EDA

The Voice Of Ontario's Electricity Distributors

October 27, 2006

Board Secretary
Ontario Energy Board
P.O. Box 2319
27th Floor
2300 Yonge Street
Toronto, ON M4P 1E4

Via email to BoardSec@oeb.gov.on.ca and by courier

Dear Board Secretary:

Re: Final Written Comment: Cost of Capital (EB-2006-0088) and 2nd Generation Incentive Regulation (EB-2006-0089) for Ontario's Electricity Distributors – Comments of the Electricity Distributors Association

The Electricity Distributors Association ("EDA") is the voice of Ontario's electricity distributors. Enclosed is the final report, prepared for the EDA by Christensen Associates Energy Consulting, and the EDA's comments that are provided in response to the Board's invitation to interested parties to file their final written comments on the determination of Cost of Capital and 2nd Generation Incentive Regulation for Ontario's Electricity Distributors.

Please direct any questions or comments to Guru Kalyanraman at 905.265.5334 or at gkalyanraman@eda-on.ca.

Yours truly,

C.C. (Charlie) Macaluso
President and Chief Executive Officer

Encl.

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IN THE MATTER OF a consultation by the Ontario Energy Board on the Cost of Capital and 2nd Generation Incentive Regulation for Electricity Distribution Companies

A. OVERVIEW

1. It is the position of the EDA that the process currently proposed by the Board to incorporate ratemaking methodologies into LDC license conditions is inconsistent with the process established by the *Ontario Energy Board Act, 1998* (OEB Act) for doing so. This consultation process and the proposed code making process are not a lawful substitute for establishing mandatory ratemaking methodologies through license conditions.

2. On the substantive question of what constitutes appropriate ratemaking methodologies, the EDA has previously filed a report prepared by Mr. Camfield of Christensen Associates Energy Consulting (Camfield methodology) and is filing an updated version with this submission. If the Board proposes to move away from the currently approved methodology, it is the position of the EDA that the Camfield methodology is the appropriate direction to move in. The EDA is fully prepared to lead evidence in a properly constituted proceeding to support this position.

3. However, the Board should not make any changes to the currently approved methodology until such a proceeding has been held and a proper evidentiary record is in place to assist the Board in determining if a change is justified and if so, what changes should be made so that LDCs continue to recover a fair return on invested capital, as mandated by the OEB Act.

B. THE PROCESS

4. In a letter dated April 27, 2006 the Board set out the details of its approach to establishing methodologies for determining the cost of capital and establishing 2nd generation incentive regulation. In that letter, the Board indicated that it would "implement its cost of capital and second-generation IRM determinations through an amendment to electricity distribution licenses."

5. The Board went on to say that Board staff would release proposals for both the cost of capital and second-generation IRM in early June, 2006 based on the research and analysis of external experts and Board staff. Based on comments received during this consultation exercise, the Board indicated it would issue a proposed Cost of Capital Code and a proposed Productivity Code pursuant to the code making provisions in the Ontario Energy Board Act (OEB Act).

6. During the course of this consultation, concerns regarding the process have emerged. The Board members present at the consultation process indicated that the process concerns could be addressed in license amendment proceeding EB-2006-0087, which the Board commenced on its own motion by way of Notice of Proceeding, on July 7, 2006.

7. The EDA and several other parties have made submissions in that proceeding expressing concern over the Board's intention to establish ratemaking methodologies in codes and to incorporate those codes into licence conditions without a proceeding. The OEB Act requires such a proceeding to consider the appropriateness of such license conditions and whether such license conditions are in the public interest.

8. In taking this approach, the Board will be declining to act within its jurisdiction and will not be complying with its statutory obligations. It is one thing for the Board to develop a code that will act as a guideline. It is quite another thing for the Board to take such a code and incorporate it into a license and thereby make compliance

with the code mandatory. Furthermore, it appears that the Board is of the view that once a code is incorporated into a license, it is not possible to seek a licence amendment to change or amend that code, despite the fact that the code now forms part of the license.

9. For the purposes of these submissions, the EDA incorporates and relies upon the submissions it made in license amendment proceeding EB-2006-0087.

C. THE BOARD STAFF PROPOSAL

10. Board Staff has indicated that in preparing its discussion paper on the cost of capital and 2nd generation incentive regulation, it departed from its experts' recommendation for a two-tiered deemed debt/equity structure. Board staff did so, based on consideration of certain objectives the Board would like to achieve.

> The Staff have taken their expertise they have in dealing with regulated companies, cost-of-service applications, all different types of applications, and taken the input provided by the consultants, and weighed that alongside their practical understanding, as well as the practical understanding of where the market is now and the objectives that the Board would like to achieve, which have been listed there. And we've come up with a proposal.
>
> **Sept. 20, 2006 Transcript at page 122**

11. The objectives that Board Staff identified in the discussion paper were:

> **Protect customers in relation to prices.** This requires a consideration of the impacts of rate adjustments while at the same time ensuring that prudently incurred costs required for the operation of the distribution system are recovered from customers.
>
> **Predictability and stability**. To provide an environment where distributors and consumers are better able to plan and make decisions.
>
> **Promote economic efficiency by providing the appropriate pricing signals and a system of incentives for distributors to maintain an appropriate level of reliability and quality of service**. To create an

> environment where the distributor is encouraged to implement operating efficiencies, while being obliged to maintain appropriate and enforceable service quality standards.
>
> **Ability to raise the financing necessary to invest in distribution infrastructure to enhance service quality and reliability**. This includes allowing distributors the opportunity to earn a reasonable return on shareholder capital and to maintain their financial viability.
>
> **Minimize the time and cost of administering the framework.** Costs imposed on all participants, including the regulated entity and the regulator, should not exceed the benefits available. This objective could be met through a simple process that reflects the concerns of interested parties and reduces the formal process requirements.
>
> **Establishing a common capital structure and incentive framework for all distributors.** The objective is to avoid imposing barriers to consolidation within the electricity distribution sector.
>
> **Discussion Paper at pages 5 and 6**

12. There is no opportunity provided for in this consultation process or the proposed code making process to understand or test the expertise the Board staff say they have applied to deviate not just from the opinions of the experts they retained in this consultation process but also from the expertise that the Board relied on when it originally endorsed Dr. Cannon's approach to cost of capital.

13. Pursuant to subsection 78(3) of the *Ontario Energy Board Act, 1998* (OEB Act), the Ontario Energy Board is required to set distribution rates that are "just and reasonable".

> 78(3). The Board may make orders approving or fixing just and reasonable rates for the transmitting or distributing of electricity and for the retailing of electricity in order to meet a distributor's obligations under section 29 of the Electricity Act, 1998.

14. It is a well established principle that just and reasonable rates must allow a utility to recover a fair return on invested capital. A fair return is what one would receive if investing the same amount in an investment of similar risk.

15. This principle has been established by the Supreme Court of Canada:

> The duty of the Board was to fix fair and reasonable rates; rates which, under the circumstances, would be fair to the consumer on one hand, and which, on the other hand, would secure to the company a fair return for the capital invested. By a fair return is meant that the company will be allowed as large a return on the capital invested in its enterprise (which will be net to the company) as it would receive if it were investing the same amount in other securities possessing an attractiveness, stability and certainty equal to that of the company's enterprise.
>
> ***Northwestern Utilities Ltd. v. Edmonton (City)*, [1929] S.C.R. 186**

16. This principle is binding on the Board, something the Board has recognized in the past:

> And, as a matter of law, utilities are entitled to earn a rate of return that not only enables them to attract capital on reasonable terms but is comparable to the return granted other utilities with a similar risk profile.
>
> **EB-2005-0421**

17. Cost of capital is a real cost that must be recovered by LDCs. If an LDC is prevented from recovering that cost, it will ultimately fail:

> Even though cost of capital may be more difficult to estimate than some other costs, it is a real cost that the utility must be able to recover through its revenues. If the Board does not permit the utility to recover its cost of capital, the utility will be unable to raise new capital or engage in refinancing as it will be unable to offer investors the same rate of return as other investments of similar risk. As well, existing shareholders will insist that retained earnings not be reinvested in the utility. In the long run, unless a regulated enterprise is allowed to earn its cost of capital, both debt and equity, it will be unable to expand its operations or even maintain existing ones. Eventually, it will go out of business. This will harm not only its shareholders, but also the customers it will no longer be able to service.
>
> ***TransCanada Pipelines Ltd. v. Canada (National Energy Board)*, [2004] F.C.J. No. 654 (F.C.A)**

18. In determining cost of capital, the Board is restricted to considering what a fair return would be to the utility. Objectives such as protecting consumers (i.e. in regard to the

pricing of electricity service) are irrelevant in the determination of an LDC's cost of capital.

> **While I agree with the appellant that the impact on customers or consumers cannot be a factor in the determination of the cost of equity capital, any resulting increase in tolls may be a relevant factor for the Board to consider in determining the way in which a utility should recover its costs.** It may be that an increase is so significant that it would lead to "rate shock" if implemented all at once and therefore should be phased in over time. It is quite proper for the Board to take such considerations into account, **provided that there is, over a reasonable period of time, no economic loss to the utility for deferring recovery of its cost of capital. In the end, where a cost of service method is used, the utility must recover its costs over a reasonable period of time, regardless of any impact those costs may have on customers or consumers**. [emphasis added]
>
> ***TransCanada Pipelines Ltd. v. Canada (National Energy Board)*, [2004] F.C.J. No. 654 (F.C.A)**

19. This is not to say that in implementing rates, the Board should not consider the Board's objective to protect the interests of consumers with respect to the price of electricity service. There are options available to the Board that will allow a utility to recover its cost of capital while protecting the interests of customers (i.e. deferring the recovery of revenue requirement) as described in the Federal Court of Appeal reference above.

20. The policy objectives of achieving LDC consolidation and reducing regulatory burden are also irrelevant to the question of what constitutes a fair return on invested capital, but this a consideration that Board staff have pursued:

> Mr. Houldin: The question was: What was the reason that Staff did not accept the idea of stratifying the LDCs into two risk groups? And the simple answer is provided in the objectives of our discussion paper, in that we did not want to put in place anything that we would see as an inhibitor to the consolidation in the sector, and that having more than one group we think does that.
>
> MR. KAISER: How does it do that?
>
> MR. HOULDIN: Well, it gives the opportunity for investors to -- sorry, let me start over.

> MR. FOGWILL: I'm Allan Fogwill. I'm with the Board. There are two elements to this. One is we didn't see any information that would lead us to believe that multiple structures were needed. And in terms of one structure, we thought it's less complicated. It reduces regulatory burden. It lessens the ability of parties to -- or lessens the likelihood that parties are going to make uneconomic decisions when they're looking at mergers or acquisitions.
>
> And the bottom line is we didn't see a reason why they had to be differentiated, and the question we've got, really, for the stakeholders is: Can you provide us some information on why there should be a differentiated structure between utilities, small versus large?
>
> **October 18 transcript, page 26**

21. If the statute requires the Board to make determinations in a particular way, that is the burden placed upon the Board by the Legislature and it is the obligation of the Board to discharge its statutory burden. In this case, the obligation of the Board is to establish a methodology that will produce a fair return on invested capital in a manner consistent with what the Courts have directed, and to do so in a proper proceeding as required explicitly by the statute.

22. The Board staff proposal is not compliant with the principles that the Courts have established for the determination of a fair return on invested capital and it is clear from the transcripts of this consultation process that the Board staff proposal takes into account factors that are extraneous to those binding principles.

D. ABSENCE OF SUPPORTING EVIDENCE

23. Any methodology that the Board relies on to determine cost of capital for the purpose of setting just and reasonable rates must be supported by evidence in a proceeding.

24. The current deemed debt/equity structures adopted by the Board in the first distribution rate handbook were based on evidence produced by Dr. Cannon and endorsed by the Board in rates proceedings.

25. However, during this process, it has become apparent that Board Staff has no evidence to support its proposal for a single deemed debt/equity structure for all LDCs:

> **Q1** Given that the Board Staff is recommending one debt/equity structure for all LDC's, please explain why Board Staff did not commission Dr Lazar and Dr. Prisman to conduct an anaylsis to determine whether one debt/ structure is appropriate for all LDCs?
>
> **A1** Staff contracted with Drs. Lazar and Prisman to provide advice on the cost of capital; they were not asked to recommend on any particular capital structure.

26. There is nothing to support the Board staff proposal other than an assertion by Board staff in a consultation process that they applied "their practical understanding, as well as the practical understanding of where the market is now and the objectives that the Board would like to achieve".

27. Board Staff's own expert, Dr. Lazar, indicated at the technical conference that he had not conducted a study to support a single deemed debt/equity structure:

> So, obviously, we think there are differences, at least the historical financial performance data suggest that there are, and maybe over time things will change. But we don't have any particular evidence. We didn't do an exhaustive analysis to suggest that there will be sort of a convergence among the various utilities regardless of size, and therefore one debt/equity structure would be appropriate for all.

28. Rather than proposing a deemed debt/equity structure that is based on supporting evidence, Board Staff arbitrarily selected a single deemed debt/equity structure for all LDCs:

> **Q2** On page 13 of the Staff Discussion Paper, issued July 25, 2006, it is stated that "While there are several dimensions of risk that vary across utilities, such as load concentration, total load, etc., staff finds that there is no reasonable way to differentiate them". Have Board staff completed any studies of the differences in risks across utilities in Ontario to support this finding? If so, please provide these studies or analyses.
>
> **A2** If the EDA believes that additional information (from any source, including distributors) would allow assessment of significant

> differentiation, the EDA in its final written comments to the Board can detail those studies or analyses. **Absent such information, staff does not have a way to support a non-arbitrary way to differentiate between distributors**. **[emphasis added]**

29. The Supreme Court of Canada has held that administrative decisions made arbitrarily (i.e. without supporting evidence) are *ultra vires:*

> We agree with Robertson J.A. that the reviewing court should adopt a deferential approach to this question and should set aside the Minister's discretionary decision if it is patently unreasonable in the sense that it was made arbitrarily or in bad faith, it cannot be supported on the evidence, or the Minister failed to consider the appropriate factors.
>
> ***Suresh v. Canada (Minister of Citizenship and Immigration)*, [2002] 1 S.C.R. 3**

30. If Board Staff were to maintain its proposal in regard to deemed debt/equity structure, and the Board were to adopt that proposal in the absence of evidence to support a single deemed debt/equity structure for all LDCs, the Board would have declined its jurisdiction.

31. Furthermore, it is not open to Board staff to make a proposal that is not in compliance with the applicable law and then turn around and attempt to impose an evidentiary burden on LDCs:

> And that's the question we've got. If you can convince someone or provide a good argument for why they should be different, then I think it's important for the Board to consider that. But we couldn't find that. The major elements associated with risk, you know, weather, economic conditions, things like that, those are all similar for all the utilities. So we'd very much appreciate if you could provide some details that would say why that's not true.

32. The Board is obligated to ensure that any proposed methodology will produce just and reasonable rates. It is for Board staff to demonstrate their proposal does so.

E. WHAT IS THE BOARD REQUIRED TO DO

33. If the Board wishes to establish ratemaking methodologies as conditions of license, through a code or otherwise, the statute requires that the Board do so in a proceeding.

34. Section 70.1 of the OEB Act provides that the Board can incorporate a code by reference into a condition of license. To do so in the present case, the Board must hold a proceeding to amend the licenses of LDCs, which the Board has properly commenced on its own motion in EB-2006-0087. At issue is the Board's assertion in Procedural Order No. 1 in that proceeding that only the wording of the amendment is to be considered and not the substantive issue of whether particular methodologies, which have yet to be proposed by the Board, are in the public interest. In Procedural Order No. 1, the Board purports to exclude the very issue that such a proceeding is intended to address, i.e. the appropriateness of the methodologies to be included as conditions of LDC licenses and whether those methodologies are in the public interest.

35. It is the position of the EDA that the Board ought not to depart from the current methodology until the required proceeding has taken place, allowing for a proper evidentiary record to be established so that the Board is in a position to make the kind of decision that the statute requires it to make.

36. If the Board is going to propose a methodology that moves away from Dr. Cannon's methodology, then it should move in the direction proposed by Mr. Camfield. The Camfield methodology is built upon principles that are established by the Cannon methodology and represents an evolutionary step forward from the Cannon methodology toward better ratemaking. The Cannon methodology recognized that size is a factor to be taken into account and this was endorsed by the Board when it adopted that methodology. In the 2006 EDR process, the Board also recognized that actual capital structure should fall within a reasonable range. In that process, the Board required LDCs whose actual capital structure was more than 10 percentage points outside the applicable deemed capital structure to provide an explanation for why that was the case and provide a plan for addressing the issue.

37. The Camfield methodology incorporates both of those ideas and proposes the use of actual capital structure for ratemaking purposes, provided that the actual capital structure falls within an equity range of 42 to 52%. LDCs with less then 42% equity would be deemed at 42% and LDCs with greater than 52% equity would be deemed at 52%. The Camfield methodology is premised on the regulatory principle that managers should manage and regulators should regulate. The actual capital structure will be reflective of management decisions relating to the needs of the LDCs. Therefore, it is appropriate to rely on actual capital structure for ratemaking purposes, provided that it is within a reasonable range.

38. Having taken the position that the Board should address the substantive issue of what constitutes an appropriate ratemaking methodology in a properly convened proceeding, the EDA is fully prepared to present evidence to substantiate the appropriateness of the Camfield methodology in such a proceeding.

39. The EDA reiterates that the Board ought not to move away from the Cannon methodology until there is a proper evidentiary basis established in a proceeding to support such a move. It is critical that the Board complies with its statutory obligation to ensure that rates are just and reasonable and that LDCs recover a fair return on invested capital, as they are entitled to do.

40. In conclusion, the EDA respectfully asks that the Board continue the process of examining ratemaking methodologies as part of the already constituted license amendment proceeding, EB-2006-87, and issue a revised Procedural Order to that effect.

ALL OF WHICH IS RESPECTFULLY SUBMITTED

October 27, 2006

TECHNICAL REPORT (FINAL)

RATE OF RETURN FOR ONTARIO'S ELECTRICITY DISTRIBUTORS

for the consideration of:
ONTARIO ENERGY BOARD

developed by:
Robert J. Camfield
Mathew J. Morey, PhD
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submitted on behalf of:
ELECTRICITY DISTRIBUTORS ASSOCIATION

October 27, 2006

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Executive Summary

This report presents analysis and recommendations of Christensen Associates Energy Consulting regarding the cost of capital of Ontario's electricity distributors. The purpose of the report is to provide guidance to the Ontario Energy Board ("Board"), Board staff, and other interested parties in the deliberation of regulatory policy related to the determination of the cost of capital.

For some time, the Ontario Energy Board has employed the approach developed and proposed by Dr. Cannon to determine rates for Ontario's electricity distributors. The main provisions of that approach, often referred to as the Cannon Methodology[1] include the means to set prescribed cost rates for debt, recognizes several methods to determine the cost of equity capital, and differentiates the capital structure for Ontario's LDCs accordingly to size. The Cannon Methodology is plausible, and has arguably served Ontario well.

The proposed approach herein is an evolution along the path set forth by Dr. Cannon and adopted by the Board.[2] Our approach and accompanying recommendations extend Cannon's approach with a more complete recognition of the nature of private capital markets, both in process and result. Specifically, capital markets account for and accommodate risk differences, unique features and needs, and the way that capital is managed across firms. The recommended approach, while an evolution of Cannon with further differentiation, constitutes a significant departure:

- Debt Cost Rates: Set the long- and short-term debt cost rates at the observed cost of debt of individual LDCs.
- Capital Structure: Adopt 42% - 52% as an acceptable range of equity participation within total capital.

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[1] Reference *A Discussion Paper On the Determination of Return On Equity and Return on Rate Base for Electricity Distribution Utilities In Ontario*, prepared for the Ontario Energy Board by Dr. William T. Cannon, December 1998; and the Board's *DRAFT GUIDELINES ON A FORMULA-BASED RETURN ON COMMON EQUITY FOR REGULATED UTILITIES*, March 1997.

[2] Dr. Cannon incorporates a differentiating policy that recognizes differences among Ontario LDCs—i.e., a differentiated capital structure and explicit recognition that higher risks attend small size.

- Equity Rate of Return: Utilize multiple methods for the determination of the cost of equity capital; draw upon the capital market experience within the U.S. and Canada to estimate the cost of capital; and recognize or further investigate the effects of size on the equity cost of capital.

For Ontario Electricity Distributors, the proposed Cost of Capital Policy Guideline for consideration by the Board contains the following features:

Capital Structure

The Cost of Capital Policy Guideline of the Ontario Energy Board, for capital structure of Ontario electricity distributors, should adopt a range of 42% - 52% equity participation. The five key elements of the proposed approach are described in section 6.1 of the body of the report. The proposed approach, with can be described as a flexible policy ("flexible approach") regarding capital structure, is fully consistent with the two cornerstones of regulatory governance—namely, *just and reasonable rates* and *fair rate of return* principles. Arguments favoring the flexible approach are as follows:

a) The Approach Provides Flexibility. Individual LDC's need operating flexibility, so that they can fund capital resources in a manner that is in keeping with how they do things, and use the capital vehicles that LDCs have in place currently.

b) Preserves Regulatory Oversight. The Board continues to regulate under longstanding principles of "fair and reasonable rates", and thus the approach ensures that long term electricity prices to retail consumers are at satisfactory levels. Under the proposed approach, the Board intervenes and imposes a hypothetical capital structure on LDCs where the actual capital structure is outside the proposed range of 42% - 52%. A similar argument can be made for the cost rates of short- and long-term debt. Namely, that the Board continues to have oversight, but that they recognize that modest-sized differences in the cost rates of debt are likely to exist among LDCs.

c) Reduces Regulatory Uncertainty. That is, the approach decreases apprehension and risk by potential lenders. Hence, cost rates are likely to decline from cost rate levels that would exist under the OEB staff approach. This result comes about because perceptions of risk are reduced.

d) Consistent with Capital Market Review and Assessment. Essentially, investors/lenders look primarily at the actual earnings of a utility to base investment/lending decisions. Hence, the use of the actual capital structure by the Ontario Energy Board aligns with the realities of capital markets.

e) Demonstration of Sensitivity. The proposed approach reveals the Board's sensitivity to the needs of LDCs and the nature of capital markets.

f) Retail Electricity Consumers Held Harmless. The overall cost of capital with and without tax effects tends to remain fairly insensitive to the capital structure, once the effects of leverage on the cost rates of debt and equity are taken into account.

g) Optimal Capital Structure Inherently Imprecise. The notion of an single optimal capital structure for all LDCs fails to recognize that, because of idiosyncratic differences, the true optimal capital structure is unique to each LDC, conditions, and timeframe. The optimal capital structure cannot be easily discerned, and experts will argue about what is best.

h) Asymmetric Information. The condition of asymmetric information is very much present. There is no way that from afar, the regulatory agency can know, precisely, what is better for an individual LDC than managers of the LDC. The Board can and should regulate generally but not meddle in details, which is inherently the result with the so-called deemed capital structure.

Long-Term Debt Cost Rate

The Board's Cost of Capital Policy Guideline should use the observed long-term debt cost rates of outstanding debt of LDCs, providing that the cost rates approximate market cost rates at the time of issue.

Short-Term Debt Cost Rate

The Board's Cost of Capital Policy Guideline should call for the use of observed short-term debt cost rates of individual LDCs's providing that the cost rates are within an acceptable range.

Rate of Return On Common Equity

The rate of return on equity for Ontario electricity distributors should be set within a range of 10.2% - 11.5%. This result comes about from the application of four methods to estimate the cost of capital for samples of Canadian and U.S. utilities and a sample of low-risk comparatively small-sized U.S. non-utility companies.

We recommend that, in its deliberation of cost of capital issues, that the Board adopt a broad-based approach that draws upon several well-recognized cost of capital methods that, together, can be referred to as a *Cost of Capital Toolbox*. This approach can cover range of cost of capital methods including Capital Asset Pricing Model, Discounted Cash

Flow, and Risk Premia analysis. The *Cost of Capital Toolbox* can and should also include Comparable Earnings, based upon historical realized returns of comparable risk companies. Also, other variations and cost of capital techniques are available, such as the Sharpe Ratio.

Comments on the Proposed Staff Approach

The Board Staff's proposed approach to determining the overall cost of capital for Ontario LDCs is a "one-size-fits-all" method based on two assumptions: there are no significant distinctions that can be made among Ontario's electricity distributors—consisting of 100 entities in number—for purposes of determining and accounting for risk and hence capital costs and the risk profiles of LDCs is similar to that of the gas distributors with which the Board staff has a strong familiarity.

The Staff Report and the consultant's (Lazar and Prisman's) discussion paper appear to neglect the Board's work, and do not provide an evidentiary review and assessment of the financial and economic issues at hand, where such factors impact LDCs regulated lines of business. Furthermore, the Staff Report does not provide the necessary detailed assessment of business risks faced by LDCs within the contemporary timeframe nor does it provide an evidentiary link between the LDCs and gas distributors in Ontario to support the claim that LDCs can be treated in similar fashion with regard to debt structure. The Staff's Report (two reports) and supporting consultant papers do not provide sufficient empirical support for the proposed approach to the estimation of the cost of capital or the proposed reductions in the rate of return for Ontario LDCs.

We respectfully disagree and suggest that the Ontario distributors reveal large differences that cut across all dimensions of the business. As stated within the Board's Comparators and Cohorts Report ("C&C")

> "The distribution systems of the LDCs and the electricity markets that they serve are complicated and can vary substantially. As mentioned, electricity distributors provide transport services covering a diverse range of business situations. These situations can give rise to substantial

> differences in total costs, and costs stated on a unit-of-output basis—e.g., cost per MWh."[3]

Our analysis suggests that there is wide variability among electric distributors in Ontario that can be related to the perceived riskiness of LDCs and thus to the cost of equity and debt capital. An assessment of the various risk factors for electric distributors implies that the electric distribution industry as a whole within the current regulatory environment in Ontario is no less risky than it was in 2000 or 2003 when overall rates of return were set for the interim period, particularly in view of continued market reform and uncertainty of regulatory governance and policy.

We find that a more flexible approach would better serve electricity consumers, the Board, and Ontario distributors and provide an improved foundation for determining the costs of equity capital and weighted average cost of capital.

We wish to mention that an overarching concern is that, prospectively, Ontario distributors will have an increasingly difficult time to realize an overall return level that satisfies fair rate of return principles. The confluence of outside factors, including the need for infrastructure invest, on-going market reform, and uncertainty of regulatory governance are challenging. For this reason, we respectfully recommend that the Board take a more general and less prescriptive approach, and give serious consideration to the flexible and accommodative policy that, as set forth herein, takes account of the numerous idiosyncratic differences among Ontario electricity distributors.

[3] Section 4.3, Part I of the Phase II Report, *Methodology and Study Finding: Comparators and Cohorts Study for the 2006 EDR*, prepared for the Ontario Energy board by Christensen Associates Energy Consulting, October 2005.

1 Introduction

This report presents analysis and recommendations of Christensen Associates Energy Consulting regarding the cost of capital of Ontario's electricity distributors. The purpose of the report is to provide policy and technical guidance to the Ontario Energy Board ("Board"), Board staff, and other interested parties in the deliberation of regulatory policy related to cost of capital.

The report does not, however, focus on regulatory governance structure, policy, or methods. Nonetheless, the underlying cost of capital of Ontario's electricity distributors is impacted directly by the structure of regulatory governance to the degree that such structure affects capital risks. As a consequence, regulatory governance cannot be fully separated from cost of capital and, generally speaking, we suggest that the Board, in the course of its deliberation of policy regarding the two issues, consider them jointly.

The report is organized as follows. Chapter 2 provides a discussion of principles and concepts on cost of capital estimation as they have come to be accepted with regard to financial analysis relevant to the regulated utility industry. Chapter 3 reviews the various methods of estimating the cost of equity capital that have been employed widely by regulators in North America and elsewhere, which includes a critique of the Capital Asset Pricing Model (CAPM) approach to estimating the equity cost of capital. Chapter 4 presents the summary of the financial characteristics of the LDCs. Chapter 5 summarizes the empirical analysis of and estimation of the equity cost of capital applying the methods described in Chapter 3. Chapter 6 summarizes are overall recommendations to the Board regarding the several elements of the cost of capital determination for Ontario LDCs. Appendices contain additional details regarding the approaches to estimating the cost of equity capital and data used in the analysis.

2 Review of Cost of Capital Concepts

2.1. Foundations for Cost of Capital Determination

Capital as Utility Resource Inputs

Utilities and, more generally, companies and other entities employ a combination of labour, materials and supplies, energy and fuels, and capital in the process of producing goods and providing services. The costs of most inputs are expressed in money terms—e.g., dollars per unit of purchase such as hours (labour) or megawatt hours (electricity). The cost of capital, however, is expressed as an interest rate, and returns to capital for utilities are typically reflected as dollars of operating income. The required level of operating income, when divided by the amount of capital employed, provides the percentage overall rate of return which should approximate the overall cost of capital.

