

**Lower Churchill Project  
Financial Returns: Musktrat Falls, Serving island Load Only**

**Summary Level Annual**

\$ millions except for per-unit

Assumptions	Reference	Value	Project year beginning July 1							
			Prior	2010	2011	2012	2013	2014	2015	
<b>Cap Ex / Op Ex:</b>										
Capital expenditures	Exhibit 5f		2,869.2	33.8	60.0	268.0	638.4	790.2	508.8	423.0
Capital sensitivity	N/A (Note 1)	0%								
Capital expenditures - current analysis			2,869.2	33.8	60.0	268.0	638.4	790.2	508.8	423.0
O&M expenses	Exhibit 8 (Note 2)									
<b>CPI</b>		2%								
<b>Production:</b>										
Musktrat Falls maximum energy, GWh										
Average	Note 3	4,873.0								
Firm	Note 3	4,506.0								
Pct of firm energy in year prior to Full Power	Note 4	27.75%								
<b>Load (GWh):</b>										
Energy required from Labrador	Note 5									
Energy required from Musktrat Falls (maximum of average production)	Exhibit 6b									
<b>Revenue Rate:</b>										
Supply price, January 1, 2010\$/MWh	MHI-Nalcor-58(h)	\$75.82								
Escalation to Full Commercial Power (years)	Jan 1, 2010 to Jul 1, 2017	7.5								
July 1, 2017 rate (\$/MWh)		\$87.96								
Credit for power before full commercial power	Note 6	0.988								
Cost-out price for Musktrat falls	Note 7; Note 8	\$ 89.03								
<b>Innu Payments:</b>										
Minimum payment, \$ M:	Exhibit 56	\$5.0								
Stated in (year)	Note 9	2008								
Payment as pct of After Debt Net Cash Flow	Exhibit 56	5%								
Payment start date (project sanction date)	Exhibit 56	01-Oct-11								
First year pct (Project year basis 1-Oct-2011 to 30-Jun-2012)	N/A	75%								
<b>Water Power Lease:</b>										
Water power lease (\$/MWh)	MHI-Nalcor-33	\$2.50								
Cost Year	Note 12	2008								
Water power cost, Full Power (\$/MWh)		\$2.99								
<b>Water Management:</b>										
Water management cost (\$/MWh)	Note 13	\$5.00								
Cost Year		2006								
Water management cost, Full Power (\$/MWh)		\$6.22								
Water management energy (GWh)		250								
<b>Cash / Working Capital:</b>										
Working capital - average requirement as % of change in revenues	Note 14	1.6%								
Cap ex defrayed by revenues before Full Commercial Power (%)		37.4%								

Project year beginning July 1							
Prior	2010	2011	2012	2013	2014	2015	
2,869.2	33.8	60.0	268.0	638.4	790.2	508.8	423.0
2,869.2	33.8	60.0	268.0	638.4	790.2	508.8	423.0

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**Assumptions**

	Full Commercial Power															
	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031

**Cap Ex / Op Ex:**

Capital expenditures

147.0

Capital sensitivity

Capital expenditures - current analysis

147.0

O&M expenses

	13.3	13.6	14.0	14.3	14.7	15.0	15.5	16.1	16.5	16.9	17.2	17.7	18.1	18.6	19.0
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**CPI**

**Production:**

Muskat Falls maximum energy, GWh

Average

Firm

Pct of firm energy in year prior to Full Power

**Load (GWh):**

Energy required from Labrador

	1,907	1,976	2,055	2,125	2,226	2,328	2,503	2,576	2,637	2,724	2,817	2,957	3,184	3,266	3,348
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Energy required from Muskrat Falls (maximum of average production)

1,250	1,907	1,976	2,055	2,125	2,226	2,328	2,503	2,576	2,637	2,724	2,817	2,957	3,184	3,266	3,348
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**Revenue Rate:**

Supply price, January 1, 2010\$/MWh

Escalation to Full Commercial Power (years)

July 1, 2017 rate (\$/MWh)

Credit for power before full commercial power

Cost-out price for Muskrat falls

**Innu Payments:**

Minimum payment, \$ M:

Stated in (year)

Payment as pct of After Debt Net Cash Flow

Payment start date (project sanction date)

First year pct (Project year basis 1-Oct-2011 to 30-Jun-2012)



