3.1

Annex

SP Energy Networks 2015–2023 Business Plan

Efficiently financing our plans and our detailed financeability scenarios

SP Energy Networks

June 2013

SP ENERGY NETWORKS

Contents

Section 1 Overview

This chapter considers the overall financeability proposal within our business plan. We propose a financing plan for each of SP Distribution and SP Manweb that is efficient and adheres to Ofgem policies laid out in its Strategy Decision document, that is consistent with RIIO principles and, in particular, ensures finaceability at a comfortable investment grade credit rating but no higher. This chapter also tackles the question of what is the appropriate cashflows for the businesses and return to shareholders.

Key assumptions & headline proposals

	Section	SP Distribution	SP Manweb
Cost of equity	2.2	6.7%	6.7%
Cost of debt	2.3	iBoxx 10 year trailing average	iBoxx 10 year trailing average
Notional gearing	2.4	65%	65%
Financeability adjustment	2.5	None	None
Capitalisation rate	2.5	80%	80%
IQI	2.5	Includes 'fast track' income in financeability tests	Includes 'fast track' income in financeability tests
Dividend yield	2.2	5%	5%
Credit rating	2.5	A3/Baa1	A3/Baa1
Other policies	3 & 4	Per Ofgem	Per Ofgem
Customer Bill Impact	*Separate Chapter*	P0 +11% then flat in real terms	P0 –16% then flat in real terms

We have also taken into consideration the views of customers, investors and other stakeholders in preparing our plan. In addition, to support the process of assessing financeability we have engaged economic consultants including NERA, First Economics, OXERA and clearly reference throughout the section the other guidance to which we have referred.

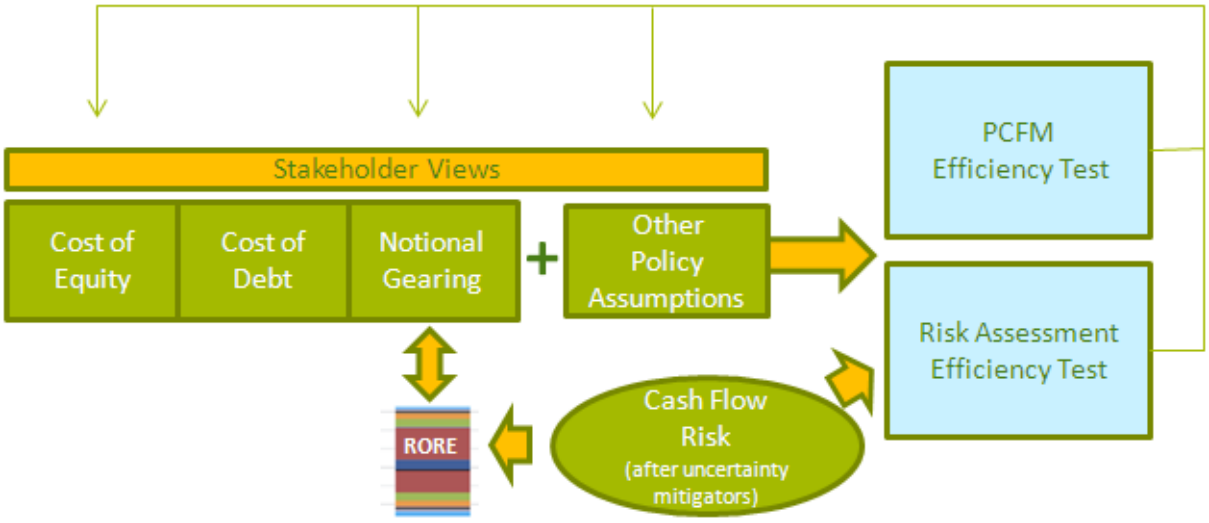
Ofgem have a statutory duty to ensure that DNOs are financeable, meaning that they are allowed sufficient cash flow to pay interest and dividends to the providers of finance. It is the DNOs responsibility to demonstrate that their financing plan is 'efficient' i.e. requiring no greater cash flow than is necessary to be 'financeable'.

Our base financial plan gives a credit rating of A3. We then considered further external risk which arguably yields a rating one notch lower.

Structure & Objectives of this chapter:

- In ***Section 2*** we provide justification for the allowed return used in our business plan. This takes up the bulk of this chapter.

    - Firstly we present a range of ***stakeholder views*** around the topic on financing costs to provide context for our other analysis.
    - Next we consider the ***cost of equity*** based on economic and financial principles.
    - On the ***cost of debt*** we discuss how we have adopted Ofgem policy without alternative weighting or transition.
    - Next we consider ***notional gearing***. At this stage we introduce cash flow risk and test that our proposal delivers acceptable upside and downside potential from the price control package using Return on Regulatory Equity (RoRE) analysis.
    - Next we test that our plan is ***financeable*****.** Here we present results from the Price Control Financial Model and carry out 'static' (or in other words non-probabilistic) testing to ensuring an expectation of a comfortable investment grade credit rating – but no higher.
    - Finally we further test the efficiency and financeability of our plan by conducting a comprehensive probabilistic ***risk analysis*** using a framework developed in conjunction with our advisers NERA to test our plan against external shocks.
- In ***Section 3*** we present our plan assumptions around capitalisation and regulatory depreciation.
- In ***Section 4*** we discuss how we have adopted Ofgem's financial policies concerning the treatment of taxation and pension costs.
- Our structured approach can be illustrated as follows:



Section 2 Allowed Return

In this section we set out the key financing components of allowed return in our business plan. We then take these out alongside other financing assumptions and present the results alongside our efficiency tests. In other words, against a backdrop of stakeholder opinion we move in stages from economic and financial principles through to a full probabilistic risk assessment.

We have replicated Moody's approach[1] to credit ratings to ensure that our overall proposal is financeable and efficiently so.

2.1 Stakeholder Views

In formulating our proposals around the allowed return we have taken into account the views of both investors and other stakeholders. Our stakeholder engagement has included the investor community and also stakeholder views expressed via Ofgem's "Consultation on strategy for the next electricity distribution price controls – RIIO-ED1 – Financial Issues". Other stakeholders have expressed interest in the absolute level of the resultant customer bill, as well as predictability and volatility of charges rather than the specific financial policy decisions.

Our stakeholder engagement has included:

- A careful review of comments received to Ofgem's RIIO-ED1 Strategy Consultation.
- An investor survey targeted at both equity and debt investors and brokers.
- A review of broker comments at the time of the publication of the RIIO-GD1 and RIIO-T1 initial proposals (this was the point at which the gearing and allowed Cost of Equity were announced and did not change for the final proposals).
- We also analysed the market's reaction by reviewing National Grid's share price performance versus the FTSE-100 and the Dow Jones STOXX Utilities index for the days immediately after the publication of these initial proposals.

This engagement has identified that stakeholders are in broad agreement on the identified credit metrics and, where opinions have been given, generally stakeholders believed that a low single A credit rating should be targeted. There was also broad support for Ofgem's approach to calculating the cost of debt however in our investor survey one broker raised the point that debt efficiently incurred more than 10 years ago would not be captured under Ofgem's policy. One supplier suggested that consideration should be given as to whether the depreciation timescale for existing as well as new assets should also be 45 years.

[1] Moody's Investors Service (2009) "Rating Methodology – Regulated Electric and Gas Networks", August

Our stakeholder engagement identified two areas where stakeholders' views differ significantly: Cost of Equity and Notional Gearing.

Responses to Ofgem's consultation indicated that some stakeholders believe a higher gearing may be appropriate: "*Ofgem should consider a relatively high starting point for its analysis of gearing, and consider downward adjustments only where clearly warranted by material financeability concerns".* One supplier indicated that the appropriate Cost of Equity could be lower than the top end of the range suggested by Ofgem.

> "Ofgem's proposed range for the cost of equity seems at odds with recent evidence and decisions. Ofgem proposes an ED1 range of 6.0% - 7.2%, so a top end of the range a full 50 bps above the GD1 Initial Proposals figure of 6.7% and an equal amount above the DPCR5 decision."

However our investor survey results indicated that the investor community believe that an appropriate gearing level would be in the 60-65% range and that an appropriate cost of equity would be in the top half of Ofgem's indicated range.

We reviewed the broker commentary and share price performance of National Grid at the time of the publication of the RIIO-T1 and RIIO-G1 initial proposals. This review indicated that the returns permitted were below market expectations. The broker comments were generally neutral to negative in their tone whilst in the first week following the publication of the initial proposals National Grid's share price underperformed both the FTSE-100 and the Dow Jones STOXX Utilities index.

Some of the broker comments were:

Deutsche Bank

> *"The headline returns on equity for gas transmission (6.8% vs our expected 7.0%) and gas distribution (6.7% vs our expected 7.0%) look disappointing (electricity transmission in line at 7.0%). However the real negative comes from higher assumed gearing (60% for ET, 62.5% GT and 65% GD vs our expected 55%), which reduces the overall allowed return"*

Nomura

> "*Overall the allowed returns are behind our expectations, and what we think the market was expecting"*

Morgan Stanley

> *"These proposals are not sufficiently tough to materially change the NG investment thesis, although they will result in slightly lower EPS, DPS and RAV growth. Perhaps most importantly we believe that the proposals leave the financeability of the overall*

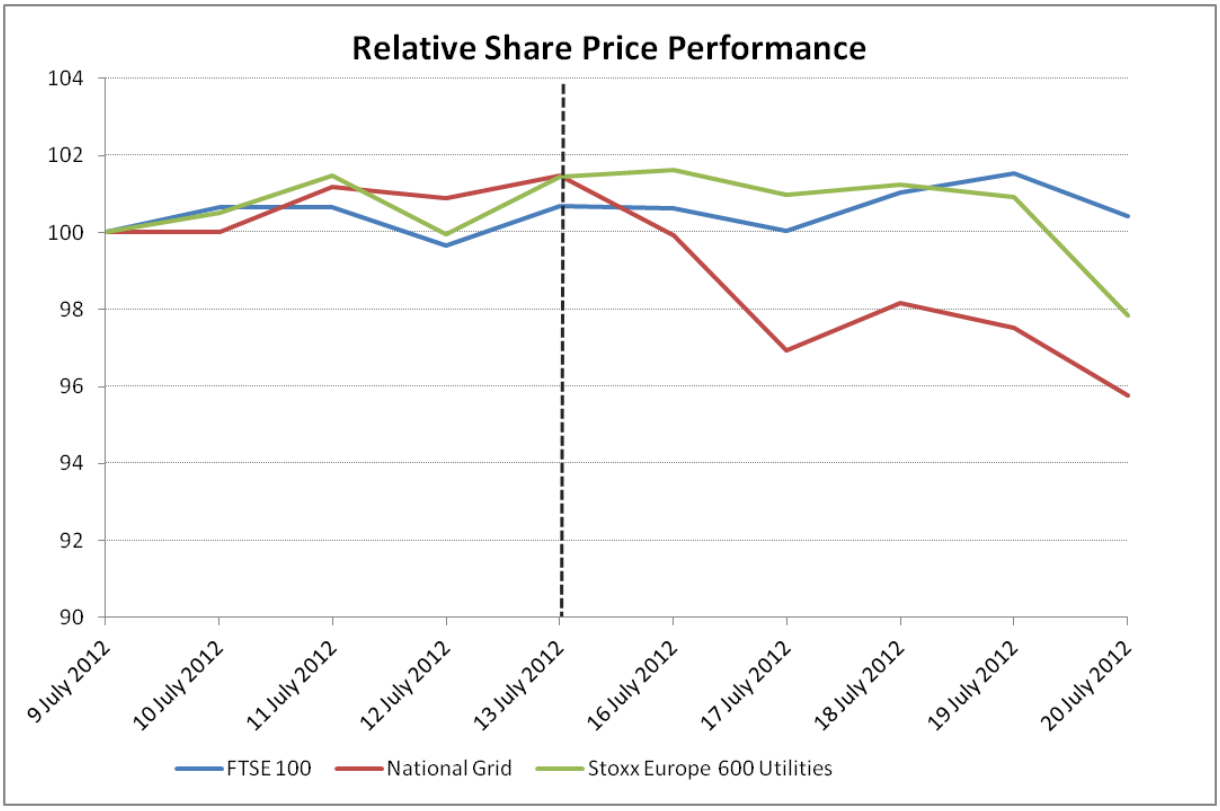
NG group in a healthy situation based on an analysis of all relevant credit and leverage metrics."

Credit Suisse

> *"Our overall observation is that cash flow issues that many investors had are being addressed by these price controls (as per our notes of 2012.01.23 entitled More than meets the eye and 2012.06.08 entitled RIIO presents a c£2.5bn opportunity). But the focus has shifted to returns, and NG could do with a slight increase to the low returns in Gas Distribution (as could the whole Gas Distribution industry)."*

Figure 1 shows the share price performance immediately prior to and after the publication of the RIIO-T1 and RIIO-GD1 Initial Proposals on 16 July 2012.

Figure 1: National Grid's Relative Share Price Performance



On the whole and after careful consideration of all of our stakeholders' opinions, we consider that our base assumptions included within this Business Plan strike an appropriate balance for all stakeholders while ensuring our business is financeable under a range of assumptions.

2.2 Cost of equity

	SP Distribution	SP Manweb
Cost of Equity	6.7%	6.7%
Dividend	5.0%	5.0%

The cost of equity is the return required by shareholders for bearing the residual risk, after the operation of risk sharing and uncertainty mechanisms. It is the minimum return needed to attract and retain equity finance for our distribution businesses, which is essential to fund the necessary investment to deliver the outputs that our customers require and to facilitate the transition to a low carbon economy. We estimate the cost of equity to be 6.7% real, post-tax.

This financing principle was concisely described in the Supreme Court of the United States[2] as:

> "the return to the equity owner should be commensurate with the return 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 to attract capital."

In estimating the cost of equity, we have taken into account:

- Theoretical asset pricing models
- Market Evidence
- Regulatory precedents
- Views of stakeholders

We also reflect on the views of and evidence from Ofgem's advisors.

Asset pricing models

Ofgem's preferred framework is the Capital Asset Pricing Model (CAPM). This derives the cost of equity by adding the company or sector risk premium to the risk free rate. The risk premium is calculated by applying a measure of relative risk, known as the "beta" factor to the risk premium for the stock market as a whole. Formally, the CAPM equation for the cost of equity is:

cost of equity = (risk free rate) + beta x (equity market risk premium)

The risk free rate has traditionally been estimated from long run averages of yields on index linked gilts. However, these have become distorted successively by pensions' regulations, quantitative easing, the Eurozone sovereign debt crisis and the "flight to quality".

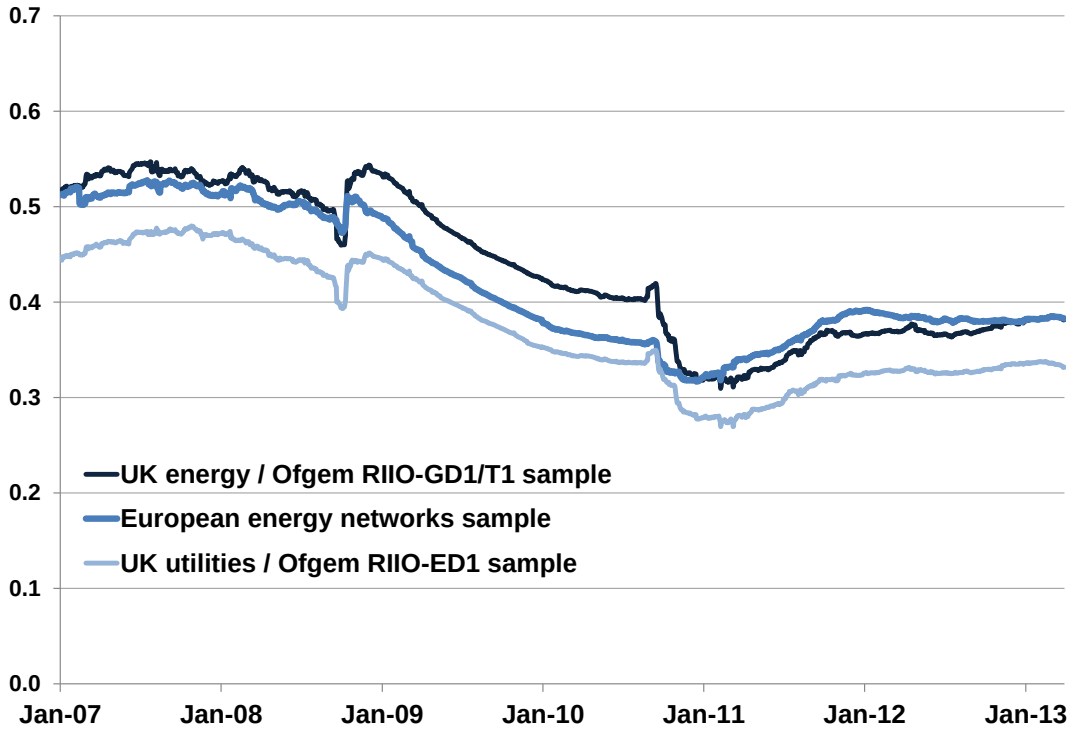
[2] *FPC v. Hope Natural Gas Co.*, 320 U.S. 591 (1944). *Bluefield Water Works & Improvement Co. v. Public Service Comm'n*, 262 U.S. 679 (1923).