Capital inputs are obtained through the process of investment involving property rights between savers and entities that employ capital. To facilitate the commitment of capital by savers and their agents to entities that employ capital, contracts in the form of letters of credit with banks, bonds and promissory notes to debt holders, and shares of stock to equity investors are put in place. These contracts define the commercial terms and conditions under which savers and their agents, as investors, commit capital. The contracts are capital (financial) assets, and are generally tradable property rights. Financial assets held by investors are claims on the income of the firm or other entities, following the payment of expenses, as compensation for the commitment of capital. Financial assets constitute the financial obligations of entities including private firms.

Factors Determining the Cost of Capital

The cost of capital is the compensation required by investors for postponing consumption, for expected inflation, and for exposure to capital risks of various dimensions. *Cost of capital* refers to the underlying interest rate used to discount expected benefit flows of capital resources including returns to financial assets, and is sometimes referred to as the rate of discount, or simply the discount rate. The cost of

capital is relevant to investors and, in the case of financial assets,[4] the expected benefits are in the form of future cash flows including interest payments, dividend payments, market appreciation, and return of principle. When investors supply funds to entities such as utilities and government entities and municipalities, not only are they postponing consumption—giving up the value of alternative expenditures in some other way, they are also exposing funds to the devaluation of ongoing inflation and various uncertainties and risk attending future cash flows. Investors are willing to incur these factors only if they are adequately compensated.

While the market prices of other inputs including labour, materials, energy can be easily verifiable, the cost of capital—essentially, the price of capital—is not easily discerned and, all too often, requires estimation through the cautious application of analytical methods.

The cost of capital is determined by the demand for capital, supply of savings, expectations of inflation, and perceptions of risks harbored by participants in capital markets. The demand for and supply of capital are determined by expectations of future levels of economic activity, while expected inflation is driven largely by monetary policy

[4] Financial assets include a multitude of debt vehicles, equity, and derivatives, and are tailored to participants of capital markets including household, small business, corporate, and government segments. Participants across these segments can supply capital—i.e., investors including lenders and holders of common and preferred stock—and also demand capital (borrowers and common stock issuing companies). Commercial banks, credit unions, finance companies, capital exchanges, and investment banks serve as intermediates that provide the institutional means that facilitates the interaction and linkage of the supply and demand sides of financial markets. These functions essentially include lending, borrowing, and the issuance of equity vehicles. Banks and credit unions borrow (and store) financial assets that in turn are invested in the form of debt and to a lesser extent equity.

Household debt vehicles include, for example, personal loans covering appliances, household services, and credit card mechanisms through finance companies and banks, and real estate and so-called home equity mortgages. Business loads include short-term loans and lines of credit with banks, inventory financing through business wholesalers, and commercial paper of various terms. Corporate debt can be in the form of lines of credit with banks, and mortgage and debenture bonds, while government debt can be in the form of revenue bonds of cities, and short- and long-term debt of various terms.

Equity refers to common and preferred stock, where the investor assumes a share in the ownership of a corporate entity. In some cases, debt instruments can participate in equity returns and have rights of conversion to common stock.

Derivatives refers to options and forward contracts that are specifically designed for speculation and risk hedging, where the market worth of the derivative is determined by investor expectations in the underlying price of an financial asset or commodity.

over the relevant timeframe. Perceptions of risk, in turn, cover many dimensions including uncertain government policy and the effects of natural phenomena such as weather. The cost of capital—the discount rate stated in nominal terms—increases with rising demand for capital, with expectations of higher rates of inflation, and with heightened perceptions of risk.

The cost of capital, however, remains positive (>0) absent inflation and risks, as savers require, as discussed above, compensation for foregoing (giving up) the right to use the funds saved for consumption of goods and services—essentially, the time value of money.

Dimensions of risk also cover idiosyncratic risks associated with specific capital resources, such as that of individual entities or companies. Accordingly, financial markets will reprice downward the bonds of a private company, should the *current* financial condition of the company suddenly decline. Essentially, the decrease in the company's current condition, reflected as reduced interest coverage—causes the expectation of the future condition of the company to also decline. Expectations of future financial conditions (possible states) of the specific company are idiosyncratic risks. Because cost of capital rises with increased risks, the price of the bonds decline.[5]

Capital Attraction and Opportunity Costs

Resources migrate to the highest valued use and worth, given perceived risks, such that the returns to capital are equivalent to opportunity costs. The various forms of capital compete among themselves for savings and with other non-capital resource inputs and

[5] Bond prices and discount rates, in the form of net interest rates or bond yields move in opposite directions; bond yields increase as bond prices decline, and decrease as bond prices rise.

opportunities.[6] Similarly, the vehicles of investment of individual entities, such as the specific bonds of a municipality or the common stock of a company, must compete for savings through a process of capital attraction. That is, if the outlook for earnings of a company rises, participants in capital markets—investors—allocate more capital to the company by bidding up the price of the stock thus increasing the company's market capitalization. Conversely, perceptions of heightened risks associated with the debt of a company or municipality precipitates a decline in the market value of the outstanding bonds, as capital migrates from the company/municipality to other resource opportunities. Thus, the prices of financial assets of entities including debt and equity securities are highly sensitive to perceptions of risk. Capital markets trade off risks and expected returns, given the overall menu of available choices, as alternative opportunities.

The cost of a specific source of capital[7] is basically determined by the riskiness of that investment in view of alternative opportunities that together represent the investors' current opportunity set. Competitive capital markets, through the process of assessing, buying, and selling, ensure that the expected payoff in the form of market rate of return is approximately equal to that of other investments of equivalent risk. In short, debt and equity investment vehicles of comparable risk are priced the same. If not, investors as participants in capital markets will bid up securities with comparatively low risks and bid down others with comparatively high risks. If investor perceptions of capital risks attending a utility increase—or the expectations for returns decline—markets bid down the securities of the utility. This implies that a utility will be unable to attract capital on

[6] Capital is the accumulated savings over time, where savings refers to the proportion of the output of an economy that is not consumed as current goods and services. Essentially, savings is the share of output held back and invested in—i.e., put into—capital resources. In the broadest interpretation, capital is output-producing goods (and services). The cumulative level of investment over time, covering many years and centuries, constitutes the capital stock of an economy and a society. It is useful to mention that capital can assume various investment forms aside from financial assets in private and public companies and other entities. The stock of capital includes real estate, household goods, education, public property and infrastructure such as libraries, museums, parks, roads, and transit systems. Individuals, firms, and government entities invest funds in capital resources if the expected flows of benefits realized by the investments in the future are equal to or greater than the value of current consumption given up or foregone.

[7] At an undefined point in time such that levels of supply and demand for capital and expectations of inflation are equivalent for all investments. Hence, cost of capital associated with specific investment opportunities, at that point in time, are only differentiated by risks, as the other factors that impact cost of capital—i.e., supply-demand, inflation expectations—are common to all investments.

equivalent terms, a result that is manifested in either of two ways: the quantity of capital acquired, in the form of new securities offerings, is reduced for a given level of return (stated in dollars), or a higher prospective rate of return attends the new offerings—it costs more to obtain an equivalent quantity of capital.

As mentioned above, investor rate of return is the discount rate that causes the present value of the expected cash flows, as receipts realized by investors, to equal the market value of the financial asset. From the utility side, the cost of funds raised to the utility through the sale of securities is equal to the discounted present value of the cash outflows to be paid by the utility, as expected by investors. But since the (positive) cash flows stream to the investor is identical to the cash outflows of the utility, the two discount rates must be identical.[8] In other words, the cost of capital to the utility is synonymous with the investors' expected rate of return. Hence, the cost of capital is the discounted expected cash flows necessary for the security to "pay the price"—i.e., in order to satisfy investors' required rate of return.

In summary, capital markets when sufficiently competitive ensure that the market value and worth of financial vehicles of the outstanding debt and equity—as held by the investment community, which can include households, financial institutions, government entities, and non-financial companies, is set (i.e., priced) at a level such that the returns to capital approximate the cost of capital. Because investors are adverse to risks, competitive financial markets inverse order financial assets according to perceptions of risks, all other factors held constant.

2.2 Utility Revenues, Rate Base, Weighted Cost of Capital

Public utilities such as Ontario distributors utilize and employ substantial levels of capital resource inputs to provide delivery services. Total invested capital used as the basis for setting regulated prices is often referred to as the rate base, and is valued at either original cost or fair market value. In Canada and the U.S., the regulatory convention is to value

[8] This statement abstracts from the effects of flotation costs. Costs to the issuer exceed the return required by investors to the extent that flotation costs decrease the net amount of funds actually available to the issue.

the capital of public utilities at original cost. The cost of capital to Ontario distributors—or perhaps more accurately, the cost rate of capital—can be referred to as the required rate of return (%) on the capital resources committed by investors.

In general, the flow of revenues less the costs of non-capital inputs to the firm such as operating expenses provides a level of dollar returns to capital, in the form of operating income. If things are right, investors realize returns equivalent to the overall cost of capital. The overall cost of capital, often referred to as the *weighted average cost of capital* ("WACC") and expressed in percentage terms, recognizes and is based on the total pool of financing vehicles used by the utility to underwrite the capital that it employs, as reflected as rate base. In summary, the WACC is the composite weighted cost of the financing vehicles including short-term debt, long-term debt such as mortgage bonds, preferred stock, and common stock. These financing vehicles are property rights and constitute the financial contracts between savers and the firm, including government entities and private companies.

As alluded to above, utilities must compete with all other entities in the free open market for the input factors (labour, materials, and energy inputs). The prices of these inputs are set in the competitive marketplace,[9] and the costs of these inputs that are incorporated into the total costs and required revenues. Likewise, prices are set in competitive markets for capital in the form of equipment, facilities, software, inventories, and working capital. Since utilities including Ontario's electric distributors must directly or ultimately attract capital through open financial markets, there is, without contradiction or subsidy, a market price to pay for the capital they require—in short, the market cost of capital that implicitly exhausts all opportunities for higher returns, given perceived risks.

[9] The discussion recognizes that entities including utilities may not face and participate in fully or even workably competitive markets in the process of acquiring various inputs. Along this line, however, it is useful to mention that, worldwide, financial markets are generally considered to be relatively competitive, where the notion of competition implies that actions and behavior by individual market participants including buyers and sellers do not have significant impact on market clearing prices or the availability and sale of goods and services.

Regulation, Demand for Capital, Capital Attraction

The cost of capital concept may also be interpreted from the perspective of internal investments and the demand for resources. Regulated utilities accommodate the ongoing and steadily rising demand for services, which involves expanding employment of resources, capital in particular. Senior managers of firms, as agents for the ownership or controlling interest of the entity such as shareholders or a local municipality, are responsible for ensuring that the expected internal returns to and on incremental capital is equivalent to the cost of capital to the firm—investors' rate of return requirements The adequacy of the internal returns on incremental investment by electric distributors to fund capital at full opportunity costs, however, is highly dependent upon the soundness of the regulatory governance structure to ensure that the utility has the opportunity to provide sufficient revenues, which in turn can provide adequate returns on new capital.

When the rate of return, as set by regulators, leads to inadequate returns to capital or to the expectation that returns to capital are likely to be insufficient, utility managers are understandably reluctant to make investments in infrastructure. Indeed, when the expansion of capital resources occurs under a regulatory requirement, such as the obligation that accompanies Provider of Last Resort (POLR) status for distribution utilities, the absence of adequate returns implicitly constitutes the confiscation of the capital. Under these regulatory conditions, the utility is forced to provide services that involve new investment, even though adequate returns are not obtainable. The result is a failure of capital attraction by the utility, and the confiscation of capital of investors—an outcome that comes about from the inherent efficiency of competitive capital markets.

Investors, investment rating agencies, investment banks, and commercial bank lenders follow regulatory developments. Anticipating a shortfall of the internal returns to capital vis-à-vis rate of return requirements, capital markets bid down the prices of the outstanding securities of the utility. The reduced market capitalization of the utility constitute confiscation of the existing capital of holders of the utility's securities. Essentially, the utility has failed to (or simply cannot) attract capital on fair terms—terms that do not cause outstanding investors to incur wealth losses.

In summary, the utility and its managers can often find themselves, as a result of service requirements, forced to invest in real physical assets that are uneconomic from the perspective of the firm and its constituent investors, if the return on incremental investments falls short of the cost of capital.[10] The cost of capital is the minimum rate of return that must be earned on physical assets to justify their acquisition, and thus the regulator must be mindful of the allowed rate of return levels and implement regulatory procedures that provide the utility with an acceptable level of opportunity to realize returns, on the margin, that satisfy the cost of capital—i.e., rates of return equivalent to that realized on investments of comparable risks. In the context of a binding regulatory constraint, and other regulatory requirements such as POLR obligations, it is necessary and sufficient for the required rate of return on incremental investment to adequately satisfy the opportunity cost of funds. The regulator should set the allowed rate of return equal to the cost of capital so that the utility is free to satisfy its capital needs and service customers at fair prices.

The aforementioned principle and accompanying rule can be illustrated by an example. Suppose a utility with a rate base of $60 million financed 50% through debt and 50% through equity. Assume that the cost rate of the outstanding debt capital is 7.25%, and that rate of return on equity capital is 9.0%, giving a weighted average cost of capital of 8.13 %. Suppose further that the regulator sets the allowed rate of return at 6.81%, rather than 8.13%. To fully service the property right claims of both bondholders and shareholders, revenues over operating costs should amount to $4.8 million annually (i.e., 0.0813 x $60 million). An allowed rate of return of only 6.81% on a rate base of $60 million provides returns to capital equal to $ 4 million. The returns to capital are sufficient to service the outstanding debt, $2.2 million (i.e., $ 60 million x 0.50 x 7.25 %). However, bondholders have primary claims to the returns to capital, and shareholders residual claims. Hence, the return available to service equity holders is a mere $1.8 million, allowing for an equity rate of return of 6.00%.

[10] The incremental investment is a particular concern because of aging infrastructure and the on-going replacement of the capital stock, where the incremental cost of the physical resources can be several times greater than the book value of embedded facilities.

As a consequence, share prices are significantly bid down, giving rise to sharp decline in market capitalization of the firm. The result is a significant wealth transfer from shareholders, as investors, to retail consumers. In short, the capital of investors is confiscated via a failed regulatory governance structure. In addition, the regulatory structure, particularly where the utility has binding service requirements and constraints, causes a breach of fairness criteria and leads to a failure of the utility to satisfy capital attraction standards where capital can be raised at fair and equitable terms.

It is useful to pursue this line further and consider the counter factual case. Specifically, if the allowed rate of return is greater than the cost of capital, the capital investments are undertaken and investors' opportunity costs are more than achieved. Any excess earnings over and above those required to service debt capital accrue to equity holders, resulting in a rise in share prices. In this case, the wealth transfer occurs from electricity consumers to shareholders.

The upshot is that, in the absence of other considerations such as the impact of the incentive properties of a chosen regulatory governance structure, investments and capital expansion are undertaken by the utility without inappropriate and unfair wealth transfers between consumers and shareholders if, and only if, the allowed rate of return is set equal to the cost of capital. In the case of the above example, the expected earnings realized on incremental investments are just sufficient to service both the incremental and outstanding claims of debt and equity holders on the capital returns of the utility, no more, no less. In conclusion, setting the allowed rate of return equal to the cost of capital is the only policy that ensures that necessary investments are made in order to satisfy utility service requirements while also providing fair and equitable returns to investors.

2.3 Legal Principles for Setting Fair, Non-confiscatory Rates of Return

Legal principles for rate regulation have been discussed extensively in many settings. As a point of departure we note the testimony filed by Professor Roger A Morin in New Hampshire.

The heart of utility regulation is the setting of just and reasonable rates by way of a fair and reasonable return. There are two landmark United States Supreme Court cases that define the legal principles underlying the regulation of a public utility's rate of return and provide the foundations for the notion of a fair return:

1. Bluefield Water Works & Improvement Co. v. Public Service Commission of West Virginia, 262 U.S. 679 (1923).
2. Federal Power Commission v. Hope Natural Gas Company, 320 U.S. 591 (1944).

The Bluefield case set the standard against which just and reasonable rates are measured:

> "A public utility is entitled to such rates as will permit it to earn a return on the value of the property which it employs for the convenience of the public equal to that generally being made at the same time and in the same general part of the country on investments in other business undertakings which are attended by corresponding risks and uncertainties … The return should be reasonable, sufficient to assure confidence in the financial soundness of the utility, and should be adequate, under efficient and economical management, to maintain and support its credit and enable it to raise money necessary for the proper discharge of its public duties."

The Hope case expanded on the guidelines to be used to assess the reasonableness of the allowed return. The Court reemphasized its statements in the Bluefield case and recognized that revenues must cover "capital costs." The Court stated:

> "From the investor or company point of view it is important that there be enough revenue not only for operating expenses but also for the capital costs of the business. These include service on the debt and dividends on the stock … By that standard the return to the equity owner should be commensurate with returns on investments in other enterprises having corresponding risks. That return, moreover, should be sufficient to assure confidence in the financial integrity of the enterprise, so as to maintain its credit and attract capital." [11]

The economics of the standards of the *Hope* and *Bluefield* cases rests on the opportunity cost associated with the supply of capital funds. Investors will expect a return at least as great as that they could have obtained by other investments with comparable risk. If public utility investors cannot achieve this level of return, they will not provide investment capital to utility companies.

[11] NHPUC Docket No. DE 04-117, Direct Testimony of Roger A Morin, pp 8-9 [emphasis removed].

Subsequent cases have reaffirmed the standards established by the *Bluefield* and *Hope* cases.[12] In the *Permian Basin Area Rate Cases* (390 U.S., 747, 1968) the U.S. Supreme Court stressed that

> the court must determine whether the order may reasonably be expected to maintain financial integrity, attract necessary capital, and fairly compensate investors for the risks they have assumed, and yet provide appropriate protection to the relevant public interests, both existing and foreseeable. The court's responsibility is not to supplant the Commission's balance of these interests with one more nearly to its liking, but instead to assure itself that the Commission has given reasoned consideration to each of the pertinent factors.

In *Duquesne Light Company et al. v. Barasch et al.* (488 U.S. 299, 1989) the Court expanded the standards to require consideration of the risk arising from the uncertainty of changing modes and rules of regulation. Regulatory risk is discussed in more detail below.

Similar case law has developed in Canada regarding the fair rate of return for a regulated utility. Two cases are particularly noteworthy. These are *Northwestern Utilities v. City of Edmonton* (S.C.R. 186, 1929) and *British Columbia Electric Railway Co. v. Public Utilities Commission of British Columbia* (S.C.R. 837, 1960). In the *Northwestern Utilities* decision, which preceded the *Bluefield* and *Hope* decisions in the U.S., the Court focused on the fair rate of return that allowed the utility a return commensurate with those on unregulated investments facing similar risk, and on the return needed to assure the financial integrity and stability of the public utility. Specifically, the Court states

> By a fair return is meant that the company will be allowed as large a return on the capital invested in its enterprise as it would receive if it were investing the same amount in other securities possessing an attractiveness, stability and certainty equal to that of the company's enterprise. (SCR 186, 1929)

[12] As discussed in Roger A. Morin, *Regulatory Finance: Utilities' Cost of Capital*, Public Utilities Report Inc., 1994), pp. 10-11, these cases include *Federal Power Commission v. Memphis Light, Gas & Water Division* (411 U.S. 458, 1973), *Permian Basin Area Rate Cases* (390 U.S., 747, 1968) and *Duquesne Light Company et al. v. Barasch et al.* (488 U.S. 299, 1989).

Likewise, in *British Columbia Electric Railway Co.* the Court decided that earnings should be sufficient for the utility to be able to pay reasonable dividends and to attract capital through the sale of shares or securities.

The relevant legal decisions indicate that the fair rate of return must be commensurate with the risk, must allow the efficient utility to make reasonable dividend and debt payments, and must allow earnings necessary to maintain the utility's financial integrity and credit worthiness such that it can attract new capital at a reasonable cost. These legal principles have been succinctly summarized by Professor Morin:

> Thus, the expected rate of return on a public utility's debt and equity capital should equal the expected rate of return on the debt and equity of other firms having comparable risks. Moreover, a utility is entitled to a return that will allow it to maintain its credit so that it continues to have access to the capital markets to raise the funds required for investment. The allowed return should therefore be sufficient to assure confidence in its financial health so that it is able to maintain its credit and continue to attract funds on reasonable terms. [13]

2.4 Risk Factors Shaping the Cost of Capital

Several factors influence the cost of capital.[14] Of particular interest are business risk, commodity risk, regulatory risk, financial risk, and liquidity risk.

Business Risk

In assessing utility investments, suppliers of investment capital will necessarily give weight to business risk. Such factors may be related to weather or to a host of short- and long-term economic aspects that impinge on the utility's customers. Internal or controllable factors also affect sales volatility including, for example, maintenance and demand management practices.

In regard to business risks, Ontario distributors will be incurring substantial costs associated with the mandated Smart Metering initiative. In addition, LDCs are in the

[13] Ibid, p. 10.

[14] For a more complete discussion see Morin, *Regulatory Finance*, pp. 36-43.

position of Provider of Last Resort (POLR) and face obligations to serve and connect all customers. The cost sharing of the installation of plant for new customers is determined by the Economic Valuation Model as defined in the Distribution System Code. These capital expenditures are outside the control of the LDCs and can be significant. Such requirements are in sharp contrast to the gas distributors who do not have the same obligation to serve and have choices regarding whether to install plant (cost sharing is determined by the gas version of the Economic Valuation Model) and, as a result, do not service many areas served by LDCs. Finally, Ontario's LDCs face municipal mandates with respect to the types of distribution facilities, CDM capital expenditures and, in contrast to natural gas distributors, to the sometimes burdensome default service obligations. One can assume that these demand risks are factored into investor's expectations of risks and the competitive return on investment in a distribution utility. Thus, significant differences exist between the LDCs and gas distributors of Ontario that materially affect the risk profiles of LDCs vis-à-vis gas distributors.

It is important to note the effects regarding provider of last resort (POLR) type services, known variously as supplier of last resort, default, standard offer, or basic generation services. These services are roughly equivalent to a call option for customers that can impose substantial costs on utilities that translate into earnings risks for utilities and their investors. The LDCs are under an obligation to serve which means that they must make expenditures to ensure service even in situations where average rates do not recover the actual costs of service, including investment costs. This situation can contribute to the view among investors that the utility is a riskier proposition and would thus require a higher return as fair compensation in order to attract capital.

Commodity Risk

Commodity risks are present in at least two forms. First, there is the potential for substantial lag between the payment for purchases of power supply and the invoicing to electricity consumers and receipt of revenues. Second, the liquidity or lack thereof in the wholesale markets for power, and in particular for financial instruments that can be used to hedge wholesale commodity price and fuel input price risk, presents a challenge for utilities. To the extent that forward markets are not liquid, the risk associated with fixed

price, physical or financial forward contracts increases. This risk is borne directly by the party, usually the utility, required to provide a fixed price product to the market.

Regulatory Risk

Regulatory risk arises from the consistency and predictability of regulation. It is related to both the timeliness and reasonableness of rate awards, as well as to the potential for overly rapid changes in regulatory procedures.

In *Regulatory Finance* Morin notes that the U.S. Supreme Court's decision in *Duquesne Light Co. et al v. Barasch et al* (488 U.S. 299 (1989)), "established regulatory risk, which is defined as the risk of a particular regime in a given jurisdiction, as a distinct risk to be recognized by regulators in setting a fair rate of return.[15]

Factors that investors are likely to consider in evaluating regulatory jurisdiction include return on equity, quality of regulation, and regulatory technique.[16] Business risk premia are sensitive to the timeliness and predictability of regulatory response to unanticipated increases in operating and capital costs. The investment community is mindful of regulatory governance, and is increasingly cautious about assessing the credit worthiness of utility capital without consideration of regulatory context.[17]

Regulation can also lower business risk. Examples of actions that can lower regulatory risks include bonded rate increases, forward-looking test years, fuel adjustment clauses, etc. Professor Morin describes how unreasonable rate treatment affects the cost of capital:

> Unreasonable rate treatment for any utility may not only raise the cost of capital and, hence, retail customer burdens, but may also have serious public policy implications and repercussions for the entire business or economic region. When adhering to questionable implementations of a given methodology, or when ignoring relevant evidence, a regulatory body

[15] Morin, *Regulatory Finance*, p. 11.

[16] Ibid, p. 39.

[17] Immediate evidence is at hand in the form of an article published by the Bank of Montreal where it was stated "We have set out our view herein of a proposal made by Staff of the Ontario Energy Board (OEB) to establish the return on equity for local electricity distribution companies in Ontario within a range of 7.52% and 8.36%. We believe this range is confiscatory and likely violates the fair return standard."

> runs the risk of ignoring the policy implications of a recommendation. The quality of regulation and the reasonableness of rate of return awards clearly have implications for regulatory climate, economic development, and job creation in a given territory. Fair and reasonable regulation must be consistent with the economic well-being of the area served.[18]

Several issues specific to Ontario regulation of LDCs bear significant relationship to the regulatory risk factor. One of those, as addressed in the EDA's comments on the Staff's proposed overall approach is that associated with the 2nd Generation IRM, which this report will not address in detail. However, we have noted that the development of incentive mechanisms must be done in concert with the process of setting the cost of capital.

In addition to that issue, however, there is the issue of the obligatory Smart Meter program funding over time. The current depreciation rate set to recover the costs of the smart meter installation is 4 percent per annum. A plausible concern that the depreciation rates regarding new metering technologies will not be sufficient to cover replacement costs that will likely be incurred sooner, perhaps within six to ten years, rather than much longer depreciation rates typically applied to conventional metering technologies. What this means is that replacement costs must be funded out of working capital or through short-term debt. In either case, the implications for equity holders is likely to be a reduction in the earned return, which will in turn mean that the utility is viewed as a riskier investment.

The proposed approach to rebasing also adds another dimension of regulatory uncertainty and risk to the LDCs profiles. Ontario's distributors face substantial rising capital and operating costs in the near term. The effective reductions in revenues vis-à-vis costs of service would likely be exacerbated because rebasing and the speed of rate adjustments may cause revenues to lag costs that are driven by expanding capital requirements and rapidly growing plant accounts with corresponding increases in the net rate base of the LDCs. The effect may imply significant reductions of internal cash flows to fund investment, which is vital to electricity consumers, and to provide adequate returns to capital. A concern is the effect of regulatory lag, which can imply the confiscation of

[18] Morin, *Regulatory Finance*, p. 39.

capital, on the incentives to invest in needed infrastructure as well as more advanced metering. Indeed, regulatory lag associated with the proposed rebasing process can translate into lower returns on equity (and debt) or, at the very least, into the perceptions by investors that the LDCs are a more risky investment opportunity.

Financial Risk

Financial Risk is a key component of overall risk. Turning to Morin:

> Financial risk stems from the method used by the firm to finance its investments and is reflected in its capital structure. It refers to the additional variability imparted to income available to common shareholders by the employment of fixed-cost financing, that is, debt and preferred stock capital…The use of fixed cost financing introduces additional variability into the pattern of net earnings over and above that already conferred by business risk, and may even introduce the possibility of default and bankruptcy in unusual cases.[19]

Given this relationship between net earnings variability and the extent of fixed cost financing the mathematical relationship between equity returns and capital structure is:

$$r = [R + (R - K_d) \cdot D/E] \cdot (1 - t) \qquad (1)$$

Where

r	=	the rate of return on common equity
R	=	the rate of return on total assets
K_d	=	the interest rate on debt
D/E	=	the debt to common equity proportion
t	=	the income tax rate.[20]

As the equation shows, the variation in business risk R is amplified by the ratio of debt to equity.

[19] Morin, *Regulatory Finance*, pp. 40-43.

[20] Ibid, p. 43.

Liquidity Risk

Finally, liquidity risk reflects the ready marketability of an asset—the ability to sell quickly without loss relative to current market value. Investors will require an increased rate of return for assets with lower liquidity. Investors in small firms generally experience lower liquidity and hence such firms will incur a higher cost of capital.

2.5 Ontario LDCs Compete for Capital in Efficient Global Capital Markets

Today, the LDC's must compete for capital resources in the face of vastly expanded opportunities for capital as a result of globalization and reduced barriers to capital flows among nations, and markets with increased return opportunities. Capital markets are much more integrated now than in 2000, which was the setting for Cannon's paper on cost of capital for Ontario LDCs. In particular, Canada has removed the Foreign Property Rule, and has experienced substantial growth in income trust vehicles to place capital. One can only conclude that Canadian electric service providers including Ontario's LDCs must participate in significantly more competitive capital markets where investors have a substantially larger set of opportunities to place capital, including other utility regulatory jurisdictions.

