EXPERT TESTIMONY

PREPARED IN RESPONSE TO

ONTARIO ENERGY BOARD STAFF DISCUSSION PAPER

DATED 25 JULY 2006

REGARDING:

COST OF CAPITAL PROCEEDING (EB-2006-0088)

Michele Smart
Ron Warrington

14 August 2006

Energy and Environmental Economics, Inc.
Expert Testimony Regarding Cost of Capital and Capital Structure
Response to OEB Staff Discussion Paper Dated 25 July 2006

EXPERT TESTIMONY

SUMMARY

In response to the Cost of Capital (EB-2006-0088), 2nd Generation Incentive Regulation Mechanism (EB-2006-0089) and Licence Amendment Proceeding (EB-2006-0087), as detailed in the Staff Discussion Paper dated July 25, 2006, Energy and Environmental Economics, Inc. (E3) has been retained by Newmarket Hydro, Ltd. and is pleased to provide this expert testimony regarding the appropriate the cost of capital and capital structure for LDCs in Ontario.

Our testimony is in three parts. Part 1 describes the appropriate methodology for determining the equity return. Part 2 describes factors that must be considered in determining an LDC's capital structure. Part 3 provides our recommendations for the cost of capital and capital structure, including our recommendations for beta, the market return, riskless rate, cost of debt, and return on equity (ROE).

The key results of our testimony are as follows:

Cost of Capital:

1. In Appendix A of the Staff Discussion Paper, ROE values have been underestimated due to the use of inappropriately high debt interest rates in the Capital Asset Pricing Model (CAPM) formula.
2. The correct ROE, using Staff's assumptions for the 60-month, all rate-regulated scenario, is 10.4%

Capital Structure:

3. Imposing one capital structure and equity return on all LDCs could imperil the financial health of smaller distribution companies.
4. Either the equity return or the capital structure must be segmented to enable small utilities to earn a return commensurate with their business risks.

Recommendation:
We recommend an equity return of approximately 11% (10.5% plus 50bp for transaction/flotation costs) and two capital structures, 50:50 for smaller LDCs and 60:40 for larger distribution companies.

PART 1: COST OF DEBT AND EQUITY CAPITAL

Key Points:

Energy and Environmental Economics, Inc.
Expert Testimony Regarding Cost of Capital and Capital Structure
Response to OEB Staff Discussion Paper Dated 25 July 2006

1. ROE values in Appendix A of the Staff Discussion Paper have been underestimated due to the use of inappropriately high debt interest rates in the CAPM formula.
2. The imputed debt interest rates in all cases in Appendix A are higher than the corresponding equity returns, which is a logically inconsistent result.
3. Applying the correct methodology and Staff-provided values from the 60-month, all rate-regulated scenario results in an ROE of 10.4%, assuming a debt interest rate of 6.01%. This is in contrast to the Staff-calculated ROE of 7.87%.

As Board Staff has noted, the cost of capital is important for distributors since it represents a significant component of the revenue requirement. Through the cost of capital component of rates, distributors are able to maintain their financial viability and attract the capital necessary to provide reliable, quality service to their customers. Furthermore, it is contemplated that the new allowed ROE will be in place for 4 years and the new capital structure and debt interest rate(s) for 3 years. This period coincides with significant new capital investment requirements to fund OEB-mandated projects such as Smart Meters. Cost of capital is therefore of paramount importance.

Unfortunately, the ROE values provided in Board staff's second report dated July 25, 2006 have been calculated incorrectly. The result of this oversight is a recommendation of equity returns that are <u>less than</u> the cost of debt. Equity returns less than the cost of debt are logically inconsistent with the CAPM. We provide a proof, using Staff's assumptions from the 60-month, all rate-regulated scenario, that the suggested ROE of 7.87% must lead to Cost of Debt of 8.65% in order to preserve the Weighted Average Cost of Capital (WACC), or Asset Return, of 6.47%.

After demonstrating the logical flaw in the results, we provide the correct calculation methodology, which results in an <u>ROE of 10.4%,</u> using the same Staff-provided values from the 60-month all rate-regulated scenario.

We urge Staff to review these calculations for guidance on the correct use of CAPM equations. While these equations can be simple to employ, often the complexities underlying their derivation lead to misapplication. We have stayed away from a more technical review of the results, believing that the following explanation provides a straightforward, understandable description of the inconsistencies. We would be happy to provide further explanation of these results at Staff's request.

