NERA
Economic Consulting

Cost of Capital Estimation for RIIO-ED1

Initial Estimates and Issues for WPD

Dr. Richard Hern
Director

Dominik Huebler
Consultant

Tomas Hozik
Analyst

London

27 July 2012

Insight in Economics™

NERA
Economic Consulting

Ofgem precedent on CoE

Ofgem has previously used total market returns of 7.0%-7.25% and qualitative arguments for setting beta

NERA Economic Consulting

Decisions relevant to the energy sector

	TPCR (2006)	GDPCR (2007)	DPCR5 (2009)	CC Bristol (2010)	Ofgem RIIO T1/GD1 Low	Ofgem RIIO T1/GD1 High
Gearing	60%	62.50%	65%	60%	65%	55%
Risk-free Rate (%)	2.5	2.5	2.0	2.0	1.7	2.0
ERP (%)	4.5	4.75	5.25	5.0	4.75	5.5
Market Returns	***7.00***	***7.25***	***7.25***	***7.00***	***6.45***	***7.50***
Equity Beta	1.0	1.0	0.9	0.92	0.9	0.95
Asset Beta	0.40	0.38	0.32	0.37	0.32	0.43
Cost of Equity (%)	***7.0***	***7.3***	***6.7***	***6.6***	***6.0***	***7.2***
CoE (%) @ 60% gearing	7.00	6.95	6.13	6.60	5.44	7.88

Source: CC (2010) Bristol Water Price Determination and various Ofgem publications, NERA analysis

- Ofgem estimates of general market returns (mostly) based around long-run assessments, all based in 7.0-7.25% if RIIO is taken to be near top end (see next slide)
- Beta generally based on qualitative arguments as opposed to explicit analysis - DPCR5 (implied) estimate for asset beta near bottom end of RIIO range

Ofgem's preliminary RIIO WACC range implies very large differences between different types of infrastructure

NERA Economic Consulting

Implied CoE allowances using common gearing

	ET (fast track)	NGET	NGG	GD
Cost of Equity	7.0	7.0	6.8	6.7
Gearing	55%	60%	62.5%	65%
Risk-free rate - assumed	2.0	2.0	2.0	2.0
ERP - assumed	5.25	5.25	5.25	5.25
Equity Beta - implied	0.95	0.95	0.91	0.90
Asset Beta - implied	***0.43***	***0.38***	***0.34***	***0.31***
CoE @ 60% gearing	7.63	7.00	6.50	6.11

Source: Ofgem (2012): RIIO-T1: Final Proposal for SPT/SHET; letters setting out high level proposals for non fast-tracked companies

- Large range based on Ofgem draft decisions with (so far) limited explanation (Difference of >150bps for similar infrastructure)
- Ofgem stresses (perceived) risk over capital market data in selecting points in range
- Making a strong case on capital market data is important but focusing on individual risk outcomes and exposure is also indispensable