As an example of the globalization of the capital markets, net private capital (i.e., debt plus equity) flows to developing countries increased from $188 billion in 2000 to $491 billion in 2005.[21] As a World Bank Report states:

> Demand for emerging market debt and equities remained strong, spurred by improved fundamentals in many developing countries and investors' search for higher yields in an environment where long-term interest rates remain low in major industrial countries, despite higher short-term interest rates.[22]

[21] Source, The World Bank, "Global Development Finance: The Development Potential of Surging Capital Flows – Review, Analysis and Outlook, 2006 ("World Bank Report").

[22] The World Bank Report, p. 18.

The emergence of robust global capital markets over the past decade has placed the Ontario LDCs in the position of competing with developing and developed countries as well as the complete gamut of industries seeking capital resources.

In particular, directly as a result of the globalization of capital markets, utilities in Canada must compete directly with utilities in the U.S. for debt and equity funding. The indirect evidence of this comes from the fact that capital inflows into the United States—most of them private—continue to finance the U.S. current account that among other things continues to support the market value of U.S. currency. These flows carry on unabated because of favorable growth and real interest rates within the U.S., as well as its deep and liquid capital markets. These conditions are unlikely to change direction abruptly since no other country or region enjoys the combination of robust growth and deep financial markets that the U.S. offers.

The global capital markets are today driven by the fact that institutional investors are unlikely to sit on the fence for long as large scale investors cannot afford to stay in risk-free but low-yielding cash or low yielding investment positions. Institutions will remain fully invested and seek out "undervalued" assets. Finally, strategic institutional investors, like pension funds and life insurance companies, are growing in importance in worldwide financial markets. The increasing sophistication of these institutional investors means that they are able to differentiate between country- and *company-specific* investment opportunities. This translates into investment behavior that pays close attention to the risk profiles of the utility industry in Canada, including Ontario, when making decisions about strategic placement of funds.

The ties between capital markets in the U.S. and Canada have been strengthened over the past decade as a result of a variety of trade agreements reached among countries in the Western Hemisphere, such as the Canada-U.S. Free Trade Agreement (1988) and the North American Free Trade Agreement (1994). The impact of these efforts to liberalize of trade is to equalize the cost of capital across the two countries.

Evidence of the integrated nature of the Canadian-U.S. financial markets is the significant side of foreign direct investment (FDI) that is exchanged between the two countries. According to the Congressional Research Service (CRS):

> The U.S.-Canada economic relationship is characterized by substantial investment in each nation by investors of the other. The United States is the largest single investor in Canada with a stock of $216.6 billion in 2004, a figure that has more than doubled from $97 billion in 1997. This figure represents 10.5% of U.S. direct investment abroad (DIA), and U.S. investors accounted for 65% of inbound foreign direct investment (FDI) in Canada in 2004. Finance and insurance, manufacturing, and mining/energy are the three largest categories of U.S. FDI in Canada. Canada has a prominent (though not the largest) FDI position in the United States at $133.8 billion, 8.8% of the total FDI stock in the United States. The United States is the most prominent destination for Canadian DIA, with a stock of 44% of total Canadian DIA in 2004.[23]

The implications of the growing convergence of the capital markets in Canada and the U.S. is that regulatory policy decisions will be viewed from afar, particularly if decisions lead to significant changes to either the allowed equity return or the overall cost of capital for Ontario's LDCs.

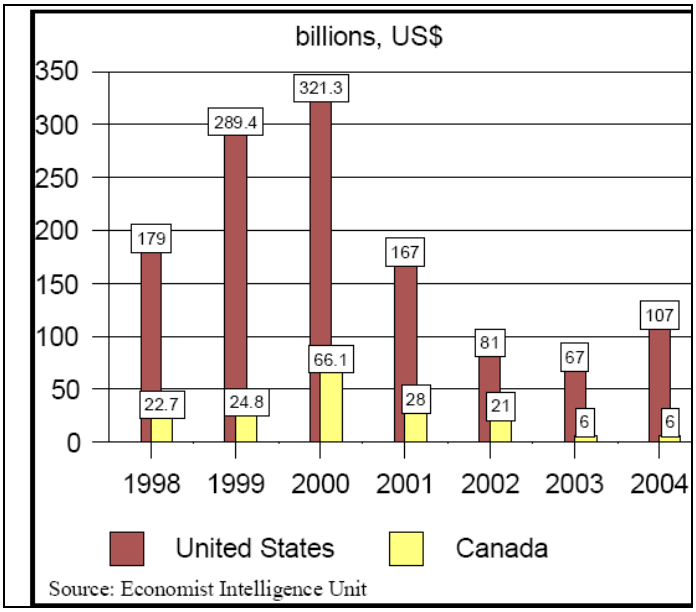
Further indirect evidence that Ontario's utilities compete in a global capital market that is increasingly competitive for Canadian industry in general is that Canada's FDI recently has been on a downward trend as shown in Figure 1. Again, the CRS states:

> Canada's share of North American and global FDI has dropped in the last decade. Canada's share of North American FDI has dropped from 17.0% to 13.0%, while the U.S. share has increased to 78.0% from 76.0%. Also, the Canadian share of inward global investment stock fell from 7.7% in 1980 to 3.0% in 2002.[24]

[23] Congressional Research Service, "CRS Report for Congress: United States-Canada Trade and Economic Relationship: Prospects and Challenges," Updated March 29, 2006, p. 9.

[24] Ibid, p. 10.

Figure 1 Inward FDI Flows from All Countries to Canada and U.S.: 1997-2004[25]



The fact that Ontario's LDCs will be competing for capital in highly integrated, international capital markets cannot be minimized when considering setting the equity cost of capital and the overall cost of capital.

3 Review of Cost of Capital Methods

This chapter reviews the methods used to estimate the cost of capital to Ontario distributors and determine the recommended rate of return. These methods are widely applied to issues and problems relating to the determination of the cost of capital, both in North America and abroad. Within the context of determining cost of capital for Ontario distributors, we begin by setting forth three essential points, as follows:

- cost of capital for the entity/firm—and of investors—is a function of the demand for and supply of capital, expectations of inflation, and perceptions of risk, as discussed above.
- cost of capital currently is equal to the opportunity cost of capital in the contemporaneous timeframe, though the experience of long-term history guides the assessment of opportunity costs.
- estimates of the cost of capital for Ontario distributors can be developed from market experience of firms of comparable risks. It is appropriate to then use the

[25] CRS, p. 11.

market cost of capital, as inferred, to determine the regulated prices for distribution services.

Estimation of the cost of debt and the cost of equity, at some point in time, are distinctly different problems, and determination of the opportunity cost rate for equity capital is the more challenging. In the case of debt, both the market price and future expected cash flow returns to capital are observable by inspection. Investors' perceptions of risks are implicit in the primary and secondary market prices of the debt obligations themselves, and need not be known or even estimated. Thus, the net expected yield to maturity, which reflects the opportunity cost of capital to holders of debt, can be determined directly—simply solve iteratively for the underlying discount rate on the expected returns to and of the principle.[26] This *is* the market rate of return, *ex ante*. For purposes of determining the overall utility rate of return, however, the cost rate of long-term debt, as a component of the WACC, is often set according to cost rates of the individual debt issues, at the time of issuance of debt within primary financial markets.

In contrast, expectations of investors about the prospective cash flows and market returns on common equity cannot be observed directly, and must be inferred with estimation procedures. In addition, the determination of the cost of common equity involves perceptions of risks harbored by investors, as a matter of the consensus view. Perceptions of risk are also not observable directly, although modern finance theory provides a useful guide. The allowed equity rate of return is typically set according to the current and expected cost of capital, though much of the total equity investment, as with debt, was committed in many years past. In short, the cost of common equity can only be discerned through the proper and careful application of well-established methods that serve as the cornerstone of modern finance theory.

As mentioned, the methods employed herein are well established, including two variations of the constant growth Discounted Cash Flow model (DCF), and the Capital Asset Pricing Model (CAPM. These classical approaches are commonly recognized within modern finance theory and are readily utilized by the investment community in the

[26] The observed yields on tradable debt instruments are not the same as the expected yield to maturity. It is yield to maturity, which captures the implied discount rate and thus the cost of debt capital, which is of particular interest.

process of evaluating financial assets. Our analysis and recommendations also draw upon Risk Premia and Historical Market Returns to infer the underlying cost of equity capital. Finally, we also incorporate a discussion of Arbitrage Pricing Theory (APT), sometimes referred to as Multi-Factor Models. The cost-of-capital estimates realized by applying these two formal models are augmented by historical returns realized by utility and non-utility companies of comparable risks, and the so-called risk-premium methodology. The application of the procedures to determine the cost of equity capital requires estimation of key parameters, and it is here where the challenges reside.

The efficient market hypothesis plays an essential role in the determination of the cost of capital. Specifically, the working assumption, which is largely though not completely borne out by empirical analysis, is that capital markets are fairly efficient. This means that the supply and demand for risky financial assets, as reflected in bid and ask prices to buy and sell shares, result in financial assets being traded at price levels where *rates of return above the cost of capital cannot be systematically realized*. Above-normal returns—returns above the cost of capital—are realized only randomly. Essentially, the opportunities to systematically realize returns above the underlying cost of capital are exhausted by the competitive market process.

Estimating the cost of capital, though not trivial, can be fairly straightforward, and both the DCF and CAPM approaches provide a useful framework. The risks to investors in various sectors of the energy services industry cannot ever be known directly; risks—and hence the implied cost of capital—can only be inferred. Specifically, the determination of useful estimates of the cost of common equity capital within either framework requires a discerning application of theory through careful analysis such as that presented herein. In particular, the determination of the cost of equity capital faces two overarching concerns:

- Both approaches are forward looking and thus the results are highly dependent upon useful estimates of investor expectations about future market performance.
- The underlying assumptions for DCF and CAPM include, among other things, an efficient market and rational behavior of investors such that all opportunities for above- and below-normal returns to capital are exhausted on an expected-value

basis. In short, capital markets value financial assets at the implied opportunity costs of capital, given investor perceptions of risk.

It is useful to mention that the notion of *risky assets* can apply to any real or financial asset wherein the prospective returns from holding the asset are uncertain. Risky assets include commodity contracts, financial property rights, financial derivatives, and real assets such as transmission facilities. Risk assessment and option theory, moreover, can be applied to the analysis of unbundled services, such as electricity transmission development plans. Within the context of this discussion, however, risky assets refer to financial obligations of firms—common stock—and asset values refer to prices of common stock as observed on major stock exchanges.

3.1 Discounted Cash Flow Methodology

The constant-growth Discounted Cash Flow (DCF) model was originally developed by Myron Gordon in 1957, and was advanced actively during the early 1960s. In its classical form, the derived DCF model defines the cost of capital as the sum of the adjusted dividend yield, and expectations of future growth in cash flows to investors including dividends and future appreciation in share prices. The classical (one-stage) DCF model is as follows:

$$k_{e,j} = D_{0,j}(1+E(g_j))/P_{0,j} + E(g_j) \quad (1)$$

with,

$k_{e,j}$ = cost of equity capital, asset j

$D_{0,j}$ = current dividends per common share, asset j

$E(g_j)$ = expected growth in future cash flow returns to investors in asset j

$P_{0,j}$ = current price per common share, asset j.

The one-stage form of the DCF model is an elegant and intuitively tractable model with two terms, a mathematical result derived from the constant growth present value model. A cursory review of historical returns of equities suggests substantial variation in growth in the internal returns to capital and market appreciation is both the typical and dominant pattern. It is plausible that the *expected path of future returns* harbored by investors may assume a pattern of non-constant growth. This means that, at least under some market

conditions, the constant growth form of discounted cash flow may not represent investor expectations of growth with sufficient accuracy. Arguably, other forms of DCF may serve as better approximations of investor expectations.

A plausible means to better model expectations of varying growth might be with stochastic models, where the path of returns and growth is a function of time, with a random component. However, stochastic models introduce considerable complexity. As a first-order approximation to stochastic processes, multiple step constant growth models known as multi-stage DCF can serve admirably well. Essentially, multi-stage DCF is a variation of present value theory which postulates that future returns assume a pattern of several growth steps or stages. While any number of stages of constant growth is possible, two- or three- stages are typically applied. In stylized fashion, the Three-Stage DCF model is shown below:

$$P_{0,j} = D_{0,j} * S_1 + D_{5,j} * S_2 + D_{10,j} * S_3 \qquad (2)$$

with,

$P_{0,j}$ = current price for common share, asset j

$D_{t,j}$ = current and future dividends per common share for time *t,* asset *j*

$E(g_{n,j})$ = expected growth of future cash flows in stages *n=1, 2, 3*, asset *j*

$k_{e,j}$ = cost of equity capital asset *j*

$S_{n,j}$ = factor for growth $E(g_{n,j})$ and discounting $k^{\tau}_{e,j}$, stages *n=1,2,3*.

Appendix I provides a step-by-step derivation of both the classical and the multi-stage discounted cash flow models shown above.

3.2 Capital Asset Pricing Model

In this section we discuss the theoretical underpinnings and formulation of the Capital Asset Pricing Model and the problems associated with estimation of a risk premium using that model. The upshot of the discussion is that the CAPM should be used with caution just as any other approach would be used because of the inherent biases that attend the estimation of the Equity Risk Premium using this rather simplistic, but convenient model.

3.2.1 Theoretical Underpinnings of the CAPM

The CAPM has a long history of theoretical and empirical investigation. Several authors have contributed to the development of a model describing the pricing of capital assets under conditions of market equilibrium including: Eugene Fama, Michael Jensen, John Lintner, John Long, Robert Merton, Myron Scholes, William Sharpe, Jack Treynor, and Fischer Black. For the past three decades, the mean-variance CAPM of Sharpe-Lintner and Black have served as a cornerstone of financial theory.[27]

The underlying rationale of the CAPM is that an investor diversifies by combining risky securities into a portfolio. The result is such that the risk of the total portfolio is less than that of any of its parts.[28]

The adjusted risk-based return is based upon three factors: 1) the covariation of the returns to the asset and that of markets for risky assets, 2) the statistical variance of returns of the market for risky assets, and 3) the *difference* between expected overall returns on risky assets, and risk-free returns. The third parameter is referred to as the excess return for risk, and is equal to the difference between the overall returns to risky assets for the market as a whole, and the risk-free return rate. The CAPM is shown below:

$$k_{e,j} = r_f + B_{jm}*(r_m - r_f) \qquad with, \quad B_{jm} = \sigma_{jm}/\sigma_m^2 \qquad (3)$$

where,

$k_{e,j}$ = cost of capital for risky asset *j,* stated in percentage terms

r_f = risk-free rate of return

B_{jm} = ratio of the covariation between risky asset *j* and the market as a whole, σ_{jm}, and the variance of market returns, σ_m^2

r_m = rate of return on the overall market for equities.

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[27] The derivation of the Capital Asset Pricing Model is provided in Appendix II, along with additional details regarding problems with and limitations of the CAPM in estimating the equity risk premium.

[28] There arise problems with this general result of diversification due to limitations of the expected utility maximization criterion that has been the cornerstone of the modern theory of decision making under uncertainty for half a century. The path breaking work of Artzner, Delbaen, Eber, and Heath (Artzner et al) (1998) suggests that the mean-variance foundation of the CAPM model, and hence the traditional estimation of the Equity Risk Premium by the CAPM "market beta," does not satisfy the principles for coherent risk measures. A reformulation of the CAPM guided by coherent risk measure principles would result in the application of robust estimation methods, such as regression-quantile methods of Koenker and Bassett (1978).

The CAPM in equation (3)[29] is derived, discussed and critiqued further in Appendix II.

In the Sharpe-Lintner framework, diversification reduces portfolio risk. However, it is impossible to completely eliminate portfolio risk because of market-wide forces that cause securities to move together.

The Sharpe-Lintner asset pricing model uses the characteristics of the consumer wealth allocation decision to derive the equilibrium relationship between risk and expected return for assets and portfolios.[30] In the development of CAPM, simplifying assumptions about the real world are used to define the relationship between risk and return that determines security prices. These assumptions are:

- all investors are risk-averse individuals that maximize the expected utility of their end of period wealth,
- investors are price takers and have homogenous expectations about asset returns that have a joint normal distribution,
- there exists a risk-free asset such that an investor can borrow or lend unlimited amounts at the risk-free rate,
- the quantities of the asset are fixed,
- all assets are marketable and perfectly divisible,
- asset markets are frictionless and information is costless and simultaneously available to all investors, and

[29] The expression in (3) can be generalized from the assumptions described above, and is particularly useful in the next section on APT and multi-factor models, as follows:

$$k_j = f[E(F)] \qquad \text{with, } \partial k_j/\partial F > 0$$
$$= E(r_j).$$

where,

k_j = cost of capital of financial asset j;

$E(F)$ = the set of relevant risk factors, as perceived by investors; and,

$E(r_j)$ = market rate of return on asset j, as expected by investors.

Two results logically follow from the above equation. First, the cost of capital for a given asset is a function of risks perceived by investors that influence the return on investment in that asset. Second, efficient markets—that is, the no-arbitrage principle discussed above—value assets at a level such that the expected market returns, $E(r)$, are equivalent to the cost of capital of investors, k.

[30] Eugene F. Fama, "Risk Return and Equilibrium", *Journal of Political Economy*, Vol. 79, No. 1, pp. 30-35.

- there are no market imperfections, such as taxes, regulations, or restrictions on other trading.

The CAPM assumes that the risk of an asset can be separated into systematic and unsystematic risk components. Systematic risk is non-diversifiable, whereas unsystematic risk can be eliminated through diversification (*i.e.*, a portfolio of assets can be constructed that obtains the same expected return while reducing the variance of returns). Systematic risk is based on factors in the economy and financial markets that present surprises that cannot be hedged by investors. The CAPM takes the view that systematic risk is embodied in one factor, the "market"—the entire market of financial assets. This "market" is often represented in terms of a market index, such as the S&P 500 index. Essentially, systematic risk of an individual asset within the context of CAPM is the riskiness of returns to the asset with respect to returns to the market as a whole.

A basic principle of the CAPM is that risk-averse investors require greater expected return for investments with larger risks. Consequently, higher-risk securities are priced to yield a greater expected return. As Professor Morin has pointed out:

> The CAPM quantifies the additional return required for bearing incremental risk, and provides a formal risk-return relationship anchored to the basic idea that only market risk matters, as measured by beta [the risk premium coefficient].[31]

To recap the above discussion, the CAPM posits that all securities are priced such that:

Expected Return = Risk-free Rate + Risk Premium
= Risk-free rate + Relevant Risk x Market Price of Risk
= Risk-free Rate + Beta x Market Price of Risk.

Application and testing of the implications of the CAPM relies on the assumption that the *ex post* distribution from which returns are drawn is perceived *ex ante* by investors. It follows from multivariate normality that (3) directly satisfies the Gauss-Markov regression assumptions. Therefore, when the CAPM relationship is estimated empirically

[31] NHPUC Docket No. DE 04-117, Direct Testimony of Roger A Morin, p. 42.

or tested in the formal literature of financial economics, as it has been voluminously, it is usually written in the following form:

$$k_j - r_f = \alpha + \beta(r_m - r_f) + \varepsilon_j \quad (4)$$

In equation (5), the intercept term α is added, the term $(r_m - r_f)$ is the market price of risk or in other words the excess return of the market over the risk-free rate and $(k_j - r_f)$ is excess return on asset j over the risk-free rate. The term ε_j is the error term that accounts for the fact that realized return is a random variable and will not be fully explained by the term modeling component: $\alpha + \beta(r_m - r_f)$. In typical, straightforward regression models, of which equation (3) is an example, the error term is assumed to be normally distributed and independently distributed over time and across assets.[32] The estimation of the parameters α and β is typically accomplished through an application of the ordinary least squares (OLS) regression method.

If the estimate of α is found not to be significantly different from 0 and if the estimate of β is found to be greater than 0, then the CAPM is assumed to be supported empirically. Conversely, if the asset were uncorrelated with the market, then β should be found to equal 0 and α should be found equal to the risk-free rate.

3.2.2 Problems in Estimation of the Cost of Capital Using the CAPM Formulation

The issues attending the estimation of the cost of capital with CAPM—essentially, the estimation of the equity risk premium (ERP) in terms of β with equation (5)—arise for reasons having to do with the assumptions underlying the CAPM specification as a whole, and obtaining reliable estimates of β as the sole measure of the relevant risks.

The traditional CAPM, which describes stock returns solely on the basis of an estimate of β, is based on the assumption that all market participants share identical subjective expectations of mean and variance of the return distribution, and the portfolio decision is exclusively based on these moments. However, empirical evidence suggests that the estimated CAPM does not conform to the theory. It has been observed by Engle (1982)

[32] In other words, the error terms are said to be *iid* $N(0,\sigma^2)$.

and Bollerslev (1986) that return distributions vary over time. In other words, the stock return distribution is time variant in nature and hence, the subjective expectation differs from one period to the next. This can be interpreted as saying that investor expectations of the moments of the *ex ante* distribution of returns behave like random variables rather than as constants, as assumed in the traditional CAPM. The result of this modification of the assumptions in the CAPM has led to the specification of conditional CAPM (CCAPM) formulations that attempt to account for the fact that both the expected value and the variance of returns may be time varying. This approach has been illustrated in the work of Domowitz and Hakkins (1985) and Engle (1987) and Bollerslev (1988), which has been followed subsequently by efforts to improve the precision of the estimate of the risk premium parameter β through the work of Ng (1991) and Bollerslev, Engle, and Woldridge (1988); Harvey (1989); and Bodurtha and Mark (1991).

The CAPM and CCAPM have been subjected to extensive empirical testing over the past 30 years. The early studies of the Sharpe-Lintner-Black (SLB) model were conducted by Black, Jensen, and Scholes (1972); Blume and Friend (1973); Fama and MacBeth (1973); Basu (1977); Reinganum (1981); Banz (1981); Gibbons (1982); Stambaugh (1982); and Shanken (1985). In general, the results from these studies offered very little support for the CAPM or CCAPM approaches. Appendix II contains a detailed discussion of these studies and problems associated with estimation of the CAPM.

The valuable lesson that can be taken from the shortcomings associated with the theoretical development of and estimation of the market based risk premium using a single factor CAPM formulation is that it is subject to a great deal of uncertainty. Therefore, the exclusive use of CAPM-based estimates of the ERP to apply to the Ontario LDCs introduces risk into the regulatory rate-setting process that can be avoided or at least reduced by relying on a wider set of approaches. This is of course our strategy, and we recommend that it be adopted by the Board for the purposes of setting electricity distribution charges.

The OEB Staff acknowledges that CAPM is not without well-known limitations. They contend that these limitations are far less serious than the shortcomings of alternative

approaches such as the comparable earnings (CE) and discounted cash flow (DCF) approaches. The failings of the CAPM approach are serious enough to warrant consideration of additional information that might temper the biases inherent in the CAPM framework. Of course, the choice of the proxy group of companies which is a significant consideration in Ontario, given that the majority of LDCs are not publicly traded companies, merely compounds the problems inherent in the CAPM approach, and increases the importance of constructing an estimate of ERP and the rate of return through a more robust approach.

3.3 Risk Premium and Historical Returns Approaches

The risk premium method for determining the cost of equity capital is based on an algebraic decomposition of equity capital cost into (1) the cost of debt and (2) the difference between the cost of equity and the cost of debt. Since investors generally perceive equity to be riskier than debt and therefore require a higher return to equity, the difference in (2) is viewed as a risk premium.

Measurement of historical returns is increasingly used as a basis to assess plausible returns in the future. As discussed, efficient markets suggest that *all* financial assets are priced at levels such that the *expected* future returns of individual assets are equivalent to the underlying opportunity cost. Thus, if historical returns guide expectations of future returns, historical returns provide a useful benchmark and, within reasonable bounds, reflect the opportunity cost of capital. In this respect, the Historical Returns methodology can be viewed as a market-based approach of Comparable Earnings, and thus fully satisfies *Bluefield* and *Hope* criteria. The key to successfully applying this approach is to identify and measure historical returns in a manner that reasonably reflects expectations of investors about the future outlook.

Historically realized returns and future expected returns of financial assets are ordered according to risks. This ordering according to risks is a natural and inevitable result of competitive financial markets: because risk is costly, higher costs must be offset by higher returns. While it is not based upon an explicit model, the analysis of the risk premia among classes of risky assets provides a means to infer the underlying

opportunity cost of capital. The underlying concept of the risk premium approach is that *differences* in perceptions of risks among financial assets such as equities and debt are revealed in differences between the historical market returns. The historical differences between equity and debt returns—*i.e.,* the risk premium—can thus serve as a surrogate for the compensation for risk in the future. Risk premia, when combined with the expected cost of debt prospectively, provides a useful benchmark to gauge the underlying cost of equity capital.

The application of the risk premium approach contains two potential pitfalls, as follows:

- the opportunity cost of common equity capital, stated in nominal terms is a responsive to the demand for and supply of capital, as discussed above;
- the observed risk premia between debt and equity is quite sensitive to expected inflation. As a consequence, the *ex ante* application of the risk premium methodology, must adequately account for expected inflation in the future. That is, the underlying rate of inflation and conditions of the historical period over which risk premiums are estimated must match that of the expected conditions of the relevant period over which the common equity recommendation is being applied, and over which electricity distribution charges are being set.

The usefulness of the risk premium approach derives from the fact that the cost of debt is readily available, and the risk premium is easier to model than the cost of equity, both of which are unobserved. The risk premium can be modeled using either historical risk premium data or by using prospective expected risk premiums.

The historical approach to estimating risk premiums is based on actual returns to stocks and bonds. Here the actual historical return to debt is subtracted from the actual historical return to equity in order to obtain the risk premium. An alternative to this method is to determine the relationship between book returns to equity and bond yields over a reference period and apply that relationship to a specific utility's current borrowing costs.

One important issue in the applications of the historical method is the stability of the risk premium over time. Generally, the assumption is made that changes in interest rates do not have a significant effect on the risk premium. However even if the risk premium is not directly affected by changes in interest rates, one observes changes in the risk

premium over time, and an important empirical issue is the time period over which security data is collected and analyzed. Similarly, one might question whether there are differences between the historical risk premiums and expected future risk premiums.

The expected risk premium approach is based on a model of differences in the expected returns of common equities and bonds. In order to implement this approach there are several issues that must be addressed, including the choice of an appropriate debt security, the selection of a representative sample of securities for analysis, the method used for computing returns, and the adjustment of the risk premium to account for comparable risk.

3.4 Arbitrage Pricing Theory and Multi-Factor Models

Another theory relevant to the issue of estimating the cost of capital for Ontario LDCs is the Arbitrage Pricing Theory (APT). This theory is predicated on a similar economic intuition as CAPM, but provides a more general framework for modeling purposes, and offers a potential improvement over the CAPM approach to estimating the ERP. In practice, the application of APT results in the formulation of multi-factor models for the estimation of the cost of capital for a given investment asset.

APT takes the view that relevant risks can assume dimensions other than optimally diversified financial market risk alone, which is inherent with mean-variance theory. The generality of APT accords with the intuition that interest rates, inflation, and the level of business activity have important impacts on the volatility of market returns, and thus risk. The framework for multi-factor models accommodates dimensions of risk associated with: 1) systematic state variables; 2) extracted market factors; and 3) idiosyncratic factors of individual financial assets. Such sources of risk are unspecified within the general framework for APT, however. The intuitive appeal underlying factor models provides practitioners with a variety of relatively new and practical tools to assess the risk-return tradeoff. In the case of the utility industry, the models have the potential to provide more accurate estimates of the cost of capital.

What are the relevant risks that define market return requirements? As mentioned, APT and general factor models do not specify relevant measures of risk or even how many risk metrics exist. However, academic and commercial research suggests that several primary sources of risk consistently impact market returns, and thus return requirements. Among others, relevant risk metrics can be investor confidence, monetary policy, expected inflation, and financial market performance, along with firm-specific (idiosyncratic) factors.

As a general theory, APT recognizes that the underlying cost of capital is a positive function of risk factors only. In practice, the challenge of estimating factor models is empirical. Namely, what is the plausible set of relevant risk factors that impact the cost of capital and thus ultimately the rate of return requirements?

The conceptual framework underlying factor models is premised on the standard three properties described throughout, namely:

- investors are risk averse. For a given level of expected returns, investors prefer lower risk to higher risk.
- the cost of capital is a positive function of risks, as perceived by investors. The market value and worth of financial assets is ordered according to perceived risks.[33]
- financial assets are efficiently priced by markets comprised of many buyers and sellers. Efficient markets are a result of information symmetry, such that individual investors have ready access to a common set of information regarding the future prospects and risks of assets. Accordingly, opportunities for above-normal returns, on an expected value basis, are exhausted, and individual investors cannot systematically select assets that realize *ex post* returns above expected returns.