**Water Power Lease:**

Water power lease (\$/MWh)

Cost Year

Water power cost, Full Power (\$/MWh)

**Water Management:**

Water management cost (\$/MWh)

Cost Year

Water management cost, Full Power (\$/MWh)

Water management energy (GWh)

**Cash / Working Capital:**

Working capital - average requirement as % of change in revenues

Cap ex defrayed by revenues before Full Commercial Power (%)

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**Assumptions**

	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047
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**Cap Ex / Op Ex:**

Capital expenditures

Capital sensitivity

Capital expenditures - current analysis

O&M expenses

	19.5	20.0	20.5	21.0	21.5	22.1	22.6	23.2	23.8	24.4	25.0	25.6	26.2	26.9	27.6	28.3
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**CPI**

**Production:**

Muskrat Falls maximum energy, GWh

Average

Firm

Pct of firm energy in year prior to Full Power

**Load (GWh):**

Energy required from Labrador

	3,430	3,511	3,593	3,667	3,732	3,666	3,735	3,808	3,874	3,939	4,004	4,069	4,134	4,199	4,264	4,328
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Energy required from Muskrat Falls (maximum of average production)

	3,430	3,511	3,593	3,667	3,732	3,666	3,735	3,808	3,874	3,939	4,004	4,069	4,134	4,199	4,264	4,328
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**Revenue Rate:**

Supply price, January 1, 2010\$/MWh

Escalation to Full Commercial Power (years)

July 1, 2017 rate (\$/MWh)

Credit for power before full commercial power

Cost-out price for Muskrat falls

**Innu Payments:**

Minimum payment, \$ M:

Stated in (year)

Payment as pct of After Debt Net Cash Flow

Payment start date (project sanction date)

First year pct (Project year basis 1-Oct-2011 to 30-Jun-2012)



**Water Power Lease:**

Water power lease (\$/MWh)

Cost Year

Water power cost, Full Power (\$/MWh)

**Water Management:**

Water management cost (\$/MWh)

Cost Year

Water management cost, Full Power (\$/MWh)

Water management energy (GWh)

**Cash / Working Capital:**

Working capital - average requirement as % of change in revenues

Cap ex defrayed by revenues before Full Commercial Power (%)

**Lower Churchill Project**  
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**Summary Level Annual**

\$ millions except for per-unit

**Assumptions**

2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063
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**Cap Ex / Op Ex:**

Capital expenditures

Capital sensitivity

Capital expenditures - current analysis

O&M expenses

29.0	29.7	30.4	31.2	32.0	32.8	33.6	34.4	35.3	36.2	37.1	38.0	39.0	39.9	40.9	42.0
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**CPI**

**Production:**

Muskrat Falls maximum energy, GWh

Average

Firm

Pct of firm energy in year prior to Full Power

**Load (GWh):**

Energy required from Labrador

4,393	4,458	4,515	4,571	4,628	4,684	4,737	4,789	4,842	4,894	4,946	4,998	5,051	5,103	5,155	5,207
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Energy required from Muskrat Falls (maximum of average production)

4,393	4,458	4,515	4,571	4,628	4,684	4,737	4,789	4,842	4,873	4,873	4,873	4,873	4,873	4,873	4,873
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**Revenue Rate:**

Supply price, January 1, 2010\$/MWh

Escalation to Full Commercial Power (years)

July 1, 2017 rate (\$/MWh)

Credit for power before full commercial power

Cost-out price for Muskrat falls

**Innu Payments:**

Minimum payment, \$ M:

Stated in (year)

Payment as pct of After Debt Net Cash Flow

Payment start date (project sanction date)

First year pct (Project year basis 1-Oct-2011 to 30-Jun-2012)



**Water Power Lease:**

Water power lease (\$/MWh)

Cost Year

Water power cost, Full Power (\$/MWh)

**Water Management:**

Water management cost (\$/MWh)

Cost Year

Water management cost, Full Power (\$/MWh)

Water management energy (GWh)

**Cash / Working Capital:**

Working capital - average requirement as % of change in revenues

Cap ex defrayed by revenues before Full Commercial Power (%)

**Lower Churchill Project**  
**Financial Returns: Muskrat Falls, Serving island Load Only**

**Summary Level Annual**

\$ millions except for per-unit

**Assumptions**

2064	2065	2066	2067
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**Cap Ex / Op Ex:**