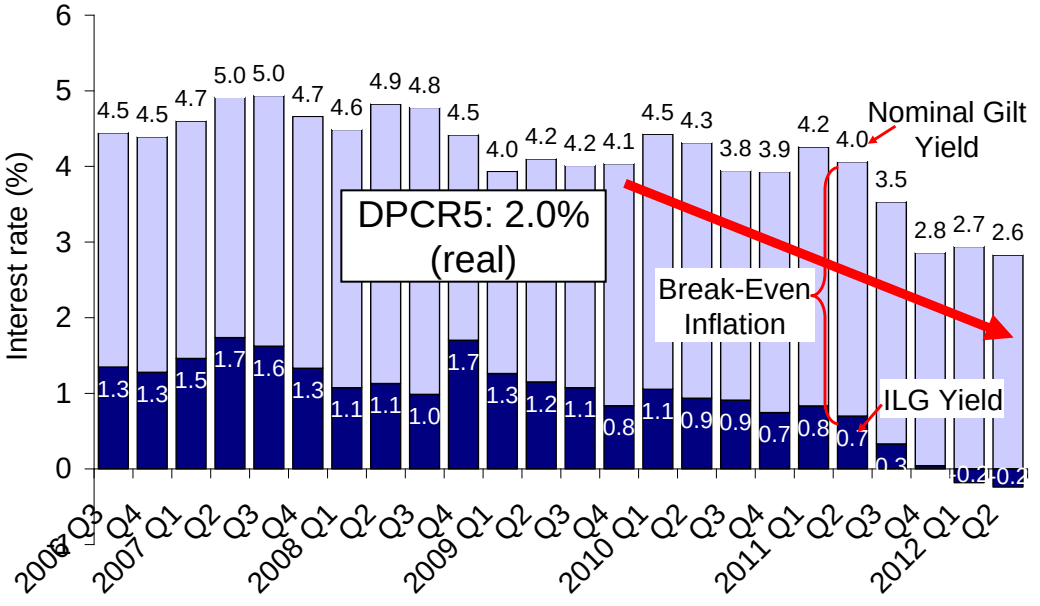
NERA
Economic Consulting

Empirical Evidence on General Market Parameters

Measures of the risk free rate have been falling since 2008

- The standard approach in UK has been to use ILGs but these are biased downward by pension fund demand and unconventional monetary policy
  - Bank of England (2008): *"… strong pension fund demand for inflation-protected bonds has pushed down their yields ...this demand may reflect several regulatory and accounting changes*
  - Ofgem's own advisers (2010) state *"…current yields may be biased downwards by around 100 basis points due to QE"*
  - *Strongly upward-sloping forward curve*

UK government bond yields



Risk-free rates over different time horizons

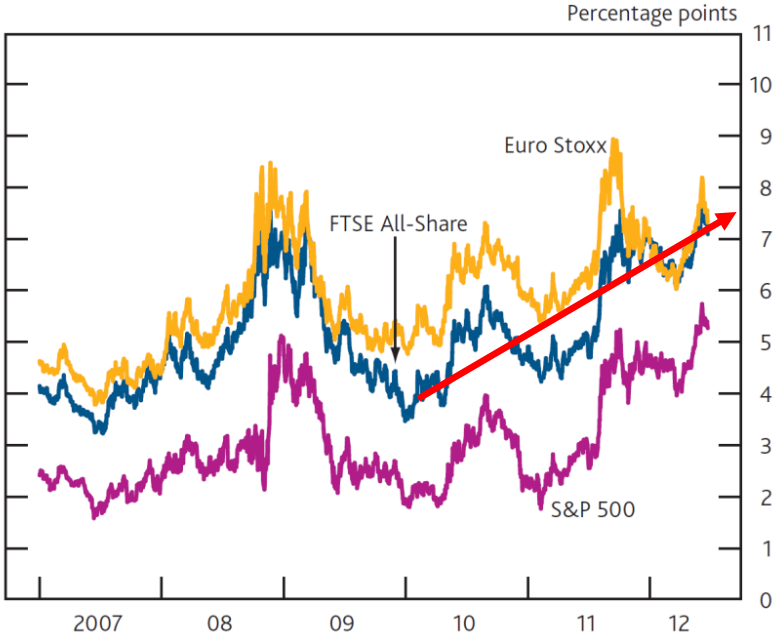
	Averaging Period					Long-run
	Spot	1Y	2Y	5Y	10Y	(DMS)
5 Year	-1.2	-1.3	-0.8	0.5	1.2	n/a
10 Year	-0.6	-0.4	0.1	0.8	1.3	2.1
20 Year	0.0	0.1	0.5	0.8	1.2	n/a

All ILG-derived risk-free rate estimates need to account for bias in ILGs

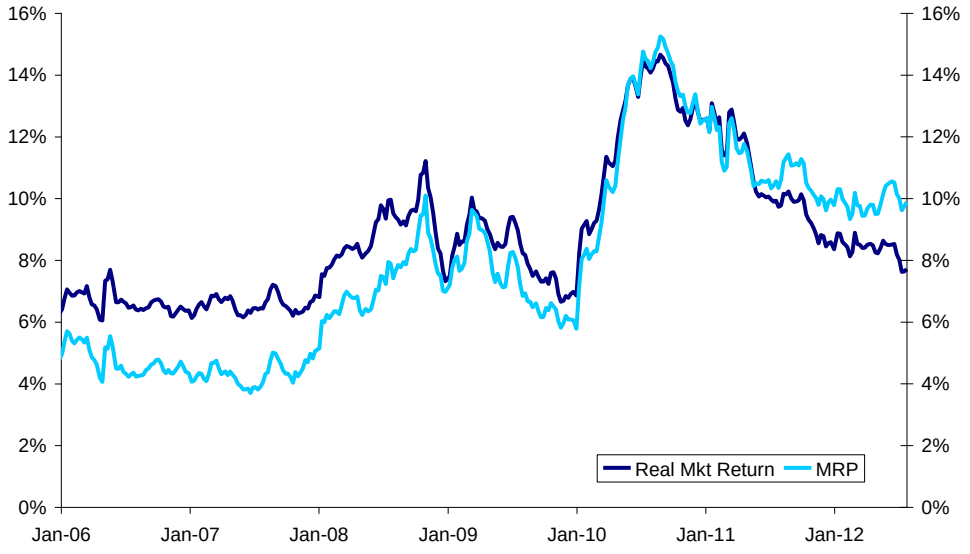
But forward looking measures of the ERP have increased since 2008 due to higher equity risk