The generalized conceptual model for CAPM as shown in equations (3) and (4) is applicable to the formation of multi-factor models. Since expected market returns are equal to the cost of capital, expected returns are therefore a function of the relevant risk

[33] This means that if perceived risks—measured as the variance of market return (σ)—are greater for asset A than for asset B that have the same expected return, the market price of asset B will be greater than the market price of asset A. Stated differently, investors will price asset A lower than asset B so that its expected future market return is *greater* than that of asset B. This ensures that, by holding asset A, investors are compensated for assuming higher risks.

factors, which enables the generalization and expansion of the CAPM framework, as follows:

$$E[r_j(t)] = f(E(F)]$$
$$= E(F_1) + E(F_2) + \ldots + E(F_M) \quad \text{for all } m=1, 2, \ldots, M. \qquad (6)$$

In (6), expected market returns of asset *j*, $E[r_j]$, are stated as a function of the expected value of risk factors *m*.

The above properties are generally common to cost of capital methods such as discounted cash flow, risk premium, market-based comparable earnings approaches, and CAPM. However, with the exception of CAPM, these approaches only implicitly incorporate risk. In contrast, multi-factor models provide a framework for an explicit representation of risk.

Multi-factor models impose no limitations regarding the definition of risk factors, or how factors can be incorporated into the general framework. However, factor models also give no guidance about the relevant, perceived risks harbored by investors.[34] The task at hand, then, is empirical: to identify the relevant, perceived risk factors that determine the expected rates of return. This task is carried out through an empirical assessment of the relationships between various quantifiable risk factors and actual (*i.e.,* realized) market returns.

A generalized multi-factor model[35] can be specified as a return generating process where expected market returns to financial assets are a linear function of risk factors. The exposure of individual assets to specific risk factors is referred to as *factor loadings*. For each asset, the factor loading attending each risk factor is interpreted as a risk premium of

[34] However, economic theory and general intuition help define the relevant factors *a priori*. For example, Irving Fisher many years ago described how the rate of interest can be stated in real and nominal terms, and how the cost of capital is a function of expected inflation. Fisher's theory provides a basis to infer how the expected rate of inflation influences market rates of return. Similarly, history reveals that profits generally rise with increased economic activity. Thus, we can expect that some measure of real economic activity will be positively related to *ex post* market returns.

[35] As referenced in Roll and Ross (1985). Also, an early unpublished study of return generating processes involving multiple factors can be found in Brennan (1971).

the asset with respect to the risk factor. The value of the risk factor is referred to as the *price of risk*.[36]

The realized return is defined as the end-of-period *ex post* return, and is represented as a function of the observed values of the relevant factors,[37] as follows:

$$\begin{aligned} r_j &= a + f(F_m) \\ &= a + \Sigma_j b_{jm}*(F_m) \qquad \text{for all } m=1, 2, \ldots, M \\ &= a + b_{j1}*F_{j1} + b_{j2}*F_{j2} + \ldots + b_{jM}*F_{jM} \end{aligned} \tag{7}$$

The risk factors, F_m, describe the risks attending asset j and determine the return generating process of j. Some or perhaps all of the relevant risk factors can be idiosyncratic to asset j.[38] It is highly likely, however, that some of the relevant risk factors are common to many if not all, financial assets, and that such factors are external to financial markets (*i.e.,* exogenously determined). These common factors are generally referred to as *systematic factors* or state variables. Nonetheless, idiosyncratic factors—factors specific to individual assets or industries—can also have significant impact on the total risk of the underlying assets.

The inclusion of systematic factors along with idiosyncratic factors gives rise to the following model formulation:

$$\begin{aligned} r_j &= a + \Sigma_s c_{js}*(F_{js}) + \Sigma_n b_{jn}*(F_{jn}) \\ &\qquad \text{for all } s=1, 2, \ldots, S \\ &\qquad \text{for all } n=1, 2, \ldots, N \\ &= a + c_{j1}*F_{js=1} + c_{j2}*F_{js=2} + \ldots + c_{jS}*F_{jS} + b_{j1}*F_{jn=1} \\ &\quad + b_{j2}*F_{jn=2} + \ldots + b_{jN}*F_{jN} \end{aligned} \tag{8}$$

[36] This is equivalent to the market β estimated in the CAPM.

[37] Thus, the expectations operator is absent from equation (7).

[38] A particularly interesting result is that, if the risk factors of the individual assets of a portfolio are idiosyncratic and uncorrelated, the risks of the assets can be completely diversified. Also, if the factors are completely idiosyncratic, the appropriate notation of the factor loadings is b_m , rather than b_{jm}.

In (8), risk factors *s* refers to systematic factors common to all (or most all) financial assets, whereas risk factors *n* refer to idiosyncratic factors.[39]

The right-hand-side variable, *a*, is the rate of return absent risk (i.e., the riskless rate) and, in the context of the CAPM and other formulations such as APT, is referred to as the risk-free return. CA Energy Consulting has recently worked toward the development of empirical APT (multi-factor) models on behalf of a consortium of major electric utilities in the U.S. So far, we have demonstrated an APT model inclusive of five common factors. These explanatory factors appear as statistically significant variables that represent plausible factors affecting investors' expectations for equity risk premia such as business confidence, time horizon and payout, expected inflation, general business activity, and overall market activity. Our models are able to explain 40% of total variation in monthly returns realized by a sample of large electric utilities. Five factor models—and larger models as well—have been applied previously. The major research challenge, which is of keen interest, is finding the appropriate set of idiosyncratic factors.

The application of a multi-factor model may offer improvements over the estimation of a single "market beta" in the CAPM. As mentioned above, we firmly recommend that the Board and Board staff consider fully the prospects of adopting this modeling approach in conjunction with use of the CAPM and other tried and true methods of estimating the common equity return returns—essentially a cost of capital tool box. The estimation uncertainty is simply too great to rely upon CAPM alone.

3.5 Weighted Average Cost of Capital (WACC) and Overall Rate of Return

Traditionally, the allowed rate of return in regulatory hearings is calculated as the weighted average of the cost of capital ("WACC") of each individual component of the capital structure weighted by its book value.

[39] If risk factors *n* are idiosyncratic to asset *j* and have no influence on assets $i \neq j$, the appropriate notation of the factor loadings is b_n , rather than b_{jn}.

The optimal capital structure of the firm is based on the tradeoffs between risk and return. As the firm increases the relative amount of debt in its capital structure, total fixed charges (i.e., interest expenses) increase. All else equal, this decreases the return to shareholders and makes that return more risky. This in turn leads to an increase in the return to equity, as required by investors.

To see how the optimal capital structure emerges, first consider a zero debt level ratio. Here the average cost of capital is equal to the cost of equity. As the firm substitutes lower-cost debt for higher-cost equity, the average cost of capital decreases. But the cost of equity also increases, due to the fact that risks to investors increase, which tends to increase the average cost of capital. The optimal capital structure emerges when these two factors exactly offset.

Utilities should strive for a capital structure that minimizes the composite capital cost while remaining sufficiently flexible. Finding the optimal capital structure is not easy, and the ideal of a specific capital structure for all Ontario LDCs, as a matter of the imputed capital structure, must be approached with caution.

4 Profiles of LDCs

Appendix 3 presents profiles of the Ontario electric distributors. As can be observed, the distributors constitute an enormous range of business context, size in particular, with assets that range from a few hundreds of thousands to amounts approaching five hundred million dollars. The returns to capital, as shown, are significantly below reasonable estimates of the cost of capital and are risky. Specifically, the average realized return to common equity for the LDCs shown is 6.32 percent for the 2001 – 2004 timeframe. Of concern is the high variability—and comparatively high risk—of the book value return on equity for Ontario LDCs which, as measured by the standard deviation statistic, is 5.29 percentage points and further evidenced by the coefficient of variation of 0.78. This measure of risk is at a level of over three times above that of the sample of mid-sized U.S. electric companies, upon which (among other samples of companies) the cost of equity for LDCs is based. Similarly, the LDC have much higher risks than the other

samples as shown. Thus, one would infer that the Ontario distributors have comparatively higher financial and capital market risks.

Through our Comparators and Cohorts analysis for the Ontario Energy Board work as well as the immediate engagement, we have participated in several forums discussing the highly varied business environments and issues facing Ontario's LDCs, and have an appreciation for the challenges associated with managing the current issues including changes in market and regulatory structure and associated requirements.[40]

5 Empirical Analysis of Cost of Equity Capital, Ontario LDCs

This section presents the results of the analysis of the cost of equity capital appropriate for the determination of the rate of return for Ontario LDCs. Recommendations regarding the appropriate rate of return are not, alone, a mechanical model-driven result obtained in isolation. An understanding of business context to gauge capital risks is essential. Analysis of the cost of capital, for purposes of setting the rate of return, should be fully sensitive to the facts defining the risk profiles of the utilities and the overall investment environment.

The general empirical approach begins by assessing the situation and context of the Ontario distributors. This approach helps gauge the overall business context of the Ontario distributors including the various business and financial risks that they face in the ongoing course of the providing distribution services. This involved many discussions and conference calls with the Electricity Distributors Association and its members and draws on a number of documents that are currently available from various sources including bank reports and documents of the Ontario Energy Board.

The analyses reported here utilize the four approaches discussed above including discounted cash flow, CAPM, risk premium and comparable earnings as measured by

[40] It is perhaps useful to mention the importance of properly interpreting the Comparators and Cohorts analysis of 2005. That analysis found significant differences in business context and costs among LDCs, though the differences were largely systematic and could be explained with cost equations. These equations define the mathematical relationship between costs and explanatory factors. These factors, in turn, were used to group LDCs into cohorts. Individual LDCs within cohorts were then described according to predefined cost diagnostics. Though substantial differences in market context and costs exist across LDCs, cost differences are systematic and can be explained.

realized historical returns. The methods are applied to utilities and non-utility companies of comparable risk. The methods are applied to two samples of Canadian utilities, and three samples of U.S. companies. In the case of the Canadian experience, the analysis is based on a sample of utilities listed on the Toronto Stock Exchange, TSX. The U.S. companies are traded on the New York Stock Exchange (NYSE) and the National Association of Security Dealers' market known as NASDAQ and operated by NASDAQ Stock Market LLC. In the case of the U.S. experience, the cost of capital estimates are based on samples of medium- and comparatively small-sized electric utilities, natural gas utilities, and comparable risk non-utility companies.

The analyses are based on recent and long-term historical experience to assess capital risks and the future prospects for capital returns. While estimates of the cost of capital are inherently forward looking, the process of estimation draws upon historical assessments of risk and the future prospects for market returns—essentially, the realized returns to investors and savers, as holders of property rights claims to capital in the form of financial assets. The following tables summarize the analysis conducted using four approaches, first presenting CAPM results for the sample of Canadian utilities, and followed by analyses using the DCF, CAPM, Risk Premium, and Comparable Earnings approaches for the U.S. utilities and non-utility companies.

Table 1 Discounted Cash Flow Analysis, U.S. Utilities

Mid-Sized Electric Utilities		
Estimated Cost of Equity (%)	Dividend Yield (%)	Expected Growth In Cash Flows (%)
9.2	4.7	4.5
Gas Distribution Utilities		
Estimated Cost of Equity (%)	Dividend Yield (%)	Expected Growth In Cash Flows (%)
9.6	4.4	5.3

Table 2 CAPM Analysis: Canadian and U.S. Utilities, U.S. Non-Utility Companies

Canadian Utilities, Samples 1 and 2				
Estimated Cost of equity (%)		Risk Free Rate (%)	Beta	Market Risk Premium (%)
8.4		4.2	0.70	6.0
8.7		4.2	0.75	6.0
U.S. Mid-Sized Electric Utilities				
Estimated Cost of Equity (%)		Risk Free Rate (%)	Beta	Market Risk Premium (%)
11.1		4.7	0.76	8.3
U.S. Gas Distribution Utilities				
Estimated Cost of Equity (%)		Risk Free Rate (%)	Beta	Market Risk Premium (%)
10.5		4.7	0.70	8.3
Comparable Risk Non-utilities				
Estimated Cost of Equity (%)		Risk Free Rate (%)	Beta	Market Risk Premium (%)
9.1		4.7	0.52	8.3

Table 3 Comparable Earnings: U.S. Companies

Historical Market Returns (%)	
Mid-Sized Electric Utilities	11.1
Gas Distribution Utilities	11.4
Comparable Risk Non-Utility Companies	11.3

Table 4 Risk Premium Analysis: U.S. Utilities and Non-Utility Companies

Risk Premium for U.S. Utilities, Non-Utilities	
	Risk Premium (%)
Mid-Sized Electric Utilities	12.2
Gas Distribution Utilities	12.0
Comparable Risk Non-Utility Companies	10.6

(The results above do not incorporate issuance costs)

The estimated cost of equity capital using single-stage DCF analysis is comparable to that of the three-stage DCF approach[41] (not shown) for the sample of small electric utilities and, for the sample of U.S. natural gas utilities 9.6% for both single- and 3-stage model results. The DCF cost of equity results for the electric utilities reflect the slowdown in earnings and cash flow growth during 2004 and continuing in 2005. The slowdown is in large part a result of rising input costs, particularly for new investment, that is not being recovered in current rates. The dividend yields of the DCF analysis utilize the stated dividend rates, as observed during early- to mid-2005, and stock prices sampled from May-June of 2005. Expected growth relies on a survey of analysts' assessments and historical experience for both internal cash flow and earnings per share.

The CAPM results utilize estimated betas for two samples of Canadian utilities is based the period beginning in the year 2000 forward, and are estimated monthly.[42] In the case of the U.S. companies, including utilities and non-utilities, the analyses are based upon Valueline estimates of CAPM betas, and are also estimated weekly. Both analyses incorporate the Blume adjustment for long-run central tendency of betas to trend toward unity.[43] The U.S. electric and gas utilities draw upon more contemporary betas, as estimated over the 60-month period ending in 2005, as it appears that the underlying market risks of electric and gas utilities have risen somewhat in the contemporary period. The CAPM analysis of the non-utility U.S. companies, however, utilize average betas estimated over successive 60-month timeframes, although the incremental gains in information is not as great as what it might be suggested by the longer period. As can be seen in the attached exhibits, the so-called risk-free or riskless cost rates used within the

[41] The 3-stage DCF results suggest a 9.1% cost of equity.

[42] The analysis that obtains CAPM Betas for the Canadian utilities utilizes monthly yields on short-term Canadian government debt as the surrogate for the risk free rate. These yields are used for the determination of the historical risk premia for estimation of CAPM Betas. However, these yields are only an approximation to the risk-free asset which, in fact, is the flow of interest income on the debt vehicles, without inclusion of market appreciation in ex post returns.

[43] The so-called Blume methodology derives from the work of Marshall Blume, as first presented in the article "On the Assessment of Risk", *Journal of Finance*, Vol. 26, 1971. The alternative approach to adjust the estimated raw Betas is the so-called Vasicek technique, as proposed by O.A. Vasicek in "A Note on Using Cross-Sectional Information in Bayesian Estimation of Security Betas," *Journal of Finance,* vol. 28, 1973. Generally speaking, the Vasicek approach is considered the preferred methodology though considerable information is required for implementation. Commercial financial services including Bloomberg, Compustat, and Valueline. Ibbotson Associates employs the Vasicek correction method.

CAPM framework are not consistently drawn. In the case of the Canadian CAPM analysis, the risk-free rate is the contemporary ten-year yield on government debt. The U.S. analysis employs the average of 10-year yields on U.S. government bonds sampled from historical periods, which appear to match fairly well with current investor expectations. Specifically, the historically risk-free cost rate used in the U.S. analysis is 4.73%, while long-term U.S. nominal bond rates are currently at 5.05%, suggesting that the U.S. CAPM analyses somewhat understate the cost of equity capital. For reference, the inflation-indexed U.S. long-term government bond yield resides at 2.53%, suggesting an expected 2.5% rate of overall price inflation, which we find to be best captured historically by the chain-weighted GDP price deflator.

The risk premium approach draws upon observed historical risk premia across realized market returns for classes of debt and equity vehicles. Risk premia can be calculated in many ways. The analyses, here, draw upon the risk premia reported and published by Ibbotson Associates. The analyses suggest that efficient capital markets demand substantially higher market rates of return on equity vis-à-vis debt of various terms. Specifically, equity risk premia are reported with respect to short-, intermediate-, and long-term government debt. We summarize risk premia in selected pages of the Appendix V - VII.

It is worth noting that progressively higher equity risk premia attend small-sized companies, particularly for micro-sized companies like the Canadian distributors. For this reason, our estimated cost of capital results and rate of return recommendations are conservative and, in fact, may understate the underlying cost of capital for Ontario distributors.

Risk premia associated with small size, sometimes referred to as small capitalization risk premia, reflect intuition, well established principles that serve as the foundation of finance theory, and the observed realities of capital markets. First, ordinary common sense would lead one to recognize that small entities face higher business risks than large entities. Higher risks attending small risk come about from the principle of large numbers. Specifically, the financial impacts of random business events, which occur

over the course of business enterprise, cannot be diversified as well by small entities as large entities. Essentially, the impacts of business events within larger enterprises get absorbed within a pool of other events, both positive and negative, with the result that such events are substantially muted in their total impacts on the financial results of the enterprise.

The intuitive idea of diversification of business activity is reflected in portfolio theory. In this regard, the larger entity can be viewed as, essentially, a larger portfolio of individual business activities with the attending diversification effects, providing that individual business activities have less than perfect correlation.

The facts of capital markets reveal that, among other factors, the variability of the returns to capital for small entities, reflected as operating income, will typically be higher for smaller entities than larger entities. Second, historically market returns for entities with smaller market capitalization, will have higher variation than for entities with higher market capitalization. Within the context of Capital Asset Pricing Model (CAPM) theory, the core of modern finance theory, the relevant and well known measure of risk is the covariation of market returns of individual equities with the market as a whole, normalized by the variance of the overall market, referred to as CAPM Beta. Insofar as this notion of risk – i.e., systematic risk – is the only relevant measure of risk given optimal portfolio theory, competitive capital markets would ensure that equities would be priced at levels such that the realized market returns of individual equities would be ordered according to CAPM betas.

Essentially, CAPM theory would then suggest that, to the degree that the higher risks of small capitalization entities can be diversified – i.e., are non-systematic – CAPM Betas would still reflect the most relevant risks. To the degree that higher risks of small capitalization entities cannot be full diversified – i.e., are systematic – higher risks are reflected in higher CAPM betas.

Empirical evidence suggests that CAPM Betas do not explain market returns of small capitalization entities. Indeed, a substantial body of evidence suggests that CAPM under estimates and thus understates historical market returns of small firms. In one interpretation, the difference between the realized market returns of small capitalization

firms and the estimated market returns under CAPM constitutes the small-capitalization risk premia. A second interpretation is that, after accounting for various factors, it appears that size, as reflected in capitalization, is inversely related to historical market returns and that the relationship is systematic – both repeatable and non-random. The magnitude of small capitalization risk premium is large, as best demonstrated by the published analytical work of Ibbotson Associates, Eugene Fama and Kenneth French, Banz, Kaplan, and Roger Ibbotson. In the latest published work, the analyses of Ibbotson Associates[44] demonstrate that for entities organized into deciles according to capitalization, as a measure of size, size-related risk premia assume the following magnitudes:

Size Decile[45] and	**Size-related Risk Premia:**
Decile 1	-0.37%
2	0.67
3	0.85
4	1.10
5	1.49
6	1.73
7	1.67
8	2.33
9	2.76
10	6.36

It is useful to mention that, as reported, decile 9 includes entities with market capitalization of $265.1 - $586.4 million, while decile 10 includes entities with market capitalization of $1.1 – 265.0 million.

CAPM theory can be challenged for a number of reasons that warrant our full consideration for purposes of setting the rate of return for Ontario's LDCs, and these reasons can, in the large, be viewed as fatal flaws. In terms of size-related risk premia, the understatement of market returns by CAPM for small-sized entities is perhaps not widely understood at this time. Our general view, however, is that, for small entities, the

[44] SBBI Valuation Edition 2006 Yearbook by Ibbotson Associates, 2006

[45] The deciles organize equities into capitalization groups, where the largest entities are within Decile 1, and the smaller entities are within Deciles 9 and 10.

cost of acquiring information regarding the prospects for future returns and assessment of risks is unusually high. Because the acquisition of information is costly, less information and knowledge within the investment community about small entities is available. Hence, investors with positions in small entities inherently incur higher risks. For small-sized entities, higher returns are thus the compensation for the assumption of higher risks. It is useful to emphasize that while CAPM, over long timeframes does reveal higher risk premia and cost rates for smaller entities. However, evidence suggests that CAPM understates risk premia attending comparatively small size.

Unfortunately, we have not developed empirical estimates of the size-differentiated risk premia for Canadian capital markets and have accordingly elected to not impute the U.S. size-premia to the Canadian experience. However, we suggest that empirically-based size premia for Canada, particularly given the small-sized utilities in Canada, is a topic worthy of further exploration by the Board and Board staff.

The fourth approach to our overall framework to estimation of cost of equity capital, Comparable Earnings, is in keeping with a market-based analysis. Namely, that as a matter of interpretation, in the Comparable Earnings approach, Historical Market Returns provides the only relevant basis for estimating the cost of capital. Essentially, to a substantial extent, history is the basis upon which investors form expectations. In fact, such approach is well founded by empirical evidence of capital market experience. For this reason, we draw upon the historical market returns realized by the sample of utilities and non-utility Canadian and U.S. companies of comparable risk. These results do not require explanation, though we wish to mention that the historical returns shown in the Appendices attached hereto incorporate the combined impact of realized dividends as well market appreciation.

Finally, we wish to note that interpretation of Comparable Earnings as either book returns to capital or authorized returns, as is so often the case, is a clear example of circular reasoning where regulators set book returns on a basis of book returns set by others. This results in book returns potentially departing from the underlying cost of capital by substantial margins. Thus, we suggest that the Board employ reasonable caution in the

use of realized book returns on equity (as estimates of the cost of equity) as a basis for the determination of the rate-of-return level(s) for Ontario distributors.

As shown above, the cost of equity capital for electric and gas utilities as well comparable-risk non-utilities suggests that the underlying cost of equity and rate of return, resides within the range of 9.3 – 12.9%, suggesting a mid-point value of 11.1%. This overall result is before adjustment for issuance costs associated with common equity. The recommendation of Board staff of 50 basis points to cover the issuance costs associated with common shares is reasonable, and is accepted for use in the analyses here. The analysis draws significantly on the U.S. experience and thus the U.S.-based analyses need to be adjusted for Canada-U.S. currency exchange rates (0.8961). In addition, the analyses should be adjusted for the quarterly payment of dividends that, for utilities, constitutes about 23 basis points. Finally, in view of the analyses being conducted on substantially larger companies than the Ontario LDCs, it is appropriate to recognize the small capitalization size premia. For very small-sized companies such as Ontario's LDCs, size premia can range upwards of 300 basis points. These factors, taken together, suggest an overall fair rate of return on common equity for Ontario electricity distributors in the range of 10.2% – 11.5%.

6 Recommendations Regarding the Rate of Return for Ontario LDCs

We recommend that the Board adopt a flexible policy approach to the determination of the overall weighted-average cost of capital for Ontario distributors. A flexible approach has several attractive features—in particular, the accommodation of the widely varying needs of the LDCs. The proposed approach contains several key components that we describe below.

6.1 Capital Structure

As discussed over the course of the proceedings including the technical conferences organized by the Board, we respectfully recommend that the Board adopt a flexible regulatory policy regarding capital structure for Ontario's electricity distributors. The

proposed approach is a clear evolution of the longstanding Cannon approach, which recognizes greater equity participation in total capital with smaller-sized LDCs. More specifically, for purposes of setting the overall rate of return of the LDCs we recommend that the Board adopt the observed capital structure of the LDCs, providing that the observed structure satisfies reasonable standards. The Board should codify capital structure policy standards that it finds acceptable. Implementing a flexible policy for capital structure requires that protocols and working mechanics be defined. To this end, we identify the following five principles:

> First, that the observed capital structure of individual LDCs be used for purposes of determining electric distribution rates, providing that the observed structure is consistent with reasonable and prudent financial management.
>
> Second, that a prudent capital structure is defined as one that utilizes an acceptable level of overall debt leverage, where leverage is defined as 58% - 48% debt participation within total capital which implies equity participation of 42% - 52%.
>
> Third, that the acceptable level debt leverage include both short- and long-term debt components.
>
> Fourth, where the observed capital structure of an LDC resides outside the range defined as reasonable and prudent, for purposes of determining the LDC's distribution rates the Board, at its discretion, should consider pursuing one of two options:
>
> - where the debt participation is unusually high utilize a higher authorized rate of return on equity. Conversely, where debt participation is unusually low levels, employ a lower cost of equity for the determination of the authorized rate of return, *or*
> - impute a hypothetical capital structure, where such structure is within the capital structure bounds identified in the second principle, above. Departures from the observed capital structure may imply the application of different cost rates for debt and for equity components of the capital structure.
>
> Fifth, in cases where an electricity distributor's observed capital structure does not fall within the acceptable ranges, the distributor should be given the opportunity to demonstrate that the observed (or proposed) structure is reasonable and appropriate.

Should the Board have interest in, or adopt, the flexible policy regarding capital structure, the above principles will need to be defined using sufficiently explicit language in the electric distribution code or elsewhere. In addition, where the observed financial

structure departs from the acceptable range, the Board and Board staff would need to establish the appropriate protocol and filing requirements under which the LDCs would set forth: 1) the observed capital structure; and 2) its reasoning why the Board should adopt the observed capital structure.

Any recommendation for significant changes to the capital structure for regulated utilities bears serious scrutiny. The determination of the optimal capital structure contains challenges, and the topic continues to attract research and remains a topic of debate within corporate finance and academic circles. There is no exact scientific method or formula to derive a specific utility's optimal capital structure. Consequently, caution should be exercised in taking steps that would dramatically alter the capital structure used to determine electric distribution rates, when the rates are within the recommended range of 42% - 52% equity participation.

In addition, and as we have discussed, such policy has implications for the estimated cost of equity capital. The degree of corporate leverage has impact on the cost rates of both debt and common equity. Significant changes in the leverage rate should not be made without consideration of concomitant changes to the equity risk premium. Changes to the leverage rate should not be considered in isolation from the effects that such changes will have on the cost of equity capital (or on what would be the implied cost of equity capital). For example, an increase in the share of debt will be expected to carry with it a corresponding increase in the cost of equity capital.

The OEB staff's recommendation is to apply the same capital structure of 60% debt and 40% equity to all Ontario LDCs. This level of leverage implies a significant increase in the share of debt in total capital for many LDCs. For some LDCs a substantial increase in the leverage may significantly alter the revenue requirements, which could significantly reduce (or potentially threaten to reduce) the LDC's debt coverage.

The staff's recommended level of debt participation in total capital is not wholly unreasonable. However, we suggest that the Board and Board staff give consideration to somewhat higher levels of equity participation. Levels in the range of 42 – 52% (debt participation of 58 – 48%) would be viewed as acceptable and policy be applied according to the five principles described above.

We should mention that the issuance of debt for small utility companies tends to be somewhat indivisible and lumpy within the context of the existing capital structure. Also, small entities such as the Ontario LDCs will tend to use a much higher share of short-term debt because of the short-term financing needs for funding responses to unplanned events. For small entities, short-term debt typically is used to provide a cash bridge between revenue and costs for inputs. In addition, such entities will often have in place established short-term debt facilities with lending institutions, where the facilities have customized features and flexibility to accommodate individual circumstances. Finally, short-term debt is often built up over 2-3 year timeframes (or longer) prior to the issuance of long-term financing vehicles including debt and equity. Because issuance costs can be significant for smaller entities, it is useful to extend short-term debt to fairly high levels prior to the issuance of the long-term vehicles which are then used to "buy down" the extended outstanding short-term amount.

As a general rule, the consideration of options in developing regulatory policy should always account for the potential available to regulated entities to engage in strategic behavior and game proposed policy protocols and rules. Regarding the proposed policy of a flexible capital structure being based on the observed capital structure, one recommendation could be to consider the observed capital structure within the 2006 EDR and/or the audited financial statements of the LDCs for past periods. Because it is observed, such structure is, by definition, "locked in".

Moving forward, an LDC could thin equity participation following the point in time of rebasing. Under the price cap form of regulatory governance and other revenue-cost decoupling mechanisms, an LDC has inherent incentives to reduce total costs, and if thin equity obtains lower total cost, an LDC under full information will do so; on the other hand, if greater equity participation obtains lower cost, the LDC will have incentive to use equity more intensively. But such potential actions by LDCs are cost minimizing decisions and behavior, *given the regulatory governance structure at hand and as set by the Board.* Such cost minimizing actions by electricity distributors are desired and, because total resource costs are reduced, in the overall interest of retail electricity consumers, Ontario as a whole, and the electricity distributors.