For the purposes of our CAPM estimate, we have taken the real risk free rate to be 2%, which is consistent with the 10 year average on index linked gilts, prior to the implementation of quantitative easing, which has markedly reduced the yield on gilts. As shown later in Table 11, this is also consistent with recent regulatory precedents.

The equity market risk premium is assumed to be 5%, which is consistent with the long run arithmetic average for the UK.

The equity beta is estimated to be 0.94 which is within Ofgem's proposed range for RIIO-ED1 and implies an asset beta of 0.33 at 65% gearing. We note that this asset beta is at the bottom end of the range of 0.33 to 0.44 estimated by NERA but we understand that NERA have used a "Blume[3] adjustment" to estimate their betas, which assumes that equity betas revert to one over time.

Figure 2: Two year rolling asset beta estimates for different energy and utility network portfolios



Source: NERA estimates based on Bloomberg data. 2Y rolling asset betas based on daily data, Miller and Blume adjusted. Data until end of March 2013.

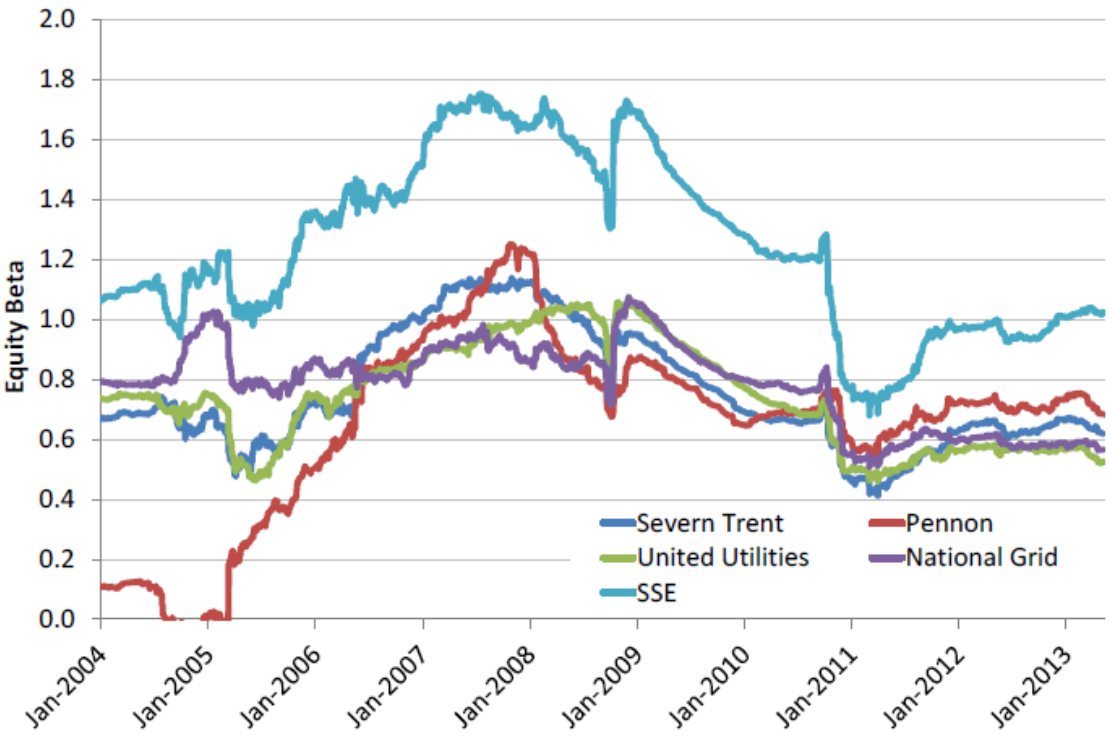
However, in their report for Ofgem, Imrecon reject the use of the Blume adjustment for regulated network companies and they assert[4]:

[3] Blume, M (1971) "On the assessment of risk", Journal of Finance, March; and Blume, M (1975) "Betas and their regression tendencies", Journal of Finance, June

[4] Imrecon (2012) "RIIO reviews – Financeability study", November, page 25

> "Blume adjustments are generally, and rightly, rejected by regulators. There appears to be no justification for applying them to betas in the network sector."

Figure 3: Two year rolling equity beta estimates with notional gearing of 65%



Source: NERA analysis

NERA's analysis shows that (unadjusted) equity betas for individual UK energy and water network companies, at a notional gearing level of 65%, lie in the range of 0.6 to 1.0 during the last year but 0.7 to 1.7 in the three years up to October 2010. However, as Figure 3 shows, these beta estimates are not stable over time.

In their assessment of relative risk, Oxera conclude[5] that asset risk may be higher in RIIO-ED1 and suggest a beta range of 0.95 to 1.20 at 65% gearing. However, consistent with RIIO-T1 and GD1, we use the capex/RAV ratio and the potential spread of return on regulatory equity (RoRE) as our primary indicators of relative risk.

Similarly, in their assessment of relative riskiness First Economics conclude:[6]

> "the DNOs are likely to be among the more risky regulated networks from the perspective of equity investors."

[5] Oxera (2013), "RIIO-ED1 Risk assessment framework", April 10th
http://www.ofgem.gov.uk/Pages/MoreInformation.aspx?docid=12&refer=NETWORKS/PRICECONTROLS/WEBFORUM

[6] First Economics (2012), "The Riskiness of the Electricity DNOs under RIIO Relative to Other Regulated Networks", August
http://www.ofgem.gov.uk/Networks/ElecDist/PriceCntrls/riio-ed1/consultations/Documents1/ENA_ED1StratResponse_First%20Economics_relative%20risk.pdf

Nevertheless, we note that, unlike the water and sewerage sector, electricity DNOs are not traded as separate entities. It is therefore a matter of judgement as how best to estimate and interpret betas obtained from larger groups and comparators.

Combining these CAPM components, we calculate the cost of equity to be 2% + (0.94 x 5%) = 6.7% real, post-tax.

This is consistent with Oxera who have estimated[7] that 6.7% is likely to be the minimum cost of equity for RIIO-ED1.

We have cross checked this against other approaches, including:

- Forward looking estimates
- Dividend Growth Model (DGM)
- Total market return

Forward Looking estimates

The onset of the financial crisis in 2008 brought an end to the 'Great Stability' period, making prospects for UK and global economic growth appear not just weaker, but more uncertain. This elevated uncertainty is likely to have adversely affected spending decisions and contributed to the depth of the recent recession and the weakness of the recovery. While uncertainty is not directly observable, the Bank of England has constructed[8] an aggregate measure of the economic uncertainty faced by households and companies, based on a number of proxy indicators.

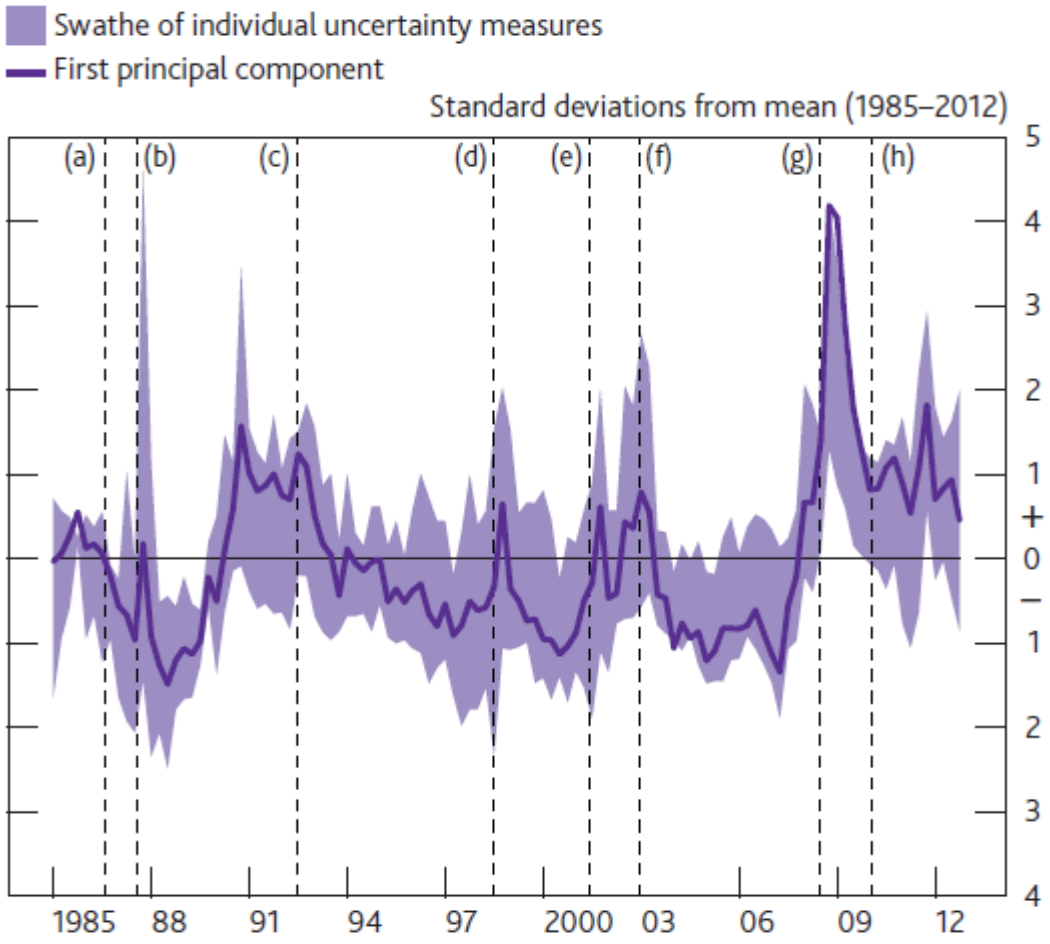
The Bank of England observes:

> "uncertainty was at an unusually low level for a prolonged period just prior to the recent crisis. In 2003, the index fell sharply, to over one standard deviation below its mean. The experience of unprecedented stability in both the UK and world economies before the crisis might have altered — in hindsight, perhaps unrealistically — individuals' perceptions of the likelihood of future economic shocks occurring.
>
> But the magnitude of the uncertainty shock experienced in the recent financial crisis was unprecedented over the period covered. During late 2008, the uncertainty index rose to over four standard deviations above its mean. In part, this might have reflected a rapid reassessment of risks from the financial sector in the wake of the failure of Lehman Brothers. The shock to uncertainty during the recent crisis has also been unusually persistent. In each previous episode of heightened uncertainty, shown in Figure 4, the uncertainty index began to fall back within one to three years of the original shock, including following the 1990s recession. By contrast, uncertainty has remained one standard deviation above its mean for most of the past five years and still appears to be elevated."

[7] Oxera (2012), "Determining efficient financing costs for RIIO-ED1", September 3rd http://www.ofgem.gov.uk/Networks/ElecDist/PriceCntrls/riio-ed1/consultations/Documents1/ENA_ED1StratResponse_Oxera_Financing.pdf

[8] Haddow A, Hare C, Hooley J and Shakir T (2013) " Macroeconomic uncertainty: what is it, how can we measure it and why does it matter?", Bank of England Quarterly Bulletin, 13 June

Figure 4: Bank of England's time series of uncertainty indicators



Source: Bank of England Quarterly Bulletin, Chart 3, page 104, 13 June 2013

Notes:

(a) 'Big Bang' (October 1986).
(b) 'Black Monday' (October 1987).
(c) Sterling exits ERM (September 1992).
(d) LTCM failure (September 1998).
(e) September 11 attacks (September 2001).
(f) Iraq war (March 2003).
(g) Lehman Brothers' failure (September 2008).
(h) Greece requests EU/IMF assistance (April 2010).

The Bank of England concludes:

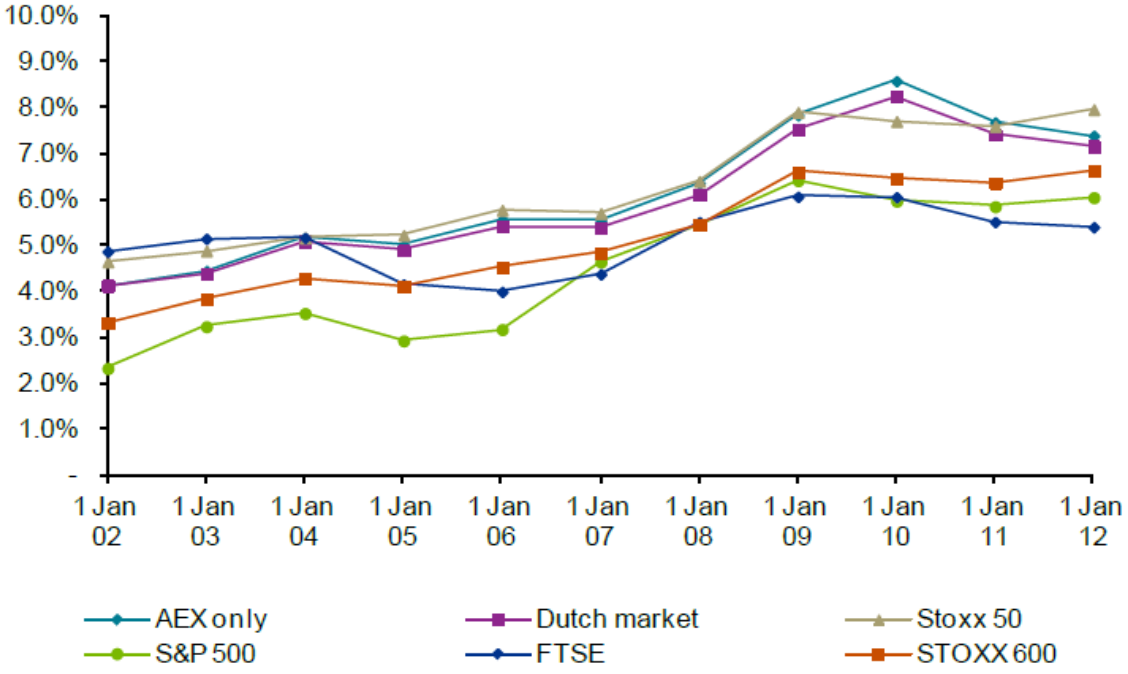
> "uncertainty about the macroeconomic outlook is likely to have a negative effect on asset prices because investors require compensation that captures the risk of holding the asset — a risk premium. During periods of heightened uncertainty, investors require greater compensation as insurance against future risks. This reduces asset prices and the financial wealth of investors holding those assets. Asset prices also tend to be more volatile during

periods of heightened uncertainty. Lower and more volatile asset prices are likely to discourage investment by making borrowing more expensive, since the cost of credit tends to be negatively related to the financial wealth of borrowers."

KPMG derives the equity market risk premium by assessing current income, growth expectations and current prices. The general Discounted Cash Flow (DCF) formula is then used to solve for the implied discount rate that reconciles these parameters. Deducting the risk-free rate from this implied discount rate will yield an implied equity market risk premium. KPMG conclude:[9]

"As the graph shows, equity market risk premia have been relatively stable before 2008, after which all equity market risk premia have significantly increased and have stabilised around 6.5%."

Figure 5: Implied equity risk premium



Source: KPMG[9]

NERA have also considered forward looking estimates of the equity risk premium (ERP) which are summarised in the following table.

Table 6: Equity risk premium estimates over different time horizons (%)

	Spot	1Y	2Y	5Y	10Y	Long-Run (DMS)
Bloomberg	9.9	9.7	10.1	9.7	n/a	5.0

[9] KPMG (2013), "Equity Market Risk Premium – Research Summary", January http://www.kpmg.com/NL/nl/IssuesAndInsights/ArticlesPublications/Documents/PDF/Financial-Services/MRP-study-summary-Jan2013.pdf

Bank of England	c.7.25	c.7.0	c.6.0	c.5.5	c.5.0
German Bundesbank	c.10.0	c.9.5	c.8.5	c.7.5	n/a

Sources: Bloomberg, Bank of England Financial Stability Report, June 2012, Bank of England Quarterly Bulletin 2010, Q1 and German Bundesbank, Monthly Report November 2012.