NERA Economic Consulting

Ofgem has previously considered Bank of England DGM



Bloomberg's DGM estimates show higher numbers than BoE



Bank of England uses GDP growth as the driver for long-run dividend growth, Bloomberg uses medium-term analyst forecasts adjusted for current payout ratios. Use of analyst forecasts is standard in US. UK Competition Commission has previously criticised analyst forecasts because of optimism bias

ERP estimates over different time horizons

	Spot	2Y	2Y	5Y	10Y	Long-run (DMS)
Bloomberg	9.9	10.2	11.5	9.0	n/a	5.0
Bank of England	c.7.25	c.7.0	c.6.0	c.5.5	n/a	

Should Rf and ERP be estimated using recent data or averages of historic data?

NERA Economic Consulting

Arguments for using trailing averages:

- Financial markets are very volatile and trailing averages will smooth for volatility and business cycle effects
- Ofgem prefers to estimate the cost of debt using long run trailing averages => for consistency, should use trailing averages for equity too
- Using trailing averages will lead to more stable regulatory WACC estimates over time
- Short run ERP estimate are very imprecise

Arguments for using recent data:

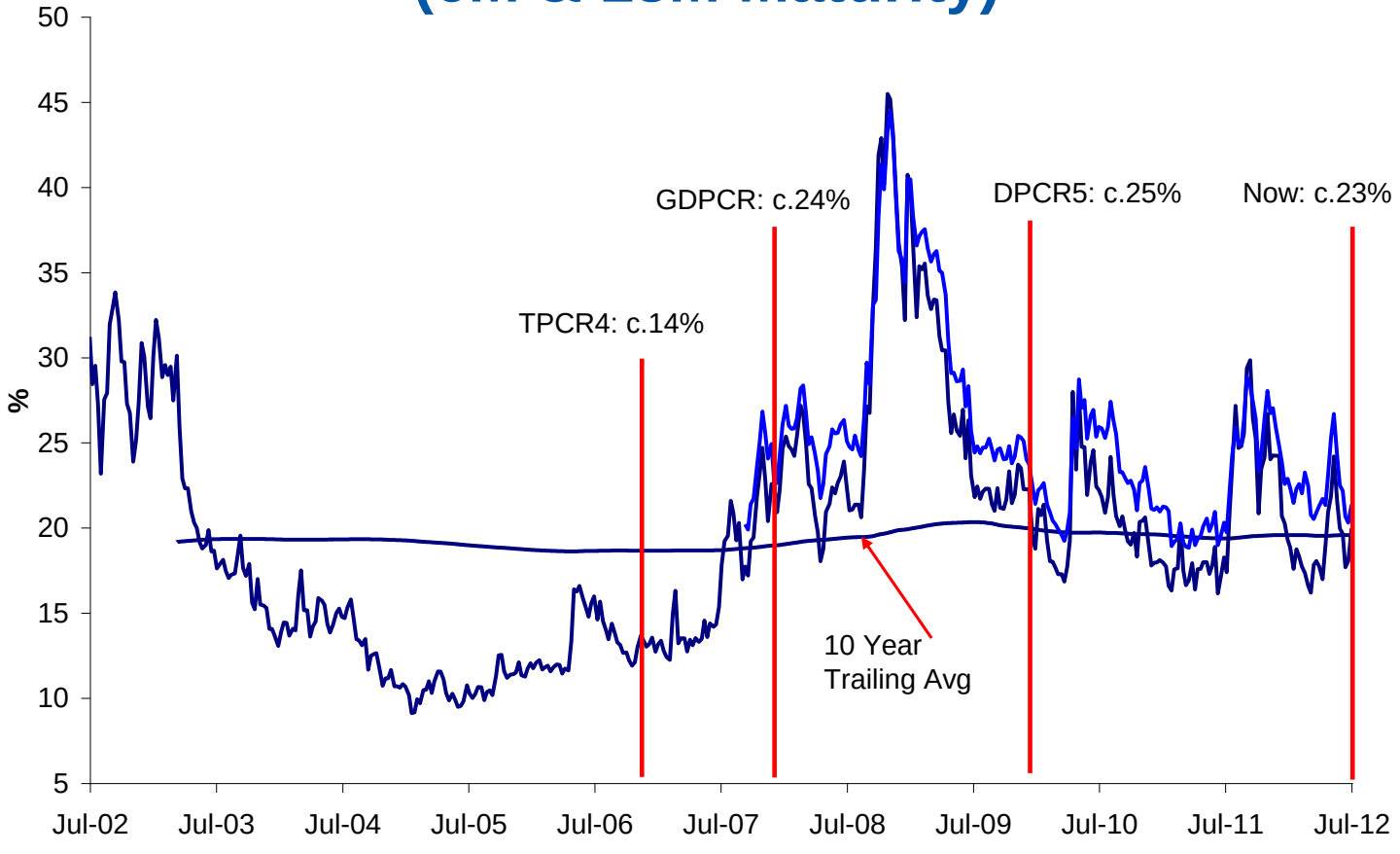
- If markets are efficient, then recent data is the best predictor of the future