In summary, flexibility of capital structure and financing is an important operating consideration, and is of particular importance in Ontario given the fact that the LDCs are faced with substantial infrastructure investments in the near future. Such investments will include financing the Smart Meter program, which faces the prospect that the allowed deprecation rates will not provide a sufficient fund to cover replacement costs.

6.2 Long-term Debt Cost Rate

Board and Board staff should utilize the overall cost rates of both existing and new long-term debt of individual LDCs, provided that the cost rates closely approximate the market cost of long-term debt *at the time of issue*. Departure from the true cost of long-term debt used to determine electric distribution rates can result in inappropriate windfalls favoring either electricity consumers or shareholders, as discussed previously. Accordingly, departures from existing debt can be interpreted as a violation of the principles of cost-based ratemaking.

The importance of using the observed contract rates for long-term debt in the context of cost-based ratemaking is evidenced by the pattern of short- (and long-) term interest rates. Essentially, long-term debt is akin to locking in a forward price, and avoids potentially large swings in interest costs. The effects can be significant. As Figure 2 below illustrates, the Prime Interest Rate has moved from the nearly historic lows achieved during the period from 2001 to 2004 to levels that are more consistent with the longer term, reaching levels of around 8.25% in mid-2006. The pattern for Canada is similar to that of the U.S., as shown in Figure 3 which plots the Bank Rate over the period 2000 to mid-2006. Again, the historic lows reached in the period 2001 to 2004 seem unlikely to return soon. The Bank Rate in Canada has recently increased and is trending toward the levels seen in the period prior to 2000.[46]

[46] Source: Bank of Canada website August 2, 2006, http://www.bankofcanada.ca/cgi-bin/famecgi_fdps Both Figure 2 and Figure 3 are used solely for illustrative purposes. The interest rates represented in each figure cannot be compared directly.

Figure 2 US Prime Interest Rate 1996 to 2006[47]

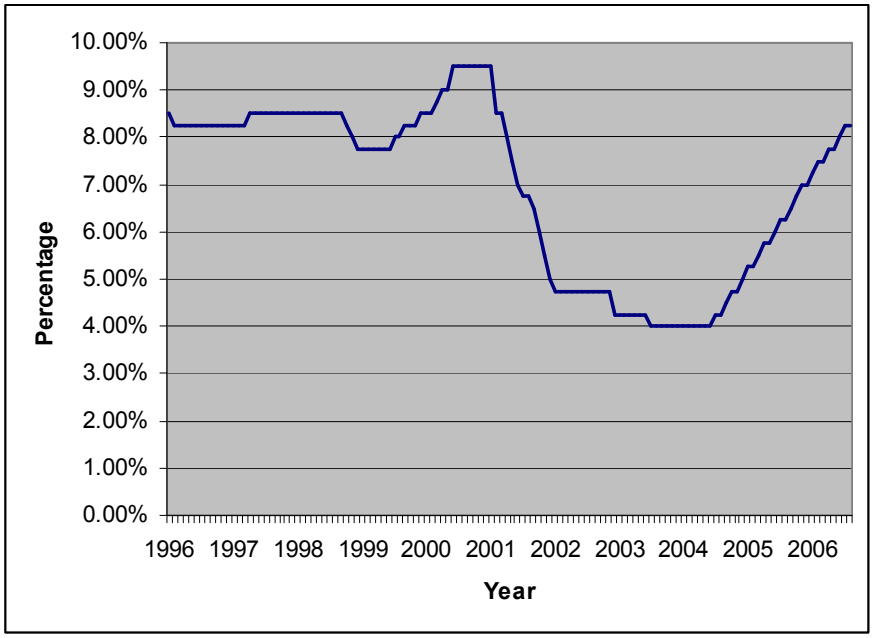
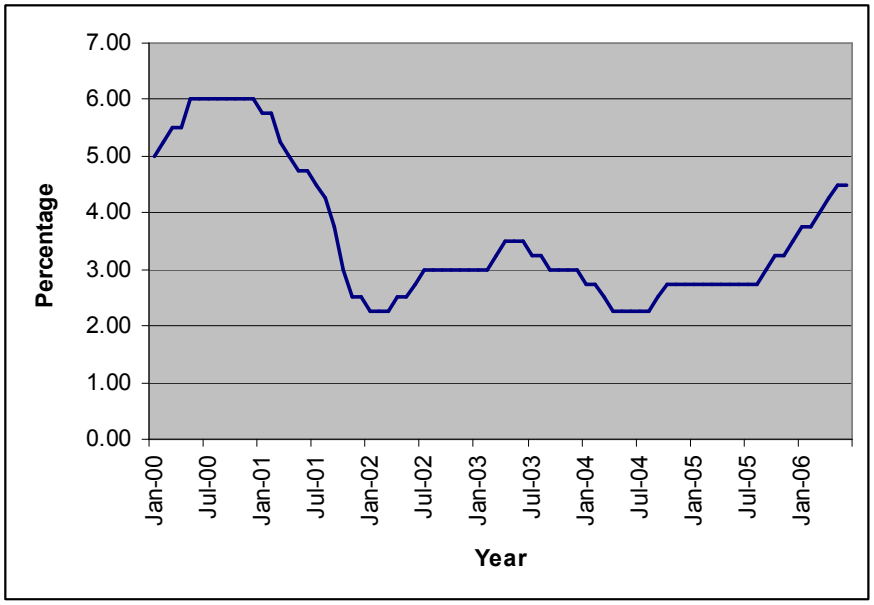


Figure 3 Canadian Bank Rates 2000 to Mid-2006



[47] Source: Federal Reserve Bank of St. Louis website: http://research.stlouisfed.org/fred2/data/PRIME.txt.

6.3 Short-term Debt Cost Rate

Short-term debt is used to provide for cash needs of utilities and as a bridge between revenue and cost input flows. Short-term debt also funds the gradual expansion of capital needs and, once short-term balances reach relative high levels, such debt is then converted in longer term vehicles, and short-term balances are paid down; this is due to the 'lumpiness' referred to previously. Finally, short term debt provides the means fund resource input needs that result from unexpected events including higher expenditures for power supply that may come about from season variation in weather.

Board and Board staff should incorporate short-term debt and the accompanying short-term debt cost rate within the overall capital structure. Exclusion of short-term debt from the capital structure can give rise to unbalanced capital structures for small utilities like Ontario's LDCs. This result comes about because short-term financing vehicles allow for interim financing of investment and cash flow needs of utilities. As mentioned above, as the balances of short-term debt rise, it is converted to long-term debt and to equity. Hence, for small entities like Ontario LDCs, the equity and long-term debt participation levels can exhibit rather abrupt changes when viewed in isolation from the levels of short-term debt. Particularly for small utilities, short-term debt is vital. Essentially, short-term debt serves a long-term function along with other sources of capital; together they constitute the cash needs and permanent capital resources of the LDCs. In addition, the notion that short-term debt is assigned (solely) to working capital ignores the reality of the overall pool of capital funding, operated by the treasury function. In short, it is impossible to trace or track the sources and uses of the overall pool of capital funds through a treasury.

6.4 Cost of Equity Capital

As shown above, estimates cost of equity capital for Canadian utilities, and for electric and gas utilities in the U.S. (as well as for comparable-risk, non-utility companies) suggest that the underlying cost of equity and resulting rate of return lies within a broad range greater than two hundred basis points. Further, when risk premia associated with small size is accounted for, our assessment indicates that a plausible range for the equity rate of return is 10.2% to 11.5%.

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Technical Appendices

APPENDIX I

Present Value of Investment and Derivation of the Constant Growth and Multi-Stage Discounted Cash Flow Model (DCF)

Present Value Theory

As wages are the compensation to labor, interest is the compensation or return to savings and capital. Savings is the share of current income held back to be consumed in later periods. A unit of current consumption has greater value than an equivalent amount of consumption later. Hence, savings must obtain greater consumption later, in order to compensate for its reduced (discounted) value.

The inducement to save is interest; essentially, the accrual of interest on savings offsets the reduction in value of later consumption vis-à-vis current consumption. Without the expectation of interest, savings would be largely exhausted as consumption in the current period. Savings are invested and, over time, give rise to and constitute the accumulation of capital. Savings realize the market rate of interest. Savings and investment—and thus the accumulation of capital—rise as expected interest increases.

Returns to savings, investment, and capital can be viewed as cash flow returns, and can be stated as an annual percentage amount. Cash flows in subsequent periods forego the interest that would have accrued on earlier cash flows. Because of foregone interest, later cash flows are worth less than those of earlier periods by the amount of interest that would have been realized on the earlier flows.

Cash flows over time can be ordered with a discounting procedure commonly known as present value. Present value revalues future cash flows according to the accrual of interest that would have been realized, had they occurred in the present. Specifically, the cash flow within a time step is discounted by a factor equal to the inverse of one plus the market rate of interest, k, compounded by time – $(1/(1+k))^t$. The present value procedure can be shown more formally as:

$$PV = \frac{CF_1}{(1+k)^1} + \frac{CF_2}{(1+k)^2} + \frac{CF_3}{(1+k)^3} + \cdots + \frac{CF_n}{(1+k)^n} \qquad (1)$$

or,

$$\sum_{t=1}^{n} \frac{CF_t}{(1+k)^t} \qquad (2)$$

where,

PV = present value

CF_t = cash flow in time t

k = market cost (rate) of interest.

Hence, $1/(1+k)^t$ is the discount factor by which the cash flows at time t are reduced.

Present value analysis equates cash flows at different points in time to the present, and constitutes a fundamental principle of financial and investment analysis. Essentially, present value normalizes the cash flows at the market rate of discount.

Consider a cash flow occurring at time, $t=0$. Since the cash flow occurs in the present and, unlike the subsequent cash flows shown in (3), below, no interest is foregone and thus it is not discounted:

$$NPV = CF_o + \frac{CF_1}{(1+k)^1} + \frac{CF_2}{(1+k)^2} + \frac{CF_3}{(1+k)^3} + \cdots + \frac{CF_n}{(1+k)^n}. \qquad (3)$$

Presume that a savings agent, a household, invests savings. The purchase of an investment or financial asset such as securities or other liquid assets by the agent constitutes a negative cash flow – an outflow of money. It is the expectation of positive cash flows later that induces the purchase. Positive cash flows prospectively, as expected, tend to balance the negative cash outflow associated with the purchase of the asset. All negative and positive cash flows are contained in net present value, as shown in (4) below:

$$NPV = -CF_o + \sum_{t=1}^{n} \frac{CF_t}{(1+k)^t} \qquad (4)$$

where,

$NPV =$ net present value – *i.e.,* the net of all positive and negative cash flows

If net present value (*NPV*) is positive, the investment action is "economic" in the sense that the expected positive cash flows, discounted at the market cost of capital, are greater than—or at least equivalent to—the purchase price of the asset, the negative flow.

Competitive capital markets—or the processes of market competition—seek to discover and exhaust all opportunities for positive and negative present values. That is, the *expected* NPV of investment opportunities approximates zero, given the implicit rate of discount harbored by investors. Essentially, the market value of assets is driven to its competitive level prospectively because of arbitrage inherent to competitive markets. Market forces bid prices up in the presence of expected positive returns (NPV), or bid prices down if negative returns are expected. The discounted positive cash flows equate to and balance the purchase cost of the asset, as shown in (5), below:

$$CF_o = \sum_{t-1}^{n} \frac{CF_t}{(1+k)^t}. \qquad (5)$$

In market equilibrium, then:

$$P_o = \frac{CF_1}{(1+k)^1} + \frac{CF_2}{(1+k)^2} + \frac{CF_3}{(1+k)^3} + \cdots + \frac{CF_n}{(1+k)^n} \qquad (6)$$

$$P_o = \sum_{t=1}^{n} \frac{CF_t}{(1+k)^t} \tag{7}$$

where,

P_o = market price at time $t=0$.

The market cost of capital implicitly incorporates investor's perceptions of risk and expectations about inflation over the life of future cash flows. It is straightforward to solve for the market cost of capital, k, as we are confronted with one equation and one unknown value. For example, to solve for the internal rate of cost of a debt obligation of a borrowing firm, such as bond, simply determine the internal rate of discount that equates the positive cash flow occurring at time zero, CF_o, and the negative flows, $-\Sigma CF_t$, which represent the annual interest cost and retirement of the principle. The discounted negative cash flows from the perspective of the borrowing firm can be shown as $-\Sigma CF_t/(1+k)^t$. The analysis problem for lenders is precisely the same except that the signs attending the cash flows are reversed. Hence, the rate of discount is both the opportunity cost of capital to investors, given market arbitrage, and the cost of capital to the borrowing firm.

Constant Growth Discounted Cash Flow

For equity capital, investors' expected earnings reflect expectations of future cash flows associated with shares of stock, and thus determine the stock price currently. Assume that investors expect earnings, E_t, and dividends, D_t, to grow at some constant rate, g, over the future, such that:

$$E_t = (1+g)E_{t-1} \tag{8}$$
$$E_1 = (1+g)E_o$$
$$E_2 = (1+g)E_1 = (1+g)^2 E_o$$
$$\text{--}$$
$$\text{--}$$
$$\text{--}$$
$$En = (1+g)^n E_o .$$

Dividends of course are a function of earnings and therefore represent, along with price appreciation, the discounted cash flows. Dividends can thus be shown similarly to that of earnings, as below:

$$D_t = (1+g)D_{t-1} \tag{9}$$

i.e.,
$$D_1 = (1+g)D_o$$
$$D_2 = (1+g)D_1 = (1+g)^2 D_o$$
$$\text{--}$$
$$\text{--}$$
$$\text{--}$$
$$D_n(1+g)^n D_o .$$

Further, assume that dividends, D_t, are a fixed share, m, of earnings, E_t, such that:

$$D_t = mE_t \qquad \text{and,} \qquad D_t / E_t = m \,. \tag{10}$$

From equation (8), then:

$$D_t = m(1+g)E_{t-1} \tag{11}$$

$$\text{and,} \qquad D_n = m(1+g)^n E_o \,.$$

Restating equation (7) to represent dividends as a fixed share of earnings which are paid out, provides:

$$\begin{aligned} P_o &= \sum_{t=1}^{n} \frac{mE_t}{(1+k)^t} \\ &= \frac{mE_1}{(1+k)^1} + \frac{mE_2}{(1+k)^2} + \frac{mE_3}{(1+k)^3} + \cdots + \frac{mE_n}{(1+k)^n} \,. \end{aligned} \tag{12}$$

Observation will disclose that in fact the payout ratio is volatile and tends to offset the volatility in earnings so that dividend growth (realized cash flows) is smoothed.

Equation (12) can be restated to read:

$$\begin{aligned} P_o &= \frac{D_1}{(1+k)} + \frac{D_2}{(1+k)^2} + \frac{D_3}{(1+k)^3} + \cdots + \frac{D_n}{(1+k)^n} \\ &= \sum_{t=1}^{n} \frac{D_t}{(1+k)^t} \,. \end{aligned} \tag{13}$$

The relationship between D_{t-1} and D_t is simply $(1+g)$, which is also the relationship between E_{t-1} and E_t defined in (8). And, with an assumed constant payout ratio or share of earnings, the following is obtained:

$$\begin{aligned} P_o &= \frac{D_o(1+g)}{(1+k)} + \frac{D_o(1+g)^2}{(1+k)^2} + \frac{D_o(1+g)^3}{(1+k)^3} + \cdots + \frac{D_o(1+g)^n}{(1+k)^n} \\ &= \sum_{t=1}^{n} \frac{D_o(1+g)^t}{(1+k)^t} \,. \end{aligned} \tag{14}$$

Now, assume an infinite time horizon:

$$P_o = \frac{D_o(1+g)}{(1+k)} + \frac{D_o(1+g)^2}{(1+k)^2} + \frac{D_o(1+g)^3}{(1+k)^3} + \cdots + \frac{D_o(1+g)^\infty}{(1+k)^\infty} \,. \tag{15}$$

Equation (15) above is simply a geometric series with a growth and discounting parameter, *(1+g)/(1+k),* that defines the relative value of any two sequential terms.[48] Therefore, (15) may be expressed as:

$$P_o = \frac{D_o(1+g)}{(1+k)}\left[\frac{1-[(1+g)/(1+k)]^{\infty}}{1-(1+g)/(1+k)}\right]. \tag{16}$$

And since $[(1+g)/(1+k)]^{\infty}$ is zero,[49] and $(1-(1+g)/(1+k))$ is equal to $(k-g)/(1+k)$, the following form can be obtained:

$$P_o = D_o(1+g)/(k-g). \tag{17}$$

Multiplying through by $(k-g)$ and $1/P_o$, and rearranging gives:

$$k = D_o(1+g)/P_o + g. \tag{18}$$

This is the derived form of the constant growth Discounted Cash Flow model.

In addition, the assumption of an infinite time horizon can be relaxed. Assume that the investor has a finite time horizon, *n,* with a salvage value equal to P_n and a constant price-earnings ratio. Equation (14) is then restated as:

$$P_o = \sum_{t=1}^{n}\frac{D_o(1+g)^t}{(1+k)^t} + \frac{P_n}{(1+k)^n}. \tag{19}$$

Since $P_o/E_o = P_n/E_n$, $P_n = P_o(1+g)^n$. Thus, (19) can be restated as:

$$P_o = \sum_{t=1}^{n}\frac{D_o(1+g)^t}{(1+k)^t} + \frac{P_o(1+g)^n}{(1+k)^n}. \tag{20}$$

The first term on the right may be restated as described above, and incorporated into (20), shown below:

$$P_o = \frac{D_o(1+g)}{(k-g)}\left[1-(1+g)^n/(1+k)^n\right] + P_o(1+g)^n/(1+k)^n. \tag{21}$$

Rearranging and simplifying terms obtains:

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[48] With $(1+g) = d$, and $(1+k) = r$, a series of the form:

$$\sum_{t=1}^{n} a(d/r)^t = a\sum_{t=1}^{n}(d/r)^t.$$

This may be alternately expressed as:

$$a\frac{d}{r}[(1-(d/r)^n)/(1-(d/r))].$$

[49] If $k>g$

$$P_o - P_o(1+g)^n/(1+k)^n = \frac{D_o(1+g)}{(k-g)}[1-(1+g)^n/(1+k)^n] \quad (22)$$

or,

$$P_o[1-(1+g)^n/(1+k)^n] = \frac{D_o(1+g)}{(k-g)}[1-(1+g)^n/(1+k)^n] .$$

Now, dividing both sides by $[1-(1+g)^n/(1+k)^n]$ gives an equivalent result to (16):

$$P_o = D_o(1+g)/(k-g) . \quad (23)$$

Rearranging terms provides:

$$k = D_o(1+g)/P_o + g . \quad (24)$$

Thus, the constant growth form of Discounted Cash Flow is derived for a finite time horizon.

Multi-Stage DCF

The model of constant growth over the future holding period may not be a fully satisfactory representation of investor expectations under some market conditions. The constant growth form can be generalized to a varying growth path or growth with stochastic elements. Such approach increases complexity.

As a practical matter, a useful extension of the constant growth model known as multi-stage DCF can be easily developed. Arguably, multi-stage DCF presents a platform for a more accurate representation of expectations of growth harbored by investors. A derived form of the multi-stage form is developed below:

Multi-stage DCF can be shown as a restatement of Equation 14 with three patterns or rates of growth applicable to specific forward timeframes or stages:

$$P_o = \sum_{t=1}^{5} \frac{D_o(1+g_1)^t}{(1+k)^t} + \sum_{t=1}^{5} \frac{D_5(1+g_2)^t}{(1+k)^t}(1/(1+k)^5) + \sum_{t=1}^{\infty} \frac{D_{10}(1+g_3)^t}{(1+k)^t}(1/(1+k)^{10}) . \quad (25)$$

Each stage can be shown in a simplified form. We begin by separating out the first stage, S_1 – *i.e.,* the first rhs term with growth = g_1 – as follows:

$$S_1 = \sum_{t=1}^{5} \frac{D_o(1+g_1)^t}{(1+k)^t} . \quad (26)$$

Pulling out the initial rate of dividends, D_0, from the sum,

$$S_1 = D_o \sum_{t=1}^{5} \frac{(1+g_1)^t}{(1+k)^t} .$$

Presenting the ratio of the growth and discount factors as a single term, $F = \frac{(1+g_1)}{(1+k)}$,

and incorporating *F* into the sum, $S_1 = D_o \sum_t^5 F^t$.

The sum can then be expanded as follows:

$$S_1 = D_o\left(F^1 + F^2 + \cdots + F^5\right). \tag{27}$$

Defining a new term equal to unity, $\frac{(1-F)}{(1-F)}$, and including the term into the rhs of Equation 27:

$$S_1 = D_o\left(F^1 + F^2 + \cdots + F^5\right)\left(\frac{(1-F)}{(1-F)}\right), \text{ and then expanding,}$$

$$S_1 = D_o\left((F^1 + F^2 + \cdots + F^5) - (F^2 + F^3 + \cdots + F^6)\right)/(1-F). \tag{28}$$

Canceling terms of Equation 28 provides, $S_1 = D_o(F^1 - F^6)/(1-F)$, and then collecting common terms gives a simplified result, as follows:

$$S_1 = D_o F^1 (1-F^5)/(1-F). \tag{29}$$

Expanding *F* in Equation 28 provides,

$$S_1 = D_o\left(\frac{(1+g_1)}{(1+k)}\right)\left(1-\left(\frac{(1+g_1)}{(1+k)}\right)^5\right)/\left(\frac{(1+k)-(1+g_1)}{(1+k)}\right).$$

Finally, canceling terms to simplify Equation 29 provides the result,

$$S_1 = D_o(1+g_1)\left(1-\left(\frac{(1+g_1)}{(1+k)}\right)^5\right)/(k-g_1). \tag{30}$$

The above result for Stage 1 can be stated as follows,

$$S_1 = D_o\left(\frac{(1+g_1)}{(k-g_1)}\right)\left(1-\left(\frac{(1+g_1)}{(1+k)}\right)^5\right). \tag{31}$$

Note that this outcome for Stage 1 is identical to Equation 22, above.

Stage 2 of Equation 24 is:

$$S_2 = \sum_{t=1}^{5} \frac{D_5(1+g_2)^t}{(1+k)^t}(1/(1+k)^5).$$

The derived form of Stages 2 and 3 are obtained through application of the same procedures as above, and need not be reviewed. The derived result for Stage 2 is as follows:

$$S_2 = D_5\left(\frac{(1+g_2)}{(k-g_2)}\right)\left(1-\left(\frac{(1+g_2)}{(1+k)}\right)^5\right)(1/(1+k)^5). \quad (32)$$

Stage 3 of Equation 25 is:

$$S_3 = \sum_{t=1}^{\infty}\frac{D_{10}(1+g_3)^t}{(1+k)^t}(1/(1+k)^{10}).$$

Similarly, the derived form of Stage 3 is:

$$S_3 = D_{10}\left(\frac{(1+g_3)}{(k-g_3)}\right)\left(1-\left(\frac{(1+g_3)}{(1+k)}\right)^{\infty}\right)(1/(1+k)^{10}). \quad (33)$$

Note that in Stage 3, the second term in the second bracket of the rhs vanishes as a result of, by assumption, $k>g$.

APPENDIX II

Capital Asset Pricing Model (CAPM)[50]

The Sharpe-Lintner Capital Asset Pricing Model (CAPM)—William Sharpe (1964) and John Lintner (1966)—is an extension of the one-period, mean-variance portfolio model of Markowitz (1959) and Tobin (1958), which in turn is built on the expected utility model of von Neumann and Morgenstern (1953). The Markowitz mean-variance analysis is concerned with how the investor should allocate wealth among the various assets available in the market, given that the investor is a one-period utility maximizer.

The derived CAPM shows how the valuation of a financial asset (price) is based upon two components: risk free returns and an *adjusted risk-based return.* Surrogates for risk free returns can be observed directly in capital markets, and include market returns on short- and intermediate-term debt. As a general rule, the cost rates and market returns on government debt obligations serve as appropriate surrogates.

The CAPM defines the market rate of return of asset j as a combination of the risk free return, R_f , and the product of a risk factor and the excess return above the risk free return, $\beta_{jm}(R_m - R_f)$. Excess return is determined as the difference between the return of the market as a whole, R_m, and the risk free return. The relevant risk factor is the well known market beta, which is defined as, the covariation of the market return of individual assets and equity markets as a whole

$$\beta_{jm} = \sigma_{jm}/\sigma^2_m \tag{1}$$

Start with an investment amount, I, where the share, α, is invested in asset j, and the share $(1 - \alpha)$ is invested in the market portfolio, m. The rate of return on the portfolio is,

$$R_\alpha = \alpha R_j + (1 - \alpha)R_m \tag{2}$$

The measure of variation I the portfolio returns is defined as,

$$\sigma_\alpha = [\alpha^2\sigma_j^2 + 2\alpha(1 - \alpha)\sigma_{jm} + (1 - \alpha)^2\sigma_m^2]^{(1/2)}. \tag{3}$$

If the portfolio share coefficient, α, is equal to zero, then the return on the portfolio is equal to R_m. This return point within rate of return – risk space is equivalent to the tangency point of market portfolio with the well-known market line.

Taking the relevant derivatives,

[50] As derived by and shown in *Investment Science*, by David Luenberger, 1998.

$$dR_\alpha / d\alpha = R_j - R_m \tag{4}$$

$$\sigma_\alpha / d\alpha = [\alpha\sigma_j^2 + (1 - 2\alpha)\sigma_{jm} + (\alpha - 1)\sigma_m^2] / \sigma_\alpha . \tag{5}$$

For $\alpha=0$, the solution to (5) is,

$$\sigma_\alpha / d\alpha = (\sigma_{jm} - \sigma_m^2) / \sigma_m . \tag{6}$$

Defining a key relationship:

$$dR_\alpha / d\sigma_\alpha = (dR_\alpha / d\alpha) / (d\sigma_\alpha / d\alpha). \tag{7}$$

For $\alpha=0$, the above result obtains,

$$dR_\alpha / d\sigma_\alpha = (R_j - R_m)\sigma_m / (\sigma_{jm} - \sigma_m^2). \tag{8}$$

The result in (8) defines a rate of change with respect to σ_α, which must be equivalent to the slope of the capital market line. Therefore,

$$(R_j - R_m)\sigma_m / (\sigma_{jm} - \sigma_m^2) = (R_m - R_f) / \sigma_m . \tag{9}$$

Now solving for R_j obtains the capital asset pricing model, stated in its well-known form,

$$R_j = R_f + [(R_m - R_j) / \sigma_m^2]\sigma_{jm} = R_f + \beta_{jm}(R_m - R_f) \tag{10}$$

where β_{jm} is defined as above.

In summary, the CAPM can be shown in the context of the general and well known formulation (as model (referred to in footnote 27 of the report text), where the expected rate of return is a function of risk:

$$R_j = f[E(F)] = R_f + \beta(R_m - R_f).$$

In this formulation, R_j and $f(E(F))$ are shown to be equivalent. As denoted in (3), R_f is the risk-free rate of return, R_M is the market rate of return and $(R_m - R_f)$ is the market price of risk, making β the risk premium attached to holding asset j in the (market) portfolio. The essential issue, then, is whether or not the relevant risk parameter (β) adequately captures all risks, as perceived by investors. As we discuss below, recent empirical evidence suggest that it may not.

Theoretical and Empirical Issues Associated with Use of CAPM to Estimated the Equity Risk Premium

The results of the early studies of CAPM have suggested that a significant positive relationship existed between realized return and systematic risk, as measured by β, and that the relationship between risk and return appeared to be linear. However, the prediction of Sharpe-Lintner version of the model – that a portfolio or asset uncorrelated

with the market should have an expected return equal to the risk-free rate of interest, have not done well, and the evidence has suggested that the average return on "zero-beta" portfolios are higher than the risk-free rate.

The first tests of CAPM on individual stock in the excess return form have been conducted by Lintner (1965) and Douglas (1968) who found that the estimated intercept is significantly different from the risk-free rate r_f and the estimate of β is statistically significant but takes a small value and the residual risk has effect on security returns. Thus, their results appear to contradict the CAPM model. However, the Douglas and Lintner studies appear to suffer from various statistical weaknesses that might explain their anomalous results. The measurement error that might be present in estimated betas in their studies could be explained by the fact that the assumptions of the regression model are not satisfied in practice.[51]

With regard to the test of CAPM in terms of stock portfolios, one classic test was performed by Fama and MacBeth (1973), who used a combined time series-cross sectional estimation to investigate whether the risk premia of the factors are non-zero. Their results showed that the beta coefficient was statistically insignificant and remained small for many sub-periods. In addition, the estimated intercept term was significantly greater than the risk-free rate, once again implying that the predictions of the CAPM might not hold.

