

Manitoba Hydro Undertaking #102

Manitoba Hydro to file the Curtailable Rate Program Report.

Please see the attached Report to the Public Utilities Board, re: Curtailable Rate Program for the period April 1, 2009 to March 31, 2010 filed with the Public Utilities Board on January 20, 2011.



**REPORT TO
THE PUBLIC UTILITIES BOARD**

CURTAILABLE RATE PROGRAM

APRIL 1, 2009 – MARCH 31, 2010

JANUARY 2011

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**REPORT TO PUBLIC UTILITIES BOARD
CURTAILABLE RATE PROGRAM
APRIL 1, 2009 – MARCH 31, 2010**

SUMMARY

This annual report on the status of the Curtailable Rate Program (CRP) covers the period April 1, 2009 to March 31, 2010. During this time four customers participated in the program, one of which was only operational from April to September. This customer is currently operating below their protected firm load resulting in no available curtailable load.

Three curtailments were called throughout the 12 month reporting period. All curtailments were successfully initiated although one of the curtailments called for a reduction of Option R load whereas the customer inadvertently curtailed their Option A load. Fortunately this did not create any adversity for Manitoba Hydro and the customer's account was credited accordingly.

The Reference Discount of \$3.03/kW/month for the 2009/10 reporting year was approved by the Public Utilities Board in Order 42/10 dated April 27, 2010. Customers received credit on their monthly electrical bill for their participation in the program, totaling \$5,760,888 for the fiscal year.

BACKGROUND

The CRP Terms and Conditions applicable during the reporting period April 1, 2009 to March 31, 2010 took effect April 1, 2005 in accordance with Board Order No. 28/05 dated February 17, 2005. A slight modification to the Terms and Conditions was approved in Board Order 90/08 dated June 30, 2008 which required customers to provide Manitoba Hydro 48 hours notice period of any anticipated plant shut downs.

The Terms and Conditions allow Manitoba Hydro to reserve the right to limit the amount of total curtailable load used for maintaining operating and contingency reserves¹. The current limit is set at 230 MW under Options A and C and 100 MW under Option R. There is no limit for Option E load. The caps have been beneficial to both Manitoba Hydro and curtailable customers by ensuring the value of curtailable load does not depreciate. A decreased value would result in lower discounts paid to customers making the program less attractive to them.

Manitoba Hydro uses curtailable load, among other measures, to maintain operating and contingency reserves as a means of minimizing disruption to firm customers in the event of loss of generation or transmission.

Curtailable load provides value to Manitoba Hydro all year round, as curtailments for system emergencies can occur at any time of the year. However, it has the greatest value during peak times as it is during the peak periods that Manitoba Hydro's capacity surplus is the least. Additional Options A and C curtailable load in these hours increases the amount of capacity for sale in the firm export markets while additional Option R load can allow Manitoba Hydro to meet its contingency reserve obligations at a lower cost.

A significant risk mitigation benefit of curtailable load is the avoidance of the need to shed firm load should Manitoba Hydro be in a situation where it would otherwise be the cause of Manitoba Hydro or the Midwest Independent System Operator (MISO) – Manitoba Hydro Contingency Reserve Sharing Group (MISO-MBHydro CRSG)² being non-compliant to North American Electric Reliability Council (NERC) Standard(s). Option R curtailable load allows Manitoba Hydro to obtain increased value in the short-term opportunity energy

¹ Per North American Electric Reliability Council (NERC) Glossary of Terms, Operating Reserves: The reserves needed to protect Manitoba Hydro and its obligations to the Midwest Independent System Operator power system against Contingencies or Disturbances. These events are typically a result of loss of supply caused by sudden generating or transmission outages. Operating Reserves consist of various types including Contingency Reserves. Contingency Reserves: a component of Operating Reserves which are sufficient in magnitude and response to meet NERC Disturbance Control Standards. Contingency Reserves are comprised of Operating Reserves-Spinning and Operating Reserves-Supplemental. Curtailable load (also referred to as Interruptible Load) can be a source of Operating Reserves-Supplemental.

