08-1 for presentation purposes.

As noted in CAC/Centra II-53, PUB/Centra I-42 from the 2013/14 Centra GRA utilized information from the updated filing on May 29, 2009.[1]

[1] Please note that the amount referenced by CAC from PUB/Centra I-42 in for 2010/11 should read $21,017 rather than $20,017; and for 2011/12 should read $23,375 rather than $23,376 or $23,367.

CAC/CENTRA II-55

Reference: **PUB/Centra I-42 and Schedule 4.12.0 of the application from the Centra 2009/10 GRA**

Preamble: **Centra indicates in PUB/Centra I-42, interest on short term debt for 2009/10 of $912 and in Schedule 4.12.0 of the application from the Centra 2009/10 GRA, an amount of $4,470.**

Centra indicates in PUB/Centra I-42, interest on short term debt for 2010/11 of $1,719 and in Schedule 4.12.0 of the application from the Centra 2009/10 GRA, an amount of $5,079.

Centra indicates in PUB/Centra I-42, interest on short term debt for 2011/12 of $3,530 but in Schedule 4.12.0 of the application from the Centra 2009/10 GRA, does not provide a comparable amount.

CAC would like to better understand these apparent inconsistencies.

a) **Please indicate the forecast amount of interest on short term debt for 2011/12 that would have been prepared on a consistent basis to the forecasts of $4,470 for 2009/10 and of $5,079 for 2010/11 found in Schedule 4.12.0 referenced above.**

b) **Please reconcile the forecast interest on short term debt, of $4,470 for 2009/10 and the forecast contained in PUB/Centra I-42, for 2009/10 of $912, indicating**

the changes in the amount of debt outstanding and changes in interest rate assumptions.

c) For Please reconcile the forecast interest on short term debt, of $5,079 for 2010/11 and the forecast contained in PUB/Centra I-42, for 2010/11 of $1,719 indicating the changes in the amount of debt outstanding and changes in interest rate assumptions.

ANSWER:

Response to part (a):

The comparable amount would be $5,547 thousand.

Response to parts (b) and (c):

Please see Centra's response to CAC/Centra II-54.

CAC/CENTRA II-56

Reference: **CAC/Centra I-6 and Section 4.1 in Tab 4 of the application**

Preamble: **Centra indicates in Section 4.1 page 1 of 7, in Tab 4 of the application, that the most recent forecasts as of the end of Q1 of the 2012 calendar year were used in developing the Economic Outlook.**

Centra indicates in Section 4.1 page 2 of 7, in Tab 4 of the application, that the summer review is usually the last point in time to incorporate information into the IFF process, unless there is a "significant financial market event".

Centra indicates in Section 4.1 page 2 of 7, in Tab 4 of the application, that "this year, the continued falling forecasts of near term interest rates …were considered materially different from the spring and summer forecasts".

CAC would like to better understand these material changes, and the level of interest rate forecast change which renders the result "materially different" from the prior data so as to require an update.

a) **Please provide the equivalent tables to Table 1 and Table 2 provided in PUB/Centra I-6 for the spring forecasts.**

b) Please provide the equivalent tables to Table 1 and Table 2 provided in PUB/Centra I-6 for the summer forecasts, many of which were provided in reply to CAC/Centra I-6 (a).

c) Please indicate whether the "materially different" result was in either long term debt rate forecasts, short term debt rate forecasts, or both, and quantify the change either in percentage or basis point terms for both the short and long term forecast rate.

d) Please provide copies of the source forecasts utilized by the Corporation as part of the spring preparation or review of the Economic Outlook.

ANSWER:

Response to parts (a) - (d):

As described in the response to PUB/Centra II-141(b), the Corporation has an established methodology for reviewing its interest rate forecasts. The IFF draws upon the most currently available Economic Outlook. As IFF12, which is the basis for the 2013/14 Centra General Rate Application, was produced in late fall/ early winter, the fall interest rate forecast was utilized. The 2012 spring and summer interest rate forecasts did not form the basis of Centra's 2013/14 General Rate Application. The 2013 Economic Outlook will be considered for the purposes of assessing whether to update the Application.

CAC/CENTRA II-57

Reference: PUB/Centra I-43 and CAC/Centra I-10

Preamble: Centra indicates in PUB/Centra I-43, $60 million of new fixed rate financing in 2012/13 and a further $30 million of new financing in 2013/14.

Centra indicates in CAC/Centra I-10, that MH had indicated that as an improvement to its forecasting methodologies, it would commencing with IFF 10 forecast 20% of new debt issuance as floating rate debt. This matter was referenced in 8.1.0 of the January 17, 2012 Board Order 5/12.

CAC would like to better understand whether the Centra forecast reflects the undertaking to forecast 20% of $90 million of new debt at the floating rate debt rates.

a) Does the interest expense forecast for Centra for this and future periods recognize that 20% of new debt will be forecast as floating rate debt issues?

b) If the interest expense forecast for Centra for this and future periods does not recognize that 20% of new debt will be forecast as floating rate debt issues, please adjust various schedules and the CGM to reflect that commitment.

c) If it is the position of Hydro that its commitment to forecast 20% of new debt issuance as floating rate debt, attracting lower rates than the long term fixed rate interest forecast, is applicable only at the Hydro level, please provide the

term sheet reflecting the interest rate and other terms of most recent floating rate issue undertaken Hydro, and the reference rate at the date of issue and at a proximate date to its reply to this question.

ANSWER:

Response to parts (a) - (c):

As Centra's long term debt issuance occurs less frequently than Manitoba Hydro's, Centra forecasts floating rate long term debt issuance on a discrete basis in order to align Centra's floating debt rate percentage within the target range of Centra's total debt portfolio. For example, in the 2013/14 fiscal year, a $30 million long term debt issue is forecast and 50% of this long term debt issue is forecast to be floating rate debt. If only 20% of this long term debt issue were to be floating rate long term debt, then Centra's floating rate debt percentage may become underweighted.

As described in response to CAC/Centra I-16 (a), the effective interest rate method is utilized to assess floating long term debt yield rates for financial reporting purposes. At the time of debt issuance, as floating and fixed rate debt of the same term to maturity have the same effective interest rate, it is incorrect to infer that floating rate debt will attract lower interest rates than fixed rate debt over the life of the debt issue.

CAC/CENTRA II-58

Reference: **CAC/Centra I-10**

Decision No.128/09 at pages 61 and 62 of 139

Preamble: **In the September 16, 2009, Decision No.128/09 at page 61 of 139, the Board wrote "The revised methodology for rate setting purposes should include; … A process to retrospectively test the accuracy of forecasters to assess their inclusion in future forecasts".**

In CAC/Centra I-10, Centra replies that "the Corporation considered that Directive No. 9 had been settled" as the PUB did not "direct the Corporation to undertake retrospective testing of its forecasters" in order 5/12 in respect of the MH GRA 2010/11.

CAC observes that the word "retrospective" does not appear in the Order 5/12, nor did the Board discuss testing of forecasts in the Intervener Positions section 8.3.0 of the Finance Expenses of the Order. CAC also observes that the Board did not appear to expressly absolve Centra of its obligation to comply with Decision 128/09 in Order 5/12.

Manitoba Hydro transcript of its GRA appears to suggest that the question of retrospective testing remains open as a result of the discussion between Mr. Peters and Mr. Schulz:, beginning at page 1103, where Mr. Schulz refers to an "internal debate on this, and as recently

as just in the last number of weeks" related to "how best to assess the accuracy of these forecasters"; continuing at page 1104, he also observes "It's a difficult thing to undertake. For us, when we're looking at this, and we're still deliberating seriously on this issue, is to say since the recovery period that we're currently in we don't have enough data points"; and, later at page 1104-5, "we're working with our economic analysis folks where we're still looking to see what would be the best path forward on this, so it's something that we're certainly taking seriously but at this point in time we haven't done …" {Emphasis added]

a) Does Centra now have enough data points to undertake retrospective testing of the forecasts of the forecasters it was using in 2009 or was using in September and October 2012?

b) Is there another Board order or decision which expressly supersedes or repeals the September 16, 2009, Decision No.128/09 at page 61 of 139, in which the Board required that "The revised methodology for rate setting purposes should include; … A process to retrospectively test the accuracy of forecasters to assess their inclusion in future forecasts"?.

ANSWER:

Response to parts (a) - (b):

As stated in the transcript from January 7, 2011 the Corporation has been deliberating seriously on the topic of retrospective testing of interest rate forecasters. To that end, the

Corporation has had discussions with economists from within its pool of external forecasters, and has also performed a review of relevant academic literature.

Based on these deliberations and consultations, it remains the Corporation's view that forecaster modeling algorithms are evolving since the financial crisis and that sufficient time through a full business cycle has not transpired to appropriately test the accuracy of these algorithms. Further, retrospective testing, with the aim of pruning or weighting forecaster opinions could potentially weaken or bias the Corporation's viewpoints in terms of understanding the spectrum of possibilities and mitigating the risk. For a broader discussion of the topic of retrospective testing of interest rate forecasters, please see the response to PUB/Centra II-141 (b).

Subsequent to Order 128/09, the topic of retrospective testing of interest rate forecasters was heavily canvassed at the 2010/11 & 2011/12 Electric GRA. Concurrently, as part of Centra's 2011/12 Cost of Gas proceeding, Centra filed its position on this topic in response to PUB/Centra 50 (b). In the PUB Orders arising out of these proceedings (Orders 5/12 and 65/11 respectively), the PUB did not recommend or redirect the Corporation to undertake retrospective testing of its interest rate forecasters.