<u>Staff Calculation Results in Cost of Debt Higher than Cost of Equity</u>

While the discussion below is somewhat technical, all of the formulas used are introductory corporate finance formulas. For each calculation, we describe the formula used then show the result of the calculation. Therefore, although the discussion below is

2

technical, it has been presented in a way that allows readers to verify results each step of the way.

Staff's Calculation:

In Appendix A of the Staff Discussion Paper, Staff calculates the after-tax, unlevered betas per the following formula:

$\{ 1 \}$ ßa = [ße * E + ßd * D * (1-T)] / [E+ (1-T)*D]

Where: ßa = unlevered, after tax asset beta
ßd = levered debt beta
ße = levered equity beta
T = the tax rate
D = % debt
E = % equity

In order to calculate ßa, it is assumed that ßd equals zero, therefore the formula reduces to:

$\{ 2 \}$ ßa = ße / [1+ (1-T)*(D/E)]

which can be re-written as:

$\{ 3 \}$ ße = ßa * [1+ (1-T)*(D/E)]

Formula { 2 } above is the formula that was correctly used in Appendix A to convert the observed, levered equity betas, ße, to the unlevered asset betas, ßa.

In order to provide a concrete example, we use figures from the 60-month all rate-regulated scenario - per the data Staff provided in Appendix A:

ße = 0.47 (60 month average observed value)

T = 0.36

E = 40%

D = 60%

Using formula { 2 } above, staff calculates:

ßa = 0.29

Energy and Environmental Economics, Inc.
Expert Testimony Regarding Cost of Capital and Capital Structure
Response to OEB Staff Discussion Paper Dated 25 July 2006

Using formula { 3 } above, Staff calculates:

$$\text{ße} = 0.57$$

We can use the formulas below to calculate Re, the equity return, and Ra, the asset return. Note that the asset return is the same as the weighted average cost of capital, WACC. This is the return on the asset assuming all equity financing (so that there are no tax benefits of debt). It is also the return of an asset produced by a weighted average of the debt interest rate and the ROE, including tax benefits produced by debt.

{ 4 } $Ra = Rf + ßa * (Rm - Rf) = WACC$

{ 5 } $Re = Rf + ße * (Rm - Rf)$

Using figures from the 60-month all rate-regulated scenario provided in Appendix A:

Where:	ßa = 0.29	per Staff, as verified in calculations above
	ße = 0.57	per Staff, as verified in calculations above
	Rm = 10.06%	per Staff in Appendix A
	Rf = 5.01%	per Staff in Appendix A

Then using formula { 4 } above, we calculate:

$$Ra = 6.47\% = WACC$$

As we discussed above, the asset return is the same as the weighted average cost of capital, WACC. Once WACC has been calculated, a wide range of equity returns can be calculated, depending upon the assumptions for the percentage of debt and equity in the capital structure and the debt interest rate.

Using formula { 5 } above, we calculate:

$$Re = 7.87\%$$

We can then calculate the pre-tax debt interest rate, Rd, that yields Ra = WACC

{ 6 } $Ra = E * Re + D * (1 - T) * Rd = WACC$

Or, rewriting the same formula, we have:

{ 7 } $Rd = [Ra - E * Re] / [D * (1-T)]$

Where: $E = 0.40$

4

Re =	7.87%	per staff, as verified in calculations above
D =	0.60	
T =	36%	
Ra =	6.47%	as calculated above

Using formula { 7 }, we determine that

Rd =   8.65%

Note we have determined that Staff used a pre-tax debt interest rate of 8.65% to calculate the equity return of 7.87%. This is impossible because debt is less risky than equity and must earn a lower return. The equity return of 7.87% has therefore not been derived correctly. We provide the corrected calculation below.

Correct Application of CAPM:

Rewriting formula { 6 } above, we have:

{ 8 }   Re =   [Ra - D * (1-T) * Rd] / E

Where:		
	E =	0.40
	D =	0.60
	T =	36%
	Ra =	6.47%
	Rd =	6.01%

Note that Staff has not recommended a debt value in their current proposal. We use in this calculation Rd = 6.01%, which is the value Staff recommended in their report dated 19 June 2006.

Using formula { 8 }, we calculate that:

Re =   10.40%

We have now correctly calculated an equity return of 10.4%.

An equity return of 10.4% provides an asset return, or WACC, of 6.47%, based on a capital structure of 60% debt and 40% equity, a tax rate of 36%, and a pre-tax debt interest rate of 6.01%.

