Annexe to the report on cost of capital for regional networks

ANNEXE TO REPORT FOR DTE

This Annexe provides updated estimates of the cost of capital for regional networks, based on data up until the end of 2005. It also provides additional description of the calculations used in estimating the cost of capital for regional networks. In particular, the annexe includes detail of the underlying data and calculations used in estimating the Beta.

WACC FOR REGIONAL NETWORKS – DATA TO DEC 2005

Table 1 provides an updated estimate of the WACC for regional networks, taking account of data up to December 2005.

	Low	**High**
Nominal risk-free rate	3.7%	4.3%
Debt premium	0.8%	0.8%
Cost of debt	**4.5%**	**5.1%**
Equity risk premium	4.0%	6.0%
Asset beta	0.28	0.41
Equity beta	0.58	0.85
Cost of equity	**6.0%**	**9.4%**
Gearing	60%	60%
Tax rate	29.1%	29.1%
Nominal pre-tax WACC	6.1%	8.4%
Inflation	1.25%	1.25%
Real pre-tax WACC	4.8%	7.0%

Table 1: Estimate of the real pre-tax WACC for Electricity regional networks

Source: Frontier Economics calculations

The elements of the calculation that have been updated are described below.

Asset betas

Table 2 shows the update estimates of the asset betas of the comparator report. The comparator sample has been amended since September:

- the Canadian utility Terasen has been removed from the sample following its de-listing; and

- the Argentine electricity utility Transener has been added to the sample[1].

Applying the methodology set-out in the main report, this data provides a range for the asset betas of 0.28 to 0.41. This is based on the average of the daily estimates and the average of the weekly estimates.

Country	Company	Daily data	Weekly data
Argentina	Transener	0.24	0.32
Australia	Australia Gas Light	0.52	0.23
Australia	Envestra	0.21	0.13
Canada	Canadian Utilities	0.29	0.26
Canada	Emera	0.13	0.11
Spain	Red Electrica	0.36	0.21
UK	Transco	0.38	0.31
UK	Scottish Power	0.42	0.43
UK	United Utilities	0.32	0.22
UK	Viridian	0.39	0.15
USA	Atlanta Gas Light	0.57	0.43
USA	Atmos Energy	0.58	0.36
USA	Duquesne Light Holdings	0.68	0.38
USA	Exelon	0.65	0.34

Table 2: Asset betas for comparator firms, Vasicek adjustment

Source: Frontier calculations

Daily data over two years from 29 Dec 2003 to 29 Dec 2005, weekly data over five years from 02 Jan 2001 to 26-30 Dec 2005 (average across 5 possible start days); national indexes.

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[1]   Over the last five years, Transener was traded on only 78% of days, below the trading frequency of the other companies in the sample. We considered that this did not pose a problem with including Transener in the sample. The frequency of its trading rose to above 90% in the second part of the period and the lower liquidity at the beginning of the sample period is less of a problem since this part of the sample is only used for weekly estimates (where trading frequency is less of an issue).

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Nominal risk free rate

Table 3 shows average nominal government bond yield for the Netherlands over periods from six months to five years.

Time period (to December 2005)	Yield on 10 year maturity – average over period
6 months	3.3%
1 year	3.4%
2 year	3.7%
3 year	3.9%
5 year	4.3%

Table 3: Yield on Netherlands Government debt

Source: Eurostat

Using the methodology described in the main report, this gives a range for the risk-free rate of 3.7% to 4.3%.

Equity risk premium

The estimate of the WACC is based on a range for equity risk premium (ERP) of 4% to 6%. This range is derived from evidence on the ERP from different sources:

- historical data on equity returns;
- models of ERP expectations; and
- survey evidence.

Figure 1 below shows the historic ERP based on an arithmetic mean and a geometric mean calculation. It shows the results for the "world" index (the total for the 16 countries in the sample) and for the Netherlands. It updates Figure 5 in the main report, taking into account data to the end of 2004. The results are broadly consistent with the previous findings:

- the historic world ERP has increased from 3.8% to 4.0% (geometric) and 4.9% to 5.1% (arithmetic); and
- the historic Netherlands ERP has fallen from 3.8% to 3.7% (geometric) and from 5.9% to 5.8% (arithmetic).