CAC/CENTRA II-59

Reference: **Decision No.128/09 at pages 62 and 63 of 139**

Preamble: **CAC observes that this hearing commenced with the filing of the Application on or about January 25, 2013.**

In Decision No.128/09 at pages 62 and 63 of 139, the Board wrote "The Board will also expect Centra to propose a methodology to be used for rate setting purposes to update the interest rate forecast during the hearing process. The Board understands that an update is already required for the cost of gas, and that an updated interest rate forecast should also be provided. Centra may choose to update its interest rate forecast coincident with its cost of gas update". [Emphasis added]

CAC also observes that the dates of many of the forecasts referenced in PUB/Centra I-6 are now over 6 months old and have been superseded with new forecasts.

a) Will Centra choose to update its interest rate forecast coincident with its cost of gas update or later "during the hearing process" of this hearing?

b) If not, why not?

c) If the reason for not providing an update "during the hearing process" is that the changes in the forecast long and short term rates are not sufficiently material to warrant that transparency, please compare the change from spring,

to summer and then to fall 2012, which was judged to be sufficiently material to warrant such an update to the interest rate forecast.

ANSWER:

Response to parts (a) - (c):

Centra will file the 2013 Spring Economic Outlook when it is finalized, and will assess whether to revise the Application at that time.

CAC/CENTRA II-60

Reference: Response to PUB-Centra I/94(a)

Preamble: The referenced IR response indicates that Centra will provide a high-level update on the National Energy Board's RH-003-2011 Decision in the second round Information Request process.

a) As part of Centra's high-level update, please discuss and describe the nature and extent of any changes to Centra's Mainline transportation and gas purchasing strategies that Centra considers may be necessary or desirable in light of the NEB's RH-003-2011 Decision, having regard in particular to (i) the elimination of the FT-RAM mechanism and (ii) the NEB's decision to allow TransCanada to set the bid floors for the Mainline IT and STFT services at any level it chooses above the equivalent FT tolls.

ANSWER:

Please see Centra's response to PUB/Centra II-178 for a high level update on the NEB's RH-003-2011 Decision. On May 1, 2013 TransCanada made a Compliance Filing which included an Application to Review and Vary portions of the NEB decision.

Centra along with other shippers awaits confirmation of tolls for all paths and services; and bid floors for IT and STFT services. Once this information becomes available, Centra will evaluate its options using this information to inform its transportation contracting and gas supply purchase decisions going forward.

CAC/CENTRA II-60

Reference: Response to PUB-Centra I/94(a)

Preamble: The referenced IR response indicates that Centra will provide a high-level update on the National Energy Board's RH-003-2011 Decision in the second round Information Request process.

b) Does Centra intend to revise its non-Primary Gas cost forecasts in this proceeding to reflect (i) the reduced FT tolls that were prescribed by the NEB in the RH-003-2011 Decision and (ii) the impact of any changes to Centra's Mainline transportation portfolio (e.g. increased levels of Empress-to-MDA FT service) that Centra expects to implement as a result of the Decision, and as discussed in the response to (a)? Explain why or why not?

ANSWER:

Centra does not intend to revise its non-Primary Gas cost forecasts in this proceeding to reflect any prospective changes to TCPL tolls and/or make any changes to Centra's Mainline transportation portfolio due to the uncertainty as described in Centra's response to CAC/Centra II-60(a).

CAC/CENTRA II-61

Reference: Order 128/09 at 34

Preamble: The Board ordered the Company to prepare a demographic study that includes "The neighbourhoods where lower income consumers reside in order that targeted mailings and other marketing activities can be directed where they will be best received".

Please provide all the Company's documentation in response to this order.

ANSWER:

As noted in CAC/Centra I-20(a), Centra filed the 2009 Residential Energy Use Survey Report – Low Income Cut-off (LICO) in response to Directive 7 of Order 128/09 on May 28, 2010, and a revised report on August 31, 2010.

The 2009 Manitoba Hydro Residential Customer Survey provided global demographic data for Manitoba, and was broken down into both LICO125 and non- LICO125 dwellings. The study also provided data on the number of lower income consumers; the numbers of standard, mid-efficiency, and high efficiency furnaces and boilers; the type of housing (single, multi-unit, townhouse, mobile, owned, rented); and consumption data associated with low income dwellings. The study was never intended to provide data at a neighbourhood level that would provide statistically valid results to enable targeted marketing to lower income neighbourhoods. It was intended to provide global characteristics of the lower income market.

The City of Winnipeg, in partnership with local community organizations, other levels of government and the Community Social Data Strategy group, matched 2006 Statistics Canada Census Data to Winnipeg neighbourhood geographic areas. Instead of incorporating neighbourhood demographics into the 2009 Residential Energy Use Survey, Centra used existing Census data at the neighbourhood demographic level to pursue targeted mailings and other marketing activities. Targeted neighbourhoods for the Lower Income Energy Efficiency Program were identified by evaluating the data with criteria such as household income, ownership and age of dwellings.

CAC/CENTRA II-62

Reference: CAC / Centra I-20(b) and (ii)

a) Please provide all the Company's documentation regarding LICO-100 and LICO-125 gas customer insulation ratings and basement insulation levels.

ANSWER:

The 2009 Residential Energy Use Survey - Low Income Cut-off (LICO) Sector contains information on LICO and LICO 125 natural gas serviced customers' insulation ratings and basement insulation levels. The survey results were provided in Centra's response to CAC/Centra I-20(a) at page 16 of the filing. The questions pertaining to customers' insulation ratings and basement insulation levels are shown starting at page 56.

CAC/CENTRA II-62

Reference: CAC / Centra I-20(b) and (ii)

b) Please reconcile the number and percentage of LICO-125 customers who are renters as shown in (i) the response to CAC/Centra I-20(b) and (ii) Table 4.2 of the 2009 Residential Energy Use Survey Report (p. 118).

ANSWER:

The difference between the two responses for the number of LICO-125 renters, 4,572 as stated in Centra's response to CAC/Centra I-20(b) and 5,171 as stated in Table 4.2 of the 2009 Residential Energy Use Survey – Low Income Cut-off Sector report, was primarily due to the adjustment in weightings for the overall Residential Energy Use Survey findings that was performed subsequent to the LICO Sector report as described in the response to CAC/Centra I-20(a). Each survey response represents a number of customers within the overall population of customers, referred to as the weighting for the response. Weightings are calculated using the ratio between the population and the number of responses for a particular group (or strata). The population is divided into strata of similar types of customers. This gives surveys more accuracy and makes them more representative of the population.

A natural gas customer weighting criteria was introduced to match the final survey results to actual number of gas customers. Adding another weighting variable creates many small strata with few surveys. Less important weighting criteria were combined to ensure an adequate number of survey responses in each stratum resulting in an adjustment to the overall number of natural gas heated LICO-125 tenants.

CAC/CENTRA II-62

Reference: CAC / Centra I-20(b) and (ii)

c) Describe (a) the method by which the existence of fair or poor insulation is determined, and (b) how the method has been proven to accurately reflect actual conditions.

ANSWER:

(a) To determine the existence of fair or poor insulation levels customers were surveyed via the 2009 Residential Energy Use Survey - Low Income Cut-off (LICO) Sector. Customers were asked "What best describes the overall level of INSULATION in your residence? (excluding Basement)" and were instructed to mark an "x" in the box(es) beside the appropriate answer. The options provided were Excellent, Very Good, Average, Fair or Poor.

(b) It was determined that the above methodology was the best approach to estimate insulation conditions based upon past survey responses. In the 2003 Residential Energy Use Survey, customers were asked to indicate the insulation R-values present in their dwellings. The results could not be used to accurately estimate actual R-values in the market as "Do Not Know" was indicated 55.0% of the time for attic insulation and 33.6% of the time for basement insulation. Incorporating a customer's qualitative assessment in the 2009 survey was deemed to be the best method to limit non-respondent error and more accurately approximate the insulation levels in the residential dwelling market.

CAC/CENTRA II-63

Reference: CAC / Centra I-20(e)(i) and (ii)

a) Please provide the full and complete rationale for excluding rental apartments from the program.

ANSWER:

Centra works with property managers to assist them in improving the overall energy efficiency of their facilities through its variety of Commercial Power Smart Programs, including such measures as boilers, ventilation and CO2 sensors, insulation and windows, and energy efficiency showerheads.

Opportunities for individual in-suite savings from insulation and furnaces are limited in rental apartments. It is not feasible to upgrade the insulation of individual suites. In addition, the majority of natural gas heated apartment blocks do not have individual suite based heating systems; instead most will have a central heating and cooling system.

CAC/CENTRA II-63

Reference: CAC / Centra I-20(e)(i) and (ii)

b) Please provide the full and complete rationale for not requiring a landlord contribution with respect to improvements financed by billings to tenants under the Pay As You Save program.

ANSWER:

The Pay As You Save Program (PAYS) operates under the principle that improvements are financed by the party that benefits from the bill reductions arising from the energy savings associated with the improvement. The Program addresses the reluctance of landlords to undertake energy efficiency upgrades that provide no monetary benefit to the landlord (e.g. where bill savings accrue to the tenant). In situations where the cost of the upgrade exceeds the amount eligible for financing under the PAYS Program, the landlord has the option to provide funds to cover the cost difference.

Landlords with qualifying low income tenants may be eligible to participate in an enhanced offering outlined in Centra's response to CAC/Centra II-65.

CAC/CENTRA II-63

Reference: CAC / Centra I-20(e)(i) and (ii)

c) With respect to insulation, state whether Landlord participation in the Home Insulation (rebate) Program is required and, if not, provide the full and complete rationale why not.

ANSWER:

Applicants for the Home Insulation Program (HIP) must be the owner(s) of the home, who may be a landlord or the resident. Tenants require written permission from their landlord if they wish to utilize the Home Insulation Program to upgrade their rented home.

As with all Power Smart Programs, participation in HIP is voluntary.