As we discussed above, once WACC has been calculated, a wide range of equity returns can be calculated, depending upon the assumptions for the percentage of debt and equity in the capital structure and the debt interest rate. Because Staff used a high pre-tax interest rate of 8.65%, a low equity return of 7.87% was required to produce a WACC of 6.47%. When a more appropriate pre-tax debt interest rate of 6.01% is used, a more appropriate equity return of 10.4% produces the same WACC of 6.47%. Note that the equity return is based on a given debt structure. As more debt is added to the capital structure, the equity return increases to reflect additional equity risk, per standard corporate finance theory.

We also again provide in Attachment 1 herein, for reference, the 2005 allowed ROE decisions for US utilities, which averaged 10.58%. Note that this average is very close to our calculated ROE of 10.4%. Often, ROE is referenced as a spread over 10-year Treasuries; for US utilities, the average spread was 621 basis points over 10-year treasuries (see Attachment 1).

PART 2: CAPITAL STRUCTURE

Key Points:

1. Small utilities have amplified business risk stemming from a serving a concentrated geographic area, carrying a small asset base, and operating in an evolving regulatory climate.
2. Imposing one capital structure and equity return on all LDCs could imperil the financial health of smaller distribution companies.
3. Either the equity return or the capital structure must be segmented to enable small utilities to earn a return commensurate with their business risks.

It is important to consider the fact that small businesses generally require equity returns to attract capital. Expected returns (E(r)) are a function of business risk and financial risk [E(r) = risk free rate + business risk premium + financial risk premium][1]. Utilities with higher business and financial risks must earn a higher return. This point was addressed to some extent under the previous plan through fixing the equity return but segmenting utilities by asset size into varied capital structures.

---

[1] Source: Leveraged Betas and the Cost of Equity, Harvard Business School, Note 9-288-036, 12/11/91.

Ibbotson Associates[2] describes the need for a size-related risk premium as follows:

> "The need for this premium when using the CAPM arises because, even after adjusting for the systematic (beta) risk of small stocks, they outperform large stocks. The betas for small companies tend to be greater than those for large companies; however, these higher betas do not account for all of the risks faced by those who invest in small companies. This premium can be added directly to the results obtained using the CAPM:"

$$k_s = r_f + \beta_s \times (ERP) + SP_s$$

where:

k_s is the cost of equity for the firm, r_f is the expected return of the riskless asset, β_s is the beta of the stock of the firm, ERP is the equity risk premium, and SP_s is the appropriate size premium based on the firm's equity market capitalization.

There are two ways to compensate a small, regulated LDC for its additional business risk:

1. increase its equity return; or
2. increase the equity component of its capital structure

Ibbotson described increasing the equity return by adding a small company premium. While conceptually accurate, this method is in practice difficult to apply to the Ontario LDCs because it is not clear how the small company premium should be calculated. There is, however, empirical and regulatory evidence for segmenting the capital structure based on business size. We therefore propose that small utilities be compensated for their additional business risks through increasing the equity component of their capital structure.

Reinforcing this point, several respondents to Staff's first draft report dated 19 June 2006 stated that the capital structure of gas utilities should not serve as a model for the electric distribution companies because the gas utilities are larger, more geographically diverse, and the gas industry over time has evolved and is more stable. Applying a single capital structure modeled after the gas industry therefore does not recognize the industry differences associated with the electric LDC industry and will have detrimental impacts to small utilities.

Rate base is the most appropriate factor in determining a distributor's level of business risk because it captures both regulated asset size and customer diversity impacts. We propose that LDCs with rate base assets of less than $100 million be considered to be small utilities eligible for an increased equity component in their rates. This approach

---

[2] Source: SBBI Valuation Edition 2005 Yearbook, page 58.

would consolidate the current four groupings into a more manageable two capital structure categories, while maintaining additional business risk compensation for the higher-risk LDC's. Per the 2006 EDR application information, of the 73 LDCs providing data, 61 have rate base assets of less than $100 million. Clearly, the majority of Ontario LDCs can be considered to be higher risk small businesses. Yet, the rate base assets of these 61 utilities are approximately equal to the total rate bases of the largest 12 distributors. Segmenting the utilities at $100 million rate base would therefore provide an appropriate cutoff on a rate base as well as a business risk basis.

The financial health of these smaller LDCs, and even the health of the Ontario electricity industry, could be imperiled if the capital structure is fixed without providing additional equity returns. Utilities that cannot achieve the target debt level will be forced to fund the difference with equity, yet will earn the lower debt return on this increment. Utilities with such higher than target equity percentages in their capital structures will therefore not be able to capture the full, allowed return on their equity, creating very real financial hardship. This would likely lead to debt covenant problems, which would then increase debt interest rates and further decrease the achieved leverage in their capital structure. Smaller utilities with upcoming capital projects may be less able to handle the amplified financial risk associated with funding their capital programs than larger utilities, potentially jeopardizing their financial viability.

