

The Brattle Group

**International Innovations
in
Rate of Return Determination**

SURFA 2012 Forum

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Agenda

Introduction

Canada: Alberta, Ontario, NEB

Australia & New Zealand

UK and Europe

Comparisons & Conclusions



Introduction

Canada

- ◆ ROE: formulaic approaches, annual updates, generic hearings
- ◆ Deemed capital structure
- ◆ Deferral accounts

Australia & New Zealand

- ◆ Deregulation
- ◆ ROE: generic approaches to methodology (academic experts)
- ◆ Overall real Rate of Return (WACC)

Europe: E.g., UK, Other

- ◆ Deregulation
- ◆ Overall Rate of Return (WACC)

Comparisons & Conclusions

Agenda

Introduction

Canada

Alberta Utilities Commission

Ontario Energy Board

National Energy Board

Summary of Canadian Rate of Return Determination

Australia & New Zealand

UK and Europe

Comparisons & Conclusions

Canada

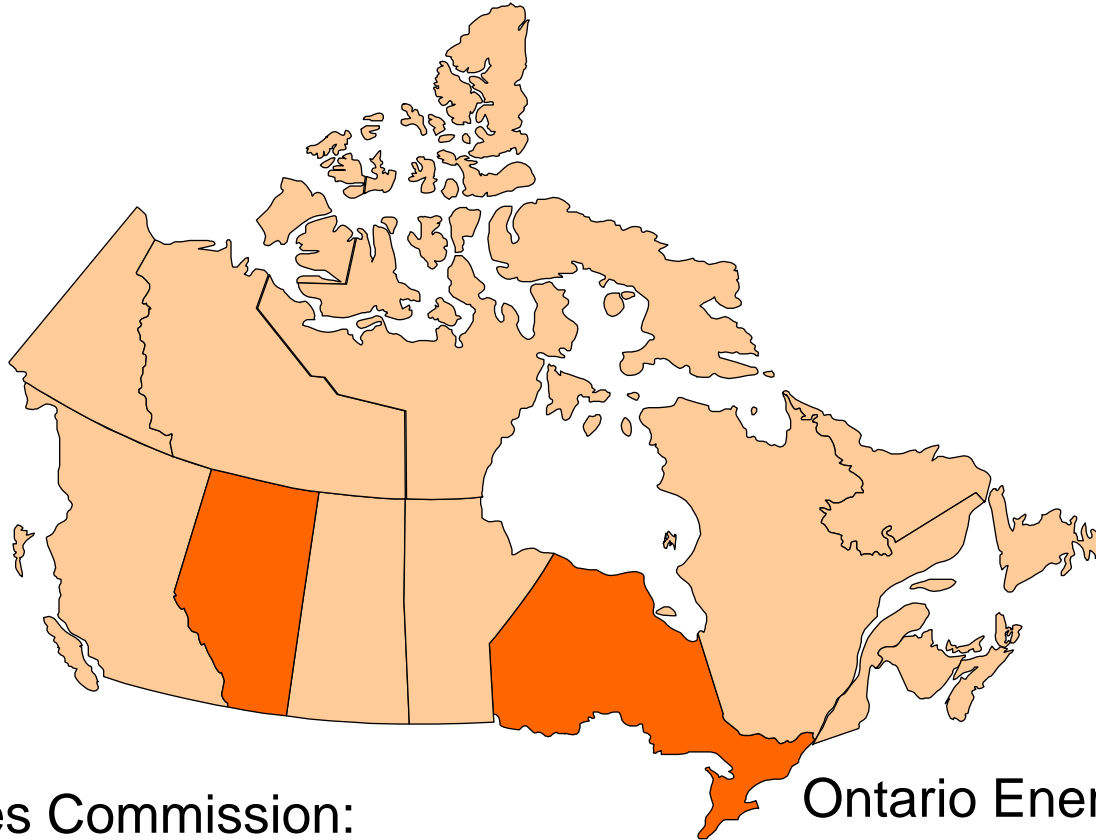
The National Energy Board (NEB) regulates inter-province and border crossing pipelines and transmission

Provinces and territories each have their own regulator that regulates in-province electric, gas and water utilities

- ◆ Alberta and Ontario have deregulated, so generation is not subject to the standard provincial cost of capital determination
- ◆ Alberta and Ontario have recently held generic cost of capital proceedings, British Columbia is in the midst of a generic cost of capital proceeding
- ◆ Characteristics:
 - Cost of service regulation
 - Deemed capital structure
 - Risk premium / CAPM approach to ROE (DCF less used)
 - Generic cost of capital hearings, formulaic approaches, deferral accounts are much more prevalent than in the U.S.