CAC/CENTRA II-63

Reference: CAC / Centra I-20(e)(i) and (ii)

d) Provide all the program details of the Home Insulation Program for landlords, including the amount of the rebate and the amount of the average cost of the measure.

ANSWER:

Landlords participate in the Power Smart Home Insulation Program in the same manner as other homeowners and receive the same rebates to cover insulation material costs, as outlined in Centra's response to CAC/Centra I-20(e) (i & ii). Rebate amounts vary by project type (e.g. attic, wall, foundation) and the additional R-value of insulation being installed.

The average rebate received to date by landlords participating in the Home Insulation Program is $764 dollars. The average material cost of these projects is $1240 while the average total cost of these projects is $1819.

CAC/CENTRA II-63

Reference: CAC / Centra I-20(e)(i) and (ii)

e) Provide all the program details of the "Other Initiatives" for landlords of lower income households and the participation therein by landlords of lower income households.

ANSWER:

Program details of the "Other Initiatives" for landlords of lower income households can be found in Appendix 7.1 - 2011 Power Smart Plan, Section 1.3 Commercial Portfolio, of this General Rate Application.

Tenant household income for multi-unit residential buildings is not collected as this is not a condition of program eligibility.

CAC/CENTRA II-63

Reference: CAC / Centra I-20(e)(i) and (ii)

f) Provide all the program details of the Neighbourhood Power Smart Project for landlords of lower income households and the participation therein by landlords of lower income households.

ANSWER:

The Neighbourhood Power Smart Project assists landlords of lower income households to improve energy efficiency levels through the use of PAYS financing and/or the Lower Income Program. Under the Neighbourhood Approach, a Community Coordinator canvases in the neighbourhood to promote the Lower Income Energy Efficiency Program for homeowners. When a tenant is encountered, the Community Coordinator provides the tenant with information on the Power Smart PAYS and the Lower Income Programs and obtains contact information for the landlord to communicate energy efficiency program opportunities.

While nine landlords to date have participated in Power Smart PAYS financing as outlined in Centra's response to CAC/Centra I-20(e)(iii), no landlords have applied for PAYS financing or the Lower Income Program under the Neighbourhood Power Smart Project. The Neighbourhood Power Smart Project is in the early stages of implementation.

CAC/CENTRA II-64

Reference: CAC / Centra I-20(e)(iii)

Please provide the low-income participation in the PAYS, HIP, and Water and Energy Saver programs.

ANSWER:

Manitoba Hydro does not require customers to submit household income in order to participate in the HIP and Water and Energy Saver Programs.

Manitoba Hydro requests financial information from participants in financing programs for the sole purpose of establishing creditworthiness and assessing a customer's ability to repay the loan. In the absence of corresponding household demographic information, PAYS participants cannot be classified as low-income under the LICO or LICO-125 criteria.

CAC/CENTRA II-65

Reference: CAC / Centra I-20(f)

Please confirm that (as shown in the response to CAC/CENTRA I-20 (e)(i)-(ii)) there is no program targeted to assisting landlords of lower income households to improve standard furnaces. If the statement is not confirmed, provide full and complete details of the program, to assist landlords of lower income households to improve standard furnaces.

ANSWER:

Under the Neighbourhood Power Smart Project, landlords can access PAYS financing to replace standard furnaces as outlined Centra's response to CAC/Centra II-63(f).

Landlords can also replace their standard efficiency furnaces through Centra's Furnace Replacement program provided an arrangement can be made to ensure the lower income tenant is realizing a substantial portion of the benefit of reduced heating costs. For example, Manitoba Hydro has made arrangements with Kinew Housing Corporation utilizing both the PAYS financing and Furnace Replacement Program to replace a number of standard efficiency furnaces as outlined under Centra's response to CAC/Centra II-66.

CAC/CENTRA II-66

Reference: CAC / Centra I-20(g)

Please confirm that (as shown in the response to CAC/CENTRA I-20 (e)(iii)) the number of lower income households living in rented quarters served by the Company's Furnace Replacement Program is zero. If not confirmed, please provide the numbers requested.

ANSWER:

Centra confirms the number of lower income households living in rented quarters served by the Furnace Replacement Program is zero.

Centra is currently working with Kinew Housing Corporation, a non-profit Aboriginal housing company providing housing to low income Aboriginal families, to replace standard efficient furnaces with funding provided through Power Smart PAYS Financing program and the Furnace Replacement Program.

CAC/CENTRA II-67

Reference: CAC / Centra I-20(h)

Please reconcile the difference in the number of boilers in low-income premises (LICO-125) as reported in (i) Table 5.6 of the 2009 Residential Energy Use Survey Report (p. 136) and (ii) the response to CAC/CENTRA I-20(h).

ANSWER:

The difference in the number of boilers in LICO 125 premises as reported in (i) Table 5.6 of the 2009 Residential Energy Use Survey Report - Low Income Cut-off (LICO) (p.136) and (ii) the response to CAC/Centra I-20(h) is due to the slight refinement of survey figures after the original filing of the report. Please see Centra's response to CAC/Centra I-20(a) for further details on the adjustments to the study.

CAC/CENTRA II-68

Reference: CAC / Centra I-20(i)

CAC/CENTRA I-20(i) requested "all Company plans" for process, impact, and all other evaluations and to "Include all documents." The response stated that "The Lower Income Energy Efficiency Program (LIEEP) is presently being evaluated based on a draft evaluation plan." However, no draft evaluation plan or any other document was provided.Please provide a copy of the documents as requested in the Information Request.

ANSWER:

Please see the attachment to this response for a copy of the final evaluation plan associated with LIEEP. The LIEEP is evaluated every year and the aggregated results are provided within the Power Smart Annual Review. The next Power Smart Annual Review is expected to be completed in the summer of 2013.

EVALUATION PLAN

Lower Income Energy Efficiency Program

Table of Contents

1.0 Evaluation Plan Objectives

The main objective of this report is to outline the process to be carried out in performing an annual evaluation of the Lower Income Energy Efficiency Program (LIEEP). The Evaluation Plan also serves as a mechanism for the Affordable Energy Department (AED), Customer Engineering Services (CES) and Power Smart Planning, Evaluation & Research (PSPER) to communicate and outline the following:

a) The evaluation objectives;
b) The results to be reported;
c) The data responsibilities of PSPER; and
d) The data responsibilities of AED/CES.

2.0 Program Background

LIEEP helps lower income customers retrofit their homes to energy efficient standards, thus increasing the comfort level of the home and decreasing the customer's energy bills.

Energy savings are achieved by retrofitting qualified customers' homes with energy efficient measures as recommended by the pre-retrofit in-home energy evaluation.

Incentives and administrative costs are covered by Power Smart, the Affordable Energy Fund (AEF), the Natural Gas Furnace Replacement Program (FRP) and external funding received from organizations such as the Province of Manitoba, non-government community groups and where available, other agencies such as Natural Resources Canada (NRCan). This mixture of funding makes the participant cost of the retrofits close to nil.

Evaluation results will be compared against the program's Power Smart Plan targets to determine whether the program is meeting its projected targets.

3.0 Impact Evaluation Plan

The intent of the Impact Evaluation is to establish and record the net energy and demand impacts of LIEEP, and to determine the cost effectiveness of these impacts. Results of the Impact Evaluation are included in the Power Smart Annual Review (PSAR).

3.1 Impact Evaluation Objectives

The objectives of the Impact Evaluation are to:

a) Determine the energy and demand savings achieved through LIEEP.
b) Determine the cost effectiveness of the energy and demand savings achieved by applying the following economic tests:

   i. Total Resource Cost (TRC);
   ii. Levelized Utility Cost (LUC); and
   iii. Rate Impact Measure (RIM).

c) Conduct a variance analysis comparing achieved energy and demand savings and economic tests, against what was forecast.

d) Recommend methods for improving future data collection.

3.2 Impact Evaluation Methodology

3.2.1 Load Impact – Achievements by Measure Type

The load impact analysis will focus on factors that affect energy and demand savings for LIEEP. The analysis will consist of an engineering evaluation completed for each energy efficient measure type.

3.2.1.1 Water & Energy Saving Measures

1) Engineering Estimates of per Unit Impacts

a) Formulae

The following equations will be used to calculate per unit energy and demand savings resulting from the installation of water and energy saving measures (low-flow showerheads, faucet aerators and water heater pipe wrap):

i. Annual Energy Savings per Unit:

Annual Energy Savings per Unit (kW.h)	=	*Energy Consumption resulting from non-EE Measure (kW.h)*	-	*Energy Consumption resulting from EE Measure (kW.h)*

ii. Demand Savings per Unit:

$$\textit{Demand Savings per Unit (KW)} = \left\{ \textit{Watts used with non-EE Measure Installed (KW)} - \textit{Watts used with EE Measure Installed (KW)} \right\} x \textit{ Coincidence Peak Factor}$$

b) Data Sources

The data inputs for the equations listed in Section 3.2.1.1 1) a) are to be taken from the following sources:

Equation Variable	Data Source	Responsibility
Energy Consumption Resulting from non-EE Measure	In-home energy evaluation (specifies whether hot water tank is gas or electric) Residential Energy Use Survey "City of Winnipeg Water Supply 2008" report "Groundwater in Manitoba: Hydrogeology, Quality Concerns, Management" (1995), National Hydrology Research Institute "Potential Water and Energy Savings from Showerheads" (2006), Berkeley National Laboratory "Showerhead Summary" (2009) – Product testing (showerhead and faucet aerator flow rates) completed by Customer Engineering Services Water Energy Saver Program (WESP) survey results	Affordable Energy Dept. External Party: Energy Advisors Market Forecast Dept. Customer Engineering Services Marketing Programs Dept.
Energy Consumption Resulting from EE Measure	In-home energy evaluation (specifies whether hot water tank is gas or electric, and indicates which EE measures were installed) Residential Energy Use Survey "City of Winnipeg Water Supply 2008" report "Groundwater in Manitoba: Hydrogeology, Quality Concerns, Management" (1995), National Hydrology Research Institute "Potential Water and Energy Savings from Showerheads" (2006), Berkeley National Laboratory "Showerhead Summary" (2009) – Product testing (showerhead and faucet aerator flow rates) completed by Customer Engineering Services Water Energy Saver Program (WESP) survey results	Affordable Energy Dept. External Party: Energy Advisors Market Forecast Dept. Customer Engineering Services Marketing Programs Dept.