On balance NERA advocate estimating regulatory WACC based on trailing averages

Evidence on expected market volatility shows no reason to lower WACC relative to GDPCR and DPCR5

NERA Economic Consulting

FTSE 100 Implied Volatility (6M & 18M Maturity)



Source: Bank of England & Bloomberg; Data cut-off date 25-Jul-12

- Ofgem allowed higher overall market returns in times of high volatility (GDPCR / DPCR5) relative to benign 2003-mid 2007
- In line with empirical findings of higher expected returns under volatility (e.g. Guo & Whitelaw, JoF 2006)
- No reason to assume long term "normal" market conditions for RIIO-ED1

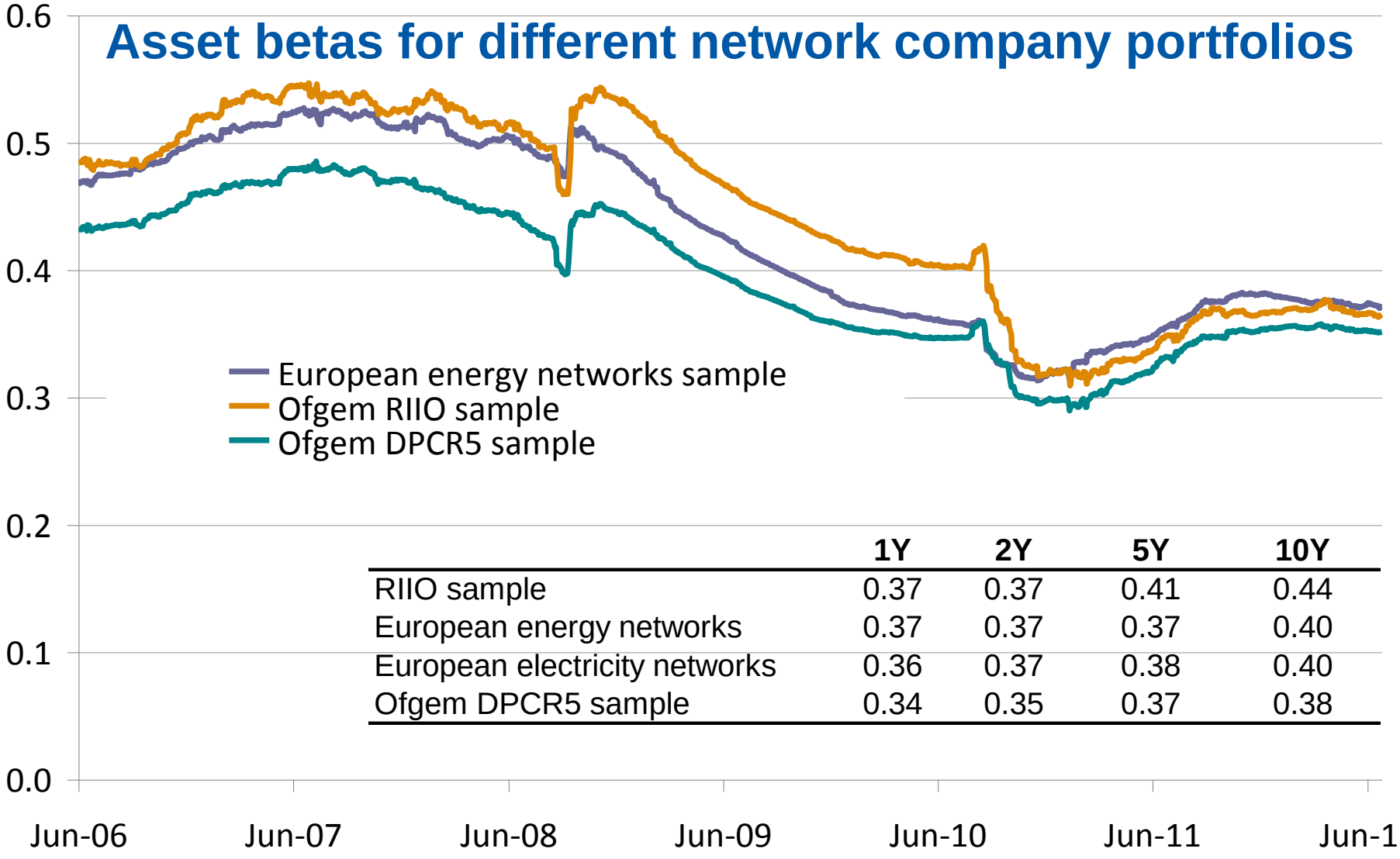
NERA
Economic Consulting

Beta

Empirical beta estimates support range from 0.38 to 0.44 in long-run

NERA Economic Consulting

Asset betas for different network company portfolios



	1Y	2Y	5Y	10Y
RIIO sample	0.37	0.37	0.41	0.44
European energy networks	0.37	0.37	0.37	0.40
European electricity networks	0.36	0.37	0.38	0.40
Ofgem DPCR5 sample	0.34	0.35	0.37	0.38

Source: NERA analysis of Bloomberg data up to 29 June 2012. RIIO sample: NG, SSE; European electricity networks: NG, SSE, Red Electrica, Terna, Acea; European energy networks: Electricity networks plus Snam Rete Gas, Gas Natural, Enagas; Ofgem DPCR5 sample: NG, SSE, Pennon, Severn Trent, United Utilities, AGL Resources.
Scottish Power and Kelda have been delisted

All indications are that beta needs to be higher than at DPCR5

NERA Economic Consulting

- Empirical evidence suggests beta ranges above Ofgem DPCR5 decision
  - Long-run betas in the range of 0.38 to 0.44
  - Short-run betas (1Y) in the range of 0.34 to 0.37 (but only consistent with higher ERP)
- A longer review period exposes WPD to higher risk
  - Market evidence shows more downside risk than upside risk in market returns
  - The distribution of key financial ratios widens, increasing the probability of a credit event
- Extending the regulatory deprecation lives increases cash flow risk to equity