Canada

Each of the 10 provinces and 3 territories have its own regulator
National Energy Board regulates inter-state pipelines and transmission



Alberta Utilities Commission:
Generic Cost of Capital Hearings

Ontario Energy Board:
Formulaic Updates to
Cost of Capital

Alberta Utilities Board (AUC)

Background

- ◆ Power markets are deregulated in Alberta
- ◆ AUC sets cost of capital for electric and gas distribution and transmission
- ◆ Alberta uses a cost of service approach with a forward test year to set rates
- ◆ AUC sets a common ROE for all and then deems a capital structure for the utilities it regulates to compensate for differences in risk.
- ◆ Largest regulated utilities: AltaGas, ATCO Electric, ATCO Gas, ATCO Pipelines, AltaLink (transmission), (Gas and Electric), AltaLink (transmission), ENMAX (electric distribution & transmission), EPCOR (electric distribution and transmission, water) and Fortis Alberta (electric distribution)

AUC: Generic Cost of Capital

Approach

- ◆ Periodical generic cost of capital hearings
- ◆ Abandoned formulaic approach to updating ROE in 2009 generic proceeding and instead set ROE for two years
- ◆ 2011 generic cost of capital proceeding
 - Determined ROE for 2011 and 2012: 8.75%
 - New proceeding in 2012-13 will determine 2013 ROE and consider future of formulaic updates to ROE
 - Consumer and Utility experts participated
- ◆ ROE pertains to all regulated utilities
- ◆ Deemed capital structure based on utility-specific risks

AUC: Generic Cost of Capital - Continued

CAPM and DCF results formed primary basis for 2011 decision

◆ CAPM:

- Forecasted Risk-free Rate: 3.4-3.8%
- The “expected equity market risk premium today may be higher than its’ historical average, due to today’s low interest rates.” Reasonable range 5.00 to 7.25%
- Beta estimates: .50 to .65 (Canadian and U.S. utilities)
- Flotation allowance: 0.50%
- ROE Range: 6.4% to 9.0%

◆ DCF:

- Experts found DCF results ranging from 7 to 10.5%
- AUC expressed concern about optimism bias and reduced weight on DCF
- Flotation allowance
- ROE Range: 8.8% to 9.5%

◆ AUC Decision: ROE = 8.75%

Other Aspects of AUC's Rate of Return Determination

- ◆ Capital Structure:
 - Utility-specific risk used to determine each utility's ratio
 - Credit metric analysis targeting an A-rating show a need for the following equity ratios
 - EBIT Coverage 37%
 - FFO Interest Coverage 30 – 38%
 - FFO to Debt 35%
 - Equity ratios approved in 2009 meet standard, so no change in 2011
 - Equity Percentages:
 - Distribution: 39 – 43%
 - Electric Transmission: 36 – 37%
 - Pipelines: 45%
- ◆ AUC has several utilities that operates on a performance based measure with earnings in excess of the allowed ROE plus a band being shared with customers
- ◆ AUC recently allowed AltaLink CWIP in rate base to ensure credit ratios were maintained

Ontario Energy Board (OEB)

Background:

- ◆ Power markets are deregulated in Ontario
- ◆ OEB sets cost of capital for electric and gas distribution and transmission
- ◆ Ontario uses a cost of service approach with a forward test year to set rates
- ◆ OEB deems a capital structure for the utilities it regulates
- ◆ Largest regulated utilities: Hydro One (a crown corp.), Enbridge Gas and Union Gas

OEB: Formulaic Approach

Approach

- ◆ Formulaic approach to cost of equity since 1998
- ◆ Periodic reviews of parameters and formula used in annual updates to cost of equity

Annual Updates to ROE:

Until 2009:

- ◆ $ROE = \text{BaseROE}_{2004} + 0.75 \times (\text{LT Bond Forecast} - \text{BaseBond}_{2004})$
BaseROE₂₀₀₄ = 9.41% in 2004
LT Bond Forecast: forecasted yield on LT Canadian Gov. Bonds
(one-year forecast made in Nov. the year before)
BaseBond₂₀₀₄: forecasted 2004 yield on LT Canadian Gov. Bonds (forecasted in Nov. 2003)