Black, Jensen, and Scholes (1972) (Black *et al*) tested CAPM by using time series regression analysis. The results again showed that the intercept term is significantly different from zero and is time varying. They found that when $\beta > 1$, the intercept is negative and conversely when $\beta < 1$, the intercept is positive. Thus the findings of Black *et al* suggest the predictions of CAPM are not supported empirically. Stambaugh (1982) employed a slightly different methodology to test CAPM and found support for Black's version but not for the Sharpe-Lintner version. Gibbons (1982) has used a similar method as the one used by Stambaugh but instead was led to reject both standard and zero-beta CAPM formulations.

One of the principal arguments against the one-factor CAPM that uses only the market to explain excess returns is that it fails to capture the impact of other economic factors that influence investors' expected return (i.e., risk premium). Thus, another avenue of attack on the Sharpe-Lintner-Black CAPM formulations includes studies that have identified variables other than market β to explain a cross-section of expected returns. For example, Basu (1977) showed that the earnings-to-price (E/P) ratio has marginal explanatory power after controlling for β and expected returns appear to be positively related to E/P. Banz (1981) found that a stock's size (i.e., price times share) could help explain expected returns, which means that in the Sharpe-Lintner-Black framework, allowing for market β, expected returns on small stocks are too low and expected returns on large stocks are too high. Bhandari (1988) found that leverage is positively related to expected stock returns,

[51] The violations of the standard model assumptions are that the error terms are not normally distributed, not independently distributed and may be correlated with the excess market return (i.e., the explanatory variable in the regression) perhaps due to omitted variables.

and Fama and French (1992) found that higher book-to-market ratios are associated with higher expected returns in their tests that also include market β.

These anomalies of the Sharpe-Lintner-Black CAPM formulations are stylized facts that can be explained by a multifactor asset pricing model, of the type considered by Merton (1973) and Ross (1976) and discussed in Section 3.5 below. For example, Ball (1978) argued that E/P is a catch-all proxy for omitted factors in asset pricing tests and one can expect it to have explanatory power when an asset pricing model is expanded to include multiple factors but all relevant factors are not included in the estimated model. Chan and Chen (1991) argued that the "stock size" effect is due to the fact that small stocks include depressed firms whose performance is sensitive to business conditions.[52] Fama and French (1992) have shown that since leverage and book-to-market equity are also largely driven by market value of equity, they may also be used as proxies for risk factors that are related to market judgments about the relative prospects of firms. One can expect when asset pricing models allow for multiple factors and, at least in theory, when all relevant factors are included in the asset pricing tests, the anomalies found in earlier work would be resolved.

The alternate approach in Chen, Roll, and Ross (1986) is to look for economic variables that are correlated with stock returns and then to test whether the loading of these economic factors describe the cross section of expected returns. This approach provides insight into how the factors relate to uncertainties about consumption and portfolio opportunities that are of concern to an investor. They examined a range of business condition variables that might be related to return because they are related to shocks to expected future cash flows or discount rates. The most powerful variables are the growth rate of industrial production and the difference between the return on long-term, low-grade corporate bonds and long-term government bonds. The unexpected inflation rate and the difference between the return on long and short government bonds are found to be less significant.

Merton (1973) has constructed a generalized inter-temporal asset pricing model in which factors other than market uncertainty are priced. In Merton's formulation, individuals are solving a lifetime consumption decision in a multi-period setting. He has shown that expected return on assets depends not only on the covariance of the asset with the market but also with the covariance of the asset with changes in the investment opportunity set. Therefore, Merton's formulation can be interpreted as another form of arbitrage pricing theory model. Fama and French (1992) demonstrated that two variables—size and book-to-market-equity—combine to capture the cross-sectional variation in average stock return associated with market beta, size, leverage, book-to-market ratio, and earning-to-price ratio.

In addition to the theoretical problems associated with the application of the CAPM to estimating risk premia, there are also statistical issues to be addressed. The problems of estimating and forecasting systematic risk, (i.e., beta) in the CAPM have been studied by

[52] The presence of depressed firms or firms highly sensitive to the business cycle introduces what is known as a martingale effect in expected returns.

several authors such as Lam (1999), Lally (1998), Bowie and Bradfield (1998), Boabang (1996), Draper and Paudyal (1995), Murray (1995), and Bartholdy and Riding (1994). The classical estimator for β is the well-known ordinary least squares (OLS) estimator, but several authors have shown that this estimator suffers from several deficiencies. For example, it has a mean reversion tendency, it is inefficient when return distributions are non-normal, and has significant bias problems when shares are thinly traded.

Several alternatives to OLS have been proposed in the literature. Included among these are Vasicek (1973) and Blume (1973) who both proposed estimators to improve the mean reversion tendency of the OLS estimator of β, Chan and Lakonishok (1992) proposed robust estimators to ensure more efficient estimation of β, and Scholes and Williams (1977) proposed estimators to deal with the bias problem when shares are infrequently traded. A host of empirical studies have been carried out in order to evaluate the performance of the estimators under various conditions including studies by Draper and Paudyal (1995), Murray (1995), Boabang (1996), and Lally (1998). Of the above-mentioned estimators, the Vasicek-estimator and the robust estimators seem to perform well over a wide range of empirical studies.

PROFILES OF ONTARIO ELECTRIC DISTRIBUTORS

	Revenue (000's)		Net Assets (000's)		Net Income and Interest Paid (000's)		Rate of return		
	2002	2004	2002	2004	2002	2004	Average	Standard Deviation	Coefficient of Variation
Asphodel Norwood Distribution Inc.	$151	$173	$396	$415	-$17	$5	0.74%	1.10%	1.50
Atikoken Hydro Inc.	$474	$919	$1,136	$1,068	-$83	$153	3.58%	6.20%	1.73
Barrie Hydro Distribution Inc	$23,803	$22,812	$93,882	$97,628	$6,828	$7,388	5.20%	4.09%	0.79
Bluewater Power Distributors	$1,918	$2,149	$40,529	$42,683	$2,687	$2,538	5.03%	4.12%	0.82
Brant County Power Inc.	$3,660	$4,615	$9,331	$10,650	$533	$1,038	4.28%	3.64%	0.85
Brantford Power Inc.	$9,154	$12,814	$41,026	$41,626	$4,800	$2,612	4.00%	5.42%	1.36
Burlington Hydro Inc.	$22,198	$24,941	$74,685	$77,697	$6,307	$7,633	7.57%	1.13%	0.15
Cambridge and North Dumfries Hydro Inc.	$14,111	$18,486	$74,264	$72,572	$4,298	$4,742	7.05%	1.78%	0.25
Canadian Niagara Power Inc.	$0	$2,149	$0	$2,762	$2,458	$4,111	5.40%	3.27%	0.60
Centre Wellington Hydro Ltd.	$2,421	$2,488	$7,240	$7,079	$835	$704	6.59%	2.75%	0.42
Chapleau Public Utlities Corporation	$292	$435	$958	$927	$171	-$260	11.50%	23.01%	2.00
Collus Power Corp	$3,747	$3,775	$9,194	$8,696	$113	$478	1.87%	1.32%	0.71
Cooperate Hydro Embrun Inc.	$295	$444	$1,909	$2,059	$146	$93	N/A	N/A	N/a
ELK Energy Inc.	$428	$8,179	$8,302	$7,713	$565	$1,716	12.58%	7.63%	0.61
Enersource Hydro Mississauga Inc.	$86,328	$94,077	$383,352	$387,806	$32,762	$23,763	5.31%	3.20%	0.60
Enwin Powerlines Ltd.	$36,744	$38,110	$139,311	$143,653	$4,411	$812	1.01%	2.03%	2.00
Erie Thames Powerlines Corporation	$4,347	$6,095	$13,264	$14,878	$650	$490	3.17%	4.29%	1.35
Espanola Regional Hydro Distribution Corporation	$979	$990	$1,886	$1,936	-$248	-$100	39.01%	78.02%	2.00
Festival Hydro Inc	$6,539	$8,038	$27,326	$28,176	$2,677	$2,369	6.31%	2.26%	0.36
Fort Frances Power Corporation	-$112	-$426	$3,813	$3,390	$95	-$25	0.69%	0.83%	1.19
Grand Valley Energy	$7	$10	$370	$364	-$8	-$23	0.44%	0.52%	1.17
Graven Hurst Hydro Electric Inc.	$2,740	$2,884	$6,975	$6,763	$575	$794	17.66%	9.14%	0.52
Greater Sudbury Hydro Inc.	$15,600	$16,321	$62,375	$60,486	$51	-$212	0.46%	0.91%	2.00
Grimsby Power Corporation	$2,592	$3,017	$9,835	$10,353	$838	$850	7.65%	2.05%	0.27
Guelph Hydro Electric Systems Inc.	$20,696	$19,347	$72,478	$71,865	$5,794	$5,407	7.23%	1.07%	0.15
Haldimad County Hydro Inc.	$6,058	$9,584	$29,272	$29,476	$3,042	$1,173	3.96%	4.21%	1.06
Halton Hills Hydro Inc.	$7,352	$7,926	$23,774	$24,114	$2,230	$2,161	6.68%	1.74%	0.26
Hawkesbury Hydro Inc.	$867	$1,232	$2,235	$2,019	$3	$277	10.89%	13.94%	1.28
Hearst Power Distribution	$51	$669	$1,258	$1,085	$82	$91	4.24%	4.81%	1.14
Hydro 2000 Inc.	$218	$318	$380	$350	$190	$126	20.54%	14.76%	0.72
Innisfil Hydro Distribution Systems Limited	$5,016	$5,714	$17,932	$16,726	$1,333	$1,366	4.25%	1.69%	0.40
Kenora Hydro Electric Corporation Ltd.	$1,735	$1,639	$4,869	$4,690	$36	$82	0.00%	0.00%	0.00

Kingston Electricity Distribution Limited	$8,457	$8,618	$19,094	$19,759	$1,650	$1,014	2.82%	1.94%	0.69
Kitchener-Wilmot Hydro Inc.	$28,609	$29,984	$121,506	$128,408	$8,407	$9,471	5.42%	1.09%	0.20
Lakefield Distributors Inc.	$532	$554	$1,323	$1,513	$39	$125	4.20%	3.94%	0.94
Lakeland Power Distributors Ltd.	$3,917	$4,363	$12,718	$12,908	$1,004	$1,267	7.62%	3.40%	0.45
London Hydro Inc.	$42,106	$42,464	$159,172	$163,318	$4,771	$12,581	4.30%	2.36%	0.55
Middlesex Power Distribution Corporation	$2,082	$2,215	$8,329	$7,741	$73	$39	0.00%	0.00%	0.00
Midland Power Utility Corporation	$2,083	$2,889	$5,000	$4,736	$258	$870	6.64%	4.06%	0.61
Milton Hydro	$7,439	$8,547	$25,616	$29,054	$2,283	$2,647	6.13%	2.40%	0.39
Niagara Falls Hydro Inc.	$42,880	$58,054	$50,360	$52,849	$5,161	$3,299	6.46%	4.57%	0.71
Niagara-on-the-Lake Hydro Inc.	$3,550	$3,257	$13,262	$16,634	$1,039	$504	3.76%	4.57%	1.21
Norfolk Power Distribution Inc.	$6,892	$7,533	$29,271	$33,747	$390	$1,340	0.47%	0.93%	2.00
North Bay Hydro Distribution Ltd	$6,068	$8,958	$36,194	$27,869	-$2,014	$1,471	4.70%	6.43%	1.37
Northern Ontario Wires Inc.	$7,614	$2,155	$4,307	$3,740	-$140	$18	0.33%	0.67%	2.00
Oakville Hydro Electricity	$24,411	$27,271	$111,390	$105,377	$4,489	$6,863	2.63%	2.65%	1.01
Orangeville Hydro Ltd	$3,524	$3,905	$11,860	$12,749	$1,211	$913	7.12%	1.15%	0.16
Orillia Power Distribution Corporation	$4,707	$7,158	$14,333	$14,829	$1,622	$1,988	9.54%	1.38%	0.14
Oshawa Power and Utilities Corporation	$1,187	$16,799	$34,927	$40,701	$4,030	$4,554	11.83%	0.67%	0.06
Ottawa River Power Corporation / River Energy Solutions Inc.	$3,019	$3,690	$8,847	$8,897	$1,198	$63	7.76%	5.03%	0.65
Parry Sound	$1,000	$1,570	$4,747	$4,555	$173	$291	2.16%	2.09%	0.97
Peterborugh Distribution Inc.	$11,840	$12,916	$38,258	$39,320	$2,107	$3,758	5.95%	4.40%	0.74
PowerStream Inc.	$91,495	$83,505	$345,291	$343,812	$0	$19,399	1.16%	2.32%	2.00
PUC Distribution Ltd.	$10,931	$10,927	$30,310	$29,035	$3,127	$4,195	14.24%	12.95%	0.91
Renfrew Hydro Inc.	$1,150	$1,384	$4,152	$4,028	$342	$283	1.76%	2.31%	1.31
Rideau St Lawrence Distribution Inc.	$1,506	$1,675	$3,180	$3,352	$219	$418	6.36%	4.89%	0.77
Sioux Lookout Hydro Inc.	$800	$1,339	$4,887	$4,903	$398	$188	5.12%	2.96%	0.58
St Thomas Energy Inc.	$5,005	$6,076	$16,546	$17,383	$542	$1,458	10.12%	4.35%	0.43
Tay Hydro Electric Distribution Inc.	$1,219	$1,289	$3,177	$2,891	$323	$299	8.44%	2.35%	0.28
Terrace Bay Superior Wires Inc.	$267	$409	$1,387	$1,239	-$70	$29	2.80%	1.91%	0.68
Veridian Connections Inc.	$18,826	$34,040	$104,452	$98,304	$2,918	$7,326	3.00%	2.15%	0.72
Wasaga Distribution Inc.	$2,383	$2,903	$7,916	$8,210	$163	$583	4.44%	4.03%	0.91
Waterloo North Hydro Inc.	$21,894	$20,753	$83,395	$82,898	$5,578	$6,349	8.13%	4.55%	0.56
Welland Hydro Electric Systems Ltd	$5,150	$5,582	$19,269	$18,624	-$228	$336	1.79%	2.34%	1.30
Welligton Electric Distribution Co Inc.	$37	$427	$1,061	$1,053	$81	$61	1.00%	1.52%	1.52
Wellington North Power Inc.	$1,049	$1,168	$2,418	$2,544	$53	$253	5.59%	5.79%	1.03
West Coast Huron Inc.	$994	$1,607	$3,747	$3,712	$322	$239	3.71%	0.35%	0.09
Westario Power	$5,265	$7,311	$18,139	$19,855	$1,588	$1,212	3.75%	2.74%	0.73
Whitby Hydro Electric Corporation	$14,416	$16,125	$48,457	$52,370	$2,356	$3,036	2.15%	1.60%	0.75
Woodstock Hydro Services Inc.	$5,556	$5,460	$17,232	$17,374	$1,100	$1,002	3.97%	2.87%	0.72
						Average:	**6.29%**	**5.32%**	**0.78**

Appendix IV

Canadian Companies Identified as Utilities by TSX

CAPM ESTIMATES OF THE COST OF EQUITY CAPITAL: CANADIAN UTILITIES (SAMPLE 1)

TSX LISTED UTILITIES

Company Name	Ticker	CAPM Beta, 2000 - Current		Realized Total Market Returns	
		Adjusted	Unadjusted	Average, 2002-2005	Variation (S.D.)
Altek Power	APK	1.599	1.83	16.7%	106.9%
TransCanada Pipelines preferred	TCA-PX	0.537	0.25	8.1%	2.0%
Nova Scotia	NSI-PD	0.464	0.14	6.4%	9.9%
Pacific Northern Gas	PNG	0.606	0.35	-2.7%	0.0%
Gax Metro	GZM-UN	0.669	0.44	7.2%	10.8%
Boralex	BLX	1.053	1.02	8.7%	48.7%
TransCanada Pipelines	TRP	0.631	0.39	19.6%	7.5%
Sierra Geothermal	SRA	0.055	-0.47	9.1%	57.2%
	Average	0.70	0.49	9.1%	30.4%
	S. D.	0.45	0.68		

AVERAGE YIELDS AND OVERALL MARKET RETURNS

	1-Year Gov't Debt Interest Rates	10-Year Gov't Debt Interest Rates	30-Year Gov't Debt Interest Rates	1- to 10-Year Spread in Debt Rates	TSX Total Return	Variation in Monthly TSX Returns (S.D.)
2000	5.75%	5.84%	5.12%	0.09%	11.59%	6.16%
2001	7.05%	10.88%	10.82%	3.83%	-17.62%	5.93%
2002	3.01%	5.37%	5.55%	2.37%	-14.24%	3.93%
2003	2.95%	4.90%	5.28%	1.95%	26.68%	2.63%
2004	2.48%	4.66%	5.14%	2.18%	8.04%	2.36%
2005	3.00%	4.08%	4.35%	1.09%	27.09%	3.64%
2006	3.87%	4.17%	4.06%	0.30%		
Average	4.01%	5.70%	5.76%	1.69%	6.92%	4.11%

VARIATION IN YIELDS AND RETURNS, OVER YEARS

	1-Year	10-Year	30-Year	1- to 10-Year Spread	TSX Returns Return
S. D.	1.72%	2.37%	2.29%	1.30%	19.34%

CANADIAN COMPANIES.

CAPM ESTIMATES OF COST OF EQUITY CAPITAL

	Cost of Equity Capital, Unadjusted	Risk-Free Rate	Market Beta, Adjusted	Expected Market Return	Risk Free Rate
Low	7.17%	4.17%	0.61	9.08%	4.17%
High	10.64%	4.17%	0.79	12.33%	4.17%
Weighted Average	8.38%	4.17%	0.70	10.17%	4.17%

	Cost Rate, Adjusted for Issuance Costs
Low	7.67%
High	11.14%
Weighted Average	8.88%

CAPM ESTIMATES OF THE COST OF EQUITY CAPITAL: CANADIAN UTILITIES (Sample 2)

TSX LISTED UTILITIES

Company Name	Ticker	CAPM Beta, Current		Realized Total Market Returns 2000 - Average, 2002-2005	Variation (S.D.)
		Adjusted	Unadjusted		
Canadian Utilities	CU	0.688	0.47	19.2%	21.5%
Coast Mountain Power Corp.	MW	0.53	0.23	27.2%	
Enbridge Inc.	ENB	0.56	0.28	-0.9%	27.9%
Maxim Power Corp	MXG	0.62	0.36	33.4%	66.2%
Pacific Northern Gas	PNG	0.61	0.35	-2.7%	
TransCanada Pipelines	TRP	0.62	0.38	19.6%	7.5%
Fortis Inc.	FTS	0.73	0.54	22.7%	14.1%
Transalta Power	TPW	0.70	0.49	12.7%	13.7%
Canadian Hydro Developers Inc.	KHD	1.02	0.97	33.4%	35.3%
Manitoba Telecom Services Inc.	MBT	0.58	0.32	7.7%	16.7%
Telus Corp		1.56	1.77	25.1%	36.0%
	Average	0.75	0.56	17.9%	26.5%
	S. D.	0.30	0.45		

AVERAGE YIELDS AND OVERALL RETURNS

	1-Year Gov't Debt Interest Rates	10-Year Gov't Debt Interest Rates	30-Year Gov't Debt Interest Rates	1- to 10-Year Spread in Debt Rates	TSX Total Return	Variation in Monthly TSX Returns (S.D.)
2000	5.75%	5.84%	5.12%	0.09%	11.59%	6.16%
2001	7.05%	10.88%	10.82%	3.83%	-17.62%	5.93%
2002	3.01%	5.37%	5.55%	2.37%	-14.24%	3.93%
2003	2.95%	4.90%	5.28%	1.95%	26.68%	2.63%
2004	2.48%	4.66%	5.14%	2.18%	8.04%	2.36%
2005	3.00%	4.08%	4.35%	1.09%	27.09%	3.64%
2006	3.87%	4.17%	4.06%	0.30%		
Average	4.01%	5.70%	5.76%	1.69%	6.92%	4.11%

VARIATION IN YIELDS AND RETURNS, OVER YEARS

	1-Year	10-Year	30-Year	1- to 10-Year Spread	TSX Returns Return
S. D.	1.72%	2.37%	2.29%	1.30%	19.34%

CANADIAN COMPANIES.

CAPM ESTIMATES OF COST OF EQUITY CAPITAL

	Cost of Equity Capital, Unadjusted	Risk-Free Rate	Market Beta, Adjusted	Expected Market Return	Risk Free Rate
Low	7.54%	4.17%	0.69	9.08%	4.17%
High	10.75%	4.17%	0.81	12.33%	4.17%
Weighted Average	8.65%	4.17%	0.75	10.17%	4.17%

	Cost Rate, Adjusted for Issuance Costs
Low	8.04%
High	11.25%
Weighted Average	9.15%

Appendix V

U.S. Electric Utilities

CAPM ESTIMATES OF THE COST OF EQUITY CAPITAL: MID-SIZED ELECTRIC UTILITIES, U.S.

Mid-Sized Electric Utilities		Adjusted Beta		Unadjusted Beta, as Inferred	
Company Name	Ticker	Current Year Data 2004	5yr Ave '00-'04	Current Year Data 2004	5yr Ave '00-'04
Avista Corp.	AVA	0.85	0.68	0.78	0.52
Black Hills	BKH	0.90	0.69	0.85	0.54
Hawaiian Elec.	HE	0.65	0.55	0.48	0.33
IDACORP Inc.	IDA	0.85	0.64	0.78	0.46
PNM Resources	PNM	0.85	0.62	0.78	0.43
Puget Energy Inc.	PSD	0.75	0.62	0.63	0.43
UniSource Energy	UNS	0.65	0.56	0.48	0.34
Cleco Corp.	CNL	1.05	0.74	1.07	0.61
Empire Dist. Elec.	EDE	0.65	0.54	0.48	0.31
MGE Energy	MGEE	0.60	0.51	0.40	0.27
Otter Tail Corp.	OTTR	0.55	0.57	0.33	0.36
CH Energy Group	CHG	0.80	0.65	0.70	0.48
Duquesne Light Hldgs	DQE	0.75	0.58	0.63	0.37
UIL Holdings	UIL	0.80	0.62	0.70	0.43
	Average	0.76	0.61	0.65	0.42
	S. D.	0.14	0.06	0.20	0.10
	Weighted Average:	0.77	0.61	0.66	0.42

AVERAGE YIELDS AND OVERALL RETURNS

	1-Year Gov't Debt Interest Rates	10-Year Gov't Debt Interest Rates	1- to 10-Year Spread in Debt Rates	S&P500 Total Return	Chain-Weighted Rates of Inflation
1950s	2.62	3.22	0.60		2.60
1960s	4.40	4.67	0.28		2.62
1970s	7.00	7.50	0.50	7.92	6.82
1980s	9.74	10.60	0.85	18.23	4.44
1990s	5.36	6.66	1.30	18.99	2.14
2000s	3.32	4.73	1.41	-3.60	1.83
60s, 70s, 90s	5.58	6.28	0.74		
Overall	5.40	6.23	0.83	13.00	3.57

VARIATION IN YIELDS AND RETURNS

	1-Year	10-Year	1- to 10-Year Spread	S&P500 Total Return
1950s	1.07	0.63	0.51	
1960s	1.32	0.91	0.46	
1970s	1.75	0.99	1.02	20.36
1980s	2.70	2.16	1.02	13.07
1990s	1.21	1.00	0.96	14.16
2000s	1.75	0.67	1.23	22.24
60s, 70s, 90s	1.43	0.97	0.81	
Overall	1.96	1.53	0.87	17.46

MID-SIZED ELECTRIC UTILITIES, U.S.

CAPM ESTIMATES OF COST OF EQUITY CAPITAL

	Cost of Equity Capital, Unadjusted	Risk-Free Rate	Market Beta, Adjusted	Expected Market Return	Risk Free Rate
Low	9.11%	4.24%	0.73	10.91%	4.24%
High	13.10%	5.21%	0.80	15.10%	5.21%
Weighted Average	11.05%	4.73%	0.76	13.00%	4.73%

	Cost Rate, Adjusted for Issuance Costs
Low	9.61%
High	13.60%
Weighted Average	11.55%

DCF ESTIMATES OF THE COST OF EQUITY CAPITAL: MID-SIZED ELECTRIC UTILITIES

	Gas Utility Company	Ticker	Dividends Declared Per Share	Average Market Price Per Share, May - June '05	Dividend Yield	Adjusted Yield	Expected Growth	Single Stage DCF Estimates of Cost of Equity Capital
1	Avista Corp.	AVA	$0.55	$16.89	3.26%	3.77%	10.67%	14.44%
2	Black Hills	BKH	$1.28	$34.72	3.69%	4.11%	6.58%	10.69%
3	Hawaiian Elec.	HE	$1.24	$24.81	5.00%	5.51%	5.26%	10.77%
4	IDACORP Inc.	IDA	$1.20	$26.96	4.45%	4.72%	1.21%	5.93%
5	PNM Resources	PNM	$0.77	$27.98	2.75%	3.06%	6.09%	9.15%
6	Puget Energy Inc.	PSD	$1.00	$21.61	4.63%	5.05%	4.19%	9.24%
7	UniSource Energy	UNS	$0.76	$29.74	2.56%	2.77%	3.38%	6.15%
8	Cleco Corp.	CNL	$0.90	$20.23	4.45%	4.68%	0.54%	5.22%
9	Empire Dist. Elec.	EDE	$1.28	$21.74	5.89%	6.66%	8.04%	14.70%
10	MGE Energy	MGEE	$1.37	$33.84	4.05%	4.53%	6.77%	11.29%
11	Otter Tail Corp.	OTTR	$1.12	$24.39	4.59%	5.08%	5.59%	10.66%
12	CH Energy Group	CHG	$2.16	$42.95	5.03%	5.48%	4.07%	9.55%
13	Duquesne Light Hldgs	DQE	$1.00	$17.82	5.61%	5.99%	1.95%	7.94%
14	UIL Holdings	UIL	$2.88	$51.59	5.58%	5.85%	0.11%	5.96%

ESTIMATED COST OF EQUITY CAPITAL SINGLE STAGE DCF, UNADJUSTED

	Dividend Yield	Adjusted Yield	Expected Growth	Estimated Cost Rate
Average	4.40%	4.80%	4.60%	9.41%
S. D.	1.04%	1.11%	3.01%	2.99%
Range				
Low	3.88%	4.25%	3.10%	7.91%
High	4.91%	5.36%	6.11%	10.90%
Weighted Average	4.34%	4.74%	4.46%	9.20%

Cost Rate, Adjusted for Issuance Costs

Weighted Average	9.70%
Range	
Low	8.41%
High	11.40%

3 STAGE DCF ESTIMATES OF THE COST OF CAPITAL: MID-SIZED ELECTRIC UTILITIES

	Gas Utility Company	Ticker	Dividends Declared Per Share	Stage 1 Component Value, 1 - 5 Years	Stage 2 Component Value, 6 - 10 Years	Stage 3 Component Value, Years 11 and Beyond	Average Market Price Per Share, May - June '05	Three Stage DCF Estimates of Cost of Equity Capital
1	Avista Corp.	AVA	$0.55	$2.84	$2.62	$11.43	$16.89	9.44%
2	Black Hills	BKH	$1.28	$5.87	$5.41	$23.44	$34.72	9.75%
3	Hawaiian Elec.	HE	$1.24	$5.44	$4.15	$15.22	$24.81	10.02%
4	IDACORP Inc.	IDA	$1.20	$4.92	$3.46	$18.58	$26.96	8.31%
5	PNM Resources	PNM	$0.77	$3.65	$3.25	$21.07	$27.98	8.00%
6	Puget Energy Inc.	PSD	$1.00	$4.35	$3.24	$14.01	$21.61	9.19%
7	UniSource Energy	UNS	$0.76	$3.43	$2.73	$23.58	$29.74	7.02%
8	Cleco Corp.	CNL	$0.90	$3.60	$2.63	$14.00	$20.23	8.50%
9	Empire Dist. Elec.	EDE	$1.28	$5.83	$4.29	$11.62	$21.74	11.51%
10	MGE Energy	MGEE	$1.37	$6.35	$5.28	$22.21	$33.84	9.53%
11	Otter Tail Corp.	OTTR	$1.12	$4.98	$3.97	$15.44	$24.39	9.87%
12	CH Energy Group	CHG	$2.16	$9.32	$6.69	$26.93	$42.95	9.41%
13	Duquesne Light Hldgs	DQE	$1.00	$4.14	$2.57	$11.11	$17.82	8.74%
14	UIL Holdings	UIL	$2.88	$11.25	$7.42	$32.92	$51.59	8.94%