Notes: Underlying data for BoE and German Bundesbank report not publicly available (averages estimated). No provider publishes the exact calculation behind its model. Bundesbank Monthly Report February 2013 contains estimate of total market returns but not explicitly the ERP. DMS refers to data compiled by Dimson, Marsh and Staunton, who are authors of the Global Investment Returns Yearbook and Sourcebook published by Credit Suisse.

We note that all providers use slightly different long-run growth rates and discounting assumptions and that there is no agreed method in the literature that would support one provider's approach over another. Table 6 shows that all current estimates of the ERP are higher than the long-run estimate of 5.0%. This is in line with expectations, as current estimates of the risk-free rate are lower and these two parameters are known to move in opposite directions.

On a forward looking basis, the Bank of England's higher risk premium of around 7.25% offsets the currently negative real interest rates to give the same estimate of the cost of equity of -0.1% + 0.94 x 7.25% = 6.7% real, post-tax.

Dividend Growth Model

An alternative approach is to use the Dividend Growth Model (DGM). This is the alternative to the CAPM, for calculating the cost of equity, which is widely used in US regulatory proceedings. The DGM derives the cost of equity by computing the discount rate that equates a stock's current market price with the present value of all future expected dividends.

Table 7 shows the results of the DGM-derived real cost of equity for a sample of European energy network companies, using Bloomberg consensus analysts' short term DPS forecasts for the first three years but zero growth thereafter.

Table 7: European energy network companies' DGM-derived real cost of equity (zero growth, actual gearing, post-tax)

Company	2010	2011	2012	Average
National Grid PLC	8.1%	6.6%	6.0%	6.9%
SSE PLC	7.7%	6.0%	6.5%	6.7%
Terna SPA	6.3%	6.4%	7.2%	6.6%
ACEA SPA	n/a	8.6%	6.7%	7.7%
SNAM SPA	7.2%	6.4%	7.9%	7.2%
Red Electrica Corporacion SA	8.5%	7.7%	8.4%	8.2%
Gas Natural SDG SA	9.4%	6.9%	9.1%	8.5%
Enagas SA	8.4%	8.7%	8.8%	8.7%

UK energy sample average	7.9%	6.3%	6.2%	6.8%
Total average real CoE	**8.0%**	**7.2%**	**7.6%**	**7.57%**
Average gearing D/(D+E)	52.1%	50.3%	57.0%	53.2%

Source: NERA analysis of Bloomberg data

Table 8 repeats the analysis but uses forecast long run real GDP growth rate for UK and the Euro-zone respectively at time of valuation for the subsequent years.

Table 8: European energy network companies' DGM-derived real cost of equity (g = GDP growth, actual gearing, post-tax)

Company	2010	2011	2012	Average
National Grid PLC	10.1%	8.4%	7.8%	8.8%
SSE PLC	9.6%	7.9%	8.2%	8.6%
Terna SPA	7.8%	7.8%	8.3%	8.0%
ACEA SPA[10]	n/a	10.0%	7.9%	8.9%
SNAM SPA	8.7%	7.8%	9.0%	8.5%
Red Electrica Corporacion SA	10.0%	9.1%	9.5%	9.5%
Gas Natural SDG SA	10.9%	8.4%	10.2%	9.9%
Enagas SA	9.9%	10.1%	9.9%	10.0%
UK energy sample average	9.9%	8.2%	8.0%	8.7%
Total average real CoE	**9.6%**	**8.7%**	**8.9%**	**9.05%**
Average gearing D/(D+E)	52.1%	50.3%	57.0%	53.2%

Source: NERA analysis of Bloomberg data

In its report[11] for Ofgem, FTI Consulting undertook its own analysis using the DGM and concluded:

> "As a cross-check using the DGM, we estimated a reasonable range for the cost of equity for National Grid PLC to be **6.8% to 8.6**%, and a reasonable range for SSE to be **6.3% to 8.1**%. These estimates are for the listed companies. We have not attempted to use these to develop specific estimates of the network companies' cost of equity. We conclude that the range of estimates using a DGM is consistent with Ofgem's range of estimates of the cost of equity using the CAPM."

We observe that FTI's cost of equity estimates for National Grid and SSE are similar to NERA's.

We conclude that our 6.7% cost of equity is at the lower end of the range of estimates produced by the DGM for comparator companies.

[10] Acea SPA ommited its dividend payment in 2010.

[11] FTI Consulting (2012), "Cost of capital study for the RIIO-T1 and GD1 price controls", 24 July http://www.ofgem.gov.uk/Networks/Trans/PriceControls/RIIO-T1/ConRes/Documents1/RIIO%20T1%20Cost%20of%20capital%20study%20for%20RIIO%20T1%20and%20GD1.pdf

Total market return

As Smithers & Co noted[12], the overall market return is more stable than the individual components of the CAPM.

> "we regard the standard approach to building up the cost of equity, from estimates of the safe rate and the equity premium, as problematic. We would recommend, instead, that estimates should be derived from estimates of the aggregate equity return (the cost of equity for the average firm), and the safe rate."

Stephen Wright, a joint author of the Smithers' reports has recently again endorsed this approach in evidence[13] to the Australian Energy Regulator (AER):

> "My views can be summarised as follows:
>
> i. Both the real market cost of equity and the MRP are inherently unobservable. But of necessity regulators have to commit themselves to a particular set of assumptions about these unobservable magnitudes. My view, in line with the UK regulators, is that regulators should work on the assumption that the real market cost of equity is constant. This approach is supported by quite strong evidence. For any firm with β reasonably close to one, the assumed real market cost of equity is by far the most important figure affecting the cost of capital for regulated companies. Thus this methodology has the added advantage of providing a stable regulatory regime. I believe this has proved its worth in the UK.
>
> ii. Any other assumptions should be consistent with this core assumption. As a direct implication, whatever assumption is made on the risk-free rate, the implied equity premium must move point by point in the opposite direction. "

Alan Gregory (formerly reporting panel member of the UK Competition Commission, from 2001-2009, and currently an External Advisor to the UK Competition Commission's Finance and Regulation Group) in his own recent evidence[14] to the AER concluded:

> 78. "Theory suggests that the individual components of the CAPM should be estimated directly. These are RF and E(RM), not RF and MRP.
>
> 79. Importantly, there is evidence, discussed at 16-17 above, that E(RM) has a stable mean. By contrast, it appears that neither RF nor the MRP have stable means. Of course, there is considerable debate in the academic literature concerning stability, as is evidenced by the differences of opinion expressed in the 2008 special issue of the Review of Financial Studies, where Cochrane (2008) and Campbell and Thompson (2008) taking opposing positions to Goyal and Welch (2008). Critically, though, note that when these authors discuss the "market risk premium" it is specifically in the context of the premium over Treasury Bill rates

[12] Smithers & Co. Ltd.(2003),., "A Study into Certain Aspects of the Cost of Capital for Regulated Utilities in the U.K"., 13 February http://ofwat.gov.uk/publications/commissioned/rpt_com_costofcapital130203.pdf

[13] Wright, S (2012), "Review of Risk Free Rate and Cost of Equity Estimates: A Comparison of UK Approaches with the AER", 25 October http://www.aer.gov.au/sites/default/files/Attachment%209.15%20Professor%20Stephen%20Wright%20Review%20of%20risk%20free%20rate%20and%20cost%20of%20equity%20estimates%20A%20comparison%20of%20UK%20approaches%20with%20the%20AER_0.PDF

[14] Gregory, A (2012) ,"The AER Approach to Establishing the Cost of Equity – Analysis of the Method Used to Establish the Risk Free Rate and the Market Risk Premium", 5th November http://www.aer.gov.au/sites/default/files/5%204%20Gregory%20A.,%20The%20AER%20Approach%20to%20Establishing%20the%20Cost%20of%20Equity%20%E2%80%93%20Analysis%20of%20the%20Method%20%20Used%20to%20Establish%20the%20Risk%20~1.pdf

not the risk premium over bonds. The stability of the MRP relative to bond yields has not been analysed in these papers.

80. If the E(RM) has a more stable mean, the consequence is that direct estimates of E(RM) are likely to be more statistically reliable than indirect estimates formed by summing RF and MRP. This may be of particular importance in the present environment of exceptionally low levels of RF.

81. Thus the clear recommendation by prominent UK academics in reports commissioned specifically for UK regulators (The Smithers Report and the follow-up 2006 Smithers & Co Report) is that the CAPM should be implemented by directly estimating the E(RM) and RF components, and specifically not by the common practice of indirect estimation using an RF and MRP. It must also be noted that the asymmetry of consequences that flow from mis-estimating the cost of capital highlight the particular danger of under-estimating the cost of equity by that the MRP remains stable in the presence of unusually low CGS yields.

82. It is clear that the UK regulators, and in particular the appeals body, the UK Competition Commission, have heeded this advice."

The arithmetic average total market return is 7.1%, which is calculated from UK data from the Credit Suisse Global Investment Returns Sourcebook 2013.

For TPCR4, Smithers' estimated[15] the implied arithmetic mean for total market returns using an adjustment to the geometric mean to reflect the volatility of market returns:

Arithmetic Total Market Return = Geometric Total Market Return + ½ Equity Market Variance

Updating Smithers' approach with UK data from the Credit Suisse Global Investment Returns Yearbook 2013 gives:

A	Geometric Mean returns (1900-2012)	5.2%
B	Standard Deviation of returns (1900-2012)	20%
C	Variance of returns (=B^2)	4.0%
D	½ Variance (=C/2)	2.0%
E	**Implied Arithmetic mean return (=A+D)**	**7.2%**

Other models

In view of Ofgem's and FTI Consulting's criticisms of the Residual Income Model (RIM) and the Intertemporal Capital Asset Pricing Model (ICAPM), for example, Brennan and Xia[16]

[15] Smithers & Co. Ltd., "Report on the Cost of Capital – provided to Ofgem", 1 September 2006 http://www.ofgem.gov.uk/Networks/Trans/Archive/TPCR4/ConsultantReports/Documents1/15576-smithers_co.pdf

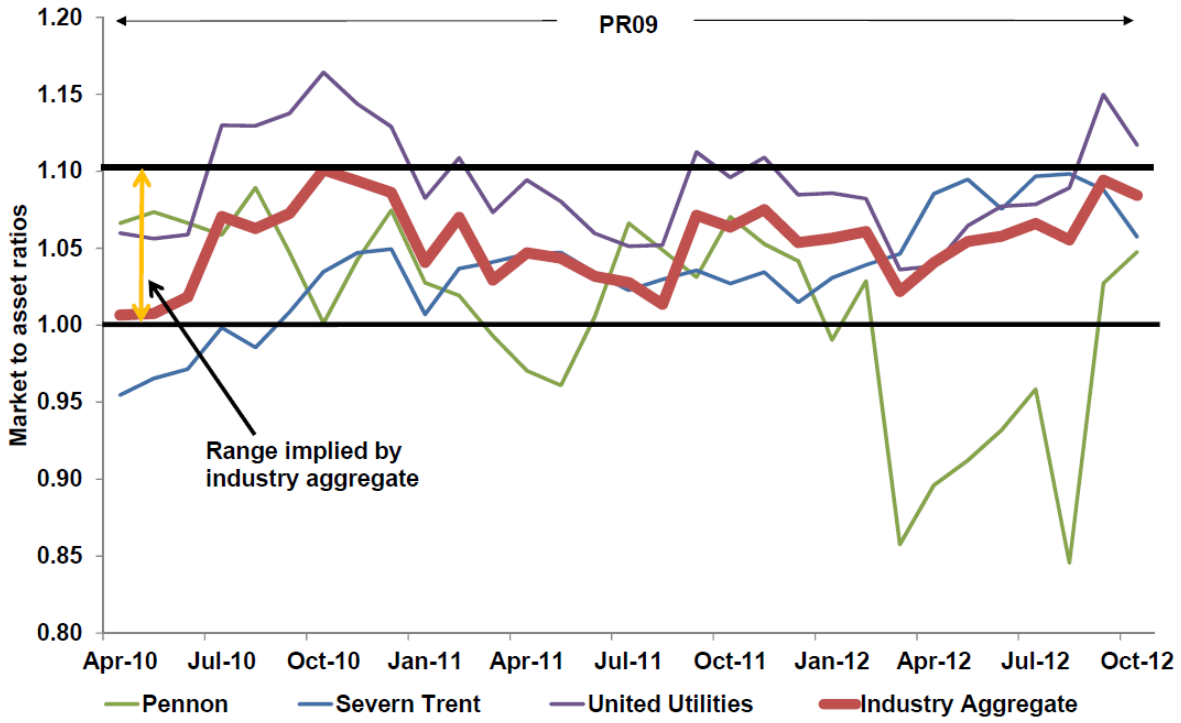
[16] Brennan, M and Xia, Y (2006),'Risk and valuation under an Intertemporal Capital Asset Pricing Model', *Journal of Business*, **79**:1

(2006), we have not relied on these approaches. In using the same cost of equity as set for DPCR5, we have reflected Ofgem's view that the increase in the length of the price control for RIIO has not increased systematic risk as measured by the CAPM beta. Nevertheless, we note that the CAPM is a single period model and, therefore, not designed to assess multi-period issues, such as arise from a longer price control period.

Market evidence

We are aware that some commentators attempt to draw conclusions from the relation between market values and the regulatory value attributed to the RAV. Although a few water and sewerage companies are still quoted on the London Stock Exchange and it is possible to track the Market to Asset Ratio (MAR) i.e. market capitalisation value relative to the RCV: this fluctuates markedly.

Figure 9: MARs for UK Water Companies



Source: Bloomberg, Ofwat RCV publications, Analyst reports, NERA calculations

Figure 9 shows that since PR09, MARs have averaged between 1.0 and 1.1 for the average of all of the listed water companies. However, for individual companies the pattern is more volatile and the range of MARs varies between 0.85 and 1.15. Some of this range is a function of the variability of estimates of the value of the non-regulated businesses, especially for Pennon.

Table 10 presents ranges of MARs for the industry aggregate and for each of the companies based on the confidence interval NERA have constructed around the value of non-regulated

business. The range of MARs is 0.98–1.10 in the period December 2008 to October 2012, and it has fallen from the range of 0.98–1.24 in AMP4.

Table 10 : Ranges for MARs - UK Water Companies

	December 2008 – October 2012	AMP4	AMP3
Pennon	0.83 – 1.09	0.72 - 1.33	0.77 - 1.12
United Utilities	1.02 – 1.16	0.88 - 1.35	0.77 - 1.06
Severn Trent	0.92 – 1.10	0.92 - 1.26	0.72 – 0.92
Dee Valley	1.36 – 1.55	1.20 – 1.55	1.06 – 1.32
Aggregate	**0.98 – 1.10**	**0.98 - 1.24**	**0.83 – 0.99**

Source: Bloomberg, analyst reports and NERA analysis.

Moreover, unlike the water sector, there are no continuously traded entities that solely reflect the value of electricity DNOs. For electricity DNOs, there are only occasional changes of ownership and these are generally accompanied by claims that the new owners will improve performance. Furthermore, the highest bid premiums have been associated with highly leveraged transactions at a time of exuberance in the credit markets and these now face substantial refinancing risks. The Bank of England[17] has outlined the risks around such deals:

> "In the mid-2000s, there was a dramatic increase in acquisitions of UK companies by private equity funds. The leverage on these buyouts, especially the larger ones, was high. The resulting increase in indebtedness makes those companies more susceptible to default, exposing their lenders to potential losses. This risk is compounded by the need for companies to refinance a cluster of buyout debt maturing over the next few years in an environment of much tighter credit conditions. From a macroprudential policy perspective it will be important to monitor the use of debt in acquisitions in future episodes of exuberance."

We note that Imrecon, in their financeability study[18] for Ofgem concluded:

> "We consider that high equity valuations provide some corroborating, but not primary, evidence for the cost of capital. We do not believe it is appropriate to place significant weight on them."

We conclude that the past premia paid for electricity DNOs are not a reliable indicator of the forward looking cost of capital.

Regulatory precedents

The risk-free rates and market risk premia used by regulators are set out in Tables 11 and 12 below.