² The MISO-MBHydro CRSG is a NERC registered Contingency Reserve Sharing Group that has operated since January 1, 2010. The CRSG was established under the terms of the Amended MISO-Manitoba Hydro Coordination Agreement and executed on October 9, 2009. Prior to the MISO-MBHydro CRSG, Manitoba Hydro was a member of the Midwest CRSG.

market³. In this circumstance the benefits of having Option R available are dependent on Manitoba Hydro's water supply conditions as follows:

- High Water Supply - the generating capacity freed up for commercial use allows for increased hydraulic generation for export as idle generating units can be run to capture additional on peak sales. Without Option R capacity in place on peak energy would be spilled. With Option R load, the additional energy generated can be sold at on peak prices.
- Average Water Supply - allows for additional hydraulic generation during on-peak hours that would otherwise be produced during off-peak hours (due to limited on-peak generating capability). In this case Manitoba Hydro captures the benefit of the price differential between on and off-peak periods.
- Low Water Supply - does not provide any significant benefits because Manitoba Hydro has sufficient shut down generating units that could be run temporarily for operating reserves purposes without relying on Option R load reductions.

Manitoba Hydro will not utilize curtailable load in order to facilitate a high value opportunity spot market sale⁴.

PERFORMANCE FOR 2009/10

Curtailment Options:

The Curtailable Rate Program consists of four base curtailment options and three combinations. Options vary dependent on: minimum notice to curtail, maximum duration per curtailment, maximum daily hours of curtailment, maximum number of curtailments per year, and maximum annual hours of curtailment.

³ Opportunity export sales are sales of capacity and/or energy that are not backed by dependable energy and are incremental exports that arise from time to time as a result of water conditions that are better than the lowest historic.

⁴ Spot market sales are sales that occur on a day ahead or real time basis. They are not considered to be a firm export sale.

Four customers participated in the Curtailable Rate Program during the April 1, 2009 to March 31, 2010 period. During this time these customers had designated a total of 270 MW to Manitoba Hydro's reserves, allocated as 80 MW Option AE, 119 MW Option A, 31 MW Option C and 40 MW Option R. (Note however that the Option R load increased from 40 MW to 50 MW on May 1, 2010). The amount each customer designated as curtailable load in relation to their total load varies, and therefore impacts their curtailable credit, as shown on the following table.

Summary of Curtailment Credit Data April 1, 2009 to March 31, 2010					
Customer	Option(s)	Curt Load as % of Total Load	Average On-Peak MW	Average On-Peak LF	Average Monthly Cr.
1	A, R, E	85%	185.2	93.0%	\$382,626
2	A	26%	32.6	72.8%	\$24,512
3	A	94%	26.5	94.6%	\$50,142
4	C	44%	59.4	71.2%	\$22,794

*Customer 1: 85% total load represents 43% Option AE, 22% Option R and 20% Option A for the 2009/10 period (prior to Option R load increasing).

Load designated under Option R must be nominated as a Guaranteed Curtailment, that is, the customer must agree to shed a specified number of MW in order to be compliant with the curtailment request. Under all the other curtailment options, customers can nominate curtailable load as Guaranteed Curtailment or Curtail to Protected Firm Load.

Dependent on the curtailment option selected, Manitoba Hydro will curtail customers to meet reliability obligations only. Options A, C and R curtailments assist in securing operating and contingency reserves whereas Option E curtailments are initiated to meet firm energy requirements in the event that Manitoba Hydro expects to be short of firm energy supplies.

Customers may nominate different quantities of curtailable or firm load for each month provided that a minimum of 5 MW of curtailable load is available in each month. Customers must specify the 12 months Guaranteed Load or 12 months Protected Firm Load prior to participation in the program and must provide 12 months' written notice to Manitoba Hydro should they wish to increase or decrease their load in any month. This may be subject to capacity limitations and will be at the discretion of Manitoba Hydro. To date no customers have elected to differentiate their monthly load.