OEB: Formulaic Approach - Continued

2009 Update for Formula:

$$\begin{aligned} \text{ROE} = & \text{BaseROE}_{2009} + 0.50 \times (\text{LT Bond Forecast} - \text{BaseBond}_{2009}) \\ & + 0.50 \times (\text{BondSpread} - \text{BaseBondSpread}_{2009}) \end{aligned}$$

BaseROE₂₀₀₉ = 9.75% in 2009

LT Bond Forecast and BaseBond₂₀₀₉: as before but for 2009

BondSpread: Spread between yield on LT A-rated utility bond and
LT government bond as of 2009

BaseBondSpread: Current spread between LT A-rated utility bond
yield and LT government bond yield

- ◆ Recently allowed ROE (2009-2012): 9.5 – 9.75%

Determining the Base ROE

- ◆ OEB determines the Base ROE using the Equity Risk Premium (ERP) approach:
 - $\text{Base ROE} = \text{Gov. Bond Yield} + \text{ERP}$
- ◆ OEB found in 2009 that the Base ROE needed to “*be reset to address the difference between the allowed return on equity arising from the application of the formula and the return on equity for a low-risk proxy group that cannot be reconciled based on differences in risk alone*”
- ◆ “*the use of multiple tests to directly and indirectly estimate the ERP is a superior approach to informing its judgment than reliance on a single methodology.*”
- ◆ 2009 Generic Hearing: 5 experts (consumers and utilities)
- ◆ Based on these observations, the OEB determined the initial ERP as follows:
 - Look at low, medium and high recommended ERP from experts
 - Take average of low recommended ERP
 - $\text{Base ROE} = \text{Gov. Bond Yield} + \text{ERP} = 4.25\% + \mathbf{5.5\%} = 9.75\%$
- ◆ Experts determined ERP from
 - CAPM, DCF, Equity Risk Premium Approach (historical and forecast)

Other Aspects of OEB's Rate of Return Determination

- ◆ Capital structure is deemed based on the utility's business risk
 - Electric distribution utilities all have 40% deemed equity
 - Gas distribution & transmission and electric transmission is deemed on a case-by-case basis but average 38-40% equity
- ◆ OEB uses embedded cost of debt but deems a LT and a ST debt cost rate for entities that have no outstanding debt and (with few exceptions) as a cap on inter-company loans
- ◆ Performance Based Rates are common with consumers and the utility sharing earnings in excess of the allowed return on equity plus a band of about 100 basis points
- ◆ Deferral accounts that are used to true-up expenses at year-end are common

National Energy Board (NEB)

- ◆ NEB regulated interstate pipelines and transmission as well as export
- ◆ NEB uses a cost of service approach with a forecasted test year
- ◆ 1994 – 2008: the NEB relied on a formulaic approach to set the ROE similar to OEB pre-2009
$$\text{ROE} = \text{BaseROE} + 0.75 \times (\text{LT Bond Forecast} - \text{BaseBond})$$
abandoned in 2009
- ◆ Most rate of return matters are settled rather than litigated
- ◆ 2009 onward: utilities' rate of return are determined on a case-by-case basis
 - RH-1-2008 (3/2009) approved an overall cost of capital (WACC)
 - Based primarily on CAPM
 - Based on market cost of debt
 - Capital structure is irrelevant

NEB's RH-1-2008 Decision

- ◆ Pertains to Trans Québec & Maritimes (TQM) Pipeline (gas transmission)
- ◆ TQM applied for and was allowed an overall cost of capital (WACC or ATWACC)
- ◆ Unique characteristics:
 - Overall return on rate base rather than cost of equity and debt specified
 - No capital structure was specified
 - The overall return was derived from
 - CAPM analysis of Canadian and U.S. utilities
 - Market cost of debt
 - Market value weighting of cost of debt and equity
 - Overall cost of capital of 6.4% is applied to the total rate base

NEB's RH-1-2008 Decision

◆ NEB Commentary

- “the ATWACC approach enables better comparisons of return on capital for companies of similar risk. This offers the potential to avoid separating two elements that are inevitably linked: capital structure and return on equity.”
 - “CAPM will inform the Board’s view on the market cost of equity.”
 - The CAPM estimates of the “cost of equity and the after-tax market cost of debt, when combined with market-value capital structure, will produce the aggregate cost of capital for sample companies.”
 - “The difference between market cost of debt and market cost of debt in this case is small and therefore does not require consideration ...”
- ◆ NEB looked to the submitted evidence on Canadian and U.S. samples, utility-specific risks and selected an overall cost of capital of 6.4%