[17] Gregory, D (2013) "Private equity and financial stability", Bank of England Quarterly Bulletin, Q1, March

[18] Imrecon (2012) "RIIO reviews – Financeability study", November, page 24
http://www.ofgem.gov.uk/Networks/GasDistr/RIIO-GD1/ConRes/Documents1/GD1_FinanceabilityStudy_DEC12.pdf

Table11: Real risk-free rates used in recent price controls

Decision year	2006	2007	2007	2008	2008	2009	2009	2010	2011	2011	2011	2012
Price control	Ofgem: TPCR4	CAA: Heathrow	Ofgem: GDPCR	ORR: PR08	CAA: Stansted	Ofwat: PR09	Ofgem: DPCR5	CAA: NATS	Ofcom: MCT	Ofcom: WBA	Ofgem: TPCR4	Ofgem: RIIO T1/GD1
Risk-free rate	2.5%	2.5%	2.5%	1.8%	2.0%	2.0%	2.0%	1.75%	1.5%	1.4%	2.0%	2.0%

Source: Joint Regulators' Group[19]

As regards the real risk free rate, there is broad consistency across sectoral regulators, although Ofcom takes a slightly different approach due to factors that specifically affect the telecommunications sector. Unlike other regulators, Ofcom sets price controls using nominal returns and of shorter length – typically three years - so it places more weight on shorter term averages and forward rates.

Table 12: Market risk premia used in recent price controls

Decision year	2006	2007	2007	2008	2008	2009	2009	2010	2011	2011	2011	2012
Price control	Ofgem: TPCR4	CAA: Heathrow	Ofgem: GDPCR	ORR: PR08	CAA: Stansted	Ofwat: PR09	Ofgem: DPCR5	CAA: NATS	Ofcom: MCT	Ofcom: WBA	Ofgem: TPCR4	Ofgem: RIIO
Market risk premium	4.5%	4.24%	4.75%	5.0%	4.67%	5.4%	5.25%	5.25%	5.0%	5.0%	5.0%	5.25%

Source: Joint Regulators' Group[20]

Most regulators take a long term view on the appropriate market risk premium, although some allowance has been made for the impact of the Credit Crisis.

Dividend Yield

We have assumed a dividend yield of 5% on the notional equity proportion of the RAV. This is again consistent with Ofgem's assumptions for DPCR5 and RIIO-GD1.

Observed dividend yields for UK network comparators lie within the range 4.4% to 5.5% with energy companies notably having a higher dividend yield than water companies.

Table 13: Dividend yields for UK network comparators

Company	Dividend Yield
National Grid	5.1%
SSE	5.5%
Pennon	4.5%
Severn Trent	4.4%
United Utilities	4.8%
Average	4.9%

[19] Joint Regulators Group (JRG), (2013), Cost of Capital and Financeability, Table 3.1, March http://www.ofgem.gov.uk/About%20us/BetterReg/JointReg/Documents1/JRG%20Report%20on%20Cost%20of%20Capital%20and%20Financeability%20-%20Final%20March%202013.pdf

[20] *ibid*., Table 3.2

There are several economic theories which show that dividend policy does matter to investors, including:

- clientele effects[21]
- signalling and asymmetric information[22]
- term premium
- agency theory[23] and free cash flow

The clientele effect is especially important for utility shares, as they are preferred predominantly by income investors who require a continuous and growing dividend. These investors would not be prepared to continue to invest should dividend cuts take place. Attempting to reclassify network operators as "growth stocks" would not be sufficient to persuade investors to fund the required capex. Such a model would be premised on the potential for even greater payments (including compounded returns) in the future, which simply cannot be bound on to future customers, governments and regulators. This is the well known "time inconsistency" problem.

For example, the well known income fund manager, Neil Woodford of Invesco Perpetual was reported in the Financial Times of 14 August 2010 as saying:

> "Equity investors are not a piggy bank ...Don't for a minute think that you can launch a rights issue or slash the dividend to retain more equity in the business ... so that you can build more infrastructure for the country."

Furthermore, deferring the dividend payments to beyond RIIO-ED1 would increase the cost of equity due to the term premium effect. With an upward sloping yield curve, there is a positive term premium, which would raise the cost of equity. The yield on non-financial BBB rated corporate bonds is 72bps higher for those with maturities of 10-15 years compared with those of 5-7 years.

Deferring dividend payments to beyond RIIO-ED1 would increase the cost of equity by up to 70bps, which would not be in the interest of customers.

Andrew Haldane, Executive Director of the Bank of England for Financial Stability, has presented[24] evidence of short-termism in capital markets, which results in excessive discounting:

> "Our evidence suggests short-termism is both statistically and economically significant in capital markets. It appears also to be rising. In the UK and US, cash-flows 5 years ahead are discounted at rates more appropriate 8 or more years hence; 10 year ahead cash-flows are valued as if 16 or more years ahead; and cash-flows more than 30 years ahead are scarcely valued at all. The long is short. Investment choice, like other life choices, is being re-tuned to a shorter wave-length."

[21] Scholz, John Karl, A Direct Examination of the Dividend Clientele Hypothesis, Journal of Public Economics 49, 261–285, 1992

[22] Bhattacharya, S. Imperfect information, dividend policy, and "the bird in the hand" fallacy. Bell Journal of Economics, 10, 259-270, 1979

[23] Easterbrook, F. H. Two agency-cost explanations of dividends. American Economic Review, 74, 650-659, 1984

[24] Andrew Haldane and Richard Davies, "The Short Long", Speech, 29th Société Universitaire Européene de Recherches Financières Colloquium: New Paradigms in Money and Finance?, Brussels, May 2011

and concluded:

> "These tests of short-termism point to two key conclusions. First, there is statistically significant evidence of short-termism in the pricing of companies' equities. This is true across all industrial sectors. Moreover, there is evidence of short-termism having increased over the recent past. Myopia is mounting.
>
> Second, estimates of short-termism are economically as well as statistically significant. Empirical evidence points to excess discounting of between 5% and 10% per year."

In addition, if allowed revenue is suppressed in RIIO-ED1, as a result of imposing dividend cuts, then future customers will have to fund an even larger amount. Investors will require future dividend payments compounded at a higher required return to compensate them for the dividends foregone during RIIO-ED1. This would result in inter-generational inequity, as future customers would face higher charges.

Finally, if dividend payments are perceived as a discretionary allowance, this exacerbates the "time-inconsistency" problem. Regulators are unable to bind comprehensively their successors or provide commitments to future government policies. In future, the objective of reducing charges to customers may take a higher priority than allowing the company to recover the full return on its sunk investment. This is a significant downside risk facing investors in regulated utilities. Colin Mayer in his 2009 Beesley Lecture[25] set this out clearly:

> "During periods of high capital expenditure requirements, regulators seek to promote investment by offering high rates of return. However, once the capital is sunk then there are strong political forces encouraging regulators to claw back as much as possible by offering lower rates of return. Even if they feel compelled to follow rules that prevent that from happening, they cannot bind their successors and there is therefore no way in which the regulatory system can provide long-term commitments to firms about allowed rates of return. In the absence of long-term contracts (implicit or explicit), firms are discouraged from undertaking long-term investments."

The impact of the time-inconsistency problem on required returns would be expected to increase with the duration of the cash flows, as there is an increased probability of adverse shocks over a longer time period.

Conclusion

Following detailed modelling and consideration of advice from economic consultants we estimate the cost of equity to be 6.7% real, post-tax. We have cross-checked this estimate using a variety of approaches that also support 6.7%.

We believe this appropriately balances the, unsurprisingly, differing views of investors and suppliers and is consistent with Ofgem's determinations for DPCR5 and RIIO-GD1.

[25] Mayer, C "Financial Markets and Financeability: The Implications of Recent Developments for Utility Regulation", 25 September 2009 http://www.rpieurope.org/Beesley/2009/Colin%20Mayer.pdf

2.3 Cost of Debt

	SP Distribution	SP Manweb
Cost of Debt	iBoxx 10 year trailing average	iBoxx 10 year trailing average

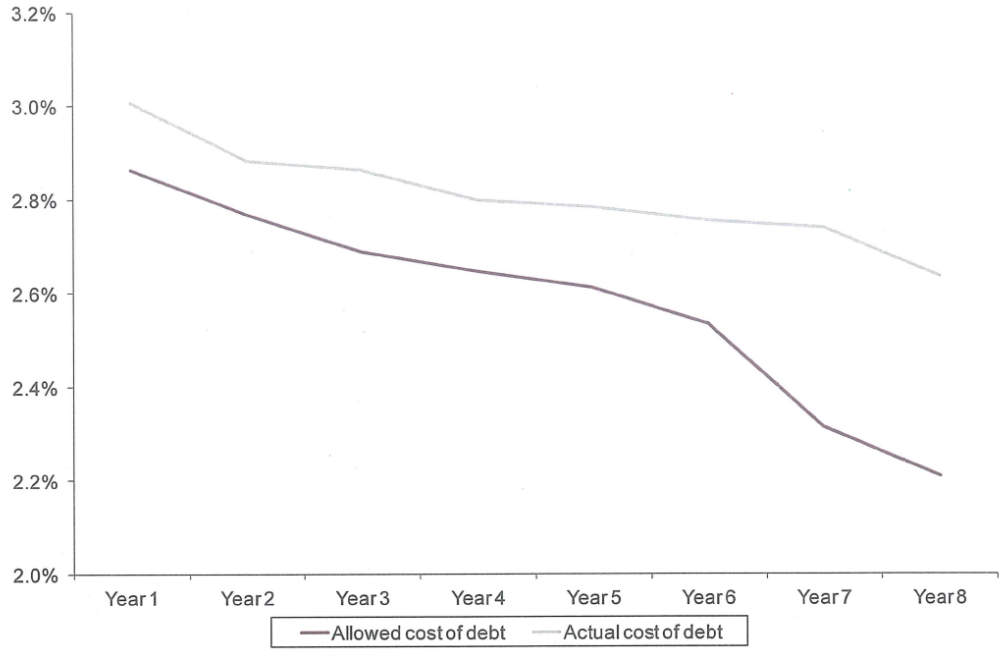
We accept Ofgem's proposed index for the cost of debt. This is calculated from the ten year rolling average of the yields on iBoxx A and BBB rated sterling non-financial bond indices, with a maturity of more than ten years, less the "break even inflation rate", calculated from UK index linked gilts.

In our business plan we have based our modelling on a cost of debt of 2.92% per annum as prescribed by Ofgem for comparability reasons.

Nevertheless, we believe that a longer trailing average period would be more reflective of DNOs' actual cost of debt, as bonds issued more than ten years ago will drop out of the cost of debt index.

Consequently, there will be risk of a significant mismatch between the cost of debt index and the actual cost of debt. DNOs are obliged to continue to pay the coupon on bonds which they have issued until they are redeemed, which in many cases extend beyond ten years. Ofgem's analysis of the cost of debt index has focused on the comparison of the coupon on DNO debt with the cost of debt index, as at the date of issue. However, this ignores subsequent movements in the cost of debt index relative to the fixed coupon. The allowed cost of debt index is forecast to continue to decline for the foreseeable future, whereas DNOs will continue to pay the same fixed coupon until the bond matures.

Figure 14: Expected DNO cost of debt versus the allowance



Source: Dealogic, Oxera analysis
Notes: The allowed cost of debt is estimated assuming that the annual average yield that goes into Ofgem's index remains unchanged from current levels throughout the price control period. The actual cost of debt is based on the assumptions that 24% of existing debt will need to be refinanced during RIIO-ED1 and that there is real annual RAV growth of 3.1%. The modelling framework is identical to that described in Oxera (2012), "Determining efficient financing costs for RIIO-ED1", September 3rd, Appendix A1.

Oxera have identified a number of ways in which a DNO remains exposed to the risk that the cost of debt index does not match that incurred by the DNO. These include:

- Frequency of debt issuance
- Re-financing profile
- RAV growth
- Intra-year volatility of yields
- Time varying inflation risk premium

Oxera conclude[26]:

> "A number of factors suggest that the exposure to the cost of debt risk will not be zero under indexation. Debt indexation may actually increase the exposure to cost of debt risk compared with a fixed cost of debt allowance. For example, for companies whose debt costs are largely fixed over the price control period, annual updating of the cost of debt allowance will introduce additional uncertainty around the difference between the allowed and the actual cost of debt."

Similarly, First Economics have advised that:

- For DNOs, the cost of debt index is likely to over-react to changes in market interest rates[27]
- "Break-even inflation" is not a sufficiently robust or accurate measure to calculate the real cost of debt[28]
- DNOs' recent experience of debt issuances calls into question the extent to which 'headroom' will exist in future to pay for items that are missing from Ofgem's cost of debt formula[29]

We note that Ofgem has considered these issues and concluded that the methodology for calculating the cost of debt utilised in RIIO-GD1 and RIIO-T1 remains appropriate for RIIO-ED1.

In line with Ofgem's generic assumption, our financial modelling assumes that our debt portfolio includes 25% of index-linked debt. We understand that this is reflective of the

[26] Oxera (2012), "RIIO-ED1 consultation on strategy – Financial issues, November 16th http://www.ofgem.gov.uk/Networks/ElecDist/PriceCntrls/riio-ed1/consultations/Documents1/ENA_ED1StratResponse_Oxera_Financial_Issues.pdf

[27] First Economics (2012), "Ofgem's Cost of Debt Index and the Cost of Equity" 8th June http://www.ofgem.gov.uk/Networks/ElecDist/PriceCntrls/riio-ed1/consultations/Documents1/ENA_ED1StratResponse_First%20Economics_Paper3_Debtindex.pdf

[28] First Economics (2012). "Indexation of the Cost of Debt and Inflation", 8th June http://www.ofgem.gov.uk/Networks/ElecDist/PriceCntrls/riio-ed1/consultations/Documents1/ENA_ED1StratResponse_First%20Economics_Paper2_Indexation.pdf

[29] First Economics (2012), "Benchmark vs Actual Cost of Debt in 2011", 8th June http://www.ofgem.gov.uk/Networks/ElecDist/PriceCntrls/riio-ed1/consultations/Documents1/ENA_ED1StratResponse_First%20Economics_Paper1_Benchmark.pdf

extent to which network companies typically rely on index-linked debt to fund their activities.

Conclusion

As we have no strong justification to depart from Ofgem's policy on cost of debt, we have implemented the i-Boxx 10 year trailing average, in accordance with Ofgem's guidance.

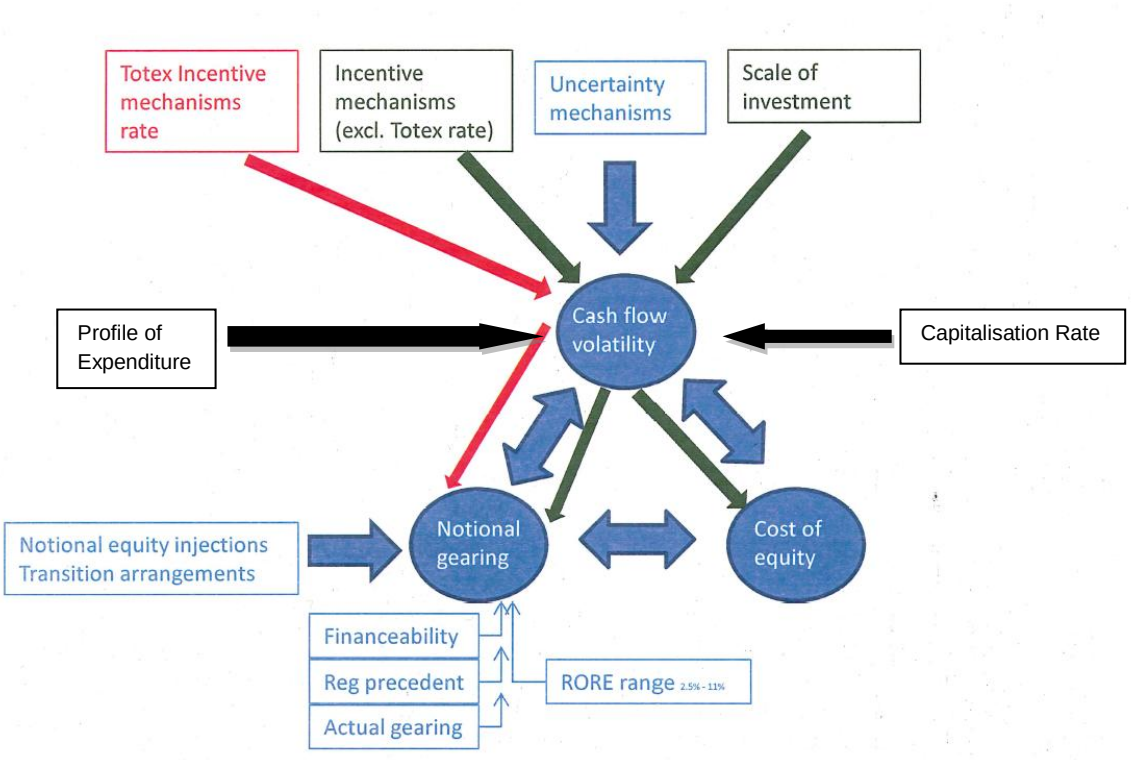
2.4 Notional Gearing & Return on Regulatory Equity (RoRE)

	SP Distribution	SP Manweb
Notional gearing	65%	65%

In this section we assess notional gearing in the context of the financial benefits and penalties that are available to the network companies in RIIO-ED1 from outperforming or underperforming the price control assumptions.