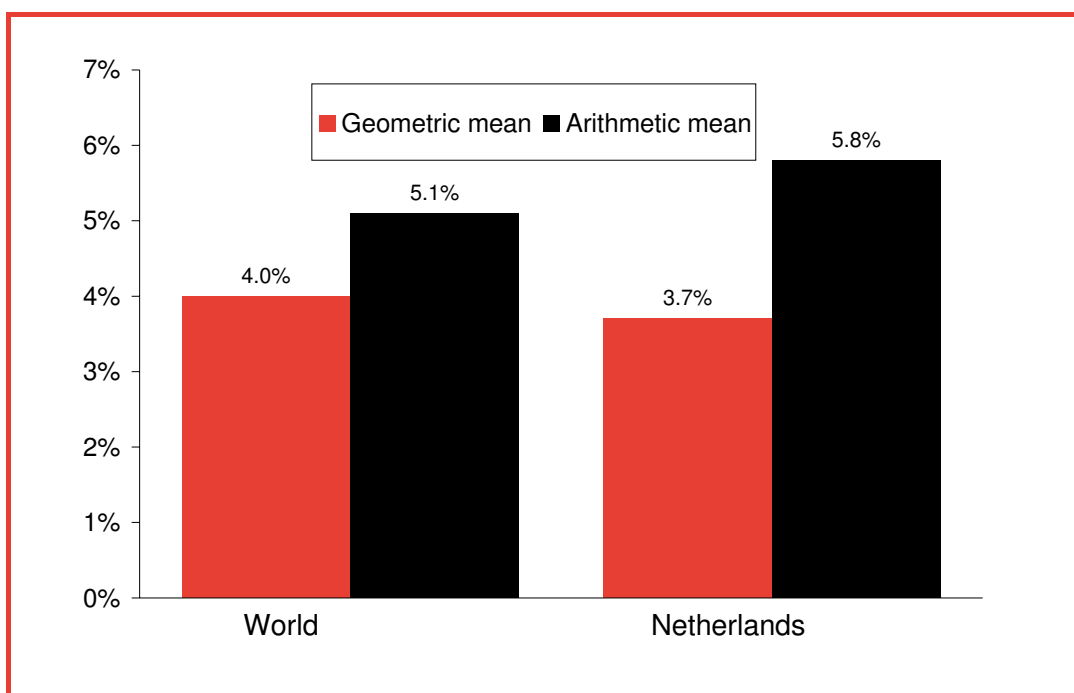The ERP range of 4% to 6% is consistent with these updated results.

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Figure 1: International evidence on the ERP: 1900 to 2004

Source: Dimson, Marsh and Staunton, 2002, Global Investment Returns Yearbook (ABN AMRO/London Business School, 2005)

Debt premium

The main report used a value of 0.8% for the debt premium. This value was based principally on data on yield spreads for a sample of comparator utility bonds. The updated results for this comparator group are shown in Figure 2 and Table 4 below.