Summary of Canadian Rate of Return Determination

- ◆ Each province and federal regulator has its own approach, but often the approach is more standardized than in the states
 - AUC: Generic proceedings
 - OEB: Formulaic approach
 - NEB: Case-by-case
- ◆ Formulaic approaches were common until the financial crisis, now mixed approach among regulators
- ◆ Generic cost of capital proceedings and ROEs are common
- ◆ Provinces: deem capital structure, use forecasted test year, forecasted interest rates
- ◆ Cost of Equity Estimation:
 - CAPM is more prevalent than in the U.S.
 - DCF is less prevalent than in the U.S.
- ◆ Cost of debt is often embedded cost but some market based measures are used

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Australia & New Zealand

Common Features

Australian Energy Regulator

New Zealand Commerce Commission

UK and Europe

Comparisons & Conclusions

Australia & New Zealand

Australia

- ◆ Australian electricity and gas markets are deregulated
- ◆ *Australian Energy Regulator (AER)*
 - Regulates electric transmission and distribution
 - Regulates gas transmission and distribution
 - Oversees wholesale markets
- ◆ *Economic Regulation Authority (ERA)* of Western Australia regulates electric, gas and rail in Western Australia

New Zealand

- ◆ *New Zealand Commerce Commission (NZCC)* regulates electricity, gas transmission and distribution, airports, and some telecommunications

Australia & New Zealand: Common Features

- ◆ Markets are generally deregulated with distinct distribution / transmission companies
- ◆ Characteristics of regulation
 - Revenue cap approach
 - Formulaic approach to determine prices
 - “RPI – X” controls allow prices to increase with inflation, plus/minus an X factor (determined by forecasting costs)
 - Resets the formula periodically
 - The reset is similar to a cost of service approach with forecasted multi-year test period
 - Very specific guidelines for how to determine cost of capital
 - Often developed through the consultation with academic experts
 - Periodic review of parameters

Australian Energy Regulator (AER)

- ◆ Historical rate base is adjusted with an inflation factor
- ◆ 5-year review of cost of capital (last in 2009)
- ◆ Overall rate of return (WACC) is determined using
 - CAPM Estimates
 - Estimates of the market cost of debt
 - Market value capital structure (referred to as gearing)
 - Adjustments for actual taxes
- ◆ WACC is in effect for the 5-year period

AER: Estimating the WACC

- ◆ Comparable companies from Australia and the U.S.
- ◆ Cost of Equity: CAPM
 - Forecast risk-free rate
 - MRP based primarily on realized Australian MRP
 - Increased in 2009 based on “market conditions”
 - Beta estimated against local market and adjusted for leverage
 - De-lever and re-lever using the Hamada formula
 - Weekly and monthly estimates
- ◆ Cost of Debt = Risk-free rate + Debt Risk Premium
 - Cost of Debt is currently the subject of a review by the AER
 - AER looks to A- and BBB+ rated utilities to assess the cost of debt

AER: Estimating the WACC - Continued

- ◆ Companies market value capital structure is used to determine the After-Tax WACC
- ◆ After-Tax WACC \times Rate Base is the collected in revenue
- ◆ The value of tax imputation credits to investors receiving dividends in Australia is estimated and taken into account when determining the cash flow that a utility can collect
- ◆ Resulting Parameters:
 - After-Tax WACC: 8.82%
 - Based on 60% debt at 7.45%
 - Implicit ROE is 10.88%
- ◆ Rate of Return is used to set rates for 5-years, where annual rates are adjusted for inflation minus a productivity factor

New Zealand Commerce Commission (NZCC)

- ◆ Regulation is similar to that in Australia
 - Periodic review of overall rate of return methodology (last in 2009)
- ◆ Rates are set on a company-by-company basis but detailed guidelines for rate of return (after-tax WACC) exists
- ◆ Rate base is indexed to inflation, rate of return is in real terms
- ◆ Overall rate of return (WACC) is determined using
 - CAPM Estimates; Fama-French is used as a check
 - Estimates of the market cost of debt
 - Market value capital structure (referred to as gearing)
 - Adjustments for actual taxes