Equation Variable	Data Source	Responsibility
Watts used with non-EE Measure Installed	In-home energy evaluation (specifies whether hot water tank is gas or electric) Residential Energy Use Survey "City of Winnipeg Water Supply 2008" report "Groundwater in Manitoba: Hydrogeology, Quality Concerns, Management" (1995), National Hydrology Research Institute "Potential Water and Energy Savings from Showerheads" (2006), Berkeley National Laboratory "Showerhead Summary" (2009) – Product testing (showerhead and faucet aerator flow rates) completed by Customer Engineering Services Water Energy Saver Program (WESP) survey results	Affordable Energy Dept. External Party: Energy Advisors Market Forecast Dept. Customer Engineering Services Marketing Programs Dept.
Watts used with EE Measure Installed	In-home energy evaluation (specifies whether hot water tank is gas or electric, and indicates which EE measures were installed) Residential Energy Use Survey "City of Winnipeg Water Supply 2008" report "Groundwater in Manitoba: Hydrogeology, Quality Concerns, Management" (1995), National Hydrology Research Institute "Potential Water and Energy Savings from Showerheads" (2006), Berkeley National Laboratory "Showerhead Summary" (2009) – Product testing (showerhead and faucet aerator flow rates) completed by Customer Engineering Services Water Energy Saver Program (WESP) survey results	Affordable Energy Dept. External Party: Energy Advisors Market Forecast Dept. Customer Engineering Services Marketing Programs Dept.
Coincidence Peak Factor	Natural Resources Canada report on average home's hours of use 2010 Residential Vintage Model	Affordable Energy Dept. Customer Engineering Services Market Forecast Dept.

2) Engineering Estimates of Program Load Impacts

a) Formulae

The following equations will be used to calculate energy and demand savings at the program level:

i. Annual Energy Savings of the Program:

$$\text{Annual Energy Savings (kW.h)} = \text{(Rebated Sales - Free Riders + Free Drivers)} \times \text{Annual Energy Savings per Unit (kW.h)} \times \text{Persistence Factor}$$

ii. Demand Savings of the Program:

$$\text{Demand Savings (KW)} = \text{(Rebated Sales - Free Riders + Free Drivers)} \times \text{Demand Savings per Unit (KW)} \times \text{Persistence Factor}$$

b) Data Sources

The data inputs for the equations listed in Section 3.2.1.1 2) a) are to be taken from the following sources:

Equation Variable	Data Source	Responsibility
Rebated sales	Completed In-home Energy Evaluation	Affordable Energy Dept.
Free riders	n/a	n/a
Free drivers	n/a	n/a
Persistence Factor	Water Energy Saver Program (WESP) survey results	Affordable Energy Dept. Marketing Programs Dept. Power Smart Planning, Evaluation & Research

3) Definition of Variables

Refer to Glossary in Section 4.0 for definition of variables mentioned above.

3.2.1.2 Insulation

1) Engineering Estimates of per Unit Impacts

The per unit impact analysis will focus on factors affecting the energy and demand savings resulting from insulation improvements. The analysis will consist of an engineering evaluation using the following ASHRAE-recognized calculations.

a) Electric Demand

i. Formula

The following calculation is used to determine the per unit demand impact in KW on a per square foot basis. Heating values will be used to calculate winter peak, whereas peak in shoulder summer months is based on the on/off statistics for electric space heat[1]. It has been established that a net zero impact occurs on summer demand peak as attributable to air conditioning.

$$\text{Per Unit Demand Savings (KW)} = \left(\left\{ \frac{\text{ALF} \times \text{BGRF} \times \text{DTD}}{\text{HCCF} \times \text{HCE}} \right\} \times \left\{ \left(\frac{1}{[\text{CF} \times R_{BEF} + R_{ADJ}]} \right) - \left(\frac{1}{[\text{CF} \times R_{AFT} + R_{ADJ}]} \right) \right\} \right) \times \text{Coincidence Peak Factor}$$

Where:

- Air Leakage Factor (ALF) – This factor is used to account for the effect of air leakage on the energy performance of the home. In this calculation it is assumed that upon re-insulating a home, air leakage issues will be addressed/improved upon simultaneously.

- Below Grade Reduction Factor (BGRF) – A reduction factor used in calculating savings for basement and crawlspace measures due to the differing characteristics of heat/cooling loss/gain below grade.

- Design Temperature Difference (DTD) – This measures design heat/cooling loss as tabulated in the building code for a particular geographic location.

- Heating/Cooling Conversion Factor (HCCF) – The energy contained within a fuel.

[1] Source: Residential Energy Use Survey

- Heating/Cooling Efficiency (HCE) – The efficiency with which the heating/cooling value is extracted from the fuel to its intended purpose.

- Construction Factor (CF) – This factor reduces the nominal/rated R-value of the insulation improvement as per the typical losses that would be expected in actuality considering construction breaks in the insulation barrier (i.e. wall construction/studs).

- R-Value – Measures a material's resistance to heat flow in units of Fahrenheit degrees x hours x square feet per BTU. The higher the R-value of a material, the greater its insulating capability.
  R_{BEF} = R-value prior to re-insulation
  R_{AFT} = R-value after re-insulation
  R_{ADJ} = Adjustment factor for standard building materials

ii. Data Sources

The data inputs for the equation listed in Section 3.2.1.2 1) a) i) are to be taken from the following sources:

Equation Variable	Data Source	Responsibility
Air Leakage Factor	Statistically-derived modifier*	Customer Engineering Services
Below Grade Reduction Factor	Statistically-derived modifier*	Customer Engineering Services
Design Temperature Difference	Manitoba Building Code	Customer Engineering Services
Heating/Cooling Conversion Factor	Conversion factor (BTU to kW.h or cu.m), ASHRAE-recognized	Customer Engineering Services
Heating/Cooling Efficiency	Average market value, adjusted periodically as the market shifts its share of standard, mid and high efficiency units	Customer Engineering Services Market Forecast Dept.
Construction Factor	Statistically-derived modifier*	Customer Engineering Services
$R_{BEFORE / AFTER}$	Preliminary assessment by external party energy advisors Contractor's invoicing Random post-verification completed by external party energy advisors or Manitoba Hydro staff (20% sample)	External Party: Energy Advisors Contractor Affordable Energy Dept.
$R_{ADJUSTMENT}$	Statistically-derived modifier*	Customer Engineering Services
Coincidence Peak Factor	Natural Resources Canada report on average home's hours of use 2010 Residential Vintage Model	Affordable Energy Dept. Customer Engineering Services Market Forecast Dept.

*Used to better represent typical residential construction within the general formula.

b) Electric Energy

i. Formula

The following calculation identifies per unit savings in kW.h per square foot. Heating values are used for calculating energy savings in winter months and shoulder summer months[2]. Cooling values will be used to calculate additional summer energy savings for those applications submitted for homes with central air conditioning.

$$\text{Per Unit Energy Savings (kW.h)} = \text{Per unit Demand Savings (KW)} \times \text{HDD/CDD} \times \left\{ \frac{\text{C-Factor}}{\text{DTD}} \right\}$$

Where:

- Heating/Cooling Degree Days (HDD/CDD) – Expresses the relationship between outside and optimum inside temperature, assuming that to maintain a temperature of 21°C inside, the energy requirement will vary in proportion to the difference between the outside temperature and 18°C. A degree day is equal to one degree difference in a single day's mean temperature from that of 18°C.

- C-Factor – A constant based on several variables relating to the construction, occupancy and geographic location of the building.

- Design Temperature Difference (DTD) – This measures design heat/cooling loss as tabulated in the building code for a particular geographic location.

ii. Data Sources

The data inputs for the equation listed in Section 3.2.1.2 1) b) i) are to be taken from the following sources:

Equation Variable	Data Source	Responsibility
Heating/Cooling Degree Days	Manitoba Building Code	Customer Engineering Services
C-Factor	Statistically-derived modifier*	Customer Engineering Services
Design Temperature Difference	Manitoba Building Code	Customer Engineering Services

*Used to better represent typical residential construction within the general formula.

[2] Source: Residential Energy Use Survey

c) Natural Gas Energy

i. Formula

The following calculation identifies per unit savings in m^3 per square foot.

$$\text{Per Unit Energy Savings (cu.m)} = \left\{ \frac{ALF \times BGRF \times HDD/CDD \times C\text{-}Factor}{HCCF \times HCE} \right\} \times \left\{ \left(\frac{1}{[CF \times R_{BEF} + R_{ADJ}]} \right) - \left(\frac{1}{[CF \times R_{AFT} + R_{ADJ}]} \right) \right\}$$

Where:

- Air Leakage Factor (ALF) – This factor is used to account for the effect of air leakage on the energy performance of the home. In this calculation it is assumed that upon re-insulating a home, air leakage issues will be addressed/improved upon simultaneously.

- Below Grade Reduction Factor (BGRF) – A reduction factor used in calculating savings for basement and crawlspace measures due to the differing characteristics of heat/cooling loss/gain below grade.

- Heating/Cooling Degree Days (HDD/CDD) – Expresses the relationship between outside and optimum inside temperature, assuming that to maintain a temperature of 21°C inside, the energy requirement will vary in proportion to the difference between the outside temperature and 18°C. A degree day is equal to one degree difference in a single day's mean temperature from that of 18°C.