Capital expenditures

Capital sensitivity

Capital expenditures - current analysis

O&M expenses

43.0	44.1	45.1	46.0
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**CPI**

**Production:**

Muskrat Falls maximum energy, GWh

Average

Firm

Pct of firm energy in year prior to Full Power

**Load (GWh):**

Energy required from Labrador

5,259	5,306	5,349	5,389
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Energy required from Muskrat Falls (maximum of average production)

4,873	4,873	4,873	4,873
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**Revenue Rate:**

Supply price, January 1, 2010\$/MWh

Escalation to Full Commercial Power (years)

July 1, 2017 rate (\$/MWh)

Credit for power before full commercial power

Cost-out price for Muskrat falls

**Innu Payments:**

Minimum payment, \$ M:

Stated in (year)

Payment as pct of After Debt Net Cash Flow

Payment start date (project sanction date)

First year pct (Project year basis 1-Oct-2011 to 30-Jun-2012)

**Water Power Lease:**

Water power lease (\$/MWh)

Cost Year

Water power cost, Full Power (\$/MWh)

**Water Management:**

Water management cost (\$/MWh)

Cost Year

Water management cost, Full Power (\$/MWh)

Water management energy (GWh)

**Cash / Working Capital:**

Working capital - average requirement as % of change in revenues

Cap ex defrayed by revenues before Full Commercial Power (%)

## Lower Churchill Project


### Financial Returns: Muskrat Falls, Serving island Load Only

#### Summary Level Annual

\$ millions except for per-unit

##### Notes:

1. This input for capital sensitivity is optional and was used to verify results from this model with PWC's full project model.
2. PWC modeling uses a July 1 to June 30 project year. For modeling purposes, annual operating costs in Exhibit 8 are adjusted as  $(\text{year}_t + \text{year}_{t+1}) / 2$ .
3. The firm and average values of 4,873 and 4,506 GWh were used throughout the DG2 screening process based on past hydrology studies. Hydrology studies undertaken in 2011 (see CE-27 Rev. 1) confirmed the adequacy of these estimates.
4. As per internal analysis by LCP.
5. In the DG2 screening level analysis, annual calendar year Island volume was used to calculate project-year revenues.
6. Muskrat Falls produces and sells power in the year preceding full power and commencement of financial returns. These revenues are used to defray construction costs, thereby reducing the required revenue. The 98.80% was estimated over previous Muskrat analysis.
7. Muskrat Falls cost out price recovers all costs spread over average power starting at Full Commercial Power.
8. Cost out price in run-up year to Full Power is equal to price in year beginning Full Power.
9. Historical model assumption used prior to formal agreements.

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12. Historical model assumption used prior to formal agreements. For the final executed water lease, the royalty payable is \$2.50 /MWh in 2009 with annual CPI escalation commencing in January 2010, based on the previous 12 months ending September 30.
  13. Historical model assumptions based on working provisional quantities and expense for Gull Island.
  14. Assumptions for cash and working capital were derived from PWC's full project model. These assumptions enable the simplification of this model.



**Nalcor Energy**  
**Lower Churchill Project**  
**Financial Returns: Muskrat Falls, Serving island Load Only**

**Summary Level Annual**

\$ millions except for per-unit

Full Commercial Power

**Development Phase**

Capital expenditure  
 Revenue before Full Power  
 of which: used to defray construction expenditures  
                   carried forward to PY 2017  
 Working capital  
 Water power rental  
 Innu payments  
 Equity requirement

2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
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Note: in the year prior to Full Commercial Power, construction expenditures are incurred in the first half of the year when revenues are minimal, and revenues are mostly in the second half when there are minimal construction expenditures. Therefore, equity is required to meet construction expenditures, while revenues give rise to cash balances which are carried forward to the operational phase.