Implementation and Size of Curtailments:

There were three curtailments during the April 1, 2009 to March 31, 2010 period: one Option A and two Option R curtailments. The first curtailment occurred on May 21, 2009 whereby Manitoba Hydro initiated an Option R curtailment due to the loss of Dorsey Valve Group 42. The customer however inadvertently reduced their Option A curtailable load. The Option A curtailment lasted 1 hour and resulted in a 42 MW load reduction. On January 19, 2010, an Option R curtailment was initiated due to the loss of Valve Group 32. The Option R curtailment lasted 0.55 hour and resulted in a 40 MW reduction. The last Option R curtailment was initiated on February 20, 2010 due to the loss of Pole 2 Valve and lasted for 3 minutes with a 40 MW load reduction. All curtailments occurred during peak hours. Customer(s) did not use an alternative power source to supply their load during the curtailments.

Manitoba Hydro continues to use manual telephone to communicate curtailment requirements to the four customers on the program. This procedure is manageable and provides the additional security the curtailment(s) will be initiated by confirmation from an agent of the customer. Manitoba Hydro experienced no difficulties in communicating the three curtailments during this reporting period to the customer, however on one of the curtailment calls the customer curtailed their Option A load instead of their Option R load as requested by Manitoba Hydro. This action did not create any adversity for Manitoba Hydro and the customer customer's account was credited accordingly.

Reference and Reserve Discounts:

The maximum discount available to a participating customer is called the "Reference Discount." The Reference Discount is related to the marginal value of capacity, expressed in Canadian Dollars, and was set at \$2.75 per kW/month as of April 1, 2005. This amount is adjusted on April 1 of each year by the inflation factor (the change in Manitoba Consumer Price Index as recorded for the most recent 12 months). Each year Manitoba Hydro submits an application for the adjusted Reference Discount to the PUB for *ex parte* approval.

The Reference Discount in effect for the reporting period April 1, 2009 to March 31, 2010 was \$3.03/kW/month, approved on April 24, 2009 via Board Order 46/09. The customer under Option AE received 100% of the discount, while customers under Option A and Option R received 70% of the discount or \$2.12 per kW/month. The Option C customer received 40% of the discount or \$1.21 per kW/month.

For curtailable load nominated as 'Protect to Firm Load' the Reference Discount is calculated and credited to customers' bill each month as $(A - B) \times C \times D$ where:

A = On-Peak Period Demand (kW)

B = Protected Firm Load (kW)

C = On-Peak Period Load Factor

D = Discount Amount

For curtailable load designated as a 'Guaranteed Curtailment' the Reference Discount is calculated and credited to customers' bill each month as $GC \times D$ where,

GC = the customer's guaranteed curtailable load

D = Discount Amount

Customers selecting Curtailment Option R receive, in addition to the Reference Discount, a Reserve Discount for each curtailment initiated and successfully completed. The Reserve Discount is set at \$0.04/kW.h and represents the value of carrying contingency reserves. The actual amount of the Reserve Discount that customers receive depends on the amount of load reduction (in kW) requested by Manitoba Hydro's System Control and the duration of the curtailment.

The monthly Reference Discount Credit each customer received from April 1, 2009 to March 31, 2010 has been itemized in the following table as well as their maximum monthly On-Peak Demand and On-Peak Load Factor.

The discounts shown in the table do not include the \$960 paid to Customer 1 for the Option R Reserve Discount which is calculated and credited to customers' bill for each successful curtailment as $LR \times Du \times FD$ where,

LR = amount of load reduction (in kW) requested by Manitoba Hydro's System Control to the customer at the time of an Option R curtailment

Du = duration of the curtailment (in hours)

FD = fixed discount amount, currently set at \$0.04⁵ per kW.h

⁵ The Fixed Discount amount is based on the value of carrying contingency reserves on Manitoba Hydro units.