- C-Factor – A constant based on several variables relating to the construction, occupancy and geographic location of the building.

- Heating/Cooling Conversion Factor (HCCF) – The energy contained within a fuel.

- Heating/Cooling Efficiency (HCE) – The efficiency with which the heating/cooling value is extracted from the fuel to its intended purpose.

- Construction Factor (CF) – This factor reduces the nominal/rated R-value of the insulation improvement as per

the typical losses that would be expected in actuality considering construction breaks in the insulation barrier (i.e. wall construction/studs).

- R-Value – Measures a material's resistance to heat flow in units of Fahrenheit degrees x hours x square feet per Btu. The higher the R-value of a material, the greater its insulating capability.
  R_{BEF} = R-value prior to re-insulation
  R_{AFT} = R-value after re-insulation
  R_{ADJ} = Adjustment factor for standard building materials

ii. Data Sources

The data inputs for the equations listed in Section 3.2.1.2 1) c) i) are to be taken from the following sources:

Equation Variable	Data Source	Responsibility
Air Leakage Factor	Statistically-derived modifier*	Customer Engineering Services
Below Grade Reduction Factor	Statistically-derived modifier*	Customer Engineering Services
Heating/Cooling Degree Days	Manitoba Building Code	Customer Engineering Services
C-Factor	Statistically-derived modifier*	Customer Engineering Services
Heating/Cooling Conversion Factor	Conversion factor (BTU to kW.h or cu.m)	Customer Engineering Services
Heating/Cooling Efficiency	Average market value, adjusted periodically as the market shifts its share of standard, mid and high efficiency units.	Customer Engineering Services Market Forecast Dept.
Construction Factor	Statistically-derived modifier*	Customer Engineering Services
$R_{BEFORE / AFTER}$	Preliminary assessment by external party energy advisors Contractor's invoicing Random post-verification completed by external party energy advisors or Manitoba Hydro staff (20% sample)	External Party: Energy Advisors Contractor Affordable Energy Dept.
$R_{ADJUSTMENT}$	Statistically-derived modifier*	Customer Engineering Services

*Used to better represent typical residential construction within the general formula.

2) Engineering Estimates of Program Load Impacts

a) Formulae

The following calculations are used to determine the program's energy and demand savings.

Demand Savings (MW) = *(Rebated Sales - Free Riders + Free Drivers)* x *Demand Savings per Unit (KW)*

Annual Energy Savings (kW.h) = *(Rebated Sales - Free Riders + Free Drivers)* x *Annual Energy Savings per Unit (kW.h)*

Annual Energy Savings (m^3) = *(Rebated Sales - Free Riders + Free Drivers)* x *Annual Energy Savings per Unit (m^3)*

b) Data Sources

The data inputs for the equations listed in Section 3.2.1.2 2) a) are to be taken from the following sources:

Equation Variable	Data Source	Responsibility
Rebated Sales	Completed In-home Energy Evaluation	Affordable Energy Dept.
Free Riders	n/a	n/a
Free Drivers	n/a	n/a

*Used to better represent typical residential construction within the general formulae.

3.2.1.3 High Efficiency Natural Gas Furnaces & Boilers

1) Engineering Estimates of per Unit Impacts

a) Formula

The following equation will be used to calculate per unit energy savings resulting from the installation of high efficiency natural gas furnaces and boilers:

Annual Energy Savings per Unit:

$$\textit{Annual Energy Savings per Unit (cu.m)} = \left\{ \textit{Consumption with standard efficiency furnace/boiler (cu.m)} - \textit{Consumption with high efficiency furnace/boiler (cu.m)} \right\}$$

b) Data Sources

The data inputs for the equation listed in Section 3.2.1.3 1) a) are to be taken from the following sources:

Equation Variable	Data Source	Responsibility
Consumption with standard efficiency furnace/boiler	Residential Energy Use Survey data regarding averages for overall consumption and furnace/boiler efficiency, adjusted to reflect the average size of a lower income home based on Market Forecast data.	Affordable Energy Dept. Customer Engineering Services Market Forecast Dept.
Consumption with high efficiency furnace/boiler	Residential Energy Use Survey data regarding averages for overall consumption and furnace/boiler efficiency, adjusted to reflect the average size of a lower income home based on Market Forecast data.	Affordable Energy Dept. Customer Engineering Services Market Forecast Dept.

2) Engineering Estimates of Program Load Impacts

a) Formula

The following equation will be used to calculate energy savings at the program level:

i. Annual Energy Savings of the Program:

Annual Energy Savings (cu.m) = *(Rebated Sales - Free Riders + Free Drivers)* x *Annual Energy Savings per Unit (cu.m)*

b) Data Sources

The data inputs for the equation listed in Section 3.2.1.3 2) a) are to be taken from the following sources:

Equation Variable	Data Source	Responsibility
Rebated sales	Completed In-home Energy Evaluation	Affordable Energy Dept.
Free riders	n/a	Affordable Energy Dept.
Free drivers	n/a	n/a

3.2.1.4 Lighting

1) Engineering Estimates of per Unit Impacts

a) Formulae

The following equations will be used to calculate per unit energy and demand savings resulting from the installation of compact fluorescent lamps (CFLs):

i) Annual Energy Savings per Unit:

Annual Energy Savings per Unit (kW.h) = { *Consumption with Base Measures Installed (KW)* - *Consumption with EE Measures Installed (KW)* } x *Annual Hours of Operation* x *Heating/Cooling Interactive Effects*

ii) Demand Savings per Unit:

$$\text{Demand Savings per Unit (KW)} = \left\{ \text{Consumption with Base Measures Installed (KW)} - \text{Consumption with EE Measures Installed (KW)} \right\} \times \text{Heating/Cooling Interactive Effects} \times \text{Coincidence Peak Factor}$$

b) Data Sources

The data inputs for the equations listed in Section 3.2.1.4 1) a) are to be taken from the following sources:

Equation Variable	Data Source	Responsibility
Consumption with base measures installed	Each participant is provided three 13-watt CFLs & three 23-watt CFLs. LIEEP assumes that each 13-watt CFL replaced a 60-watt incandescent bulb, and each 23-watt CFL replaced a 100-watt incandescent bulb.	Affordable Energy Dept. Marketing Programs Dept.
Consumption with EE measures installed	In-home energy assessment (details which lighting technologies were either installed or left at home) Nameplate wattage of lighting technologies installed (verified by CSA)	Affordable Energy Dept. External Party: Energy Advisor
Annual hours of operation	Natural Resources Canada report on average home's hours of use	Affordable Energy Dept. Customer Engineering Services
Heating/Cooling interactive effects	Natural Resources Canada & CEATI model homes In-home energy assessment (specifies heating system and type of residence)	Affordable Energy Dept. External Party: Energy Advisor Customer Engineering Services
Coincidence peak factor	Natural Resources Canada report on average home's hours of use 2010 Residential Vintage Model	Affordable Energy Dept. Customer Engineering Services Market Forecast Dept.

2) Engineering Estimates of Program Load Impacts

a) Formulae

The following equations will be used to calculate energy and demand savings at the program level:

a. Annual Energy Savings of the Program:

$$\text{Annual Energy Savings (kW.h)} = \text{(Rebated Sales - Free Riders + Free Drivers)} \times \text{Annual Energy Savings per Unit (kW.h)} \times \text{Persistence Factor}$$

b. Demand Savings of the Program:

$$\text{Demand Savings (KW)} = \text{(Rebated Sales - Free Riders + Free Drivers)} \times \text{Demand Savings per Unit (KW)} \times \text{Persistence Factor}$$

b) Data Sources

The data inputs for the equations listed in Section 3.2.1.4 2) a) are to be taken from the following sources:

Equation Variable	Data Source	Responsibility
Rebated sales	Completed In-home Energy Evaluation	Affordable Energy Dept.
Free riders	n/a	n/a
Free drivers	n/a	n/a
Persistence Factor	Water & Energy Saving Program (WESP) survey results Collaboration with Strategic Lighting Initiative Committee & CSA members Natural Resources Canada studies	Affordable Energy Dept. Marketing Programs Dept. Customer Engineering Services

3.2.1.5 Air Sealing Measures

1) Engineering Estimates of per Unit Impacts

a) Formulae

The following equations will be used to calculate per unit energy and demand savings resulting from the installation of air sealing measures (caulking, gasket packages, socket caps and window sealing kits):

i. Annual Energy Savings per Unit:

$$\textit{Annual Energy Savings per Unit (kW.h)} = \textit{Energy Consumption of Heating System without Air Sealing Measures Installed (kW.h)} - \textit{Energy Consumption of Heating System with Air Sealing Measures Installed (kW.h)}$$

ii. Demand Savings per Unit:

$$\textit{Demand Savings per Unit (KW)} = \left\{ \textit{Watts used by Heating System without Air Sealing Measures Installed (KW)} - \textit{Watts used by Heating System with Air Sealing Measures Installed (KW)} \right\} x \textit{Coincidence Peak Factor}$$

b) Data Sources

The data inputs for the equations listed in Section 3.2.1.6 1) a) are to be taken from the following sources:

Equation Variable	Data Source	Responsibility
Energy Consumption of Heating System without Air Sealing Measures Installed	In-home energy evaluation (provides heating system details) Historical LIEEP ecoENERGY audit results (blower door test)	Affordable Energy Dept. External Party: Energy Advisors
Energy Consumption of Heating System with Air Sealing Measures Installed	In-home energy evaluation (provides heating system details, and indicates which EE measures were installed) Historical LIEEP ecoENERGY audit results (blower door test)	Affordable Energy Dept. External Party: Energy Advisors

Equation Variable	Data Source	Responsibility
Watts used by Heating System without Air Sealing Measures Installed	In-home energy evaluation (provides heating system details) Historical LIEEP ecoENERGY audit results (blower door test)	Affordable Energy Dept. External Party: Energy Advisors
Watts used by Heating System with Air Sealing Measures Installed	In-home energy evaluation (provides heating system details, and indicates which EE measures were installed) Historical LIEEP ecoENERGY audit results (blower door test)	Affordable Energy Dept. External Party: Energy Advisors
Coincidence peak factor	Natural Resources Canada report on average home's hours of use 2010 Residential Vintage Model	Affordable Energy Dept. Customer Engineering Services Market Forecast Dept.