  - Debt index does not allow returns consistent with financing assets over the regulatory life
  - Equity holder bears more refinancing risk than under shorter regulatory lives
- Ofgem recognises high capex to RAV ratios increase risk
  - *"we consider that NGGT faces notably lower cash flow risk than NGET, in part due to it having a lower investment rate (relative to RAV)."*
  - Indications are capex programmes for RIIO-ED1 larger than for DPCR5
  - Implied RIIO-T1 beta for NGG higher despite smaller (annual) capex than DPCR5

We will need more info on capex programme to decide on points within range

NERA
Economic Consulting

Gearing

There is a case for lower gearing than at DPCR5 both theoretically and empirically

NERA Economic Consulting

- Ofgem approach to RIIO
  - "we expect a network company to take a range of factors into account when choosing their financial structure including the scale of future capital expenditure requirements and the expected risks that the business faces" (RIIO Handbook, p.107)
  - Only gas distribution networks, with very low investment needs at 65% at initial proposals stage. Other networks between 55% (Scottish TOs) and 62.5% (NGG)
- Empirical evidence suggests lower gearing required for A/BBB rating
  - Moody's indicates the threshold for A/BBB debt (consistent with Ofgem debt index) for regulated electricity and gas networks to be at 60%. (Moody's (2009): Rating Methodology – Regulated electric and gas networks)
  - Average gearing for Ofgem UK energy portfolio is below 50% (NG: ~50%, SSE: ~35%). Average gearing for European operators (incl. NG & SSE) is c.55-60% (Red Electrica: ~55%, Terna: ~55%, ACEA: ~70%, Gas Natural: ~65%, Snam Rete Gas: ~45%, Enagas: ~60%)
- Regulatory Decisions in 2011-12 use average gearing of 53%
  - Most recent decisions for ED operators in Europe consider gearing range from 44 to 60% (AEEG/Italy/Dec-11: 44%, ILR/Lux/Mar-12: 50%, ERSE/Portugal/Dec-11:50%, BNetzA/GER/Nov-11: 60%)