	Gas Utility Company		Investor Expectations Of Growth In Cash Flows				
			Stage 1	Stage 2	Stage 3 Components		Stage 3
1	Avista Corp.		10.67%	5.61%	**Labor Force:**	0.95%	
2	Black Hills		6.58%	8.95%			
3	Hawaiian Elec.		5.26%	3.47%	**Productivity:**	2.70%	
4	IDACORP Inc.		1.21%	0.75%			
5	PNM Resources		6.09%	5.17%	**Annual Change**	.	
6	Puget Energy Inc.		4.19%	2.06%	**In Energy**		4.99%
7	UniSource Energy		3.38%	1.46%	**Output Ratio:**	0.90	
8	Cleco Corp.		0.54%	2.95%			
9	Empire Dist. Elec.		8.04%	2.65%	**Firm-Specific**		
10	MGE Energy		6.77%	4.71%	**Productivity:**	1.70%	
11	Otter Tail Corp.		5.59%	4.63%			
12	CH Energy Group		4.07%	1.20%	**Firm-Specific**		
13	Duquesne Light Hldgs		1.95%	-3.43%	**Costs wrt GDP:**	0.00%	
14	UIL Holdings		0.11%	0.31%			
						4.99%	
		Average	4.60%	2.89%			
		S.D.	3.01%	2.95%			

Estimated Cost Rate, Unadjusted	
Average	9.16%
S. D.	1.06%
Weighted Average	9.06%
Range	
Low	8.09%
High	10.22%

Cost Rate, Adjusted for Issuance Costs	
Weighted Average	9.56%
Range	
Low	8.39%
High	10.52%

	Average Market Returns Per Annum: Mid-Sized U.S. Electric Utilities				
Company Name	**1995 - 2000**	**1995 - 2001**	**1995 - 2002**	**1995 - 2003**	**1995 - 2004**
Avista Corp.	15.57%	8.09%	4.25%	5.36%	8.09%
Black Hills	16.34%	22.82%	16.36%	14.91%	13.90%
Hawaiian Elec.	5.31%	8.15%	10.17%	9.52%	11.36%
IDACORP Inc.	14.72%	13.12%	9.17%	6.56%	8.09%
PNM Resources	11.01%	17.58%	13.25%	12.62%	14.64%
Puget Energy Inc.	8.96%	8.71%	6.93%	7.19%	7.12%
UniSource Energy	0.30%	5.54%	3.95%	4.79%	7.88%
Cleco Corp.	15.86%	16.44%	12.41%	9.44%	10.85%
Empire Dist. Elec.	13.17%	9.16%	8.23%	8.79%	9.01%
MGE Energy	4.47%	8.57%	9.93%	10.72%	10.71%
Otter Tail Corp.	10.54%	14.30%	13.34%	11.34%	10.20%
CH Energy Group	11.65%	14.45%	14.92%	12.53%	12.35%
Duquesne Light Hldgs	15.44%	6.88%	2.50%	1.57%	4.84%
UIL Holdings	15.64%	14.91%	12.99%	9.73%	12.69%
Sample Average	**11.33%**	**12.04%**	**9.87%**	**8.92%**	**10.12%**
Weighted Average	**10.91%**	**11.83%**	**9.59%**	**8.73%**	**10.02%**

	Five Year Returns: Mid-Sized U.S. Electric Utilities				
Company Name	**1996 - 2000**	**1997 - 2001**	**1998 - 2002**	**1999 - 2003**	**2000 - 2004**
Avista Corp.	15.57%	4.64%	-1.47%	-1.54%	7.97%
Black Hills	16.34%	24.75%	15.69%	11.15%	12.05%
Hawaiian Elec.	5.31%	8.55%	11.23%	8.99%	15.39%
IDACORP Inc.	14.72%	10.91%	6.03%	0.77%	5.71%
PNM Resources	11.01%	14.65%	11.48%	8.89%	17.73%
Puget Energy Inc.	8.96%	7.25%	3.06%	2.73%	5.24%
UniSource Energy	0.30%	6.90%	6.00%	8.23%	20.02%
Cleco Corp.	15.86%	16.49%	12.41%	5.26%	9.02%
Empire Dist. Elec.	13.17%	8.84%	8.32%	5.46%	3.58%
MGE Energy	4.47%	7.73%	12.59%	12.56%	14.95%
Otter Tail Corp.	10.54%	15.63%	16.90%	12.73%	10.20%
CH Energy Group	11.65%	14.17%	13.70%	6.79%	9.55%
Duquesne Light Hldgs	15.44%	3.69%	-3.30%	-9.32%	-5.70%
UIL Holdings	15.64%	14.96%	15.31%	1.19%	8.23%
Sample Average	**11.33%**	**11.34%**	**9.09%**	**5.26%**	**9.58%**
Weighted Average	**10.91%**	**10.97%**	**8.39%**	**4.98%**	**9.71%**

RISK PREMIUM ANALYSIS: MID-SIZED U.S. ELECTRIC UTILITIES

Timeframes	S&P 500 minus Intermediate Term Debt		S&P 500 minus Short Term Debt		GDP Inflation
	Average Per Annum	Geometric	Average Per Annum	Geometric	
1950s	18.2%	16.6%	19.0%	17.4%	2.6%
1960s	4.2%	3.2%	4.8%	3.8%	2.6%
1970s	0.4%	-1.3%	1.2%	-0.7%	6.8%
1980s	8.2%	7.4%	9.3%	8.4%	4.4%
1990s	12.7%	11.8%	14.1%	13.2%	2.1%
2000s	-3.8%	0.0%	-2.5%	0.0%	1.8%
Average, 50s-90s	8.7%	7.5%	9.7%	8.4%	3.7%
'50s, '60s, '80s, '90s	10.8%	9.8%	11.8%	10.7%	2.5%
'70s, '80s	4.3%	3.0%	5.2%	3.9%	5.6%
2000s	-3.8%	0.0%	-2.5%	0.0%	1.8%

Timeframes	Mid-Cap Size Premia		Small-Cap Size Premia		Micro-Cap Size Premia		1-Year Treasury Yields	1-Year 10-Year Spread
	Average	S.D	Average	S.D.	Average	S.D.		
1950s	1.8%	2.1%	2.3%	2.9%	3.6%	4.3%	2.6%	0.6%
1960s	3.0%	3.3%	4.5%	6.5%	8.3%	10.7%	4.4%	0.3%
1970s	3.4%	5.5%	4.6%	9.8%	5.6%	13.8%	7.0%	0.5%
1980s	2.2%	4.2%	3.6%	8.0%	2.4%	11.3%	9.7%	0.9%
1990s	-1.0%	4.2%	-1.6%	5.3%	-1.5%	8.1%	5.4%	1.3%
2000s	2.8%	5.7%	5.7%	7.5%	11.2%	12.3%	3.3%	1.4%
Average, 50s-90s	1.9%	3.8%	2.7%	6.5%	3.7%	11.0%	6.6%	0.7%
'50s, '60s, '80s, '90s	1.5%	3.4%	2.2%	5.7%	3.5%	7.7%	4.1%	0.7%
'70s, '80s	2.8%	4.8%	4.1%	8.9%	4.0%	12.5%	8.4%	0.7%
2000s	2.8%	5.7%	5.7%	7.5%	11.2%	12.3%	3.3%	1.4%
S. D. Across Decades	1.6%		2.6%		4.5%		2.6%	0.5%

Overall Equity Market Return

Cost Rate Components	Market Return Requirements	
	Lower Bound	Upper Bound
1-Year Treasuries	2.0%	4.6%
1-Yr - 10-Yr Spread	1.2%	1.6%
Equity - T. Debt Risk Premia	7.5%	
Expected Overall Market Return	11.5%	13.0%

Cost Rate Adjustments, Small-Sized Equities

Adjustment Component	Lower Bound	Upper Bound
Diversifiable Risks	-3.1%	-1.4%
Small Capitalization Equities	0.9%	3.5%
Very Small Capitalization Equities	1.2%	5.7%

Cost of Capital, Small-Sized Equities

	Lower Bound	Upper Bound
Small Capitalization Equities	9.3%	15.1%
Very Small Capitalization Equities	11.3%	17.3%

Mid-Sized Electric Utilities

	Ticker	Industry	Market Cap ($M)	Beta	Average Beta 2000-2004	Stock Price	Revenues	Operating Margins	Total Assets	Assets/ Revenue
Avista Corp.	**AVA**	**UtilWest**	781.21	0.85	0.68	17.14	1151.58	19.01	3703.82	194.84
Black Hills	**BKH**	**UtilWest**	735.77	0.9	0.69	29.6	1121.70	19.77	2056.16	104.00
Hawaiian Elec.	**HE**	**UtilWest**	1,245.35	0.65	0.55	27.82	1924.06	21.44	9610.63	448.26
IDACORP Inc.	**IDA**	**UtilWest**	1,008.29	0.85	0.64	29.34	844.49	23.88	3234.17	135.43
PNM Resources	**PNM**	**UtilWest**	1,111.11	0.85	0.62	24.57	1604.79	14.56	3487.64	239.54
Puget Energy Inc.	**PSD**	**UtilWest**	1,624.17	0.75	0.62	23.63	2568.81	25.40	5833.37	229.66
UniSource Energy	**UNS**	**UtilWest**	580.72	0.65	0.56	23.67	1169.00	30.38	3175.52	104.53
Cleco Corp.	**CNL**	**UtilCent**	561.06	1.05	0.74	19.41	745.82	22.07	1837.06	83.24
Empire Dist. Elec.	**EDE**	**UtilCent**	379.18	0.65	0.54	21.43	325.54	30.06	1027.54	34.18
MGE Energy	**MGEE**	**UtilCent**	338.20	0.6	0.51	34.67	424.88	20.44	827.37	40.48
Otter Tail Corp.	**OTTR**	**UtilCent**	444.71	0.55	0.57	24.49	882.32	13.46	1134.15	84.26
CH Energy Group	**CHG**	**UtilEast**	514.49	0.8	0.65	45.89	791.51	13.87	1287.00	92.79
Duquesne Light Hldgs	**DQE**	**UtilEast**	757.30	0.75	0.58	18.1	897.30	27.01	2632.80	97.48
UIL Holdings	**UIL**	**UtilEast**	548.40	0.8	0.62	50.59	1101.29	13.44	1787.61	133.01
Average			759.28	0.76	0.61		1,110.94	21.06	2,973.92	144.41

Mid-Sized Electric Utilities

	Equity Participation in Total Capital				Measures of Market Risk			Measures of Business and Financial Risk			
	1995	2000	2003	2004	Beta 2004	Average Beta 2000-2004	Stability of Market Beta	Variation in Cashflow per share 5 Year	Coefficient of Variation in Cashflow per Share 5 Year	Variation in Cashflow per share 10 Year	Coefficient of Variation in Cashflow per Share 10 Year
Avista Corp.	45%	47%	41%	42%	0.85	0.68	0.12	0.43	0.40	0.54	0.47
Black Hills	52%	47%	44%	50%	0.9	0.69	0.17	0.67	0.28	0.65	0.34
Hawaiian Elec.	46%	40%	50%	51%	0.65	0.55	0.06	0.16	0.11	0.13	0.09
IDACORP Inc.	46%	46%	46%	51%	0.85	0.64	0.16	1.11	0.49	0.75	0.33
PNM Resources	49%	49%	52%	52%	0.85	0.62	0.16	0.62	0.40	0.47	0.34
Puget Energy Inc.	51%	37%	42%	39%	0.75	0.62	0.08	0.41	0.29	0.37	0.23
UniSource Energy	1%	16%	21%	23%	0.65	0.56	0.08	0.29	0.22	0.91	0.55
Cleco Corp.	47%	40%	34%	53%	1.05	0.74	0.22	0.12	0.08	0.18	0.14
Empire Dist. Elec.	46%	42%	48%	49%	0.65	0.54	0.08	0.32	0.30	0.26	0.23
MGE Energy	46%	52%	57%	63%	0.6	0.51	0.07	0.05	0.03	0.28	0.18
Otter Tail Corp.	47%	54%	54%	61%	0.55	0.57	0.03	0.12	0.08	0.20	0.14
CH Energy Group	50%	56%	62%	59%	0.8	0.65	0.11	0.39	0.14	0.28	0.10
Duquesne Light Hldgs	47%	33%	35%	36%	0.75	0.58	0.12	0.41	0.40	0.80	0.46
UIL Holdings	33%	48%	50%	53%	0.8	0.62	0.12	0.98	0.30	0.69	0.21
Average	43%	43%	45%	49%	0.76	0.61	0.11		0.25		0.27

Appendix VI

U.S. Natural Gas Utilities

CAPM ESTIMATES OF THE COST OF EQUITY CAPITAL: U.S. GAS DISTRIBUTION UTILITIES

Gas Distribution Utilities		Adjusted Beta		Unadjusted Beta, as Inferred	
Company Name	Ticker	Current Year Data 2004	5yr Ave 00-04	Current Year Data 2004	5yr Ave 00-04
AGL Resources	ATG	0.80	0.68	0.70	0.52
Atmos Energy	ATO	0.65	0.60	0.48	0.40
Cascade Natural Gas	CGC	0.75	0.63	0.63	0.45
Delta Natural Gas	DGAS	0.50	0.48	0.25	0.22
EnergySouth Inc	ENSI	0.50	0.49	0.25	0.24
Laclede Group	LG	0.70	0.60	0.55	0.40
New Jersey Resources	NJR	0.70	0.62	0.55	0.43
NICOR Inc.	GAS	1.00	0.79	1.00	0.69
Northwest Nat. Gas	NWN	0.65	0.60	0.48	0.40
Peoples Energy	PGL	0.75	0.73	0.63	0.60
Piedmont Natural Gas	PNY	0.75	0.65	0.63	0.48
South Jersey Inds.	SJI	0.55	0.49	0.33	0.24
Southwest Gas	SWX	0.80	0.70	0.70	0.55
WGL Holdings Inc.	WGL	0.75	0.65	0.63	0.48
	Average	0.70	0.62	0.56	0.44
	S. D.	0.13	0.09	0.20	0.14
	Weighted Average:	0.75	0.66	0.63	0.49

AVERAGE YIELDS AND OVERALL RETURNS

	1-Year Gov't Debt Interest Rates	10-Year Gov't Debt Interest Rates	1- to 10-Year Spread in Debt Rates	S&P500 Total Return	Chain-Weighted Rates of Inflation
1950s	2.62	3.22	0.60		2.60
1960s	4.40	4.67	0.28		2.62
1970s	7.00	7.50	0.50	7.92	6.82
1980s	9.74	10.60	0.85	18.23	4.44
1990s	5.36	6.66	1.30	18.99	2.14
2000s	3.32	4.73	1.41	-3.60	1.83
60s, 70s, 90s	5.58	6.28	0.74		
Overall	5.40	6.23	0.83	13.00	3.57

VARIATION IN YIELDS AND RETURNS

	1-Year	10-Year	1- to 10-Year Spread	S&P500 Total Return
1950s	1.07	0.63	0.51	
1960s	1.32	0.91	0.46	
1970s	1.75	0.99	1.02	20.36
1980s	2.70	2.16	1.02	13.07
1990s	1.21	1.00	0.96	14.16
2000s	1.75	0.67	1.23	22.24
60s, 70s, 90s	1.43	0.97	0.81	
Overall	1.96	1.53	0.87	17.46

GAS DISTRIBUTION UTILITIES, U.S.

CAPM ESTIMATES OF COST OF EQUITY CAPITAL

	Cost of Equity Capital, Unadjusted	Risk-Free Rate	Market Beta, Adjusted	Expected Market Return	Risk Free Rate
Low	7.05%	4.24%	0.64	8.6%	4.24%
High	14.57%	5.21%	0.77	17.4%	5.21%
Weighted Average	10.94%	4.73%	0.75	13.0%	4.73%

	Adjusted for Issuance Costs
Low	7.55%
High	15.07%
Weighted Average	11.44%

DCF ESTIMATES OF COST OF EQUITY CAPITAL: U.S. GAS DISTRIBUTION UTILITIES

	Gas Utility Company	Ticker	Dividends Declared Per Share	Average Market Price Per Share, May - June '05	Dividend Yield	Adjusted Yield	Expected Growth	Single Stage DCF Estimates of Cost of Equity Capital
1	AGL Resources	ATG	$1.30	$34.11	3.81%	4.05%	6.18%	10.23%
2	Atmos Energy	ATO	$1.25	$26.55	4.71%	4.80%	2.00%	6.80%
3	Cascade Natural Gas	CGC	$0.96	$18.54	5.18%	5.55%	7.21%	12.76%
4	Delta Natural Gas	DGAS	$1.19	$24.68	4.82%	5.07%	5.21%	10.29%
5	EnergySouth Inc	ENSI	$0.83	$26.45	3.14%	3.32%	5.80%	9.12%
6	Laclede Group	LG	$1.38	$28.02	4.93%	5.28%	7.14%	12.42%
7	New Jersey Resources	NJR	$1.36	$43.59	3.12%	3.28%	5.03%	8.31%
8	NICOR Inc.	GAS	$1.86	$37.40	4.97%	5.15%	3.61%	8.77%
9	Northwest Nat. Gas	NWN	$1.32	$35.19	3.75%	3.98%	6.04%	10.02%
10	Peoples Energy	PGL	$2.18	$40.14	5.43%	5.79%	6.68%	12.48%
11	Piedmont Natural Gas	PNY	$0.91	$23.26	3.91%	4.17%	6.64%	10.81%
12	South Jersey Inds.	SJI	$0.65	$27.36	2.38%	2.51%	5.67%	8.18%
13	Southwest Gas	SWX	$0.82	$24.25	3.38%	3.56%	5.15%	8.71%
14	WGL Holdings Inc.	WGL	$1.32	$30.78	4.29%	4.48%	4.38%	8.85%

ESTIMATED COST OF EQUITY CAPITAL SINGLE STAGE DCF, UNADJUSTED

Average	4.13%	4.36%	5.48%	9.84%
S. D.	0.92%	0.97%	1.43%	1.79%
Range				
Low	3.67%	3.85%	4.77%	8.61%
High	4.59%	4.87%	6.20%	11.07%
Weighted Average	4.15%	4.36%	5.25%	9.62%

Cost Rate, Adjusted for Issuance Costs

Weighted Average	10.12%
Range	
Low	9.11%
High	11.57%

3 STAGE DCF ESTIMATES OF THE COST OF CAPITAL U.S. GAS DISTRIBUTION UTILITIES

	Gas Utility Company	Ticker	Dividends Declared Per Share	Stage 1 Component Value, 1 - 5 Years	Stage 2 Component Value, 6 - 10 Years	Stage 3 Component Value, Years 11 and Beyond	Average Market Price Per Share, May - June '05	THREE STAGE DCF ESTIMATES of COST of EQUITY CAPITAL
1	AGL Resources	ATG	$1.30	$5.95	$5.15	$23.01	$34.11	9.41%
2	Atmos Energy	ATO	$1.25	$6.68	$5.38	$14.49	$26.55	11.44%
3	Cascade Natural Gas	CGC	$0.96	$4.62	$3.64	$10.28	$18.54	11.38%
4	Delta Natural Gas	DGAS	$1.19	$5.22	$4.07	$15.38	$24.68	9.96%
5	EnergySouth Inc	ENSI	$0.83	$3.84	$3.43	$19.17	$26.45	8.56%
6	Laclede Group	LG	$1.38	$6.44	$4.64	$16.94	$28.02	9.68%
7	New Jersey Resources	NJR	$1.36	$6.18	$5.54	$31.87	$43.59	8.50%
8	NICOR Inc.	GAS	$1.86	$7.90	$5.85	$23.65	$37.40	9.53%
9	Northwest Nat. Gas	NWN	$1.32	$6.15	$4.80	$24.23	$35.19	8.56%
10	Peoples Energy	PGL	$2.18	$9.74	$7.37	$23.02	$40.14	10.82%
11	Piedmont Natural Gas	PNY	$0.91	$4.22	$3.53	$15.51	$23.26	9.35%
12	South Jersey Inds.	SJI	$0.65	$3.07	$2.87	$21.42	$27.36	7.65%
13	Southwest Gas	SWX	$0.82	$3.62	$3.59	$17.03	$24.25	9.64%
14	WGL Holdings Inc.	WGL	$1.32	$5.80	$4.49	$20.49	$30.78	9.06%
							Average	9.54%

	Utility		Investor Expectations Of Growth In Cash Flows				
			Stage 1	Stage 2	Stage 3 Components		Stage 3
1	AGL Resources		6.18%	6.36%	**Labor Force:**	0.95%	,
2	Atmos Energy		13.92%	1.91%			,
3	Cascade Natural Gas		9.94%	3.61%	**Productivity:**	2.70%	,
4	Delta Natural Gas		5.21%	4.21%			,
5	EnergySouth Inc		5.80%	6.37%	**Annual Change**	.	,
6	Laclede Group		7.14%	-0.38%	**In Energy**		4.99%
7	New Jersey Resources		5.03%	6.97%	**Output Ratio:**	0.90	,
8	NICOR Inc.		3.61%	2.78%			,
9	Northwest Nat. Gas		6.04%	1.35%	**Firm-Specific**		,
10	Peoples Energy		6.68%	3.50%	**Productivity:**	1.70%	,
11	Piedmont Natural Gas		6.64%	4.72%			,
12	South Jersey Inds.		5.67%	6.48%	**Firm-Specific**		,
13	Southwest Gas		5.15%	12.48%	**Costs wrt GDP:**	0.00%	
14	WGL Holdings Inc.		4.38%	3.09%			
					TOTAL:	4.99%	
		Average	6.53%	4.53%			
		S.D.	2.59%	3.14%			

Estimated Cost Rate, Unadjusted	
Average	9.54%
S. D.	1.10%
Weighted Average	9.57%
Range	
Low	8.44%
High	10.64%

Cost Rate, Adjusted for Issuance Costs	
Weighted Average	10.07%
Range	
Low	8.74%
High	11.14%

U.S. Natural Gas Distribution Utilities
Average Returns Per Annum

Company Name	1995 - 2000	1995 - 2001	1995 - 2002	1995 - 2003	1995 - 2004
AGL Resources	6.84%	10.89%	10.59%	11.68%	12.44%
Atmos Energy	7.38%	10.09%	8.85%	8.97%	9.58%
Cascade Natural Gas	8.16%	11.17%	10.97%	9.29%	9.79%
Delta Natural Gas	4.27%	7.56%	9.30%	9.54%	10.33%
EnergySouth Inc	12.72%	13.46%	15.42%	15.12%	17.14%
Laclede Group	6.97%	9.28%	8.90%	9.11%	10.45%
New Jersey Resources	17.41%	16.18%	16.05%	15.60%	16.15%
NICOR Inc.	11.53%	12.09%	10.79%	8.59%	8.91%
Northwest Nat. Gas	6.82%	8.29%	9.93%	9.20%	10.04%
Peoples Energy	11.06%	13.35%	11.63%	11.32%	11.62%
Piedmont Natural Gas	13.32%	14.88%	13.91%	13.52%	14.07%
South Jersey Inds.	13.09%	13.66%	13.10%	13.44%	14.92%
Southwest Gas	11.15%	12.13%	11.71%	9.94%	10.30%
WGL Holdings Inc.	12.71%	12.36%	10.62%	9.53%	10.16%
Sample Average	**10.26%**	**11.84%**	**11.55%**	**11.06%**	**11.84%**
Weighted Average	**10.55%**	**12.18%**	**11.47%**	**11.08%**	**11.73%**

U.S. Natural Gas Distribution Utilities

Five Year Returns

Company Name	1996 - 2000	1997 - 2001	1998 - 2002	1999 - 2003	2000 - 2004
AGL Resources	6.84%	9.32%	8.70%	11.92%	14.66%
Atmos Energy	7.38%	6.24%	4.49%	2.00%	5.25%
Cascade Natural Gas	8.16%	10.95%	10.64%	9.09%	9.86%
Delta Natural Gas	4.27%	8.47%	10.02%	11.25%	13.28%
EnergySouth Inc	12.72%	12.62%	12.79%	9.55%	17.65%
Laclede Group	6.97%	7.22%	6.74%	6.40%	10.56%
New Jersey Resources	17.41%	13.43%	13.86%	11.51%	13.47%
NICOR Inc.	11.53%	9.78%	5.58%	0.95%	4.04%
Northwest Nat. Gas	6.82%	6.64%	7.47%	5.84%	10.23%
Peoples Energy	11.06%	10.33%	6.95%	7.24%	8.70%
Piedmont Natural Gas	13.32%	13.49%	12.45%	8.03%	10.36%
South Jersey Inds.	13.09%	12.47%	12.30%	11.20%	15.83%
Southwest Gas	11.15%	10.53%	9.99%	5.18%	2.48%
WGL Holdings Inc.	12.71%	10.55%	7.39%	4.11%	7.07%
Sample Average	**10.26%**	**10.14%**	**9.20%**	**7.42%**	**10.20%**
Weighted Average	**10.55%**	**10.09%**	**8.64%**	**6.95%**	**9.55%**

RISK PREMIUM ANALYSIS: U.S. NATURAL GAS DISTRIBUTION UTILITIES

Timeframes	S&P 500 minus Intermediate Term Debt		S&P 500 minus Short Term Debt		GDP Inflation
	Average Per Annum	Geometric	Average Per Annum	Geometric	
1950s	18.2%	16.6%	19.0%	17.4%	2.6%
1960s	4.2%	3.2%	4.8%	3.8%	2.6%
1970s	0.4%	-1.3%	1.2%	-0.7%	6.8%
1980s	8.2%	7.4%	9.3%	8.4%	4.4%
1990s	12.7%	11.8%	14.1%	13.2%	2.1%
2000s	-3.8%	0.0%	-2.5%	0.0%	1.8%
Average, 50s-90s	8.7%	7.5%	9.7%	8.4%	3.7%
'50s, '60s, '80s, '90s	10.8%	9.8%	11.8%	10.7%	2.5%
'70s, '80s	4.3%	3.0%	5.2%	3.9%	5.6%
2000s	-3.8%	0.0%	-2.5%	0.0%	1.8%

Timeframes	Mid-Cap Size Premia		Small-Cap Size Premia		Micro-Cap Size Premia		1-Year Treasury Yields	1-Year 10-Year Spread
	Average	S.D	Average	S.D.	Average	S.D.		
1950s	1.8%	2.1%	2.3%	2.9%	3.6%	4.3%	2.6%	0.6%
1960s	3.0%	3.3%	4.5%	6.5%	8.3%	10.7%	4.4%	0.3%
1970s	3.4%	5.5%	4.6%	9.8%	5.6%	13.8%	7.0%	0.5%
1980s	2.2%	4.2%	3.6%	8.0%	2.4%	11.3%	9.7%	0.9%
1990s	-1.0%	4.2%	-1.6%	5.3%	-1.5%	8.1%	5.4%	1.3%
2000s	2.8%	5.7%	5.7%	7.5%	11.2%	12.3%	3.3%	1.4%
Average, 50s-90s	1.9%	3.8%	2.7%	6.5%	3.7%	11.0%	6.6%	0.7%
'50s, '60s, '80s, '90s	1.5%	3.4%	2.2%	5.7%	3.5%	7.7%	4.1%	0.7%
'70s, '80s	2.8%	4.8%	4.1%	8.9%	4.0%	12.5%	8.4%	0.7%
2000s	2.8%	5.7%	5.7%	7.5%	11.2%	12.3%	3.3%	1.4%
S. D. Across Decades	1.6%		2.6%		4.5%		2.6%	0.5%

Overall Equity Market Return

Cost Rate Components	Market Return Requirements	
	Lower Bound	Upper Bound
1-Year Treasuries	2.0%	4.6%
1-Yr - 10-Yr Spread	1.2%	1.6%
Equity - T. Debt Risk Premia	7.5%	
Expected Overall Market Return	11.5%	13.0%

Cost Rate Adjustments, Small-Sized Equities

Adjustment Component	Lower Bound	Upper Bound
Diversifiable Risks	-3.4%	-1.5%
Small Capitalization Equities	0.9%	3.5%
Very Small Capitalization Equities	1.2%	5.7%

Cost of Capital, Small-Sized Equities

	Lower Bound	Upper Bound
Small Capitalization Equities	8.9%	15.0%
Very Small Capitalization Equities	11.2%	17.2%

U.S. Natural Gas Distribution Utilities

	Ticker	Industry	Market Cap ($M)	Beta	Average Beta 2000-2004	Stock Price	Revenues	Operating Margins	Total Assets	Assets/ Revenue
AGL Resources	**ATG**	**GasDist**	1,385.00	0.8	0.68	32.04	1832.00	25.16	5640.00	224.17
Atmos Energy	**ATO**	**GasDist**	1,133.46	0.65	0.6	26.15	2920.04	11.91	2869.88	240.96
Cascade Natural Gas	**CGC**	**GasDist**	118.51	0.75	0.63	20.22	318.08	15.58	422.62	27.13
Delta Natural Gas	**DGAS**	**GasDiv**	48.83	0.5	0.48	26.04	79.19	21.19	138.37	6.53
EnergySouth Inc	**ENSI**	**GasDist**	93.86	0.5	0.49	27.41	115.97	40.64	242.45	5.97
Laclede Group	**LG**	**GasDist**	357.02	0.7	0.6	30.14	1250.32	8.23	1265.30	153.74
New Jersey Resources	**NJR**	**GasDist**	467.92	0.7	0.62	42.38	2533.61	6.30	1855.60	294.54
NICOR Inc.	**GAS**	**GasDist**	750.70	1	0.79	35.67	2739.70	12.51	3975.20	317.76
Northwest Nat. Gas	**NWN**	**GasDist**	568.52	0.65	0.6	32.50	707.60	23.66	1732.19	73.21
Peoples Energy	**PGL**	**GasDist**	870.08	0.75	0.73	42.31	2260.20	12.30	3094.79	251.61
Piedmont Natural Gas	**PNY**	**GasDist**	854.90	0.75	0.65	22.58	1529.74	17.07	2335.88	136.84
South Jersey Inds.	**SJI**	**GasDist**	346.10	0.55	0.49	25.71	819.08	14.12	1243.33	88.05
Southwest Gas	**SWX**	**GasDist**	705.68	0.8	0.7	24.61	1477.06	21.60	2938.12	136.02
WGL Holdings Inc.	**WGL**	**GasDist**	853.42	0.75	0.65	29.56	2089.60	13.93	2504.91	179.82
Average			611.00	0.70	0.62		1,476.58	17.44	2,161.33	152.60

U.S. Natural Gas Distribution Utilities

	Equity Participation in Total Capital				Measures of Market Risk			Measures of Business and Financial Risk			
	1995	2000	2003	2004	Beta 2004	Average Beta 2000-2004	Stability of Market Beta	Variation in Cashflow per share 5 Year	Coefficient of Variation in Cashflow per Share 5 Year	Variation in Cashflow per share 10 Year	Coefficient of Variation in Cashflow per Share 10 Year
AGL Resources	48%	48%	50%	46%	0.80	0.68	0.10	0.41	0.23	0.41	0.27
Atmos Energy	55%	52%	50%	57%	0.65	0.60	0.05	0.26	0.18	0.31	0.22
Cascade Natural Gas	45%	49%	44%	48%	0.75	0.63	0.08	0.24	0.19	0.32	0.31
Delta Natural Gas	49%	38%	46%	48%	0.50	0.48	0.03	0.12	0.08	0.27	0.22
EnergySouth Inc	44%	55%	48%	53%	0.50	0.49	0.02	0.23	0.17	0.28	0.24
Laclede Group	59%	55%	49%	48%	0.70	0.60	0.08	0.28	0.18	0.25	0.16
New Jersey Resources	41%	53%	62%	60%	0.70	0.62	0.07	0.31	0.14	0.43	0.24
NICOR Inc.	59%	67%	60%	60%	1.00	0.79	0.19	0.43	0.16	0.36	0.14
Northwest Nat. Gas	50%	51%	50%	54%	0.65	0.60	0.04	0.10	0.06	0.26	0.16
Peoples Energy	51%	65%	53%	49%	0.75	0.73	0.03	0.35	0.13	0.42	0.16
Piedmont Natural Gas	50%	54%	58%	56%	0.75	0.65	0.08	0.13	0.12	0.15	0.15
South Jersey Inds.	48%	38%	49%	51%	0.55	0.49	0.04	0.20	0.16	0.28	0.27
Southwest Gas	35%	36%	34%	36%	0.80	0.70	0.07	0.22	0.18	0.52	0.50
WGL Holdings Inc.	59%	55%	54%	57%	0.75	0.65	0.06	0.43	0.23	0.33	0.19
Average	49%	51%	51%	52%	0.70	0.62	0.01		0.16		0.23

Appendix VII

U.S. Non-Utilities

CAPM ESTIMATES OF THE COST OF EQUITY CAPITAL: LOW RISK MEDIUIM-SIZED NON-UTILITY COMPANIES, U.S.