2) Engineering Estimates of Program Load Impacts

a) Formulae

The following equations will be used to calculate energy and demand savings at the program level:

i. Annual Energy Savings of the Program:

$$\underset{(kW.h)}{\textit{Annual Energy Savings}} = \textit{(Rebated Sales - Free Riders + Free Drivers)} \times \underset{(kW.h)}{\textit{Annual Energy Savings per Unit}}$$

ii. Demand Savings of the Program:

$$\underset{(KW)}{\textit{Demand Savings}} = \textit{(Rebated Sales - Free Riders + Free Drivers)} \times \underset{(KW)}{\textit{Demand Savings per Unit}}$$

b) Data Sources

The data inputs for the equations listed in Section 3.2.1.6 2) a) are to be taken from the following sources:

Equation Variable	Data Source	Responsibility
Rebated sales	Completed In-home Energy Evaluation	Affordable Energy Dept.
Free riders	n/a	n/a
Free drivers	n/a	n/a

3.2.1.6 Combined Measures (Interactive Effects)

In order to account for interactive effects occurring when building envelope and heating devices are coincidentally improved, the LIEEP uses a formula that assigns weight to the two broad classes of measures (insulation and furnace/boiler) in proportion to their independent savings. The effect is a reduction in overall savings compared to the straight aggregate of the individual savings of insulation and furnace/boiler measures.

1) Engineering Estimates of per Unit Impacts

The following equation will be used to calculate per unit energy savings when building envelope and heating devices are coincidentally improved. This formula utilizes GJ, to which both kW.h and cu.m can be converted. Equivalent kW.h for both gas and electricity can also be used; however, an alternative to the constant “93” would need to be utilized.

$$\text{Coincidental per Unit Savings (GJ)} = \text{HVAC per Unit Savings (GJ)} + \text{BE per Unit Savings (GJ)} - \left\{ \frac{\text{HVAC per Unit Savings (GJ)} \times \text{BE per Unit Savings (GJ)}}{93} \right\}$$

2) Engineering Estimates of Program Load Impacts

The following equation will be used to calculate energy savings at the program level:

$$\textit{Coincidental Total Savings (GJ)} = \textit{(Rebated Sales - Free Riders + Free Drivers)} \times \textit{Coincidental per Unit Savings (GJ)}$$

3.2.2 Load Impact – Overall Program Achievements

Once energy and demand savings are determined for each energy efficient measure type, they are combined to provide total program energy and demand savings. As noted in Section 3.2.1.6, savings have been adjusted to account for interactive effects occurring when building envelope and heating equipment are coincidentally improved. This adjustment provides a more accurate representation of overall program achievements.

3.2.3 Load Impact – Cost Effectiveness Metrics

Manitoba Hydro determines the cost effectiveness of a program's DSM activity based upon the results of the following benefit/cost analysis metrics:

Total Resource Cost (TRC)

The Total Resource Cost (TRC) measures the cost effectiveness of a product or program from the perspective of the utility and its customers. Incentives do not impact this measure as they are seen as a transfer payment between the utility and the customer. A TRC ratio greater than 1.0 indicates that a program is cost effective.

The TRC requires the following information:

a) Marginal Benefits

Electric: The present value of the 30-year stream of revenue realized by Manitoba Hydro from conserved electricity being sold in the export market, the avoided cost of new infrastructure (ex. transmission facilities) and measurable non-energy benefits (ex. water savings).

Natural Gas: The present value of the 30-year stream of the avoided cost of Manitoba Hydro purchasing natural gas, avoided transportation costs, the value of reduced greenhouse gas emissions and measurable non-energy benefits (ex. water savings).

b) Incremental Product Cost

The incremental product cost is the difference in costs between the EE technology promoted by the program and the standard technology that would have been installed in the absence of the program. This is the incremental costs associated with installing the EE technology regardless of who pays.

c) Total Program Administrative Costs

Program operating costs incurred by Manitoba Hydro for staff involved in program planning, design, marketing, implementation and evaluation. It includes all costs associated with running the Power Smart program, except for customer incentive costs.

$$TRC = \frac{PV\ (Marginal\ Benefits)}{PV\ (Incremental\ Product\ Cost + Total\ Program\ Admin\ Costs)}$$

Levelized Utility Cost (LUC)

The Levelized Utility Cost (LUC) provides an economic cost value for the energy saved through a Power Smart program. The LUC provides the total cost of the conserved energy on a per unit basis levelized over a fixed period of time. The cost value allows for comparison to other supply options and other DSM programs over different time frames.

The LUC requires the following information:

a) Utility Program Administrative Cost

Program operating costs incurred by Manitoba Hydro for staff involved in program planning, design, marketing, implementation and evaluation. It includes all costs associated with running the Power Smart program, except for customer incentive costs.

b) Incentives

Funds provided by Manitoba Hydro to the participant associated with implementing the Power Smart measure. Examples include cash-rebates, cash payments, non-cash low interest loans, reduced equipment costs, bill credits/discounts, free merchandise and no-fee services.

c) Energy

The annual energy (kW.h or m^3) saved through a Power Smart program.

$$LUC = \frac{PV\ (Utility\ Program\ Admin\ Costs + Incentives)}{PV\ (Energy)}$$

Rate Impact Measure (RIM)

The Rate Impact Measure (RIM) provides an indication of the long term impact on rates due to proposed Power Smart initiatives. This test considers all the costs incurred in operating a program and indicates the cost effectiveness of a program from the ratepayer's perspective. A RIM ratio less than 1.0 indicates that per kW.h & KW rates for customers will have to increase in order to achieve the utility's revenue requirements.

The RIM requires the following information:

a) Utility Marginal Benefits

Electric: The present value of the 30-year stream of revenue realized by Manitoba Hydro from conserved electricity being sold in the export market and the avoided cost of new infrastructure (ex. transmission facilities).

Natural Gas: The present value of the 30-year stream of the avoided cost of Manitoba Hydro purchasing natural gas and avoided transportation costs.

b) Revenue Loss

Revenue loss includes Manitoba Hydro's lost revenue associated with the participants' reduced energy consumption.

c) Utility Program Administrative Cost

Program operating costs incurred by Manitoba Hydro for staff involved in program planning, design, marketing, implementation and evaluation. It includes all costs associated with running the Power Smart program, except for customer incentive costs.

d) Incentives

Funds provided by Manitoba Hydro to the participant associated with implementing the Power Smart measure. Examples include cash-rebates, cash payments, non-cash low interest loans, reduced equipment costs, bill credits/discounts, free merchandise and no-fee services.

$$RIM = \frac{PV\ (Utility\ Marginal\ Benefits)}{PV\ (Revenue\ Loss + Utility\ Program\ Admin\ Cost + Incentives)}$$

3.3 Aggregation of Data

The following data is to be aggregated from the following sources:

Data Item	Aggregated by	Source
Total Incremental Participant Cost	Affordable Energy Dept.	Application Form In-home Energy Evaluation
Utility & Program Costs	Power Smart Planning, Evaluation & Research Dept.	Manitoba Hydro's SAP accounting reports
Affordable Energy Fund & Furnace Replacement Program Costs	Affordable Energy Dept. Power Smart Planning, Evaluation & Research Dept.	Manitoba Hydro's SAP accounting reports
External Funding	Affordable Energy Dept.	Community Groups, Manitoba Government, Natural Resources Canada
Program Energy and Demand Savings	Power Smart Planning, Evaluation & Research Dept.	Refer to Section 3.2.1 for each measure type

3.4 Power Smart Plan Targets

The actual program results will be compared to program targets using the following measures:

- Number of participants/rebated sales
- Number of free riders
- Number of free drivers
- GW.h savings
- MW savings
- Natural gas savings (m^3)
- Program costs (without incentives)
- Affordable Energy Fund & Furnace Replacement Program costs
- External funding
- Incentive costs
- Total Resource Cost (TRC)
- Levelized Utility Cost (LUC)
- Rate Impact Measure (RIM)

3.5 Impact Evaluation Report

The annual Impact Evaluation will cover the following:

- Gross number of program participants/rebated sales
- Gross energy (GW.h or m^3) savings
- Gross winter a.m. demand (MW) savings
- Gross winter p.m. demand (MW) savings
- Gross summer demand (MW) savings
- Number of free riders
- Number of free drivers
- Net number of program participants
- Net energy (GW.h or m^3) savings
- Net winter a.m. demand (MW) savings
- Net winter p.m. demand (MW) savings
- Net summer demand (MW) savings
- Program benefits and costs
- Affordable Energy Fund & Furnace Replacement Program costs
- External funding
- Cost effectiveness:
    - Total Resource Cost (TRC)
    - Levelized Utility Cost (LUC)
    - Rate Impact Measure (RIM)
- Comparison of actual results to projected targets, with an explanation of variances
- Recommendations

4.0 Glossary

i. **Rebated Sale –** A sale in which a rebate/incentive is provided to the customer.
Program Example: A participating house that has completed at least one of the recommended LIEEP retrofits.

ii. **Free Rider –** A program participant who was already planning to purchase the EE technology. Even though the incentive didn't influence their purchase decision, they received the incentive because one was available.
Program Example: There are no free riders in LIEEP as the participating customers are thought to not have the financial means to make the energy efficient upgrades to their homes.

iii. **Free Driver –** A customer that because of the information provided by the Power Smart Program (i.e. manuals, software, etc.), became aware of the potential savings and purchased the EE technology without receiving the incentive.
Program Example: There are no free drivers in LIEEP as the participating customers are thought to not have the financial means to make the energy efficient upgrades to their homes.

iv. **Persistence Factor –** The tendency for the EE technology to remain installed for its entire useful life.
Program Example: The installation rate is likely to be 100% for most of the technologies associated with LIEEP, as the low-cost/no-cost technologies are installed by an energy evaluator[3], and a contractor installs the insulation and furnaces, which are permanent fixtures in a home. Also, there is a low likelihood of product removal by the homeowner, with CFL bulbs and water saving measures (i.e. low-flow showerheads) being possibilities.

v. **Interactive Effects Factor –** The effect that a change in one end-use's energy consumption has on another end-use's energy consumption.
Program Example: For LIEEP, interactive effects are considered for CFLs and/or if a customer installs both insulation and a high efficiency furnace.

vi. **Coincidence Peak Factor –** The customer's load at the time Manitoba Hydro experiences its greatest demand for electricity.

