Q: Re: Page 2, lines 34-37, on what basis can anyone today accurately predict the trend in interest rates three years hence?

A: It is not clear what "the trend in interest rates three years hence" means. Consequently Dr. Cannon has interpreted this question to be "on what basis can anyone today accurately predict the levels of spot interest rates likely to prevail at various points in time during the next three years?"

The direct, short answer to this question is …"on the basis of the implied forward rates imbedded in the current zero-coupon Government of Canada yield curve." These implied forward rates are the best possible predictors of the levels of rates likely to prevail in the future. The following paragraphs provide an elaboration of this point.

Bond investment professionals are faced daily with the task of predicting the levels of interest rates at various points of time in the future. They need to make these predictions in order to optimize the expected return and risk profiles of the bond portfolios they manage and, on occasion, to attempt to make trading profits by switching between bonds of different maturities to exploit apparent mis-pricings on these bonds in relation to likely future interest rate levels. The predictions that those bond investors make are reflected in their trading activities which, in aggregate, determine the demand and supply of bonds, and hence the prices and yields on these bonds, at each point along the maturity spectrum.

The result of this continuous and broad bond trading activity is that, at any time that bond trading is taking place, there is in the market a "term structure of interest rates" reflecting the yields on bonds that differ from one another only with respect to their number of years to maturity. This term structure of interest rates is displayed in what is called a "yield curve." Most bond investment professionals and virtually all finance academics realize that the consensus forecast of future interest rates (from all the bond traders) can be "teased out of", or derived from, the prevailing yield curve by computing the "forward rates" imbedded in, or implied in, the yield curve. This is possible because most investors and academics believe that the "expectations theory" of interest rates is the strongest force determining the shape of the yield curve. In its simplest form, the "expectations theory" holds that today's observed interest rates are based on bond investors' expectations about what interest rates in the future will be.

In order to minimize any distortions that might impact the calculation of the implied forward Canadian rates and, hence, bond investors' consensus forecast of future Canadian spot rate levels, academics and practitioners use the zero-coupon Government of Canada yield curve for the task, because all Government of Canada bonds have the same issuer, the same credit risk (i.e., zero), and the same coupon rate (i.e., zero).

To illustrate how the zero-coupon Government of Canada bond (strips) yield curve is used for calculating implied forward Canada bond yields, Dr. Cannon has taken the yield curve provided by the Bloomberg Business News Service for 9:29 am on November 10, 2006 and read off of it the following nominal annual (compounded semi-annually) yields to maturity (YTMs) for Canada zero-coupon bond strips:

Canada bond strip	Nominal annual YTM	Assumed maturity risk premium*	Nominal annual YTM without maturity risk premium	Effective semi-annual YTM without maturity risk premium	symbol
	%	%	%	%	
2-year maturity	4.0345	0.0600	3.9745	1.98725	f_2^*
3-year maturity	3.9218	0.0900	3.8318	1.9159	f_3^*
10-year maturity	4.0750	0.3000	3.7750	1.8875	f_{10}^*
12-year maturity	4.1000	0.3600	3.7400	1.8700	f_{12}^*
13-year maturity	4.1150	0.3900	3.7250	1.8625	f_{13}^*

* Sometimes referred to as the "liquidity risk premium" or "lock-in premium".

The implied forward 10-year semi-annual rate (without the maturity risk premium included) likely to prevail in two years time (i.e., ${}_2f^*_{12}$) is found by solving the bond-value-equilibrium equation …

$$(1 + f^*_{12})^{24} = (1 + f^*_2)^4 \ (1 + {}_2f^*_{12})^{20}$$

or $$(1.018700)^{24} = (1.0198725)^4 \ (1 + {}_2f^*_{12})^{20}$$

Solving this equation yields a ${}_2f^*_{12}$ value of 1.8466%, which translates into a nominal annual value of 3.6932%, without incorporating the maturity risk premium, or 3.9932% with the 10-year maturity risk premium of 30 basis points added back in. A similar calculation predicts the 10-year Canada zero-coupon rate to be 3.993% in 3 years time, as shown below.

$$(1 + f^*_{13})^{26} = (1 + f^*_3)^6 \ (1 + {}_3f^*_{13})^{20}$$

or $$(1.018625)^{26} = (1.019159)^6 \ (1 + {}_3f^*_{13})^{20}$$

Solving this equation yields a value for ${}_3f^*_{13}$ equal to 1.8465% on a semi-annual basis or 3.693% in nominal annual terms, without incorporating the maturity risk premium. Adding back the 30 basis point maturity risk premium for a 10-year bond gives the implied forward rate on a Canada zero coupon bond of 3.993% in three years time.

Consequently, on 10 November 2006, when 10-year Canada zero-coupon bonds were yielding 4.075% on a "spot" basis, bond investors as a group were expecting 10-year Canada zeros to yield 3.993% in two years time and also 3.993% in three years time, a decline of about 8 basis points over the next 2 and 3 years.

Hydro's recent $225 million 10-year debenture issue was sold on 28 September 2006 at approximately 34 basis points above the contemporaneous benchmark Canada bond yield. If one adds this credit spread (for 10-year NLH issues) to the implied forward Canada rate of 3.993% in two years time, one gets a forecast of 4.33% as the cost of a Hydro 10-year debenture issue in November 2008. This is below the 4.50% rate that Dr. Cannon used for Hydro's debenture issue in 2008 in his projections of Hydro's embedded cost of debt (ECD) in his prefiled evidence, suggesting that Dr. Cannon's estimate of Hydro's ECD for 2008 through 2010 may have been a bit "generous". For his updated projections attached to his Response to NLH 22 CA, Dr. Cannon has used 4.40% for his projected coupon rate on Hydro's expected 2008 debenture issue to reflect the modest decline in implied two-year-forward rates that has taken place since the time he prepared his original evidence.

Finally it is important to point out that the 5.24% coupon rate that Hydro has projected for its expected $200 million debenture issue in Table 12 on page 17 of its "Regulated Activities Financial Projection: 2007 to 2011" is way out of line with the 10-year rates that bond investors in aggregate are anticipating in two years time, as reflected in the implied forward Canada rates that Dr. Cannon discussed above. Dr. Cannon is aware of no credible interest rate forecasting approach that would yield a forecast of 5.24% in the current financial market environment. Moreover, he believes that the 5.24% value that Hydro has chosen to use cannot be one that its investment bankers have attested to as the most likely cost of a 10-to-20-year Hydro debenture issue in 2008.