Low Risk Medium-Sized Non-Utility Companies, U.S.		Adjusted Beta		Unadjusted Beta,	
Company Name	Ticker	Current Year Data 2004	5yr Avg '00-'04	Current Year Data 2004	5yr Avg '00-'04
Amer. Pacific	APFC	0.50	0.53	0.25	0.30
Andres Wines Ltd. 'A'	ADW/A.TO	0.60	0.56	0.40	0.34
Atlantis Plastics	ATPL	0.60	0.56	0.40	0.34
Atrion Corp	ATRI	0.70	0.68	0.55	0.52
Koss Corp	KOSS	0.35	0.44	0.03	0.16
Marsh Supermarkets 'B'	MARSB	0.45	0.49	0.18	0.24
Max & Erma's Restaurants	MAXE	0.50	0.48	0.25	0.22
NAPCO Security Systems Inc.	NSSC	0.45	0.54	0.18	0.31
New Brunswick Scientific Co	NBSC	0.60	0.60	0.40	0.40
Patriot Transportation Holdin	PATR	0.45	0.00	0.18	-0.49
Peerless Mfg.	PMFG	0.70	0.66	0.55	0.49
Rocky Mountain Choc Factory	RMCF	0.65	0.68	0.48	0.52
S&K Famous Brands	SKFB	0.45	0.48	0.18	0.22
Span-America Medical Systems	SPAN	0.50	0.54	0.25	0.31
Tasty Baking	TSTY	0.65	0.52	0.48	0.28
Village Super Market 'A'	VLGEA	0.55	0.57	0.33	0.36
	Average	0.54	0.52	0.32	0.28
	S. D.	0.10	0.16	0.15	0.23
	Weighted Average:	0.52	0.46	0.29	0.19

AVERAGE YIELDS AND MARKET OVERALL RETURNS

	1-Year Gov't Debt Interest Rates	10-Year Gov't Debt Interest Rates	1- to 10-Year Spread in Debt Rates	S&P500 Total Return	Chain-Weighted Rates of Inflation
1950s	2.62	3.22	0.60		2.60
1960s	4.40	4.67	0.28		2.62
1970s	7.00	7.50	0.50	7.92	6.82
1980s	9.74	10.60	0.85	18.23	4.44
1990s	5.36	6.66	1.30	18.99	2.14
2000s	3.32	4.73	1.41	-3.60	1.83
60s, 70s, 9	5.58	6.28	0.74		
Overall	5.40	6.23	0.83	13.00	3.57

VARIATION IN YIELDS AND RETURNS

	1-Year	10-Year	1- to 10-Year Spread	S&P500 Total Return
1950s	1.07	0.63	0.51	
1960s	1.32	0.91	0.46	
1970s	1.75	0.99	1.02	20.36
1980s	2.70	2.16	1.02	13.07
1990s	1.21	1.00	0.96	14.16
2000s	1.75	0.67	1.23	22.24
60s, 70s, 9	1.43	0.97	0.81	
Overall	1.96	1.53	0.87	17.46

LOW RISK MEDIUM-SIZED NON-UTILITY COMPANIES, U.S.

CAPM ESTIMATES OF COST OF EQUITY CAPITAL

	Unadjusted Cost of Equity	Risk-Free Rate	Market Beta, Adjusted	Expected Market Return	Risk Free Rate
Low	7.38%	3.96%	0.49	10.91%	3.96%
High	11.21%	5.49%	0.60	15.10%	5.49%
Weighted Average	9.06%	4.73%	0.52	13.00%	4.73%

	Cost Rate, Adjusted for Issuance Costs
Low	7.88%
High	11.71%
Weighted Average	9.56%

U.S. SMALL-SIZED NON-UTILITY COMPANIES
AVERAGE MARKET RETURNS PER ANNUM

Company Name	1995 - 2000	1995 - 2001	1995 - 2002	1995 - 2003	1995 - 2004
Amer. Pacific	2.3%	-1.3%	6.6%	4.9%	4.6%
Andres Wines Ltd. 'A'	8.8%	12.1%	14.8%	16.2%	17.3%
Atlantis Plastics	10.1%	-0.7%	4.0%	12.4%	23.8%
Atrion Corp	2.7%	16.7%	16.5%	17.7%	20.1%
Koss Corp	12.5%	24.2%	25.1%	23.0%	22.9%
Marsh Supermarkets 'B'	3.7%	6.5%	5.4%	4.3%	5.4%
Max & Erma's Restaurants	1.9%	4.7%	9.8%	10.4%	9.8%
NAPCO Security Systems Inc.	5.9%	8.0%	12.2%	17.4%	18.0%
New Brunswick Scientific Co	9.9%	3.7%	9.7%	6.1%	7.7%
Patriot Transportation Holdin	2.5%	-0.8%	5.4%	5.0%	7.2%
Peerless Mfg.	7.5%	13.2%	26.5%	17.1%	17.8%
Rocky Mountain Choc Factory	-17.9%	5.5%	8.8%	8.8%	19.7%
S&K Famous Brands	2.0%	5.8%	9.1%	11.6%	11.6%
Span-America Medical Systems	0.8%	6.2%	11.6%	13.9%	17.0%
Tasty Baking	8.8%	15.9%	12.1%	6.1%	5.5%
Village Super Market 'A'	13.6%	12.5%	23.1%	19.1%	19.8%
Sample Average	**4.7%**	**8.2%**	**12.6%**	**12.1%**	**14.3%**
Weighted Average	**5.1%**	**8.0%**	**12.7%**	**12.4%**	**14.7%**

U.S. SMALL-SIZED LOW-RISK NON-UTILITY COMPANIES
FIVE-YEAR RETURNS

Company Name	1996 - 2000	1997 - 2001	1998 - 2002	1999 - 2003	2000 - 2004	Average
Amer. Pacific	2.3%	0.0%	7.7%	1.6%	4.1%	3.1%
Andres Wines Ltd. 'A'	8.8%	9.2%	4.4%	11.3%	20.7%	10.9%
Atlantis Plastics	10.1%	-1.6%	2.1%	15.8%	24.1%	10.1%
Atrion Corp	2.7%	15.0%	18.8%	30.7%	39.0%	21.2%
Koss Corp	12.5%	35.8%	36.1%	29.5%	33.9%	29.6%
Marsh Supermarkets 'B'	3.7%	7.2%	1.0%	1.0%	6.9%	4.0%
Max & Erma's Restaurants	1.9%	8.2%	17.2%	18.8%	18.6%	12.9%
NAPCO Security Systems Inc.	5.9%	7.7%	8.7%	14.5%	24.5%	12.3%
New Brunswick Scientific Co	9.9%	3.1%	9.4%	1.5%	7.6%	6.3%
Patriot Transportation Holdin	2.5%	-1.4%	3.1%	-1.9%	7.9%	2.0%
Peerless Mfg.	7.5%	16.8%	35.0%	22.8%	28.7%	22.2%
Rocky Mountain Choc Factory	-17.9%	16.3%	29.3%	28.3%	50.5%	21.3%
S&K Famous Brands	2.0%	5.6%	2.4%	5.9%	16.0%	6.4%
Span-America Medical Systems	0.8%	3.6%	14.8%	10.7%	25.8%	11.1%
Tasty Baking	8.8%	20.0%	6.5%	-4.6%	1.6%	6.4%
Village Super Market 'A'	13.6%	13.8%	27.3%	20.8%	20.5%	19.2%
Sample Average	**4.7%**	**10.0%**	**14.0%**	**12.9%**	**20.7%**	**12.4%**
Weighted Average	**5.1%**	**9.8%**	**13.5%**	**12.1%**	**20.0%**	**12.1%**

RISK PREMIUM ANALYSIS: U.S. SMALL-SIZED LOW-RISK NON-UTILITY COMPANIES

Timeframes	S&P 500 minus Intermediate Term Debt		S&P 500 minus Short Term Debt		GDP Inflation
	Average Per Annum	Geometric	Average Per Annum	Geometric	
1950s	18.2%	16.6%	19.0%	17.4%	2.6%
1960s	4.2%	3.2%	4.8%	3.8%	2.6%
1970s	0.4%	-1.3%	1.2%	-0.7%	6.8%
1980s	8.2%	7.4%	9.3%	8.4%	4.4%
1990s	12.7%	11.8%	14.1%	13.2%	2.1%
2000s	-3.8%	0.0%	-2.5%	0.0%	1.8%
Average, 50s-90s	8.7%	7.5%	9.7%	8.4%	3.7%
'50s, '60s, '80s, '90s	10.8%	9.8%	11.8%	10.7%	2.5%
'70s, '80s	4.3%	3.0%	5.2%	3.9%	5.6%
2000s	-3.8%	0.0%	-2.5%	0.0%	1.8%

Timeframes	Mid-Cap Size Premia		Small-Cap Size Premia		Micro-Cap Size Premia		1-Year Treasury Yields	1-Year 10-Year Spread
	Average	S.D	Average	S.D.	Average	S.D.		
1950s	1.8%	2.1%	2.3%	2.9%	3.6%	4.3%	2.6%	0.6%
1960s	3.0%	3.3%	4.5%	6.5%	8.3%	10.7%	4.4%	0.3%
1970s	3.4%	5.5%	4.6%	9.8%	5.6%	13.8%	7.0%	0.5%
1980s	2.2%	4.2%	3.6%	8.0%	2.4%	11.3%	9.7%	0.9%
1990s	-1.0%	4.2%	-1.6%	5.3%	-1.5%	8.1%	5.4%	1.3%
2000s	2.8%	5.7%	5.7%	7.5%	11.2%	12.3%	3.3%	1.4%
Average, 50s-90s	1.9%	3.8%	2.7%	6.5%	3.7%	11.0%	6.6%	0.7%
'50s, '60s, '80s, '90s	1.5%	3.4%	2.2%	5.7%	3.5%	7.7%	4.1%	0.7%
'70s, '80s	2.8%	4.8%	4.1%	8.9%	4.0%	12.5%	8.4%	0.7%
2000s	2.8%	5.7%	5.7%	7.5%	11.2%	12.3%	3.3%	1.4%
S. D. Across Decades	1.6%		2.6%		4.5%		2.6%	0.5%

Overall Equity Market Return			Cost Rate Adjustments, Small-Sized Equities			Cost of Capital, Small-Sized Equities		
Cost Rate Components	Market Return Requirements		Adjustment Component	Lower Bound	Upper Bound		Lower Bound	Upper Bound
	Lower Bound	Upper Bound						
1-Year Treasuries	2.0%	4.6%	**Diversifiable Risks**	-4.6%	-2.9%	**Small Capitalization Equities**	7.7%	13.6%
1-Yr - 10-Yr Spread	1.2%	1.6%	**Small Capitalization Equities**	0.9%	3.5%	**Very Small Capitalization Equities**	9.8%	15.8%
Equity - T. Debt Risk Premia	7.5%		**Very Small Capitalization Equities**	1.2%	5.7%			
Expected Overall Market Return	11.5%	13.0%						

Appendix VIII

Profiles of TSX-Listed Utility Companies

Canadian Dollars (Millions) Except Where Noted

Company	Revenue		Operating Income		Assets	
	2005	Annual % Change 2001-2005	2005	Change 2001-2005	2005	Annual % Change 2001-2005
Shear Wind Inc.[1]	0.00	N/A	(0.04)	N/A	0.45	N/A
Sierra Geothermal Power Corp	0.00	N/A	(0.31)	(0.39)	0.58	333.22%
SmartCool Systems Inc.	0.00	N/A	(0.96)	(0.52)	0.65	30.10%
Sofame Technologies Inc	1.51	8.41%	0.35	1.39	1.10	-21.07%
Clearford Industries Inc.	0.02	11.90%	(2.32)	(1.47)	1.30	12.81%
Western Wind Energy Corp	0.00	N/A	(6.67)	(6.58)	3.79	108.75%
Nevada Geothermal Power Inc.[5]	0.00	N/A	0.80	0.63	4.00	170.62%
Plutonic Power Corporation[3]	0.00	N/A	(0.92)	(0.84)	4.02	128.77%
Altek Power Corp.	1.94	52.89%	(0.90)	0.02	5.83	12.35%
Coast Mountain Power Corp.	0.00	N/A	(0.80)	(0.74)	7.03	122.45%
Hy-Drive Technologies Ltd.[3]	0.02	N/A	(3.24)	5.19	7.40	108.92%
Athlone Energy Ltd.*	1.03	N/A	(0.58)	(0.52)	11.76	137.16%
Run of River Power Inc.	0.75	135.72%	(1.25)	(1.24)	23.51	143.27%
Western GeoPower Corp.	0.00	N/A	(3.39)	(3.23)	37.51	87.09%
Polaris Geothermal Inc.[2] **	0.77	N/A	(3.57)	(0.91)	43.39	16.60%
Guest-Tek Interactive Entertainment Ltd.[4] *	43.20	72.47%	(2.85)	(3.44)	49.46	117.22%
Macro Enterprises Inc[2] *	81.00	71.36%	13.51	11.22	56.53	71.11%
Pacific Northern Gas Ltd.	159.95	3.65%	18.64	(1.84)	215.21	0.96%
Caribbean Utilities Company, Ltd.* **	135.68	10.77%	23.35	0.85	312.99	6.22%
Boralex Inc.	115.62	5.65%	23.57	1.27	429.52	4.93%
Canadian Hydro Developers, Inc.	28.90	16.65%	9.72	2.89	583.35	42.71%
Great Lakes Hydro Income Fund	154.46	30.31%	80.33	53.86	1,130.76	19.34%
Gaz Metro Limited Partnership	1,808.20	-3.32%	150.89	9.73	2,661.09	3.16%
TransAlta Corporation	2,838.50	5.18%	441.20	73.30	7,740.70	0.44%
Canadian National Railway Company	7,240.00	6.39%	2,624.00	942.00	22,188.00	1.12%
TransCanada Corporation[4]	6,124.00	5.51%	2,050.00	(143.00)	24,113.00	4.83%

Notes:

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[4] Financial data available for 2002-2005. Change statistics calculated over this period.

[5] Financial data available for 2001-2004. Change statistics calculated over this period and levels presented are for 2004.

Sources:

Company Financial Statements and Annual Reports obtained from www.SEDAR.com.

Profiles of TSX-Listed Utility Companies

Company	Equity Share		Debt Share		Rate of Return			
	2005	Average 2001-2005	2005	Average 2001-2005	2005	Average 2002-2005	Variation	
Shear Wind Inc.1	100.0%	100.0%	0.0%	0.0%	N/A	N/A	N/A	0.45
Sierra Geothermal Power Corp	100.0%	100.0%	0.0%	0.0%	N/A	N/A	N/A	0.58
SmartCool Systems Inc.	100.0%	100.0%	0.0%	0.0%	N/A	N/A	N/A	0.65
Sofame Technologies Inc	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1.10
Clearford Industries Inc.	100.0%	97.2%	0.0%	2.8%	NA/	N/A	N/A	1.30
Western Wind Energy Corp	94.1%	96.7%	5.9%	3.3%	N/A	N/A	N/A	3.79
Nevada Geothermal Power Inc.5	100.0%	100.0%	0.0%	0.0%	40.2%	91.3%	46%	4.00
Plutonic Power Corporation3	100.0%	100.0%	0.0%	0.0%	-31.3%	0.0%	38%	4.02
Altek Power Corp.	49.4%	52.0%	50.6%	48.0%	N/A	N/A	104%	5.83
Coast Mountain Power Corp.	100.0%	96.7%	0.0%	3.3%	-12.6%	-17.2%	13%	7.03
Hy-Drive Technologies Ltd.3	100.0%	100.0%	0.0%	0.0%	N/A	0.0%	56%	7.40
Athlone Energy Ltd.*	100.0%	100.0%	0.0%	0.0%	-6.3%	N/A	N/A	11.76
Run of River Power Inc.	44.8%	89.0%	55.2%	11.0%	-23.4%	N/A	N/A	23.51
Western GeoPower Corp.	87.7%	81.9%	12.3%	18.1%	-14.8%	N/A	N/A	37.51
Polaris Geothermal Inc.2 **	61.5%	67.4%	38.5%	32.6%	-17.0%	0.0%	N/A	43.39
Guest-Tek Interactive Entertainment Ltd.4 *	100.0%	97.3%	0.0%	2.7%	-6.3%	3.1%	14%	49.46
Macro Enterprises Inc2 *	66.2%	51.1%	33.8%	48.9%	N/A	N/A	N/A	56.53
Pacific Northern Gas Ltd.	45.9%	44.2%	54.1%	55.8%	24.6%	25.4%	1%	215.21
Caribbean Utilities Company, Ltd.* **	46.1%	48.6%	53.9%	51.4%	18.0%	15.3%	9%	312.99
Boralex Inc.	44.8%	63.1%	55.2%	36.9%	14.9%	6.1%	7%	429.52
Canadian Hydro Developers, Inc.	59.0%	57.0%	41.0%	43.0%	4.3%	9.0%	3%	583.35
Great Lakes Hydro Income Fund	40.9%	55.6%	59.1%	44.4%	18.0%	16.0%	3%	1,130.76
Gaz Metro Limited Partnership	39.9%	39.8%	60.1%	60.2%	16.6%	18.0%	1%	2,661.09
TransAlta Corporation	49.3%	43.7%	50.7%	56.3%	17.6%	18.0%	6%	7,740.70
Canadian National Railway Company	64.5%	61.8%	35.5%	38.2%	28.3%	23.1%	4%	22,188.00
TransCanada Corporation4	39.6%	36.8%	60.4%	63.2%	29.8%	32.1%	3%	24,113.00
	73.3%	75.2%	26.7%	24.8%	5.9%	16.0%	20.6%	

Notes:

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[5] Financial data available for 2001-2004. Averages calculated over this period and levels presented are for 2004.

Sources:

Company Financial Statements and Annual Reports obtained from www.SEDAR.com.

Profiles of TSX-Listed Companies - Non-Utilities

Canadian Dollars (Millions) Except Where Noted

Company	Revenue		Operating Income		Assets	
	2005	Annual % Change 2001-2005	2005	Change 2001-2005	2005	Annual % Change 2001-2005
Fairchild Investments Ltd. **	0.00	N/A	(0.91)	0.12	0.09	-68.05%
Luca Capital Inc.[1]	0.00	N/A	(0.10)	N/A	0.70	N/A
Audiotech Healthcare Corp.	3.81	7.91%	0.09	0.67	2.59	7.52%
Leis Industries Ltd.	0.00	N/A	(0.25)	(0.04)	2.71	12.57%
Sentex Systems Ltd	3.02	-9.33%	(0.48)	(1.13)	3.58	13.83%
Tribute Resources Inc	0.37	-9.96%	0.05	0.17	3.76	20.20%
Helijet International Inc.	20.06	2.02%	(0.37)	0.26	8.76	-9.90%
Phoenix Capital Inc.[5]	5.31	38.09%	2.19	2.43	12.34	-2.30%
Granville Pacific Capital Corp.*	6.34	2.88%	0.73	(0.00)	12.57	13.73%
Stone Mountain Holdings Inc.	9.15	-16.05%	(3.36)	(4.71)	15.70	-7.18%
General Fasteners Inc	65.49	5.87%	1.75	0.86	18.19	5.11%
Antigua Enterprises Inc. **	45.90	1.84%	3.43	12.57	27.50	3.19%
Intrinsyc Software International, Inc.	17.54	12.52%	(4.63)	(0.01)	28.09	4.44%
Forest & Marine Investments Ltd.	1.22	-6.37%	1.22	(0.36)	38.00	6.89%
Dominion Citrus Limited	125.85	4.24%	3.45	0.38	41.23	18.23%
Rutter Inc.	70.94	N/A	1.58	1.73	56.80	N/A
Viceroy Homes Limited*	102.98	4.06%	5.55	(1.62)	58.43	0.70%
Cygnal Technologies Corporation	125.77	-2.96%	(22.43)	(27.39)	73.55	-4.59%
20-20 Technologies Inc.[3] **	40.48	15.47%	5.94	1.64	78.96	58.61%
Enghouse Systems Limited	48.43	27.11%	5.89	(2.88)	136.72	18.51%
Foremost Income Fund[2]	207.50	29.08%	28.02	7.82	140.53	30.07%
E.D. Smith Income Fund[1]	N/A	N/A	N/A	N/A	N/A	N/A
Cossette Communication Group Inc.	684.28	3.31%	19.95	1.03	226.71	3.20%
Sterling Centrecorp Inc.[4]	75.64	21.92%	15.12	15.51	282.34	37.75%
Van Houtte Inc.*	377.63	4.53%	33.08	1.93	380.12	0.16%
Transat A.T. Inc.	2,364.48	2.74%	92.96	90.31	949.54	10.80%
WestJet Airlines Ltd.	1,395.02	30.68%	60.84	1.48	2,213.09	54.01%
West Fraser Timber Co. Ltd.	3,576.70	23.01%	191.48	4.25	3,633.68	11.88%
Canadian Pacific Railway Limited	4,391.60	4.39%	1,001.40	160.40	10,891.10	3.04%

Notes:

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Sources:

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Profiles of TSX-Listed Companies - Non-Utilities

Company	Equity Share		Debt Share		Rate of Return		
	2005	Average 2001-2005	2005	Average 2001-2005	2005	Average 2002-2005	Variation
Fairchild Investments Ltd.	100.0%	N/A	0.0%	N/A	11.9%	11.5%	5%
Luca Capital Inc.1	100.0%	100.0%	0.0%	0.0%	N/A	N/A	N/A
Audiotech Healthcare Corp.	41.1%	39.5%	58.9%	60.5%	10.4%	3.8%	21%
Leis Industries Ltd.	75.5%	56.6%	24.5%	43.4%	-11.8%	-8.0%	7%
Sentex Systems Ltd	68.7%	78.4%	31.3%	21.6%	-19.7%	3.2%	24%
Tribute Resources Inc	99.1%	88.0%	0.9%	12.0%	2.4%	1.2%	5%
Helijet International Inc.	100.0%	62.1%	0.0%	37.9%	48.9%	N/A	N/A
Phoenix Capital Inc.5	100.0%	95.0%	0.0%	5.0%	0.0%	14.6%	24%
Granville Pacific Capital Corp.*	11.2%	14.1%	88.8%	85.9%	65.7%	64.6%	15%
Stone Mountain Holdings Inc.	1.2%	38.5%	98.8%	61.5%	N/A	N/A	N/A
General Fasteners Inc	100.0%	84.6%	0.0%	15.4%	20.3%	21.0%	1%
Antigua Enterprises Inc.	70.1%	45.6%	29.9%	54.4%	29.5%	N/A	N/A
Intrinsyc Software International, Inc.	100.0%	97.8%	0.0%	2.2%	-19.8%	N/A	N/A
Forest & Marine Investments Ltd.	100.0%	100.0%	0.0%	0.0%	3.4%	2.7%	2%
Dominion Citrus Limited	81.1%	72.0%	18.9%	28.0%	29.6%	45.6%	15%
Rutter Inc.	23.5%	-5.5%	76.5%	105.5%	18.7%	N/A	N/A
Viceroy Homes Limited*	100.0%	100.0%	0.0%	0.0%	13.2%	7.3%	10%
Cygnal Technologies Corporation	53.0%	67.7%	47.0%	32.3%	N/A	N/A	N/A
20-20 Technologies Inc.3	97.7%	93.7%	2.3%	6.3%	16.5%	30.0%	19%
Enghouse Systems Limited	100.0%	100.0%	0.0%	0.0%	5.8%	10.6%	4%
Foremost Income Fund2	77.3%	73.8%	22.7%	26.2%	47.0%	N/A	N/A
E.D. Smith Income Fund1	76.3%	76.3%	23.7%	23.7%	N/A	N/A	N/A
Cossette Communication Group Inc.	98.9%	98.5%	1.1%	1.5%	17.2%	21.2%	3%
Sterling Centrecorp Inc.4	9.9%	31.0%	90.1%	69.0%	N/A	N/A	N/A
Van Houtte Inc.*	71.3%	67.8%	28.7%	32.2%	14.1%	12.8%	1%
Transat A.T. Inc.	100.0%	88.6%	0.0%	11.4%	27.6%	19.3%	21%
WestJet Airlines Ltd.	36.6%	52.6%	63.4%	47.4%	9.7%	15.6%	14%
West Fraser Timber Co. Ltd.	70.2%	72.3%	29.8%	27.7%	10.5%	11.7%	8%
Canadian Pacific Railway Limited	59.4%	52.1%	40.6%	47.9%	23.9%	23.1%	3%
	73.2%	69.3%	26.8%	30.7%	15.6%	16.4%	10.7%

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5 Financial data available for 2001-2004. Averages calculated over this period and levels presented are for 2004.

Sources:

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