[3] In some instances, the energy evaluator will leave a low-cost/no-cost item with the homeowner for them to install at a later date. This applies to air sealing items in particular (i.e. caulking or electrical socket caps), as well as CFLs.

CAC/CENTRA II-69

Reference: CAC / Centra I-20(k)

Please provide the complete basis for the statement in the response to CAC/CENTRA I-20(k) that "Centra does not believe there is a notable impact on the items identified that result from the Corporation's investments in DSM for lower income households to warrant the expense of such an undertaking." Include all research results and other documents.

ANSWER:

As stated in Centra's response to CAC/Centra I-20(k), Centra has not undertaken any research on this matter.

CAC/CENTRA II-70

Reference: CAC / Centra I-20(t)

CAC/CENTRA I-20(t) asked for "the difference in the reports of unaided awareness between the report for the Period Ending Sept. 30, 2012 (Filing, Appendix 7.3 at 82) and all earlier reports." The response only states "Unaided awareness in all reports prior to the Period Ending Sept. 30, 2012 includes Unaided Recall – Program Details and Unaided Recall – Program Name. This includes those that were aware of the details of LIEEP without prompting but could not recall the program name itself, and those that were aware of the program name without prompting." Thus the response does not address the differences asked about, which remain unexplained. Please provide the response as requested in the Information Request.

ANSWER:

Centra has assumed the intended reference in this question is to CAC/Centra I-20(u).

In all reports prior to the Period ending Sept. 30, 2012, the percentage of Unaided Awareness was shown as one total value that included both "Unaided Recall – Program Details" and "Unaided Recall – Program Name". The report for the Period ending Sept. 30 2012 (Filing, Appendix 7.3 at 82), was the first period where total Unaided Awareness was displayed as two separate components "Unaided Recall – Program Details" and "Unaided Recall – Program Name". Unaided recall of program details refers to respondents able to independently recall details of the Lower Income Energy Efficiency Program. Unaided recall of program name refers to respondents able to independently recall the Lower Income Energy Efficiency Program name. These two separate components together make up total

Unaided Awareness. The following chart presents for the values of Unaided and Aided Awareness in each period the survey was undertaken.

LIEEP Program Awareness	Unaided Recall - Program Details (A)	Unaided Recall - Program Name (B)	Unaided Awareness (C=A+B)	Aided Awareness (D)	Overall (E=C+D)
Jul-10	26%	7%	33%	34%	67%
Oct-10	22%	9%	31%	45%	77%
Jan-11	33%	3%	36%	36%	72%
Apr-11	24%	5%	29%	41%	70%
Jan-12	21%	3%	24%	53%	77%
Jul-12	37%	10%	47%	28%	75%
Jan-13	17%	1%	18%	58%	76%

Note: Totals may not add due to rounding.

CAC/CENTRA II-71

Reference: CAC / Centra I-20(x) and (cc)

Please provide all evidence relied upon, including full and complete documentation, for quantifying the 10% adder used in the SCT. Include identification of each non-energy benefit and/or indirect benefit intended to be included by means of the adder.

ANSWER:

The 10% adder was determined based upon a qualitative review of non-energy benefits used in cost effectiveness calculations by other utilities at the time the societal cost metric was introduced within the Corporation's analyses. No specific non-energy benefits have been quantified; rather the 10% is presented as a proxy for non-measurable non-energy benefits.

CAC/CENTRA II-72

Reference: CAC / Centra I-20(bb)

Please provide all evidence relied upon, including full and complete documentation, for establishing the "proxy for the breakdown is 94% of the value arising from the avoided cost of purchasing natural gas and avoided transportation costs and 6% arising from the value of reduced greenhouse gas emission reductions".

ANSWER:

This proxy was calculated by taking the 30-year Net Present Value (NPV) of the forecast value of reduced greenhouse gas emission reductions as a percent of the 30-year NPV of the forecast total natural gas marginal value.

	Cents/cu.m	Percent
30-year levelized value of reduced greenhouse gas emissions	$0.02	6%
30-year levelized avoided cost of purchasing natural gas and avoided transportation costs	$0.33	94%
30-year NPV of total natural gas marginal value	$0.35	100%

CAC/CENTRA II-73

Reference: CAC / Centra I-20(dd)

a) Please state the full average cost of a furnace replacement.

ANSWER:

Please see Centra's response to PUB/Centra I-59(c) for the average cost of a furnace replacement.

CAC/CENTRA II-73

Reference: CAC / Centra I-20(dd)

b) Please state the full average cost of a boiler replacement.

ANSWER:

Please see Centra's response to PUB/Centra I-59(c) for the average cost of a boiler replacement.

CAC/CENTRA II-74

Reference: CAC / Centra I-20(ee) and (gg)(b)

Please describe in full all coordination between Company programs for lower income households and provincial funds and programs. If there is none, explain in full why the Company has determined this is desirable.

ANSWER:

In the early stages of the Lower Income Energy Efficiency Program (LIEEP), Centra met with provincial partners and community representatives to discuss funding commitments for community based initiatives such as the Centennial Neighbourhood Pilot, North End Community Renewal Corporation, and Brandon Neighbourhood Renewal Corporation working with social enterprise organizations such as BUILD and BEEP. Based on these meetings, it was concluded on a go forward basis Centra would provide annual funding for energy efficiency measures and provincial partners would contribute annual funding for labour.

Centra meets with other parties (provincial as required) as new initiatives arise. As with Manitoba Housing, Centra has streamlined the distribution process by providing Manitoba Housing with the energy efficiency measures funding allowing one provincial body to make payment to BUILD and BEEP.

All other low income participation outside of these community based initiatives is funded solely through the LIEEP.

CAC/CENTRA II-75

Reference: CAC / Centra I-20(ff)(a)

Please provide the eligibility criteria as defined by the Corporation and fully describe all considerations to change the eligibility criteria. Please state also the method by which the grant is computed and all considerations to change the amount of the grant and the maximum number of grants available.

ANSWER:

An increase to the Neighbours Helping Neighbours (NHN) program grant maximum was reviewed and approved by the Community Council, which oversees the program, in February 2010 as an accommodation for an observed increase in average bill arrears of NHN participants. In addition, the program eligibility criteria was last reviewed in June 2010 and approved by the Community Council. The Community Council has representation from The Salvation Army, Manitoba Hydro and various community partners, such as Winnipeg Regional Housing Authority, United Way, and the Central Neighbourhood Development Corporation. As outlined in Centra's response to CAC/Centra I-20(ff)(e), qualifying customers are entitled to a maximum of two financial grants.

Eligibility Criteria:

Applicants must live in the Manitoba Hydro service area;

1. Applicants must have an arrears notice or shut off/disconnection notice or have a past due balance;
2. Circumstances have arisen which have depleted an individual's or family's immediate cash resources such as a critical event/unexpected crisis causing

interruption of income or increase in expenses, and which has occurred in the past 90 days leaving the individual or family with inadequate resources to meet their heating/hydro needs;

3. Applicant must be income eligible;
4. Applicant must have proof of income for current year for all household members (most recent paystubs from all employment, account books for self employed, etc);
5. Applicant must have applied to all other existing systems such as calling Manitoba Hydro and attempting to make alternative payment arrangements;
6. Applicants must sign an information release form; and
7. Applicants are eligible for assistance once per year, to a maximum of 2 financial grants.

Note: The above criteria are guidelines and on occasion, due to extenuating circumstances, applicants may be given special consideration. In these cases, NHN program staff will consult with the Salvation Army Assistant Program Coordinator.