The issues and interactions in setting notional gearing are many. The diagram below expands on Ofgem's RIIO-ED1 Strategy Decision[30] methodology diagram to show the wider range of interactions.

Figure 15: Setting notional gearing



Cash Flow Volatility

Cash flow volatility is affected by:

- Scale of investment

[30] RIIO-ED1 Strategy Decision Supplementary Annex: Financial Issues http://www.ofgem.gov.uk/Networks/ElecDist/PriceCntrls/riio-ed1/consultations/Documents1/RIIOED1DecFinancialIssues.pdf

- Capitalisation rate
- Profile of expenditure
- Totex incentive rate
- Other incentive mechanisms and rates
- Uncertainty mechanisms

Scale and profile of expenditure is largely determined externally by the requirement to meet present and anticipated outputs – to deliver a secure and efficient network.

The RIIO-ED1 uncertainty mechanisms and incentive characteristics are laid out in Ofgem's Strategy Decision. In general we have not sought to adjust cashflow risk by departing from the overall framework set out by Ofgem.

Capitalisation rate can provide a short term lever to adjust financeability. In the longer term, a notional capitalisation rate which differs from the actual capitalisation policy can lead to an accounting mis-match. We prefer not to use the capitalisation rate as a financeability lever.

Cost of Equity

The extent to which the Cost of Equity can be flexed is externally limited by the minimum expected return required by the market to secure investment. We have identified what we believe to be the current market Cost of Equity in section 2.2. This cost of equity is dependent on the systematic (non-diversifiable) risk as reflected (under CAPM) in the asset beta.

Notional Gearing

It therefore remains to ensure that given the above externally determined factors, the idiosyncratic risk for a notional average network business at a given level of gearing will, when exposed to the full range of RIIO-ED1 incentives and external risk, lead neither to excessive returns for shareholders nor to financial distress.

In this section we introduce a central base scenario for gearing of 65% along with two alternatives of plus and minus 5%.

Precedent has demonstrated that in the recent past gearing of 65% was broadly consistent with the target credit rating of A – Baa for a typical UK Distribution business

A notional gearing of 65% was accepted by DNOs at DPCR5. This level was accepted by Gas DNOs at the recent RIIO-GD1 review. Moody's see no appreciable increase in risk in the transition to the RIIO-GD1 regulatory framework and other stakeholders have said that they do not see any compelling reasons for a reduction in notional gearing levels from those used in DPCR5.

The scale of investment during RIIO-ED1 is not materially different to that at DPCR5. Had it been higher we would have placed greater emphasis on the consideration of an initial gearing below 65%.

Taking these factors into account, 65% is the obvious base scenario around which to carry out our detailed overall financeability testing in sections 2.5 and 2.6 and Annex 16.

Having identified a starting range for our gearing assessment, we then introduce a range of plausible out or underperformance outcomes arising from the most material of the package of RIIO-ED1 incentives.

This allows us to stress test our proposed level of notional gearing by examining the overall range of returns to which DNOs will be exposed. We aim for moderate double digit returns at the maximum and returns around the level of the Cost of Debt index at the minimum.

We later further validate our conclusion on Notional Gearing by simulating the external risks to cash flows and the resulting impact on business financeability (by Monte Carlo using Moody's credit rating methodology). This further credit rating test is described fully in section 2.6 and Annex 16.

Return on Regulatory Equity

At this stage we conduct RORE analysis to estimate the financial benefits and penalties that are available to the notional network company in RIIO-ED1 from outperforming or underperforming the price control assumptions.

The level of gearing should ensure a moderate possibility of low double-digit returns for shareholders (as measured by the return on the notional proportion of the RAV that is financed by equity).

The gearing should also provide sufficient interest cover to maintain an investment grade credit rating against all but extreme downside risks. This is evidenced in the first instance by a RoRE range that extends downwards to around, but not materially below, the probable range of values of the Cost of Debt Index.

The RORE calculated is forward-looking. We use RIIO-ED1 average RAV values and average allowed revenue determined by the Business Plan Financial Model in our calculation.

Our convention is to relate the impact of all risks to the allowed Cost of Equity 6.7%. This allows for a clear interpretation of the relative impact of all incentives and external risks on upside and downside performance. We do not, in this analysis, explicitly identify the expected (central) Return on Equity where this would differ from the Allowed Return.

Such a difference may arise if the incentive package is not neutral overall. Fast-track IQI Additional Income is therefore treated as outperformance above the allowed return on equity.

We show all impacts of incentive schemes in the year in which the activities giving rise to the relevant incentive payment or deduction take place, and ignoring timing differences which may occur in practice. In particular, adjustments under the Totex Incentive Mechanism in any given year are taken to apply immediately and in full, with no consideration of the lag applied by the Annual Iteration Mechanism or by capitalisation.

Where the component is capped or collared, these limits are used as the upper and lower risk limits, on the basis that a cap or collar only has value if there is a non-trivial risk that the level might otherwise be exceeded.

Where there is no limiting mechanism specified, we have taken a view on the likely range of outcomes and applied appropriate and prudent limits. In such cases there is a very small residual risk of an extreme outcome.

Our view of the risk around the Totex incentive is that within the broader +/- 10% envelope which has been applied historically, the range of outcomes for RIIO-ED1 is likely to be skewed towards overspend (Totex Incentive Mechanism downside).

This skew arises from a number of causes:

- A successful fast-track business plan is likely to have already incorporated some assumed cost efficiencies in the baseline. By definition, not every DNO will start RIIO-ED1 operating at or below the quartile used to determine notional efficient expenditure. And those which do may find that their capacity to realise further efficiencies on a similar scale is limited.
- Output measures create a pressure (via the marginally greater output penalty) to overspend to deliver outputs in full if necessary.
- Over-delivery of outputs carries the risk that it will be deemed unjustifiable and not allowed.

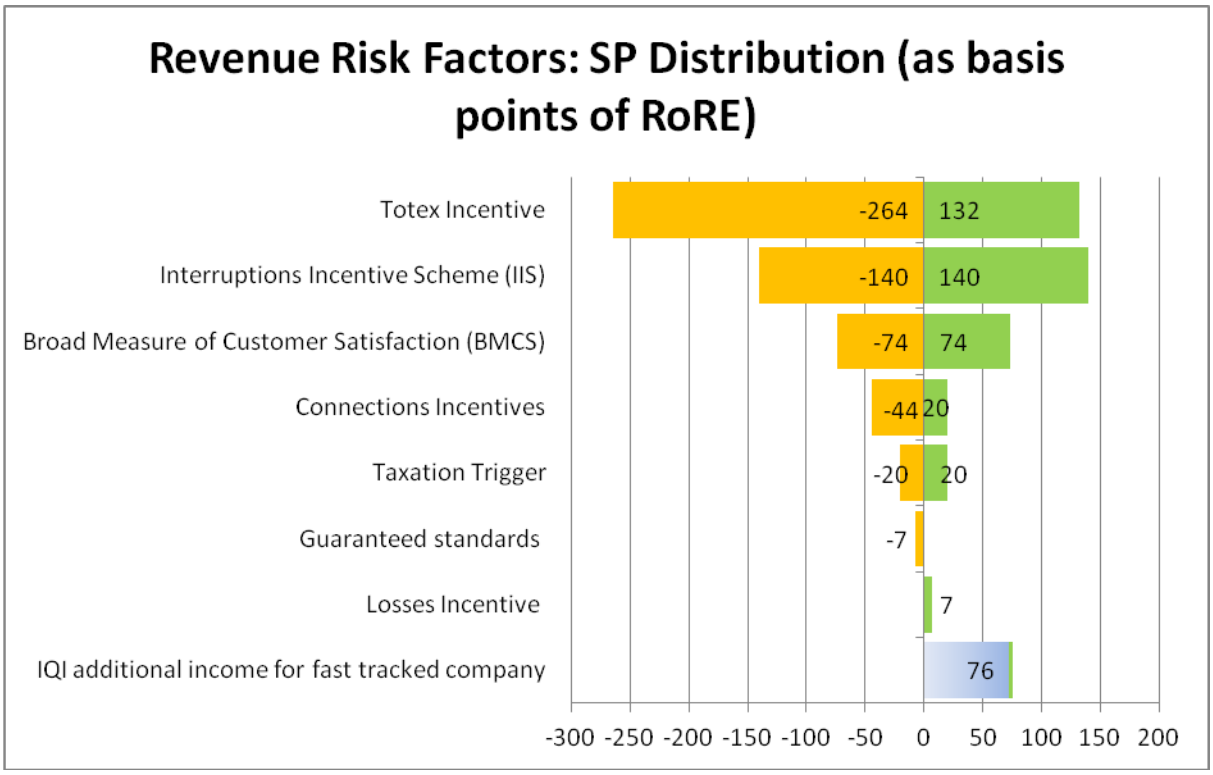
We have therefore applied a range of (+10%/- 5%) relative to plan as a plausible range of outcomes under the Totex Incentive. This range is deemed to incorporate RPEs (with risk assumed symmetrical around our forecast). This range also includes the Totex exposure under uncertainty mechanisms up to the relevant materiality/trigger thresholds, as the business view is that there is an immaterial probability that these mechanisms will be triggered for either SPD or SPM.

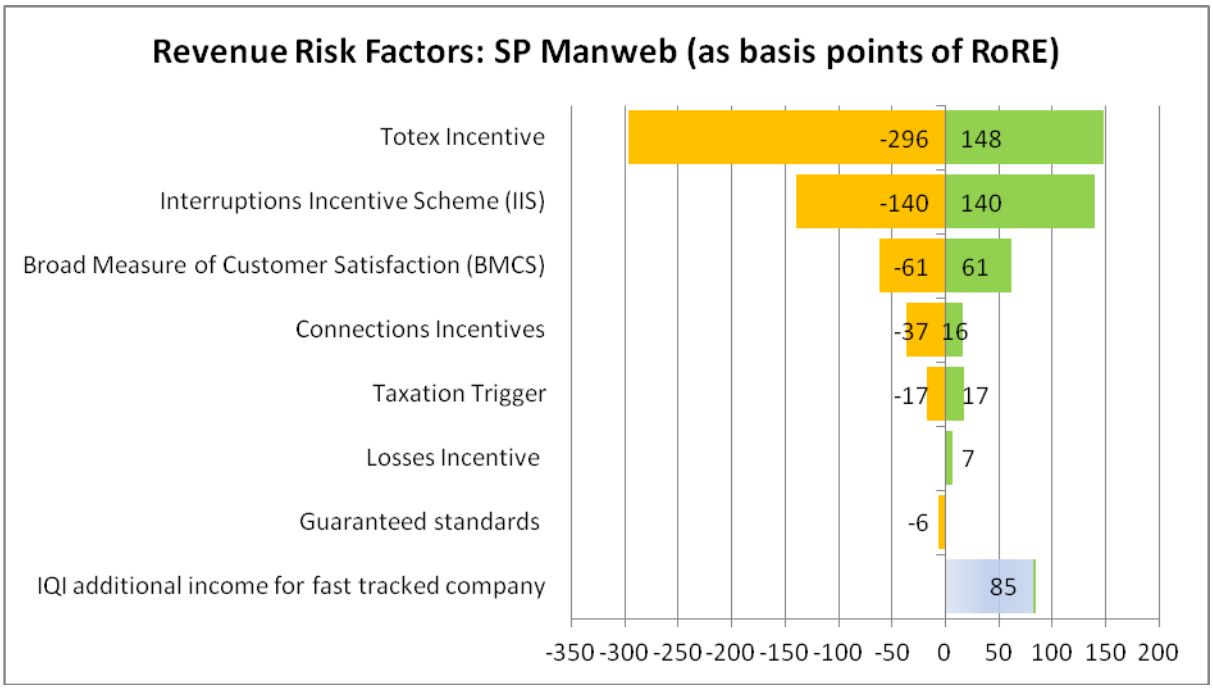
The assumptions underlying our RoRE analysis are summarised below.

For an average FAST TRACK DNO:			
	SP Manweb	SP Distribution	
Base Revenue (average p.a.)	£336m	£355m	As calculated by PCFM
Equity RAV (average p.a.)	£659m	£579m	As calculated by PCFM
Gearing	65%	65%	Base Scenario
Efficiency Incentive Rate	70%	70%	Fixed for fast-track
Totex (average p.a.)	£279m	£219m	Plan Totex
IQI additional income	2.5% of Totex - fast track reward.	2.5% of Totex - fast track reward.	Fixed. Subject to tax.
Totex Incentive	+10%/- 5% of Plan Totex	+10%/- 5% of Plan Totex	Includes RPE and risk associated with Load-related Reopener and Health Index. Asymmetry reflects both output pressure on expenditure and the extent to which efficiency is already built into fast-track plan.
BMCS	+/- 1.5% of base revenue	+/- 1.5% of base revenue	Regulatory cap and collar
IIS	+/- 250 basis points (before tax & sharing)	+/- 250 basis points (before tax & sharing)	Regulatory cap and collar
Guaranteed standards	-£0.5m p.a.	-£0.5m p.a.	Connections & Reliability
Taxation Trigger Deadband	17 bps	20 bps	Worst case 0.33% of total base revenue
Connections	+0.4%/-0.9% of Base Revenue	+0.4%/-0.9% of Base Revenue	Regulatory cap and collar
Losses	0-7 bps	0-7 bps	Discretionary Award - upside only. Model upper limit set at 1/14th of total fund.

We show the relative impact of the most material RIIO-ED1 risks as basis points of RoRE in Tornado Charts figure 16.

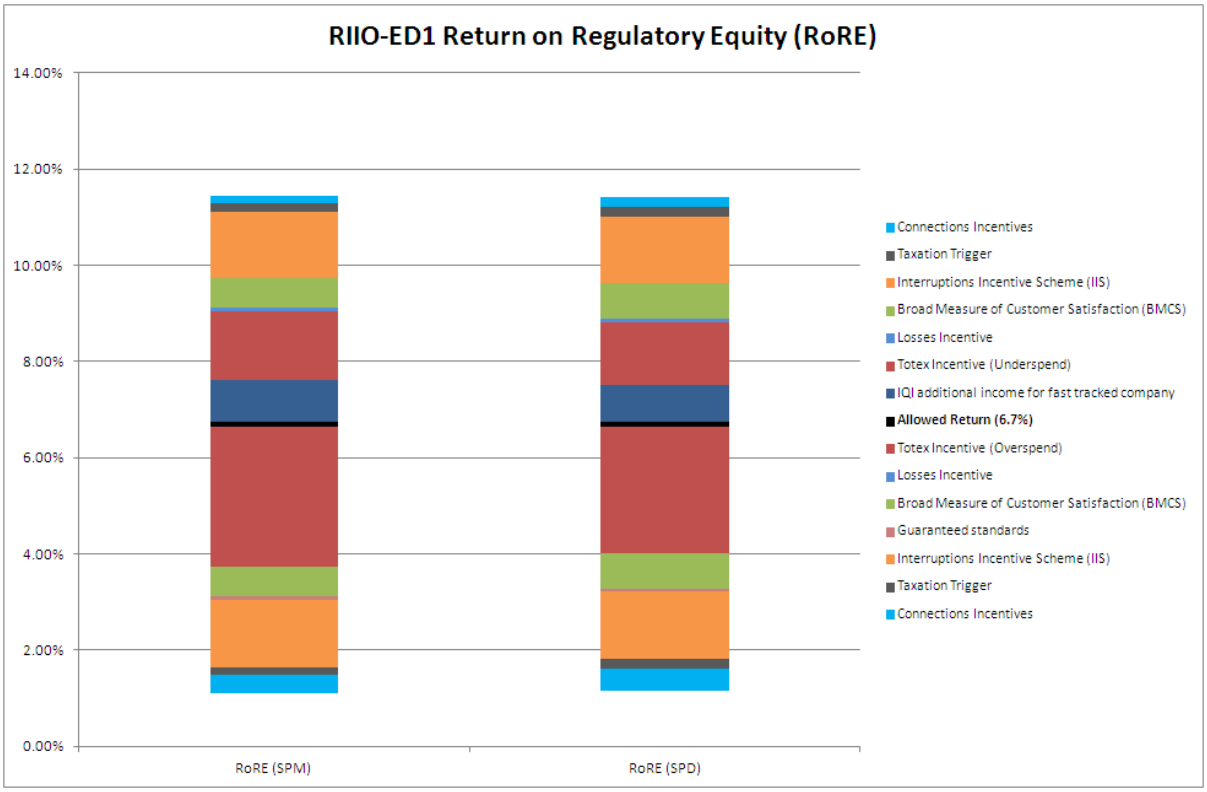
Figure 16





In aggregate these individual risks determine the overall range of feasible RoRE performance in RIIO-ED1. We present this as a 'layer cake' in figure 17. (for 65% gearing):