NZCC: Estimating WACC

◆ Cost of Equity

- Local and overseas companies used as proxies
- Betas estimated weekly & monthly against local and world index
 - De-lever and re-lever using Hamada's methodology
- Risk-free rate is LT local rate
- MRP is determined looking to local and international evidence: historical averages, forward looking estimates, and academic literature (7% for 2009)

◆ Cost of Debt = Risk-free Rate + Debt premium

- The determination of the cost of debt is the subject of an ongoing proceeding

Europe: Common Features

- ◆ Approach is not uniform
- ◆ CAPM is the basic framework in many cases
- ◆ Significant element of judgment often applied
 - for example, limited market data on equity beta in many cases

United Kingdom utility regulation

- ◆ Energy (and water and rail) utilities privatized in the 1980s/90s
 - extensive restructuring / separation of functions
- ◆ Separate authorities regulate each of:
 - energy (gas + electricity) – Ofgem
 - water (including waste water) - Ofwat
 - airports – Civil Aviation Authority
 - telecommunications - Ofcom
 - rail – Office of Rail Regulation
- ◆ However, framework is broadly similar:
 - protect interests of consumers
 - by promoting competition where effective
 - and setting price/revenue limits otherwise
- ◆ In energy, regulator has both price regulation and market design responsibilities

UK energy regulation

- ◆ “Clean slate” beginning with privatization in late 1980s
 - separate companies for distribution, transmission, generation *and* retail supply – all generation and supply essentially unregulated
- ◆ Legislative “tweaks” since then, e.g. on environmental duties
- ◆ Basic approach:
 - “retail” function (billing, procurement, meter reading) competitive
 - distribution and transmission regulated, formula-based prices
 - “RPI – X” controls allow prices to increase with inflation, plus/minus an X factor
 - X determined by forecasting costs
 - formula “reset” every 5 (now 8) years
 - reset is equivalent to “cost of service with multiple forward test years”, true-ups if actual revenues differ from formula result
 - over time, approach has evolved – formula is rather complex

Cost of capital

- ◆ return on equity is a “real” return on an inflation-indexed rate base (like “trended original cost”)
- ◆ tax allowance is explicitly forecast, using an assumed capital structure
- ◆ claw-back on tax if actual debt exceeds modeled debt
- ◆ debt is market cost (not embedded)
- ◆ CAPM approach, but with significant judgment
- ◆ real risk-free rate from gilt yields (equivalent of TIPS)
 - some UK utilities have also issued index-linked debt
- ◆ no market evidence on UK utility betas

Cost of capital determination in recent decisions

- ◆ Most recent (December 2009) Ofgem cost of capital decision for electricity distribution
- ◆ NB these are *real* returns

	DPCR5: Ofgem view	
	Low	High
Cost of debt	3.3%	3.7%
Cost of equity	6.3%	7.0%
Gearing	65%	62.50%
WACC (vanilla)	4.3%	4.9%
WACC (post-tax)	3.7%	4.3%

NB: Numbers may not add due to rounding

- ◆ Market cost of debt (10-yr) trailing average
- ◆ Tax allowance (modeled)
- ◆ Tax claw-back if gearing exceeds Ofgem assumption and interest cost is higher than modeled

Netherlands Competition Authority

- ◆ Sets price caps for a 3 year period
- ◆ Regulation similar to the UK: prices increase with inflation net of an X-factor that is forecast
- ◆ Rate base is indexed to inflation
- ◆ An overall real rate of return (pre-tax WACC) is determined using an estimated cost of debt and equity and market value capital structures
- ◆ Cost of equity is estimated using
 - Comparable European and international companies
 - CAPM
- ◆ Cost of debt is the risk-free rate plus a debt premium
- ◆ Once the WACC is estimated, inflation is removed to obtain a real WACC