NERA
Economic Consulting

Summary

Our indicative view of the cost of equity for RIIO-ED1 over 1Y and long-run time frames

NERA Economic Consulting

- **Real Risk Free Rate (Low: 1.2% / High: 2.1%)**

DPCR5: 2%

  - **Low:** 10Y ILG average
    - 10Y average for ILGs of different maturities suggests a lower bound Rf rate of 1.2%
    - Likely lower bound for long-run estimate because of known bias in ILG yields
  - **High:** DMS evidence
    - Long run estimates over period since 1900 (DMS) show a Rf rate of 2.1%
    - Averages out effects of volatility over the very long-run

- **Equity Risk Premium (Low: 5.0 / High: 5.5%)**

DPCR5: 5.25%

  - **Low:** DMS evidence
    - Long run estimates over period since 1900 (DMS) shows ERP of 5%
    - Averages out effects of volatility over the very long-run
    - Consistent with "high" estimate for risk-free rate
  - **High:** DMS evidence with uplift
    - Academic literature (e.g. Guo & Whitelaw,2006; Bliss&Panigirtzoglu,2004) find higher ERP during times of higher volatility
    - DGM evidence shows spot rates significantly in excess of long-run DMS numbers over long periods

Our indicative view of the cost of equity for RIIO-ED1 (using long-run averages)

NERA Economic Consulting

- **Beta (Low: 0.38 / High: 0.44)**

DPCR5: 0.32

- **Long-run:** 10Y averages – Ofgem DPCR5 and RIIO samples
  - At DPCR5 Ofgem used a sample including a large number of potentially lower risk water suppliers, RIIO sample does not contain distortions from potentially lower risk companies
  - Use of long-run betas consistent with long-run values for other parameters
  - Increase relative to DPCR5 consistent with qualitative risk findings but top end relatively high compared to ET

- **Gearing (Low: 55% / High: 65%)**
  - **Low:** Market evidence
    - UK and European comparator companies average gearing around 55-60%
    - Recent regulatory decisions for ED around Europe ranging from 44% to 60%
    - Reduction in gearing consistent with higher risk relative to DPCR5

DPCR5: 65%

  - **High:** Ofgem regulatory precedent / actual WPD DNO gearing
    - Ofgem confirmed 65% gearing for GD at RIIO-GD1
    - 65% gearing is target level for WPD DNOs according to “Financing strategy” document

Our preliminary analysis shows a range for the CoE from 6.4% to 7.6% (60% gearing); 7.2% to 8.4% (65% gearing)

NERA Economic Consulting

Preliminary WACC Range for RIIO-ED1

				Long-run	
		Calculation	DPCR5	Low	High
a)	Gearing	n/a	65%	60%	60%
b)	Risk-free Rate (%)	n/a	2.0	1.2	2.1
c)	ERP (%)	n/a	5.25	5.5	5.0
d)	***Market Returns***	***b+c***	***7.25***	***6.70***	***7.10***
e)	Asset Beta	n/a	0.32	0.38	0.44
f)	Equity Beta	e/(1-a)	0.9	0.95	1.10
g)	***Cost of Equity (%)***	***b+f*c***	***6.7***	***6.4***	***7.6***
h)	CoE (%) @ 60% gearing	b+c*e/(1-0.6)	6.13	6.43	7.60
i)	CoE (%) @ 65% gearing	b+c*e/(1-0.65)	6.73	7.17	8.39

Source: NERA analysis of Bloomberg data up to 29 June 2012.

- Preliminary high-level results based on empirical data for listed comparators and the market as a whole
- Analysis shows cost of equity range of 6.4-7.6% at 60%, **with mid point of 7.0%.** Range from 7.2% to 8.4% at 65% gearing
- Possible arguments for higher end of the range**:**
  - WPD specific risks eg. Higher capex than average DNO?
  - Competition Commission argument (eg. BAA airports) that WACC should be set at upper end of plausible range to encourage investment

NERA
Economic Consulting

Contact Us

Dr Richard Hern

Director
NERA—London
+44 207 659 8582
Richard.Hern@nera.com