Figure 17

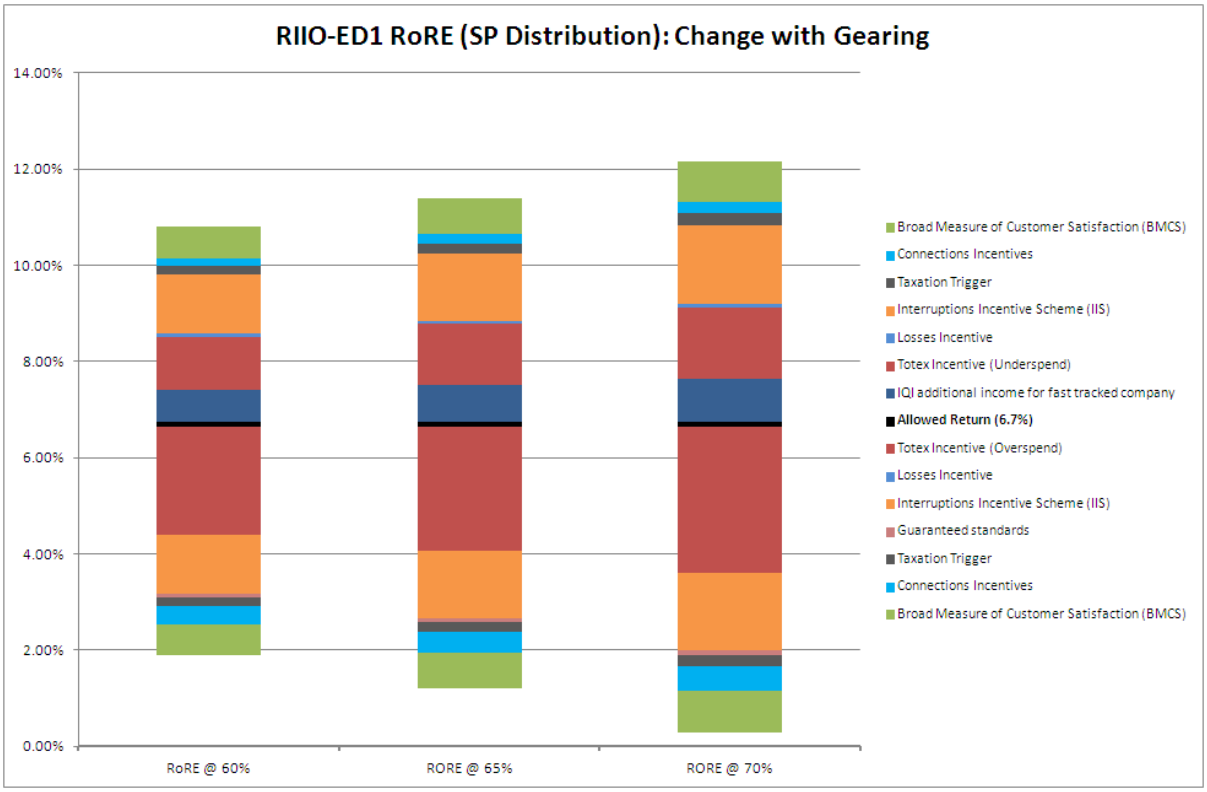


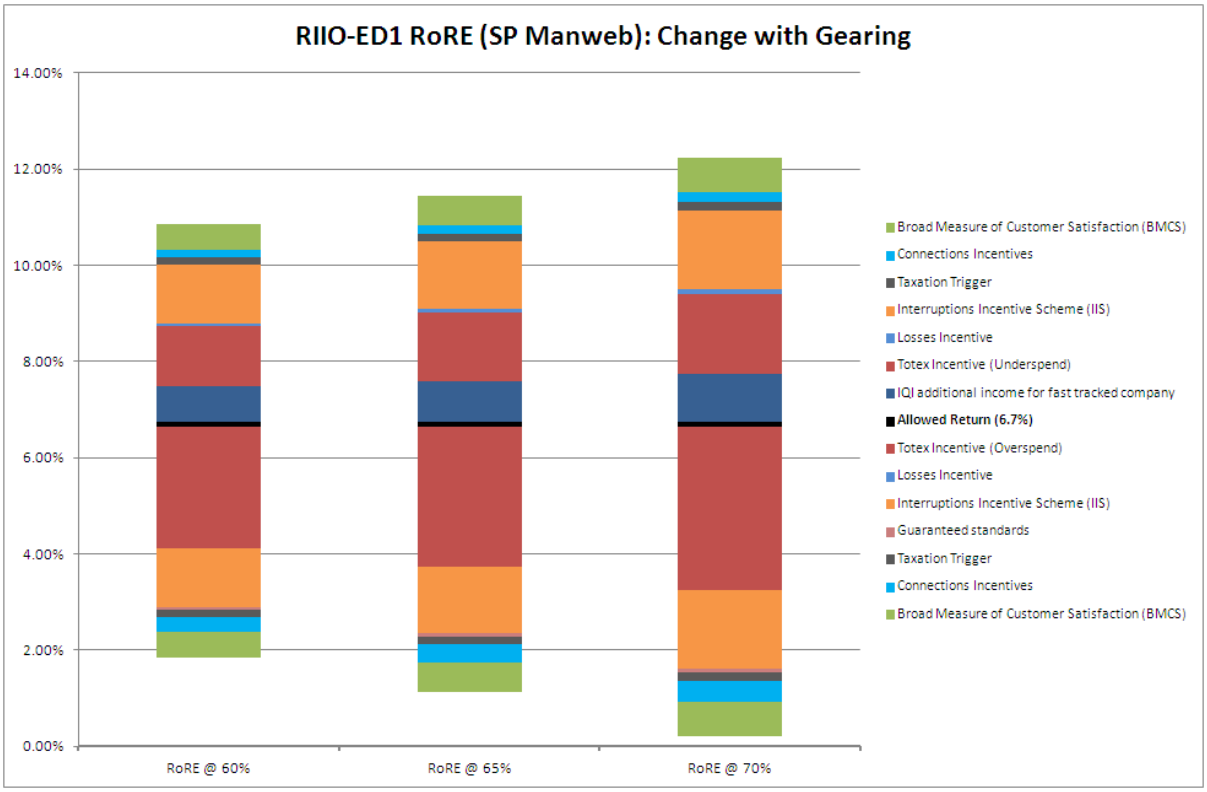
Our estimate of the impact of the offset in the RIIO-ED1 Outputs and Incentives Package (excluding Totex and the outperformance from IQI Additional Income) is that it reduces the expected return on regulatory equity by less than 10 basis points from 6.7 % to 6.6 % (real). We will disregard this small offset.

The range of feasible RoRE at 65% gearing extends from a maximum of 11.44% for SPM and 11.38% for SPD (low double figures) down to a minimum of 1.13% (SPM) and 1.20% (SPD) (compared with a Cost of Debt likely to fall from a starting point of 2.92% in RIIO-ED1.)

This indicates that our preferred Cost of Equity and Gearing are consistent with the level of risk in our RIIO-ED1 Business Plan. To determine whether we have identified the optimal level of gearing we have examined the effect of varying the gearing either upwards or downwards. We adjust the gearing in increments of 5%. The impact of these changes in gearing is shown in Figure 18.

Figure 18





The conclusions are similar for both SPD and SPM.

At 60% gearing, the potential for RoRE outperformance is constrained. The absolute maximum achievable is only 10.8% (10.1% if the uplift from IQI additional income is excluded). This suggests that 60% gearing does not present any significant possibility of double-digit returns.

At 70% gearing, the minimum of the RoRE range is more than 2% below the present (or any likely future) level of the Cost of Debt Index, at 0.21% for SP Manweb and 0.29% for SP Distribution. We conclude that 70% gearing is likely to result in excessive risk of financial distress.

Results are summarised in the table below:

Gearing	Opportunity for Outperformance	Adequate Downside Cover	Overall Conclusion
60%	10.8%	1.9%	Unsatisfactory
65%	11.4%	1.2%	Satisfactory
70%	12.2%	0.25%	Unsatisfactory

Should it be impossible to set the gearing to provide a satisfactory range of returns we would be forced to re-examine our starting Cost of Equity and set of cashflow risks (incentive calibration), and then repeat this analysis. We do not believe that this is necessary.

We conclude (operating in 5% increments) that 65% is the optimal level of gearing, and is consistent with a financeable Business Plan which allows the possibility of reasonable returns without excessive downside risk and at the lowest overall cost to customers.

2.5 – Financeability

	SP Distribution	SP Manweb
Financeability Adjustment	None	None
Capitalisation rate	80%	80%
Target Credit rating	A3/Baa1	A3/Baa1

Target Credit Rating

We have assessed the credit ratings for each of SP Distribution and SP Manweb against our target overall rating of A3 or Baa1. This makes sure that our financeability criteria are fully consistent with credit quality underpinning the allowed cost of debt index, which equally weights A and BBB (S&P) rated non-financial sterling bonds. This is also consistent with our licence obligation to maintain an investment grade credit rating.

As explained in the following section, we have taken into account the full range of credit rating factors and not just the key credit metrics. Consequently, the scores for individual sub-factors may be outside A3 or Baa1 and indeed could be out with the wider investment grade range of A1 to Baa3 (A to BBB range per S&P ratings).

Financeability Assessment

We have primarily followed Moody's rating methodology[31] for regulated electric and gas networks. This approach considers both credit metrics and qualitative factors for example business risk and regulatory environment. Moody's stated objective is for users of this methodology to be able to estimate a company's rating within two alpha-numeric notches.

Moody's analysis focuses on four key rating factors. These four factors are as follows:

1. Regulatory Environment and Asset Ownership Model
2. Efficiency and Execution Risk
3. Stability of Business Model and Financial Structure
4. Key Credit Metrics

Each of these factors is made up of a number of sub-factors, to each of which Moody's assigns a weighting. Firstly we set out in Table A1, our assessment of sub-factors 1 to 3. Our assessment of the key credit metrics are set out later in this section following on from our financial modelling.

The tables below summarises our assessment of the qualitative sub-factors for each of our licensees.

Table A1: Rating factors for SP Distribution

[31] Moody's Investors Service (2009), "Regulated Electric and Gas Networks", Rating Methodology, August

Regulated Electric and Gas Networks	Aaa	Aa	A	Baa	Ba	B
Factor 1: Regulatory Environment & Asset Ownership Model (40%) a) Stability and Predictability of Regulatory Regime b) Asset Ownership Model c) Cost and Investment Recovery d) Revenue Risk	X	X X	X			
Factor 2: Efficiency & Execution Risk (10%) a) Cost Efficiency b) Scale and Complexity of Capital Programme				X X		
Factor 3: Stability of Business Model & Financial Structure (10%) a) Ability and Willingness to Pursue Opportunistic Corporate Activity b) Ability and Willingness to Increase Leverage c) Targeted Proportion of Operating Profit Outside Core Regulated Activities	X		X	X		

Table A2: Rating factors for SP Manweb

Regulated Electric and Gas Networks	Aaa	Aa	A	Baa	Ba	B
Factor 1: Regulatory Environment & Asset Ownership Model (40%) a) Stability and Predictability of Regulatory Regime b) Asset Ownership Model c) Cost and Investment Recovery d) Revenue Risk	X	X X	X			
Factor 2: Efficiency & Execution Risk (10%) a) Cost Efficiency b) Scale and Complexity of Capital Programme				X X		
Factor 3: Stability of Business Model & Financial Structure (10%) a) Ability and Willingness to Pursue Opportunistic Corporate Activity b) Ability and Willingness to Increase Leverage c) Targeted Proportion of Operating Profit Outside Core Regulated Activities	X		X	X		

N.B. The values for the key credit metrics that comprise factor 4 are calculated as part of the financeability assessment later in this section.

Regulatory Environment and Asset Ownership Model

The first factor that Moody's assesses is the Regulatory Environment and Asset Ownership Model, which is assigned weighting of 40%.

To measure this factor, Moody's examines the following four sub-factors:

a) Stability and Predictability of Regulatory Regime
b) Asset Ownership Model
c) Cost and Investment Recovery (Ability and Timeliness)
d) Revenue Risk

In line with recently published credit ratings of Ofgem regulated networks, we have assessed these sub-factors as follows:

Rating Sub-Factor	Rating	Sub-weighting
Stability and Predictability of Regulatory Regime	Aaa	15%
Asset Ownership Model	Aa	10%
Cost and Investment Recovery (Ability and Timeliness)	A	10%
Revenue Risk	Aa	5%

Following the implementation of RIIO-GD1, Moody's concluded[32]:

> "The move to RIIO is broadly supportive of our Aaa assessment of the stability and predictability of the regulatory framework. "

In Moody's view, DNOs map to the Aa category for the "Asset Ownership Model" sub-factor, reflecting the licensing regime.

DNOs will continue to be subject to efficiency targets for the RIIO-ED1 price control and so map to the A category for the "Cost and Investment Recovery" sub-factor.

We assume that "Revenue Risk" will continue to be scored at Aa for RIIO-ED1 reflecting the limited exposure to volumes and the ability to carry forward under- and over-recovery of charges.

Efficiency and Execution Risk

The second factor is Efficiency and Execution Risk, to which Moody's assigns a weighting of 10%.

To measure this factor, Moody's examines the following two sub-factors:

a) Cost Efficiency
b) Scale and Complexity of Capital Programme

Again, in line with recently published credit ratings of Ofgem regulated networks, we have assessed these sub-factors as follows:

Rating Sub-Factor	Rating	Sub-weighting
Cost Efficiency	Baa	6%

[32] Moody's Investors Service (2013), "UK Gas Distribution Networks: Transition to RIIO Is Credit Neutral", Special Comment, March 8

Scale and Complexity of Capital Programme	Baa	4%

We assume, on average, that DNOs will be scored at Baa for the "Cost Efficiency" Sub-Factor. Without a track record of out-performance in RIIO-ED1, it would be premature to assume an A score.

As average annual additions to RAV as a percentage of the RAV value lie within the range of 8% to 12% of the RAV, we have assumed we score Baa for the "Scale and Complexity of Capital Programme" sub-factor.

Stability of Business Model and Financial Structure

The third factor is Stability of Business Model and Financial Structure, to which Moody's assigns a weighting of 10%.

To measure this factor, Moody's examines the following three sub-factors:

a) Ability and Willingness to Pursue Opportunistic Corporate Activity (M&A, Disposals and Investments)
b) Ability and Willingness to Increase Leverage
c) Targeted Proportion of Operating Profit Outside Core Regulated Activities

We have assessed these sub-factors as follows:

Rating Sub-Factor	**Rating**	**Sub-weighting**
Ability and Willingness to Pursue Opportunistic Corporate Activity (M&A, Disposals and Investments)	A	3.33%
Ability and Willingness to Increase Leverage	Baa	3.33%
Targeted Proportion of Operating Profit Outside Core Regulated Activities	Aaa	3.33%

Moody's typically maps DNOs to the A rating on the "Ability and Willingness to Pursue Opportunistic Corporate Activity" sub-factor, as regulatory provisions effectively restrict the licensees from carrying out other activities.

We have assumed there is no increase in notional gearing from DPCR5 and that this maps to Moody's score of Baa for a conservative financial strategy.

Given the regulatory ring-fence provisions that limit de minimis activities, Moody's scores the licensees as Aaa on the Targeted Proportion of Operating Profit Outside Core Regulated Activities" sub-factor.

We now develop our assessment of credit ratios using the Financial Model.

Ensuring Efficient Financing Costs – Price Control Financial Model ('Static') Analysis

In this section we present our financing plan and primary analysis. We refer to this as our 'static' analysis in contrast to our further 'probabilistic' risk assessment presented later in this section. In this section we generate and test our regulatory credit ratios.

By 'static' we mean that we introduce a number of financing components and assumptions and test the outcomes to ensure that an efficient, financeable plan can be demonstrated using Ofgem's Price Control Financial Model (PCFM). In section 2.6 we carry out a 'probabilistic' risk assessment in order to evaluate the likely impact of external risks upon our financeability ratios by applying Monte Carlo analysis to the model.

Our allowed return financing components were explained in sections 2.1 to 2.4. We begin this section by explaining our other assumptions and policies before presenting the results of our analysis.