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Australia & New Zealand

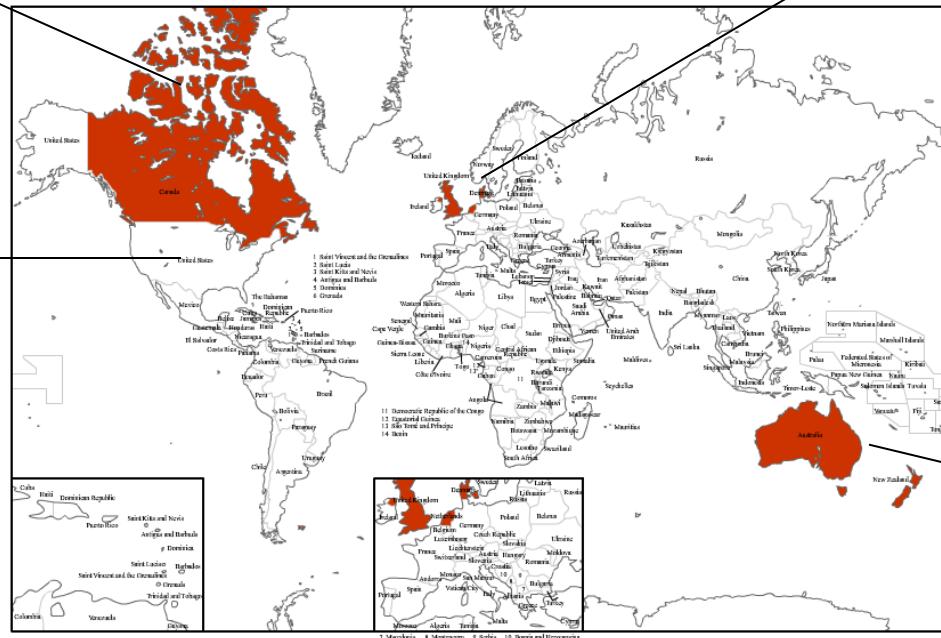
UK and Europe

Comparisons & Conclusions

Comparisons / Conclusions

Generic CoC
 Formulaic Updates
 ROE and Deemed Capital Structure

Revenue Cap
 Real WACC
 Periodic Review



Revenue Cap
 Real WACC
 Periodic Review
 Tax Adjustments

Case-by-Case Rate Case
 ROE and Actual Capital Structure

Comparison / Conclusions

- ◆ Rate of return cannot be viewed in isolation from other regulatory factors
 - Real WACC \approx Inflation Adjusted Rate Base
 - Nominal ROE \approx Historical Cost Rate Base

	U.S.	Canada	Europe, Australia, NZ
Integrated / Deregulated	Mix	Mix	Deregulated
Regulation	Cost of Service	Cost of Service	Price Cap
Return Determination	Allowed ROE	Mostly Allowed ROE	Allowed WACC
Capital Structure	Mostly Actual	Deemed	N/A or Deemed
Test Year	Mix	Forecast	Forecast
Cost of Debt	Embedded	Embedded (rarely market)	Market

References:

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National Energy Board, RH-01-2008, March 2009

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Attachment A, B, C, and D to Report to the AER, April 2009.

New Zealand Commerce Commission, “Revised Draft Guidelines: The Commerce Commission’s Approach to Estimating the Cost of Capital,” June 2009

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Netherlands Competition Authority, “Method Decision: 102135-46” and Addendum A-D.

Brief Bio



Dr. Bente Villadsen, Principal, Cambridge

Dr. Bente Villadsen is an expert in regulatory finance with more than 12 years of experience in the utility regulatory matters. She has experience in electric, gas, pipeline, railroad, and water regulatory matters in Canada as well as the U.S. Much of her recent work has focused on regulated utilities and especially cost of capital estimation and the impact of regulatory initiatives on cash flow and risk. Dr. Villadsen recently led a study on cost of capital methodologies and practices for the Canadian Transportation Agency and also worked on a survey on regulatory practices in the U.S., Europe, and Australia on behalf of an Asian utility. She is the author of several articles and presentations on regulatory finance including cost of capital. Dr. Villadsen holds a Ph.D. from Yale University's School of Management. She has a joint degree in mathematics and economics (BS and MS) from University of Aarhus in Denmark.



Dr. Toby Brown, Senior Associate, San Francisco

Dr. Toby Brown has extensive experience with European regulation and has worked on cost of capital issues for regulated entities in Australia, Belgium, and the United Kingdom, as well as in the U.S. and Canada. Hence, he is uniquely positioned to provide insights into the European approach to cost of capital determination. On several occasions Dr. Brown has produced studies commissioned by regulatory agencies wishing to understand how particular questions have been addressed in other jurisdictions worldwide (topics have included cost of capital, network planning, infrastructure charging, and rate determination). Dr. Brown holds a D.Phil. and a B.A. (Hons.) in chemistry from the University of Oxford. Prior to joining The Brattle group, he worked at the UK energy regulator (Ofgem).

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