An additional complication resulting from enforcing a 60:40 capital structure would result from the need for a majority of utilities to re-lever their capital structure. According to the 2006 EDR filings, the average amount of debt in the LDCs' capital structure is approximately 50%. If a common capital structure of 60:40 is imposed on all utilities, many LDCs will have to add additional debt to their capital structure in order to obtain their full regulated equity return. This will be a costly, distracting, and time consuming exercise that should not be undertaken during a time when utilities should be focusing on Smart Meters and other programs.

In summary, Staff's current proposed plan of fixing both the equity return and the capital structure will be insufficient to equitably compensate smaller utilities for the greater risks inherent in their business, and will distract utilities from more critical program issues such as DSM implementation. Both equity and capital structure components cannot be fixed without jeopardizing the financial health of small utilities. We therefore support a capital structure of 50:50 for distributors with a rate base of less than $100 million and a capital structure of 60:40 for larger distributors.

PART 3: RECOMMENDATIONS

Below are our recommendations for beta, the market return, risk-free rate, debt interest rate, capital structure, and equity return. Where possible, in the interest of expediency, we have worked within the range of values Staff recommended in their 25 July 2006 report.

FACTOR	E3 RECOMMENDATION
Beta:	All rate-regulated companies should be used to determine beta. A period of at least 60 months is appropriate.
Market Return	Observing the market return over a period of at least 120 months (10 years) is appropriate.
Riskless Rate:	The term of the riskless rate should match the life of the underlying assets supported by the debt. Staff's proposed long-term riskless period of 15 years is significantly shorter than the current term of 30 years, and does not adequately support either equity or assets. We therefore propose an average of the 20- and 30-year rates be used to determine the riskless rate.
Debt Interest Rate – new affiliate debt	We support Staff's proposal to use the riskless rate plus the spread of A/BBB corporate bonds of similar duration to the riskless rate. Per above, we recommend an average of 20- and 30-year terms. We support an annual re-calculation of both the A/BBB spread and the riskless rate for the sole purpose of calculating the debt rate for new affiliate debt.
Debt Interest Rate – new and existing third party debt	We support Staff's proposal to use actual interest rates for new third party debt. We do not support Staff's proposal to use the previous Board-approved rate for existing third-party debt because we believe existing third-party debt should be reimbursed at its actual cost.
Debt Interest Rate – existing affiliate debt	We support Staff's proposal to use the previous Board-approved rate.
Capital Structure	We propose two capital structures: LDCs with asset sizes lower than $100 million at 50% D, 50% E. LDCs with asset size greater than $100 million at 60% D, 40% E.
Short-term Debt in Capital Structure	We propose that the actual cost and amount of short-term debt, if any, be recognized in an LDC's cost of debt. Some distributors do not require debt to fund their working capital obligations. It is not appropriate to enforce any deemed amount of short-term debt in an LDC's capital structure.
Equity Return	We support Staff's use of a 60% debt and 40% equity capital structure to calculate the equity return and Staff's recommended adder of 50bp for flotation and transaction costs. We support use of this equity return for all distributors through 2010.

<u>Values Associated with Recommendations as Above:</u>

$T = 36\%$
$D = 60\%$
$E = 40\%$
$\beta a = 0.29$
$Rm = 10.06\%$
$Rf = 5.10\%$ (placeholder/estimated value for average of 20-yr & 30-yr rates)
A/BBB Spread = 1% (placeholder/estimated value for average of 20-yr & 30-yr spreads)

<u>Equity Return Calculated Using Values Recommended Above:</u>
Using the same methodology described in Part 1 and the values provided above, we calculate an asset return of 6.5 %, and an equity return of 10.5%. This is based on a 60% debt and 40% equity capital structure, and a debt rate of 6.1% (risk-free rate of 5.1% plus 1% spread – note these values are placeholder estimates). **With the 50bp adder for transaction costs, <u>the resulting ROE is 11.0%.</u>**

This 11% ROE and a 50:50 capital structure will provide a risk-adjusted return for small utilities with an asset size of less than $100 million. Applying this equity return to utilities with a 60% debt and 40% equity capital structure will provide the appropriate return for utilities with less financial risk.