Our over-riding objective has been to deliver an efficiently financeable plan that will offer an adequate return to investors at the lowest possible cost to customers.

We interpret an efficient plan as one that ensures that the expected overall credit rating is consistent with that underpinning Ofgem's cost of debt index. By 'overall' we mean after recognising non financial ratio components, such as the high rating associated with UK regulatory stability discussed above. Specifically we target an overall Moody's credit rating for the regulated businesses of around A3/Baa1.

Price Control Financial Model Results

Capitalisation rate

The capitalisation rate that we have adopted in this business plan reflects the capitalisation rate that we expect to experience over RIIO-ED1 in our statutory accounts. It is important that this relationship between statutory and regulatory capitalisation rates is maintained otherwise impairment of assets could result. The forecast capitalisation rates are consistent with historic levels. The capitalisation rate for each business is set out in the table below (more detail on these is set out in section 3).

	SP Distribution	SP Manweb
Capitalisation rate	**80%**	**80%**

Additional Income

Consistent with the guidance on completion of the fast track business plan we have assumed that revenues include additional income amounting to 2.5% of total expenditure.

Implied credit rating

In summary the following financial parameters have been adopted in our best view business plan submission.

	SP Distribution	SP Manweb
Cost of Equity	6.7%	6.7%
Cost of Debt	2.92%	2.92%
Gearing	65%	65%
Vanilla WACC	4.24%	4.24%
Asset lives additions from 1.4.2015	Straight to 45	Straight to 45
Capitalisation rate	80%	80%
IQI Additional Income	2.5% of totex	2.5% of totex
Equity Injection threshold	5%	5%
Dividend % of Notional Equity	5%	5%

This results in the following credit rating based on Moody's August 2009 rating methodology for regulated electric and gas networks

	SP Distribution	SP Manweb
Moody's notional credit rating	A3	A3

Revenue Profiling

From our quarterly meetings with stakeholders to discuss our revenue forecasts we are aware of customers' aversion to volatility in charges.

Unprofiled annual revenues over RIIO-ED1 arising from the above financial parameters are set out in the table below. To ensure that the revenues are comparable the 2014/15 forecast revenues only include base revenue plus any pass through adjustments including any tax trigger adjustments and any adjustment to transmission exit charges; they do not include any incentives or clawbacks which make up the balance of total revenue.

	14/15	15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23
SPD	318.4	354.2	354.4	357.3	356.7	356.0	354.7	354.9	353.9
%		11.2%	0.1%	0.8%	(0.2%)	(0.2%)	(0.4%)	0.0%	(0.3%)
SPM	399.7	328.4	338.9	336.0	337.7	341.1	344.3	330.0	328.8
%		(17.8%)	3.2%	(0.9%)	0.5%	1.0%	1.0%	(4.2%)	(0.4%)

I. For SP Distribution there is a significant increase in revenues between 2014/15 and 2015/16 as a consequence of the profiling in DPCR5 which resulted in declining base revenues; thereafter there is minimal volatility and, as a result, we did not deem it necessary to make any profiling adjustment.

II. For SP Manweb there is a significant reduction in revenues between 2014/15 and 2015/16 - a legacy of the profiling in DPCR5 which resulted in increasing base revenues; thereafter there is material volatility and in 2021/22 revenues reduce materially as a result of the second depreciation cliff edge. As a result of this volatility we decided to smooth the RIIO-ED1 revenues by making profiling adjustments by adjusting revenues on a NPV neutral basis. The profiled revenues for SP Manweb are shown in the following table and result in a flat profile across RIIO-ED1 in 2012/13 prices.

	14/15	15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23
SPM	399.7	335.7	335.7	335.7	335.6	335.7	335.6	335.7	335.6
%		(16.0%)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Please refer to row 22 of the "Revenue" tab in the Price Control Financial Model for the source of the unprofiled revenue for SP Distribution and the profiled revenue for SP Manweb.

Price Control Financial Model Results

Using Ofgem's Price Control Financial Model (the "Return&RAV", "Revenue", "FinancialStatements" and "FinancialRatios" tabs), the overall revenues, cash flows and key credit/equity metrics are shown in the following tables.

SP Distribution

Revenue £m 2012/13 prices	15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23
Closing RAV	1572.9	1612.1	1654.7	1693.1	1730.8	1761.9	1793.8	1829.5
NPV neutral RAV base	1522.5	1559.7	1599.8	1639.5	1676.7	1710.5	1741.3	1774.4
Return on RAV	64.6	66.2	67.9	69.6	71.1	72.6	73.9	75.3
Depreciation	139.9	139.0	139.2	139.0	138.4	138.0	137.2	135.1
Fast Pot	44.2	44.6	45.4	44.4	44.0	42.3	42.3	42.7
Non Controllable	64.3	64.1	64.2	63.7	63.2	63.3	62.6	62.3
Other	41.2	40.6	40.6	40.0	39.3	38.6	38.9	38.6
Revenue	354.2	354.4	357.3	356.7	356.0	354.7	354.9	353.9

Cash Flow £m Nominal	15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23
Revenue	394.9	403.2	416.2	425.2	434.7	444.6	457.8	469.4

Operating costs	(140.3)	(144.4)	(149.5)	(151.8)	(155.1)	(157.3)	(160.9)	(165.5)
Cash flow from operations	254.6	258.8	266.6	273.3	279.7	287.3	296.9	303.8
Interest paid	(53.1)	(55.4)	(58.0)	(60.7)	(63.5)	(66.1)	(68.6)	(71.3)
Tax paid	(15.7)	(14.7)	(14.6)	(14.0)	(13.1)	(12.6)	(13.3)	(13.0)
Funds from Operations	185.8	188.7	194.0	198.6	203.0	208.6	215.0	219.5
Dividends paid	(29.9)	(31.5)	(33.2)	(35.0)	(36.7)	(38.5)	(40.2)	(42.2)
Retained Cash Flow	155.9	157.2	160.7	163.6	166.3	170.1	174.8	177.3
Capex	(192.0)	(199.0)	(208.6)	(209.4)	(213.6)	(210.8)	(216.9)	(225.1)
Debt Movement	(36.1)	(41.9)	(47.9)	(45.8)	(47.3)	(40.7)	(42.1)	(47.8)

Credit/Equity Metrics	15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23
FFO/Interest	3.9	3.9	3.8	3.7	3.7	3.6	3.6	3.6
PMICR using RAV depreciation	1.6	1.6	1.6	1.6	1.6	1.6	1.6	1.6
Net Debt:RAV	64.3%	63.8%	63.4%	63.0%	62.6%	62.1%	61.6%	61.2%
FFO/Net Debt	16.2%	15.7%	15.4%	15.1%	14.7%	14.6%	14.5%	14.2%
RCF/Net Debt	13.5%	13.0%	12.7%	12.3%	12.0%	11.8%	11.6%	11.3%
RCF/Capex	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Regulated Equity/EBITDA	2.4	2.5	2.6	2.7	2.8	2.9	3.0	3.1
Regulated Equity/Regulated Earnings	23.2	25.5	26.7	28.5	30.0	30.7	30.0	29.8

SP Manweb

Revenue £m 2012/13 prices	15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23
Closing RAV	1643.1	1759.4	1850.5	1932.0	2020.7	2106.1	2186.9	2249.1
NPV neutral RAV base	1557.5	1665.5	1767.3	1852.0	1935.2	2020.6	2102.0	2172.3
Return on RAV	66.1	70.7	75.0	78.6	82.1	85.7	89.2	92.2
Depreciation	133.0	134.6	136.3	138.1	137.5	138.1	127.6	128.5
Fast Pot	59.3	62.7	56.9	54.9	56.5	55.9	52.1	47.7
Non Controllable	32.1	33.6	33.3	32.7	32.1	32.4	31.9	31.7
Other	45.1	34.1	34.3	31.4	27.4	23.5	34.9	35.5
Revenue	335.7	335.7	335.7	335.6	335.7	335.6	335.7	335.6

Cash Flow £m Nominal	15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23
Revenue	374.4	382.6	392.1	401.7	411.3	421.6	433.4	445.4
Operating costs	(120.4)	(129.2)	(125.7)	(126.2)	(131.1)	(134.3)	(132.5)	(130.2)
Cash flow from operations	254.1	253.4	266.4	275.5	280.2	287.3	300.8	315.2
Interest paid	(54.9)	(61.2)	(67.6)	(73.4)	(79.5)	(86.3)	(92.9)	(98.5)
Tax paid	(15.0)	(11.5)	(9.6)	(8.0)	(5.9)	(4.0)	(3.2)	(2.8)
Funds from Operations	184.2	180.7	189.2	194.0	194.7	197.0	204.7	213.9
Dividends paid	(31.2)	(34.4)	(37.2)	(39.9)	(42.9)	(46.0)	(49.1)	(51.9)
Retained Cash Flow	153.0	146.3	152.0	154.1	151.8	151.0	155.7	162.0
Capex	(257.8)	(280.2)	(261.1)	(259.2)	(274.4)	(278.8)	(267.2)	(251.3)
Debt Movement	(104.9)	(133.9)	(109.1)	(105.1)	(122.5)	(127.8)	(111.5)	(89.3)

Credit/Equity Metrics	15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23
FFO/Interest	3.8	3.5	3.3	3.2	3.0	2.9	2.8	2.8
PMICR using RAV depreciation	1.7	1.5	1.5	1.4	1.4	1.3	1.4	1.5
Net Debt:RAV	65.5%	66.8%	67.3%	67.8%	68.5%	69.3%	69.4%	69.1%
FFO/Net Debt	15.1%	13.1%	12.6%	11.9%	10.9%	10.2%	9.9%	9.8%
RCF/Net Debt	12.4%	10.5%	10.0%	9.3%	8.4%	7.6%	7.3%	7.2%
RCF/Capex	0.6	0.5	0.6	0.6	0.6	0.5	0.6	0.6
Regulated Equity/EBITDA	2.4	2.6	2.6	2.7	2.8	2.8	2.9	2.9
Regulated Equity/Regulated Earnings	19.3	30.1	30.1	35.6	46.4	64.7	30.7	29.9

Moody's Notional Credit Rating

The key credit ratings from the above tables result in the following rating assessment under Moody's methodology. When these are combined with the Factor 1-3 ratings the overall indicated rating results.

SP Distribution	**Aaa**	**Aa**	**A**	**Baa**	**Ba**	**B**

Factor 4: Key Credit Metrics (40%) a) Adjusted Interest Cover Ratio (3 Year Avg) b) Net Debt / RAV (3 Year Avg) c) FFO / Net Debt (3 Year Avg) d) RCF / CAPEX (3 Year Avg)			 X	 X X	 X	
Rating Indicated Rating from Grid factors 1-4			A3			

SP Manweb	**Aaa**	**Aa**	**A**	**Baa**	**Ba**	**B**
Factor 4: Key Credit Metrics (40%) a) Adjusted Interest Cover Ratio (3 Year Avg) b) Net Debt / RAV (3 Year Avg) c) FFO / Net Debt (3 Year Avg) d) RCF / CAPEX (3 Year Avg)				 X X X	 X	
Rating Indicated Rating from Grid factors 1-4			A3			

Note: We rate SP Manweb at A3. Whilst Ofgem's prescribed modelling assumption around the cost of debt of 2.92% mechanically yields a Baa1 this is not a realistic position. In fact, a marginally lower assumption on cost of debt yields an A3 rating. In any case the adjusted interest cover which is the marginal ratio is only weak in two years of the eight year period.

Alternative Scenarios

It is a feature of our modelling results that our base financing assumptions and 'vanilla' Ofgem policy assumptions deliver an efficient financing plan for each of SP Distribution and SP Manweb. Most significantly we found that under this 'fast track' proposal including the associated additional income there was no need for financeability adjustments. However we considered various alternative scenarios. Further detail and a broader range of scenarios are included in Appendix 1.

Transition to 45 Year regulatory asset lives/ Capitalisation Rates

We had initially considered that a financeability adjustment would be required and that this would involve a one period transition in the move from the assumed 20 to 45 regulatory asset lives. We found that this was unnecessary. We tested a one period transition and found that the only key result was to move revenues from future periods into RIIO-ED1. We see no clear rationale in reducing future customers' charges at the expense of today's particularly at a time when customers are so sensitive to the level of energy prices. Whilst our overall credit rating remained unchanged, key credit ratios unsurprisingly improved significantly. For example the 3-year FFO/Net Debt ratio moved for each company by almost 10%. However we did not consider this to be efficient for customers.

Where a financeability adjustment is required our preference would be for one that was long term value neutral for customers. An alternative lever of this type would be an alternative to our empirically justified 80% capitalisation rate. We tested the impact of 5%

higher and lower which had similar financeability impacts to those described above albeit also unnecessary in our business plans.

Notional Gearing

Our primary justification for a gearing level of 65% was explained in section 2.4. There we demonstrated that a gearing level of 5% higher or 5% lower gave an appropriate range of outperformance opportunity. We modelled gearing at these levels and found the impact upon financeability to be negligible. We further tested and rejected gearing of 70% as part of our probabilistic assessment described in section 2.6.

Cost of Equity

Again we place weight upon our estimate of the cost of equity explained earlier. Small variations around 6.7% were found to have negligible effects upon allowed revenues in the period and financeability.

Cost of Debt

Ofgem asked all DNOs to model the allowed cost of debt at a standard 2.92%. We believe that the index will move significantly lower during the period. Our modelling revealed that for all credible forecasts there was no material impact on financeability, albeit we remain concerned about residual risk arising from the index as described in section 2.3.

2.6 Risk Assessment

As part of our justification that our proposed financing package is not just efficient, but robust, we have worked with economic consultants (NERA) to develop a Financeability risk model. This model is based on the Ofgem Price Control Financial Model. We have extended the base model to incorporate the calculation of credit metrics and overall score (using the Moody's Methodology previously described).

We attach a paper by NERA describing their modelling methodology as Annex 16c.

We have used this Risk Model to demonstrate that our preferred financeability scenario delivers an efficiently financeable plan that will offer an adequate return to investors at the lowest possible cost to customers.

In order to demonstrate efficient but robust financeability, our model simulates (by Monte Carlo) the individual and aggregate credit metrics over the full range of plausible outcomes for each of the individual risks we have identified.

The model considers the risk to cash flows from external risks only. For each of these, we have (where possible) identified what we believe to be the plausible distribution of outcomes for an average network business. In conjunction with our RoRE analysis, this should ensure that the business is sufficiently securely funded that the normal operation of RIIO-ED1 incentives is unlikely to lead to financial distress when coupled with adverse shocks from external risks.

We interpret a robust plan as one that ensures that the expected overall credit rating ('overall' meaning including non financial ratio components) for a notional average distribution business will be solidly within the A to Baa (Moody's) range of credit rating, with only a small probability that under any realistic adverse combination of external outcomes this rating might drop to a level inconsistent with the allowed Cost of Debt. More specifically we target an overall credit rating of A3 or Baa1.

Initial Assumptions

Before conducting our financeability testing we have considered each of the components of the allowed return to provide *opening* parameters for our risk and financeability testing. The components established earlier are:

Cost of Equity (real, post-tax)	6.7%
Cost of Debt (real, indexed)	2.92%
Notional Gearing	65%
Dividend Yield (on equity proportion of RAV)	5%
Capitalisation Ratio	80%

Our cost of equity assumption of 6.7% (real, post-tax) is the same as for DPCR5 and RIIO-GD1. We justify this value in section 2.2.

We have followed Ofgem's guidance for RIIO-ED1 and assumed 2.92%, which is the value of the 10 year trailing average to 31 October 2012, for the real cost of debt. Nevertheless, we note that independent forecasts are for the cost of debt index to continue to fall for the foreseeable future.

DNOs may be compelled to refinance or raise new debt in RIIO-ED1 at a spot rate which differs from the 10 year trailing average. The impact of this mismatch within RIIO-ED1 is unlikely to be zero (whether shortfall or otherwise). At present the 10-year trailing average of the index lies above the spot value of the index, but there is likely to be a crossover at some point in RIIO-ED1 (or later).

We believe that over the full 8 year period the aggregate impact of this risk will be small. Accurate modelling of this mismatch (which is complex) within the framework of the Ofgem Price Control Model would therefore be disproportionate. For this reason we simply note that it is likely to marginally broaden the distribution of possible RIIO-ED1 outcomes.

Our RoRE analysis in section 2.4, leads us to assume that notional gearing should be set to 65%.

We have also assumed a dividend yield of 5% on the notional equity proportion of the RAV. This is consistent with regulatory precedent (Ofgem's assumptions for DPCR5 and RIIO-GD1), and with our view of market expectations discussed in Section 2.2.