The grant is applied based on the "Monthly Income Remaining Per Person" as per the following:

Monthly Income Remaining per Person	Proposed Grant Amount
Over $499	$150 + External Factor(s)
$400 - $499	$200 + External Factor(s)
$300 - $399	$250 + External Factor(s)
Less than $300	$300 + External Factor(s)

Where "Monthly Income Remaining per Person" is determined by:

{Monthly Income} minus {Monthly Rent/Mortgage} = Monthly Income Remaining

{Monthly Income Remaining} divided by {Number of Residents} = Monthly Income Remaining Per Person

Recognizing that external factors can affect individual situations, $30 is added for each of the following circumstances listed below to the maximum grant of $450.00:

- Disability
- Recent loss of employment
- Recent separation or divorce
- Recent death in the family
- Lack of support system

CAC/CENTRA II-76

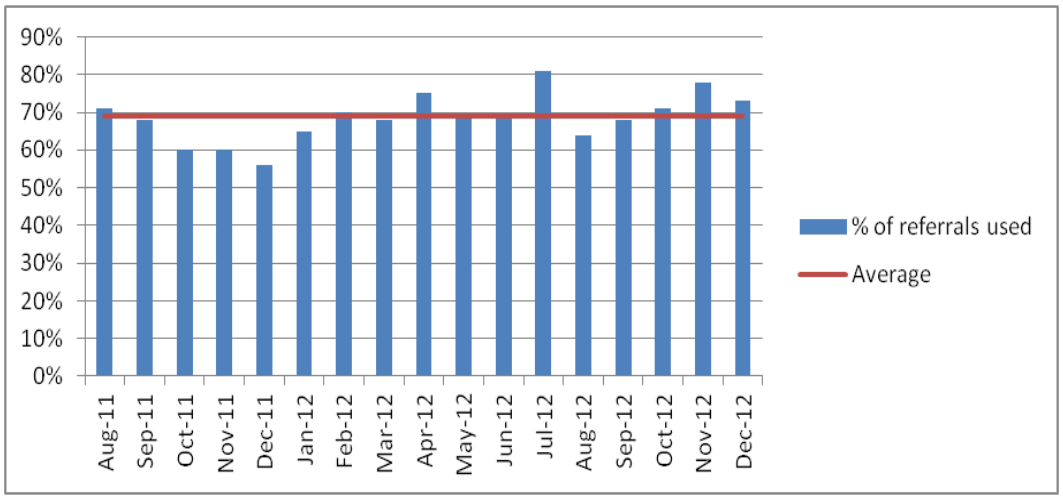
Reference: CAC / Centra I-20(ff)(d)

Please provide all evidence relied upon, including full and complete documentation, for "The belief … that by working to connect customers with available support services, they will be in a better position to manage possible future events" without need of an additional grant.

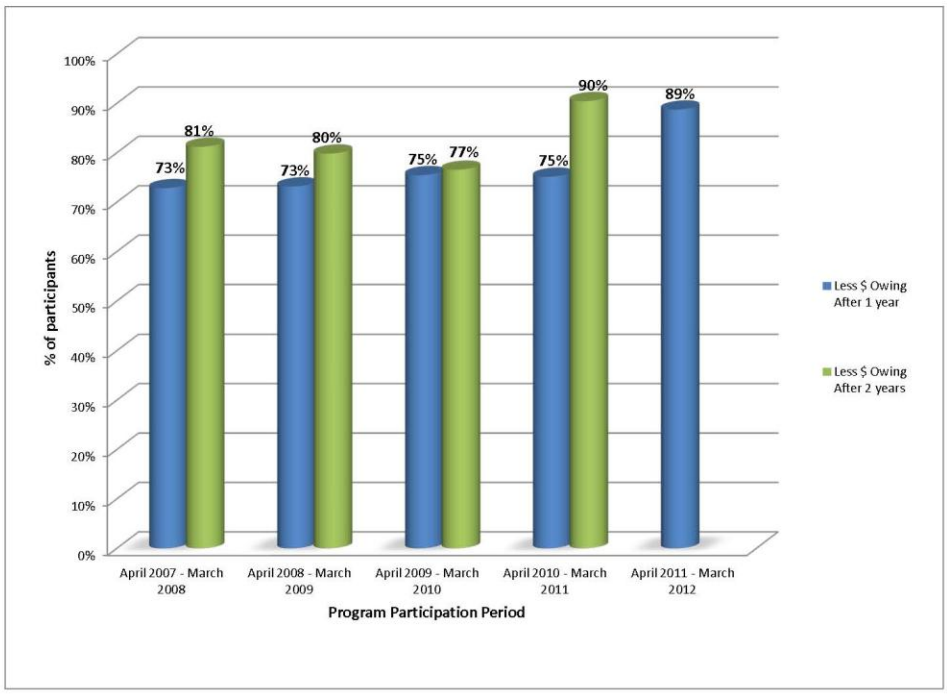
ANSWER:

As stated in Centra's response to CAC/Centra I-20(ff)(e), qualifying customers are eligible for a maximum of two grants under the Neighbours Helping Neighbours program.

Since August 2011, The Salvation Army, at Manitoba Hydro's request, instituted a follow-up assessment with NHN clients 30 days after receiving grant monies and program referrals to determine the referral uptake rate and to gauge whether clients deemed the referrals useful. The following table illustrates the overall usage rate for referrals provided under the NHN. Overall, almost 70% of the program referrals provided to NHN clients have been used.



In addition, beginning in April 2007, Manitoba Hydro began monitoring the account status of NHN participants to assess the longer term effect of the program on customer account balances. Since April 1, 2007 to March 31, 2013, 3 883 grants have been awarded with 83 grants being second time participants (or 0.021%).The results below indicate that the majority of grant recipients (73% or greater) have experienced significant improvement in their arrears situation since participating in the program.



CAC/CENTRA II-77

Reference: PUB / Centra I-54(b) and PUB / Centra I-55

a) Please reconcile the lower income expenditures shown in PUB/Centra I-54 (b) and PUB/Centra I-55.

ANSWER:

The expenditures shown in PUB/Centra I-55 are solely the natural gas Power Smart expenditures, whereas the expenditures shown in PUB/Centra I-54(b) include natural gas Power Smart, Furnace Replacement Program, and apportioned Affordable Energy Fund expenditures.

CAC/CENTRA II-77

Reference: PUB / Centra I-54(b) and PUB / Centra I-55

b) Please confirm that Centra has conducted no process evaluation of any lower income program. If not confirmed, provide all such evaluations.

ANSWER:

An overall review of the Corporation's Power Smart portfolio was performed by Dunsky Energy Consulting in 2009. The Lower Income Energy Efficiency Program was discussed in depth and the Consultant rated the program as a "Leader" in its comparisons to other providers they considered to be leaders or advanced performers. This portfolio review, titled "Leadership in Energy Efficiency: Comparing Manitoba Hydro's Power Smart with Leading North American Strategies", was previously filed with the PUB in response to PUB/MH I-155 in the 2010/11 & 2011/12 Manitoba Hydro Electric GRA (Appendix 25).

CAC/CENTRA II-78

Reference: PUB / Centra I-57(c)

a) Please provide the full rationale for using the discount rate of 6.1% in evaluating savings and benefits (PUB/Centra I-57(c)). Include all relevant documents.

ANSWER:

Centra uses its real weighted average cost of capital (WACC) as the discount rate when evaluating DSM program savings, costs and benefits. Centra's real WACC at the time the 2011 Power Smart Plan was undertaken was 6.1%.

CAC/CENTRA II-78

b) Please provide the measure life used in evaluating the benefits of each lower income measure. Include documentation and all other bases for each measure life.

ANSWER:

The following measure lives are used for technologies impacting natural gas use including in the Lower Income Energy Efficiency Program:

Technology	Measure Life (years)
High-efficiency natural gas furnace	25
High-efficiency boiler	25
Insulation (attic, wall, basement, crawlspace)	30
Low-flow showerhead	15
Handheld showerhead	15
Bathroom faucet aerator	15
Kitchen faucet aerator	15
Pipe wrap	15
Caulking	15
Electric socket gasket	15

Measure lives were determined from research completed by program engineering staff.

CAC/CENTRA II-78

c) Please describe in full the methodology used for evaluating savings, e.g. but not by way of limitation, establishment of baselines, billing analysis, selection of control group, sample sizes and criteria for selection and weighting, engineering estimates, time periods analyzed (including duration), and/or modeling. Include all documentation of how the chosen method is applied to each lower income measure.

ANSWER:

Please see Centra's response to CAC/Centra II-68.

CAC/CENTRA II-78

d) Please state and document the confidence level and precision of each savings evaluation estimate.

ANSWER:

Please see Centra's response to CAC/Centra II-68.

CAC/CENTRA II-78

e) Please describe the quality control (QC) protocol for each lower income measure and provide all documentation. Separately describe each level of QC, e.g., paperwork, in-process inspection, final inspection, including the percentage of jobs subject to each.

ANSWER:

To ensure the appropriate level of savings and benefits are attributed to a participating Lower Income Energy Efficiency Program (LIEEP) home, a number of processes are in place to help facilitate and monitor any energy efficiency upgrades undertaken. The first step in documenting energy efficiency upgrade opportunities is the in-home energy evaluation, completed once the customer has been accepted into the program. The energy advisor completes the In-Home Energy Evaluation form to document related home information including heating fuel type, existing insulation measurements and the existing furnace or boiler heating system model and efficiency level. This is also the stage where a number of basic energy efficiency technologies are installed or left in the customer's home (such as a low flow showerhead or faucet aerator) and noted on the In-Home Energy Evaluation form. This form is returned to the Lower Income Energy Efficiency Program staff and further eligible efficiency upgrades are arranged with qualifying LIEEP contractors.

Insulation, Furnace and Boiler upgrades are tracked through the submission of forms by contractors titled "Authorization to Pay." The Authorization to Pay forms contain energy efficiency upgrade information including the installation date and a signed confirmation from the customer and contractor declaring the work has been completed as originally agreed upon and approved by the Lower Income Energy Efficiency Program. All furnace

installations are inspected as per provincial regulations. Post-retrofit inspections are completed in approximately 20% of participating homes to verify measurements and that work was completed to LIEEP standards.

All upgrades are tracked by customer. Energy savings for insulation, furnace, boiler or basic energy efficiency measures installed in the home are based upon engineering estimates.

CAC/CENTRA II-78

f) State the identity of the personnel conducting the savings evaluations, including their degree of independence from the Company (e.g., employees, contractors, PUB-appointed).

ANSWER:

All program evaluations are performed by staff in the Planning, Evaluation and Research Department reporting directly to the Vice-President, Customer Care & Energy Conservation. All staff are employees of Manitoba Hydro.