Energy and Environmental Economics, Inc.
Expert Testimony Regarding Cost of Capital and Capital Structure
Response to OEB Staff Discussion Paper Dated 25 July 2006

About Energy & Environmental Economics

Energy and Environmental Economics, Inc. (E3) is an economics, regulatory, and engineering consulting firm serving the electricity and natural gas industries. We provide innovative yet practical solutions to manage the complex challenges of the energy business.

Founded in 1993, E3 has successfully completed hundreds of energy consulting projects. These encompass avoided cost estimation, integrated resource planning, general rate cases, electricity deregulation, rate design and pricing, procurement cost and risk management, corporate finance, regulatory and litigation support. This track record is the result of on-going research that leads to economic and engineering solutions to real problems brought by our clients. The rigor of E3's solutions is evidenced by our extensive publications in such scholarly journals as *Energy Policy, The Energy Journal, Energy-The International Journal, Resource and Energy Economics, Energy Economics, Electricity Journal, IEEE Transactions on Power Systems, Managerial and Decision Economics,* and *Journal of Regulatory Economics.*

Grounded in thorough analysis, our work withstands the test of third-party review and regulatory scrutiny. E3's clients include integrated utilities, local distribution companies, owners of transmission and generation, as well as law firms, large electricity consumers, government agencies, regulatory commissions and industry associations. We have worked extensively in Canada, for organizations including BC Hydro, British Columbia Transmission Corporation, Powerex, Hydro Quebec, Newmarket Hydro, and Ontario Power Generation.

Energy and Environmental Economics, Inc.
Expert Testimony Regarding Cost of Capital and Capital Structure
Response to OEB Staff Discussion Paper Dated 25 July 2006

Attachment 1

2005 Electric Rate Case Decisions

Date	Company	State	Allowed ROE	Yield on 10 Year Treasury	BP Spread
1/6/2005	South Carolina Electric & Gas	SC	10.70%	4.29%	641
1/28/2005	Aquila	KS	10.50%	4.16%	634
2/18/2005	Puget Sound Energy	WA	10.30%	4.26%	604
2/25/2005	PacifiCorp	UT	10.50%	4.27%	623
3/10/2005	Empire District Electric	MO	11.00%	4.46%	654
3/24/2005	Consolidated Edison	NY	10.30%	4.59%	571
3/31/2005	Texas -New Mexico Power	TX	10.25%	4.50%	576
	1st Quarter Averages		**10.51%**	**4.36%**	**615**
4/4/2005	Central Vermont Public Svc	VT	10.00%	4.46%	554
4/7/2005	Arizona Public Service	AZ	10.25%	4.47%	578
5/18/2005	Entergy Louisiana	LA	10.25%	4.07%	618
5/26/2005	Savannah Electric & Power	GA	10.75%	4.08%	667
5/26/2005	Altantic City Electric	NJ	9.75%	4.08%	567
6/8/2005	Public Svc New Hamprshire	NH	9.62%	3.94%	568
	2nd Quarter Averages		**10.12%**	**4.18%**	**592**
7/19/2005	Wisconsin Power and Light	WI	11.50%	4.23%	727
8/5/2005	Cap Rock Energy	TX	11.75%	4.43%	732
8/15/2005	AEP Texas Central	TX	10.13%	4.27%	586
9/28/2005	PacifiCorp	OR	10.00%	4.26%	574
	3rd Quarter Averages		**10.85%**	**4.30%**	**655**
12/12/2005	Madison Gas and Electric (WI)	WI	11.00%	4.55%	645
12/13/2005	OGE Electric Service (OK)	OK	10.75%	4.54%	622
12/16/2005	Pacific Gas and Electric (CA)	CA	11.35%	4.45%	690
12/16/2005	San Diego Gas & Electric (CA)	CA	10.70%	4.45%	625
12/16/2005	Southern California Edison (CA)	CA	11.60%	4.45%	715
12/22/2005	Wisconsin Public Service (WI)	WI	11.00%	4.44%	656
12/21/2005	Cincinnati Gas & Electric (OH)	OH	10.29%	4.49%	581
12/21/2005	Avista (WA)	WA	10.40%	4.49%	592
12/22/2005	Consumers Energy (MI)	MI	11.15%	4.44%	671
12/28/2005	Westar Energy North (KS)	KS	10.00%	4.38%	562
12/28/2005	Kansas Gas and Electric (KS)	KS	10.00%	4.38%	562
	4th Quarter Averages		**10.63%**	**4.46%**	**629**
	2005 Average		**10.58%**	**4.35%**	**621**

Source: Regulatory Research Associates
Original Source: Lehman Brothers Research Report (3/15/06)

1