The Figure shows that the credit spreads have been stable in the period between September and December 2005.
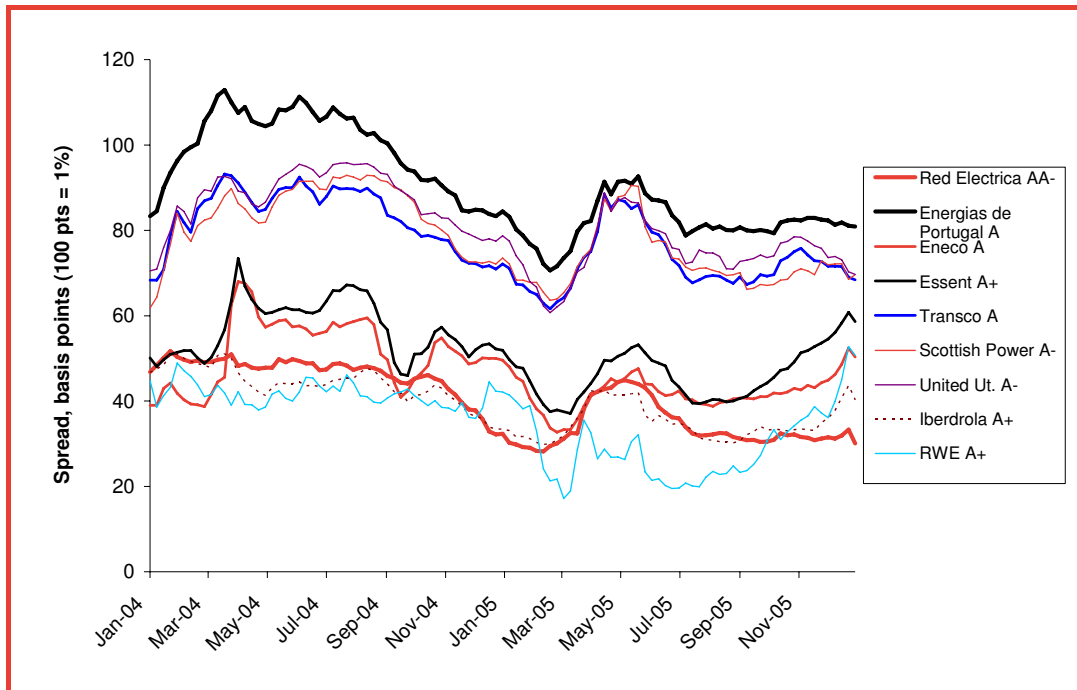
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Figure 2: Corporate bond spreads

Source: Bloomberg, Standard & Poor's

Table 4 summarises information presented in Figure 2, showing the average values of debt premium for each company in the sample, from January 2004 to December 2005. This suggests that a range of 0.4% to 0.9% is appropriate for a 'single A' credit rating, based on the two years of data.

Company	Average debt premium (basis points)
Red Electrica	40
Energias de Portugal	91
Essent	52
Eneco	47
Transco	78
Scottish Power	78
United Utilities.	81
Iberdrola	40
RWE	35

Table 4: Average debt premium by company, January 2004 to December 2005 (basis points)

Source: Bloomberg; Frontier calculations

These updated figures are consistent with the value of 0.8% for the debt premium, as set-out in the main report.

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DATA UNDERLYING BETA ESTIMATES

The second section of this annex provides details of the data used in estimating betas for the comparator group of companies.

Reference index variance assumption used in the Vasicek adjustment

In applying the Vasicek adjustment, we used the following assumptions about the variance of beta across the sample of firms that serve as an approximation to a market index [2]: daily estimates: 0.09; weekly estimates: 0.07.

Unadjusted asset betas

Table 5 shows the asset beta values for the comparator firms without the Vasicek adjustment.

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[2]   The formula for the Vasicek adjustment is

$$\beta_{adj} = \beta_{OLS} \cdot \frac{Var(\beta_{pop})}{Var(\beta_{pop}) + SE^2(\beta_{OLS})} + 1 \cdot \frac{SE^2(\beta_{OLS})}{Var(\beta_{pop}) + SE^2(\beta_{OLS})}$$

where $SE^2(\beta_{OLS})$ is the standard error squared of the OLS estimate of beta, and $Var(\beta_{pop})$ is the variance of beta across the sample of firms that serve as an approximation to some market index.

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Country	Company	Daily data	Weekly data
Argentina	Transener	0.23	0.29
Australia	Australia Gas Light	0.50	0.15
Australia	Envestra	0.20	0.10
Canada	Canadian Utilities	0.26	0.21
Canada	Emera	0.11	0.07
Spain	Red Electrica	0.35	0.19
UK	Transco	0.37	0.29
UK	Scottish Power	0.40	0.40
UK	United Utilities	0.31	0.20
UK	Viridian	0.35	0.10
USA	Atlanta Gas Light	0.56	0.41
USA	Atmos Energy	0.58	0.34
USA	Duquesne Light Holdings	0.68	0.33
USA	Exelon	0.64	0.29

Table 5: Unadjusted asset betas for comparator firms

Source: Frontier calculations

Daily data over two years from 29 Dec 2003 to 29 Dec 2005, weekly data over five years from 02 Jan 2001 to 26-30 Dec 2005 (average across 5 possible start days); national indexes.