**Operational Phase**

Island Load, GWh  
 Supply price, \$/MWh  
 Revenues, \$millions  
 Carry-over cash from prior year  
 O&M  
 Water power rental  
 Water management  
 Working capital  
                   Subtotal: Cash flow before Innu  
 Innu payments  
 Cash flow after Innu payments

1,907	1,976	2,055	2,125	2,226	2,328	2,503	2,576	2,637	2,724	2,817	2,957	3,184
\$89.03	\$90.81	\$92.63	\$94.48	\$96.37	\$98.29	\$100.26	\$102.27	\$104.31	\$106.40	\$108.53	\$110.70	\$112.91
169.75	179.47	190.39	200.78	214.51	228.86	250.99	263.43	275.08	289.79	305.72	327.35	359.51

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**Cash Flow to Equity**

198.6	152.0	162.0	171.6	189.1	204.2	224.9	236.5	247.4	261.1	275.9	295.2	324.1
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Per CE-53

200.0	152.0	162.1	171.6	189.1	204.2	224.9	236.5	247.4	261.1	275.7	295.0	323.9
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Difference

1.4	0.0	0.0	0.0	0.0	0.0	0.0	(0.0)	0.0	0.0	(0.2)	(0.2)	(0.2)
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**Nalcor Energy**  
**Lower Churchill Project**  
**Financial Returns: Muskrat Falls, Serving island Load Only**  
**Summary Level Annual**

\$ millions except for per-unit

**Development Phase**

Capital expenditure  
Revenue before Full Power  
of which: used to defray construction expenditures  
carried forward to PY 2017  
Working capital  
Water power rental  
Innu payments  
Equity requirement

2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055
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**Operational Phase**

Island Load, GWh	4,069	4,134	4,199	4,264	4,328	4,393	4,458	4,515	4,571	4,628	4,684	4,737	4,789
Supply price, \$/MWh	\$148.98	\$151.96	\$155.00	\$158.10	\$161.26	\$164.49	\$167.78	\$171.13	\$174.56	\$178.05	\$181.61	\$185.24	\$188.94
Revenues, \$millions	606.16	628.20	650.82	674.12	697.98	722.62	747.96	772.62	797.94	823.95	850.69	877.42	904.88
Carry-over cash from prior year													
O&M													
Water power rental													
Water management													
Working capital													
Subtotal: Cash flow before Innu													
Innu payments													
Cash flow after Innu payments													

**Cash Flow to Equity**

	543.0	562.6	582.7	603.4	610.9	632.8	655.3	677.2	699.7	722.8	746.5	770.2	794.5
Per CE-53	542.9	562.4	582.5	603.2	611.0	632.8	655.4	677.3	699.8	722.7	746.5	770.2	794.6
Difference	(0.1)	(0.2)	(0.2)	(0.2)	0.1	(0.0)	0.0	0.0	0.1	(0.0)	0.0	0.0	0.1

**Nalcor Energy**  
**Lower Churchill Project**  
**Financial Returns: Muskrat Falls, Serving island Load Only**  
**Summary Level Annual**

\$ millions except for per-unit

**Development Phase**

Capital expenditure  
 Revenue before Full Power  
 of which: used to defray construction expenditures  
           carried forward to PY 2017  
 Working capital  
 Water power rental  
 Innu payments  
 Equity requirement

2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067
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**Operational Phase**

Island Load, GWh  
 Supply price, \$/MWh  
 Revenues, \$millions  
 Carry-over cash from prior year  
 O&M  
 Water power rental  
 Water management  
 Working capital  
     Subtotal: Cash flow before Innu  
 Innu payments  
 Cash flow after Innu payments

4,842	4,873	4,873	4,873	4,873	4,873	4,873	4,873	4,873	4,873	4,873	4,873	4,873
\$192.72	\$196.58	\$200.51	\$204.52	\$208.61	\$212.78	\$217.04	\$221.38	\$225.81	\$230.32	\$234.93	\$239.63	
933.11	957.92	977.08	996.62	1,016.56	1,036.89	1,057.63	1,078.78	1,100.35	1,122.36	1,144.81	1,167.70	


**Cash Flow to Equity**

Per CE-53

Difference

819.5	841.5	858.2	875.2	892.5	910.2	928.2	946.6	965.3	984.4	1,004.0	1,024.1	
819.5	841.6	858.3	875.4	892.6	910.3	928.3	946.8	965.3	984.5	1,004.1	1,024.3	
(0.0)	0.1	0.1	0.2	0.0	0.1	0.1	0.2	0.0	0.1	0.1	0.2	

**Nalcor Energy**  
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**Summary Level Annual**

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Note original screening models were based on semi-annual calculations; this summary shows annual calculations

Innu

Project year beginning July 1

Full Commercial Power

Prior	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
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