Monthly Reference Discount Credit for 2009/10

2009 to 2010	Customer 1 Options AE, R, A			Customer 2 Option A			Customer 3 Option A			Customer 4 Option C		
	On Peak MW	LF %	Discount Paid \$	On Peak MW	LF %	Discount Paid \$	On Peak MW	LF %	Discount Paid \$	On Peak MW	LF %	Discount Paid \$
Apr	160.1	92.9	\$375,126	72.8	85.5	\$88,531	26.4	98.4	\$51,960	60.6	78.8	\$26,306
May	159.8	79.5	\$332,964	73.6	88.3	\$92,925	26.5	98.5	\$52,272	58.0	62.2	\$18,840
June	174.1	98.9	\$404,111	74.2	48.2	\$51,278	26.7	98.6	\$52,682	59.8	84.9	\$27,510
Jul	191.1	91.5	\$380,405	70.7	12.2	\$12,069	27.2	96.5	\$52,645	60.6	78.5	\$26,236
Aug	192.0	92.9	\$384,959	73.4	47.1	\$49,337	26.9	99.3	\$53,529	58.8	58.3	\$18,223
Sep	191.2	93.9	\$388,156	3.7	83.0	\$0	27.6	68.2	\$37,710	57.9	61.8	\$18,613
Oct	191.3	94.3	\$389,319	3.9	77.7	\$0	26.1	98.7	\$51,389	59.0	61.0	\$19,215
Nov	197.1	87.4	\$366,970	3.9	75.8	\$0	26.0	96.0	\$49,837	59.7	58.8	\$18,952
Dec	197.2	93.6	\$386,961	4.3	87.4	\$0	26.2	98.8	\$51,639	59.3	69.8	\$22,216
Jan	197.2	99.5	\$393,033	3.7	88.4	\$0	26.1	99.3	\$51,848	59.9	84.6	\$27,505
Feb	197.2	96.6	\$396,844	3.7	87.5	\$0	26.3	98.9	\$52,030	59.7	76.9	\$24,856
Mar	174.1	95.0	\$391,709	3.3	92.5	\$0	26.3	84.1	\$44,163	59.2	79.1	\$25,056
Total	2,222.3	93.0	\$4,590,558	391.1	72.8	\$294,140	318.3	94.6	\$601,704	712.5	71.2	\$273,526

Adequacy of Terms and Conditions:

The Terms and Conditions which have been in place since April 1, 2005 (with minor modification in 2008) continue to protect Manitoba Hydro's contingency reserves and provide operating reserves which satisfy the requirements of NERC and the MISO-MBHydro CRSG.

The cap limitation of 230 MW for Options A and C combined and 100 MW for Option R protects the value of curtailable load. However, going forward it may be necessary to increase the cap limitation, primarily of Option A load, for the following reasons.

- Manitoba Hydro's summer load continues to grow, diminishing the amount of surplus capacity that Manitoba Hydro can sell, which is necessary in rolling over network transmission service in the United States.
- Manitoba Hydro may have Module E delivery obligations to MISO associated with Manitoba Hydro export contracts beyond the contract provisions. This

Manitoba Hydro is currently reviewing the terms and conditions of the program and the interest by customers for additional curtailable load. One customer has shown interest in the program however the current economic situation has resulted in the customer having to reduce their operating requirements thereby making them ineligible for the program due to their significantly reduced on-peak load factor.

CONCLUSION

The Curtailable Rate Program facilitates in fulfilling Manitoba Hydro's commitment of supplying operating and contingency reserves as part of its reliability obligations with MAPP GRSP. The program also assists in minimizing disruption to Manitoba Hydro's firm customers.