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Unadjusted equity betas

Table 6 shows the unadjusted equity beta values for the comparator group.

Country	Company	Daily data	Weekly data
Argentina	Transener	0.73	0.79
Australia	Australia Gas Light	0.59	0.18
Australia	Envestra	0.54	0.29
Canada	Canadian Utilities	0.36	0.30
Canada	Emera	0.17	0.12
Spain	Red Electrica	0.55	0.30
UK	Transco	0.61	0.48
UK	Scottish Power	0.56	0.57
UK	United Utilities	0.51	0.33
UK	Viridian	0.44	0.14
USA	Atlanta Gas Light	0.82	0.62
USA	Atmos Energy	0.87	0.51
USA	Duquesne Light Holdings	0.98	0.51
USA	Exelon	0.81	0.40

Table 6: Unadjusted equity betas for comparator firms

Source: Frontier calculations

Daily data over two years from 29 Dec 2003 to 29 Dec 2005, weekly data over five years from 02 Jan 2001 to 26-30 Dec 2005 (average across 5 possible start days); national indexes.

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Standard errors of equity betas

Table 7 shows the standard errors of the beta estimates. This data is used in the calculation of the Vasicek adjustment. The lower the standard error the smaller the adjustment to the raw beta value.

Country	Company	Daily data	Weekly data
Argentina	Transener	0.07	0.21
Australia	Australia Gas Light	0.07	0.10
Australia	Envestra	0.09	0.09
Canada	Canadian Utilities	0.08	0.08
Canada	Emera	0.07	0.06
Spain	Red Electrica	0.06	0.05
UK	Transco	0.07	0.06
UK	Scottish Power	0.08	0.08
UK	United Utilities	0.07	0.06
UK	Viridian	0.09	0.07
USA	Atlanta Gas Light	0.06	0.06
USA	Atmos Energy	0.05	0.06
USA	Duquesne Light Holdings	0.06	0.10
USA	Exelon	0.07	0.08

Table 7: Standard errors of equity betas for comparator firms

Source: Frontier calculations

Daily data over two years from 29 Dec 2003 to 29 Dec 2005, weekly data over five years from 02 Jan 2001 to 26-30 Dec 2005 (average across 5 possible start days); national indexes.

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Market gearing

Table 8 shows the data on gearing used to convert from equity to asset beta values.

Country	Company	Daily data	Weekly data
Argentina	Transener	77%	72%
Australia	Australia Gas Light	19%	28%
Australia	Envestra	71%	73%
Canada	Canadian Utilities	37%	39%
Canada	Emera	46%	50%
Spain	Red Electrica	46%	46%
UK	Transco	47%	49%
UK	Scottish Power	35%	38%
UK	United Utilities	48%	48%
UK	Viridian	27%	35%
USA	Atlanta Gas Light	43%	45%
USA	Atmos Energy	45%	45%
USA	Duquesne Light Holdings	42%	47%
USA	Exelon	31%	38%

Table 8: Market gearing levels for comparator firms applied in asset beta calculations

Source: Frontier calculations

Daily data over two years from Jan 2003 to Dec 2005, weekly data over five years from Jan 2001 to Dec 2005. Market gearing defined as the average total debt (net of cash and equivalents) divided by the sum of the average market cap and the total debt (again, net of cash and equivalents).

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Tax rate assumptions

Table 9 shows the tax rates used in calculating the comparator beta values.

Country	Daily data	Weekly data
Argentina	35%	35%
Australia	30%	30%
Canada	36%	38%
Spain	35%	35%
UK	30%	30%
USA	39%	39%

Table 9: Country tax rate assumptions applied in asset beta calculations

Source: OECD

Daily data over two years from Jan 2003 to Dec 2005, weekly data over five years from Jan 2001 to Dec 2005.

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