The amount of curtailable load Manitoba Hydro has made available (230 MW for operating reserves and 100 MW for contingency reserves) has to date proven sufficient to meet Manitoba Hydro's requirements with respect to reserve obligations. Manitoba Hydro is however in the process of reviewing the cap limitation as changes are occurring within the MISO jurisdiction. In order to meet capacity obligations resulting from a Maximum Generation Event⁶, Manitoba Hydro may need to have approximately 400 MW of Option A load available for curtailment. In addition, there is an opportunity for additional Option R curtailable load to be used to meet Manitoba Hydro's Supplemental Contingency Reserves obligation to the Midwest Independent System Operator – Manitoba Hydro Contingency Reserve Sharing Group. Manitoba Hydro continues to review the terms and conditions of the Curtailable Rate Program, and will advise the Public Utilities Board of any proposed changes and will seek confirmation of such.

⁶ An event triggered by an emergency in the MISO jurisdiction.

ESTIMATE OF THE VALUE OF CURTAILABLE LOAD AT MANITOBA HYDRO

The value of curtailable load to Manitoba Hydro is related to the Corporation's estimate of the marginal cost of firm, long term capacity which incorporates both winter deferral and summer marketing benefits. Over the long term, a relatively stable value for capacity can be provided by separating out the capacity component from bundled long term firm export sales. This is done by estimating the annual carrying cost (assumes finance and depreciation costs but not operating/fuel costs) of the lowest cost resource required to provide capacity benefits in Manitoba, that being, a simple cycle combustion turbine (SCCT). This is estimated at \$78 per kW per year, or \$6.50 per kW per month, evaluated at load. This approach has the advantage of providing a clear transparent value, which is also stable over time and can be applied to evaluate the benefits of DSM resources which have a capacity component.

Curtilable load is however less valuable than a generation resource such as a SCCT. The SCCT can provide more flexibility in dispatch and also has the capability to deliver for longer time periods during extended emergency situations. Once in place a SCCT can be relied upon as a permanent long term resource. Curtilable load normally has more value in the summer months, when it can assist in supporting seasonal capacity exports, and in the peak winter months, when it may add reliability to Manitoba Hydro's generation resource. Curtilable load will provide more winter reliability benefits in years in which there is little capacity surplus on the system. When there is a significant capacity surplus on the Manitoba Hydro system, curtilable load provides less winter value than it would, for example, in the year 2015, when the requirement to add generation to serve domestic customers is forecast to be will be more pressing. The value of reliability benefits in a single year is not easily determined, which is why longer-term levelized values are used to infer the benefits of curtilable load.

In the year 2000, evaluation of the benefits of curtilable load was based on separate estimates of generation deferral benefits and summer seasonal sale benefits. This analysis yielded an estimate of annual aggregate benefits at \$33 per kW, or levelized over the year, \$2.75 per kW/month. This is equal to 42% of the carrying cost of a SCCT, which appears reasonable, based on relative dispatchability, sustainability, and long term reliability. This value would apply to the curtilable service option that provides the most value to Manitoba Hydro, that being Options AE and RE, for which the discount is set to return 100% of the estimated value of curtilable load, that is, \$3.03 per kW per month (applied throughout the

reporting period), to the customer. Other options provide less flexibility and are accordingly worth less to Manitoba Hydro. These have been priced to reflect their lesser value to Manitoba Hydro but still to return the full estimated value of that option to the customer.

Manitoba Hydro normally markets its summer surplus capacity in the preceding February and will market curtailable load or other surpluses up to the point that there is still a low probability of breaching reserve obligations even in very warm weather conditions. Hence the summer weather does not impact on the value received for such sales. However, as noted earlier, year to year changes in conditions in the MISO market can lead to considerable volatility in the value of capacity traded in that market.

In general terms Manitoba Hydro's objective for marketing curtailable capacity and energy is to utilize any excess in a manner that provides the greatest profits. This may involve the sale of additional short term 5 x 16 contracts (e.g. 48% capacity factor) if there is sufficient surplus energy, or the sale of peaking capacity which requires the supply of less energy during the on-peak period (e.g. 20% capacity factor).