Each unique combination of these inputs constitutes a single scenario. For each scenario, a Network Business will be exposed to a range of financial risks. Some of these risks will be external to the business, and some will arise from regulatory mechanisms specific to the price control (incentive/output mechanisms and residual risk which may be only partly mitigated by uncertainty mechanisms).

Our Financeability Assessment

We test the robustness of our financial plan only to those external risks which are not directly within the control of the DNO. We exclude risk arising from performance under regulatory incentives.

If the incentive package in aggregate had a materially non-neutral average outcome we would include this offset in our analysis. We demonstrate in our RoRE Analysis in section 2.4 that this offset is less than 10 basis points of RoRE. We have therefore not included an offset.

The external risks considered are:

Risk	Comment	Modelling approach
Real Price Effects (RPEs)	DNOs are exposed to uncontrollable changes in costs which inflate at a rate different from RPI.	Modelled independently from "controllable" Totex uncertainty. We apply a normally distributed shock to Totex centred on a mean of zero.
RPI	Fixed ex ante RPI assumption for RIIO-ED1 means that inflated real interest costs may not match actual nominal interest. This affects relationship between tax allowance and actual tax.	We simulate actual nominal interest using 18 independent RPI forecasts (as published in Treasury report), equally weighted
Taxation (Corporation Tax)	The Tax Trigger uncertainty mechanism has a central deadband within which DNOs are exposed to changes in tax (allowance is not recalculated)	For simplicity we approximate by applying a plausible tax change impact as a direct revenue adjustment. A symmetric triangular distribution is used with maximum and minimum set at 0.33% of revenue.

We simulate a set of outcomes by Monte Carlo. For each iteration of the Monte Carlo Model we calculate the credit metrics and use these to derive an overall credit rating using Moody's' methodology (as described in section 2.5.)

It is our convention to assess the impact of risks in the year in which they occur (i.e. the model lag is set to zero, rather than 2 years). This ensures that we measure 8 years of cash flow impact for 8 years of risk. We do not include the element of the risk arising from RPE variance which is capitalised through the TIM Slow Pot but not reflected in revenue within this Price Control.

We calculate the ratings for the individual credit metrics based on a three year (backward looking) average of the individual annual metrics.

These are then combined with the wider rating criteria in accordance with the Moody's methodology to produce an overall numeric score and to infer from this a final Credit Rating for each year for that model iteration.

We then consider the distribution of outcomes from all iterations under the full range of plausible input scenarios.

In assessing the overall risk to financeability we consider the distribution of outcomes for all years of the price control rather than focussing on individual years.

The individual credit metrics calculated within the model may take continuous values. The Moody's methodology places these into rating bands in the later stages of the calculation. It

then assigns scores according to these individual sub-ratings. For this reason the final numeric scores take a set of discrete values, rather than generate a continuous distribution.

In considering this distribution we attach weight to the range of outcomes, and to both to the median (50th percentile) rating score and the expected (mean) rating score.

The median will by its construction take one of the discrete numeric values leading to a final rating, whereas the mean may take an intermediate value.

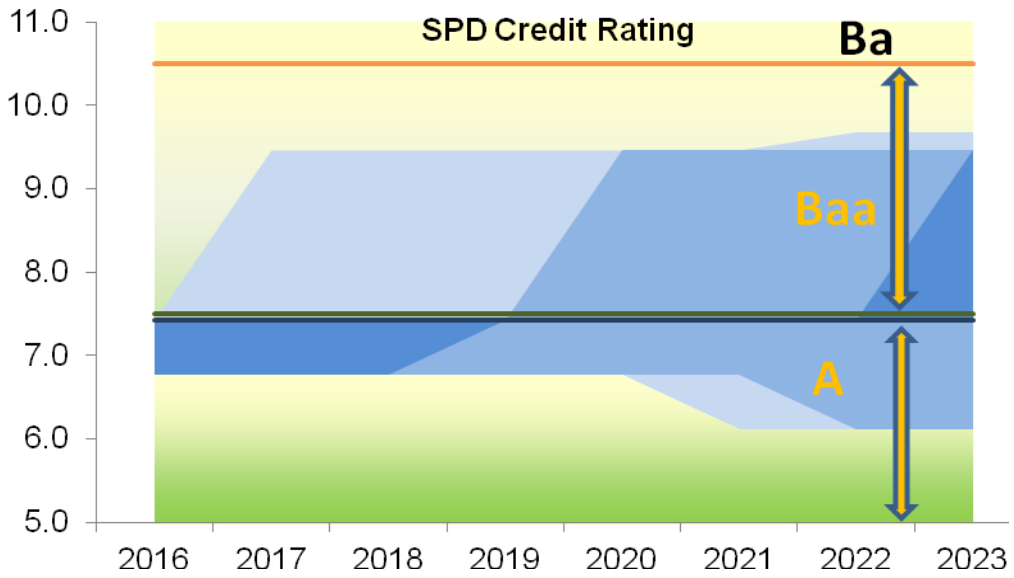
The median can therefore be taken to indicate a "central" and actual rating score, but may mask the fact that the financeability position is very close to a jump between discrete values (and possibly rating bands). The position may therefore not be as robust as it appears. The mean value of the score will partially capture this. We therefore consider both median and mean in our assessment.

Moody's methodology applies significantly greater weights to components of the overall calculation which are towards the low rating end than to components at A or above. This means that the distribution of rating outcomes is strongly asymmetric. This skew towards outcomes on the downside is clear in the following analysis.

SP Distribution

The distribution of credit rating outcomes generated by simulation is shown as a fan chart in Figure 19.

Figure 19: Fan Chart Showing SPD credit rating including External Risk



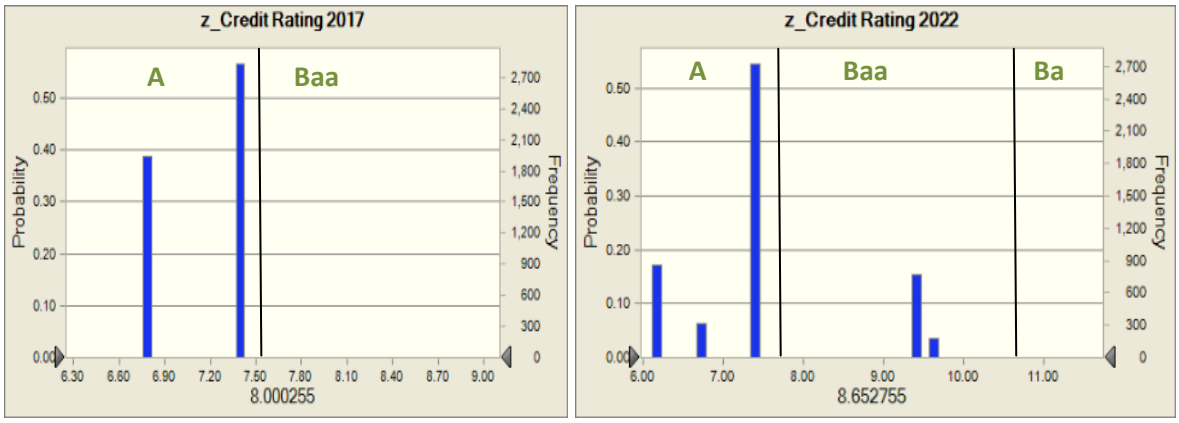
The central path for SP Distribution (the median) is shown as a dark line which runs almost exactly along the boundary between an A3 and Baa1 rating.

The table below shows the ratings based on the median and on the mean for the individual years of RIIO-ED1.

SP Distribution								
Expected Value	7.197	7.287	7.365	7.563	7.725	7.804	7.825	7.819
E.V. Rating	A3	A3	A3	Baa1	Baa1	Baa1	Baa1	Baa1
Median	7.418	7.418	7.418	7.418	7.418	7.418	7.418	7.418
Median Rating	A3	A3	A3	A3	A3	A3	A3	A3

In the later years of RIIO-ED1 the expected rating is below the median rating. This reflects the increased probability of a rating at Baa1 (or below).

This movement can be understood by comparing the simulated outcomes for 2017 and 2022.

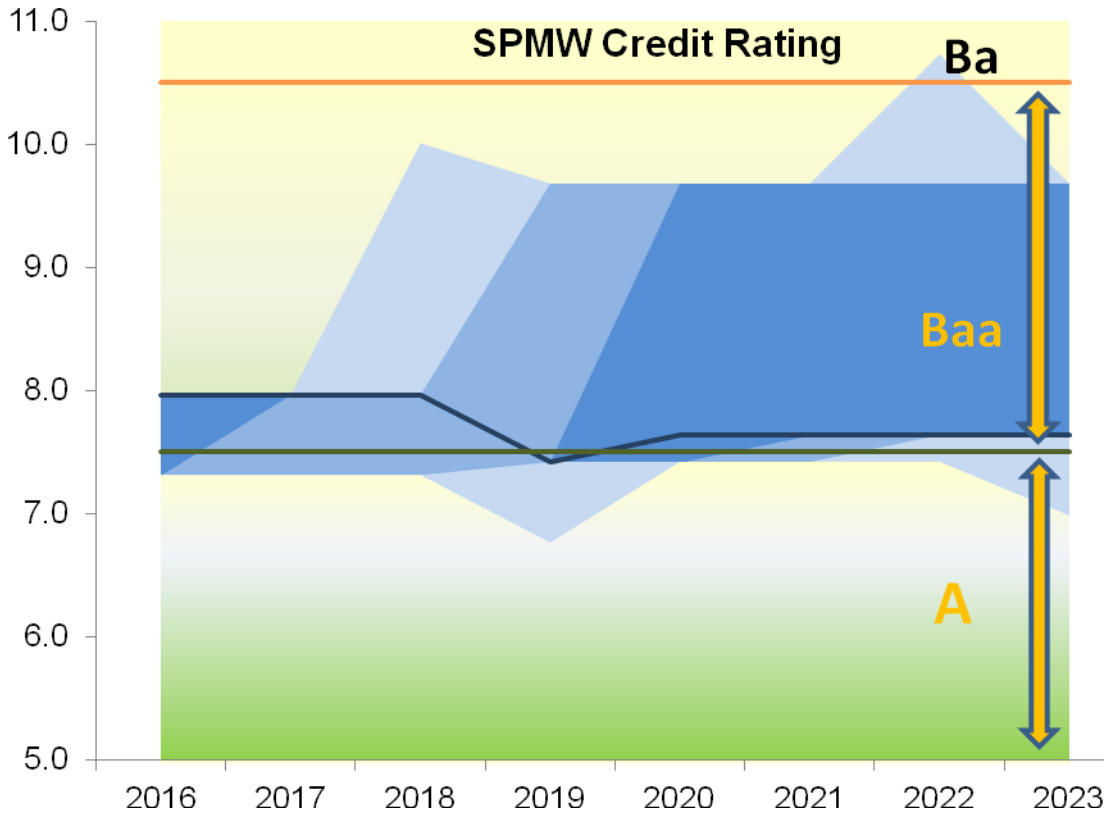


In 2017 there is negligible probability of a rating outcome below the median, which lies just within the A3 band. By 2022 there is around a 20% probability of an outcome on the border between Baa2 and Baa3.

SP Manweb

The distribution of credit rating outcomes generated by simulation is shown as a fan chart in Figure 20.

Figure 20: Fan Chart Showing SPM credit rating including External Risk



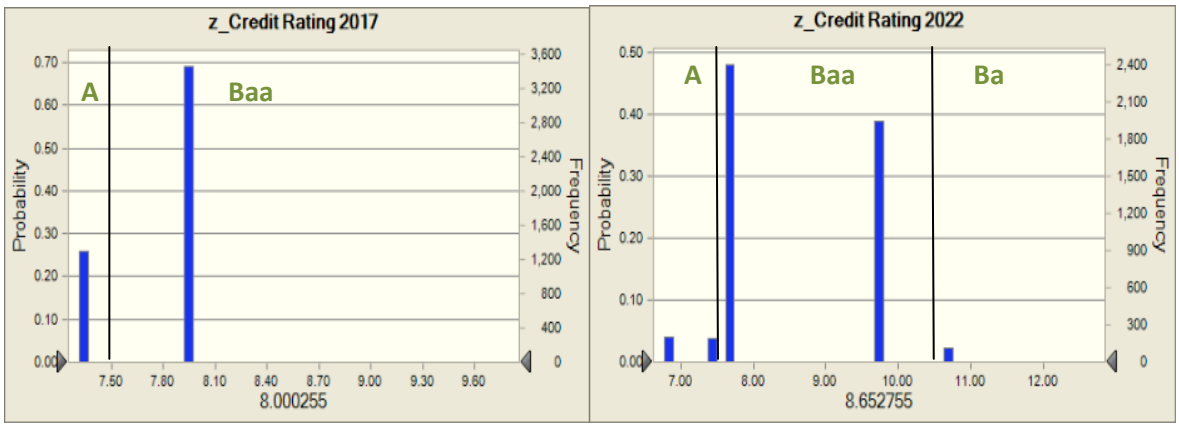
The central path for SP Manweb (the median) is shown as a dark line predominantly within the Baa1 band, briefly crossing into A3 mid Price Control.

The table below shows the ratings based on the median and on the mean for the individual years of RIIO-ED1.

SP Manweb								
Expected Value	7.685	7.918	8.039	7.942	8.269	8.673	8.651	8.381
E.V. Rating	Baa1	Baa1	Baa1	Baa1	Baa1	Baa2	Baa2	Baa1
Median	7.964	7.964	7.964	7.418	7.635	7.635	7.635	7.635
Median Rating	Baa1	Baa1	Baa1	A3	Baa1	Baa1	Baa1	Baa1

Throughout RIIO-ED1 the expected rating is at or slightly below the median rating. This median rating lies below the ratings for SPD – it is more heavily weighted towards outcomes in the Baa band.

This movement can be understood by comparing the simulated outcomes for 2017 and 2022.



In 2017 there is negligible probability of an outcome below the median, which lies towards the middle of the Baa1 band. By 2022 there is an increased probability of an A3 rating , but also around a 40% probability of an outcome of Baa3 and a small probability of an outcome below Baa.

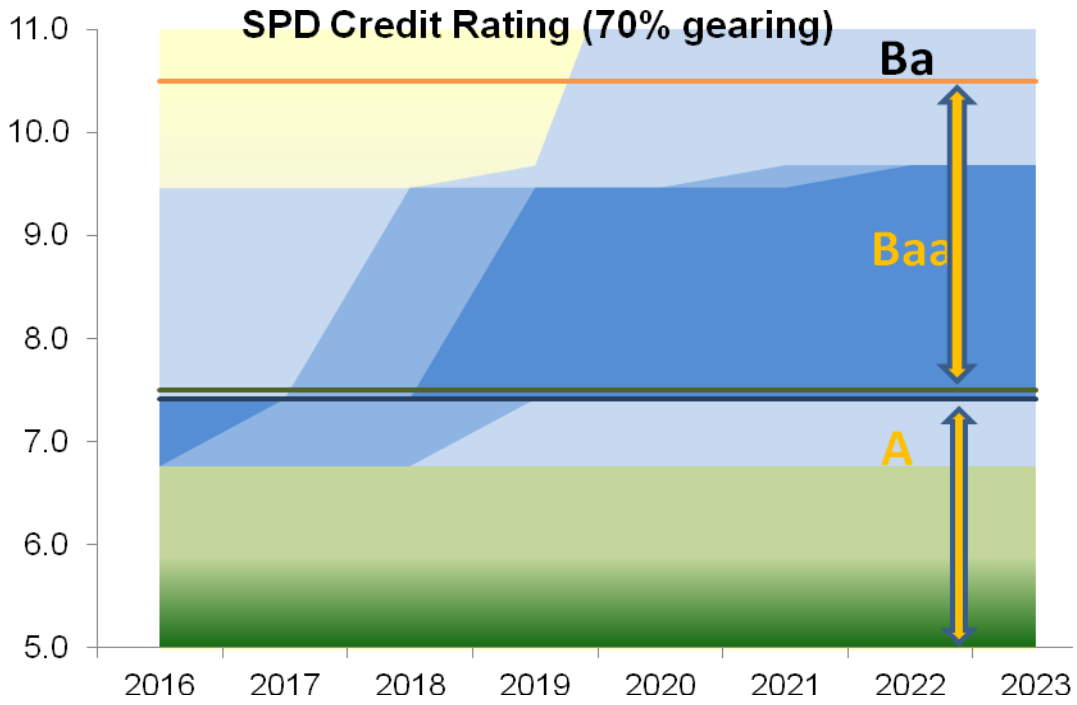
We conclude that the base financeability position of our plan is robust to a plausible range of external risks and consistent with the Allowed Cost of Debt.

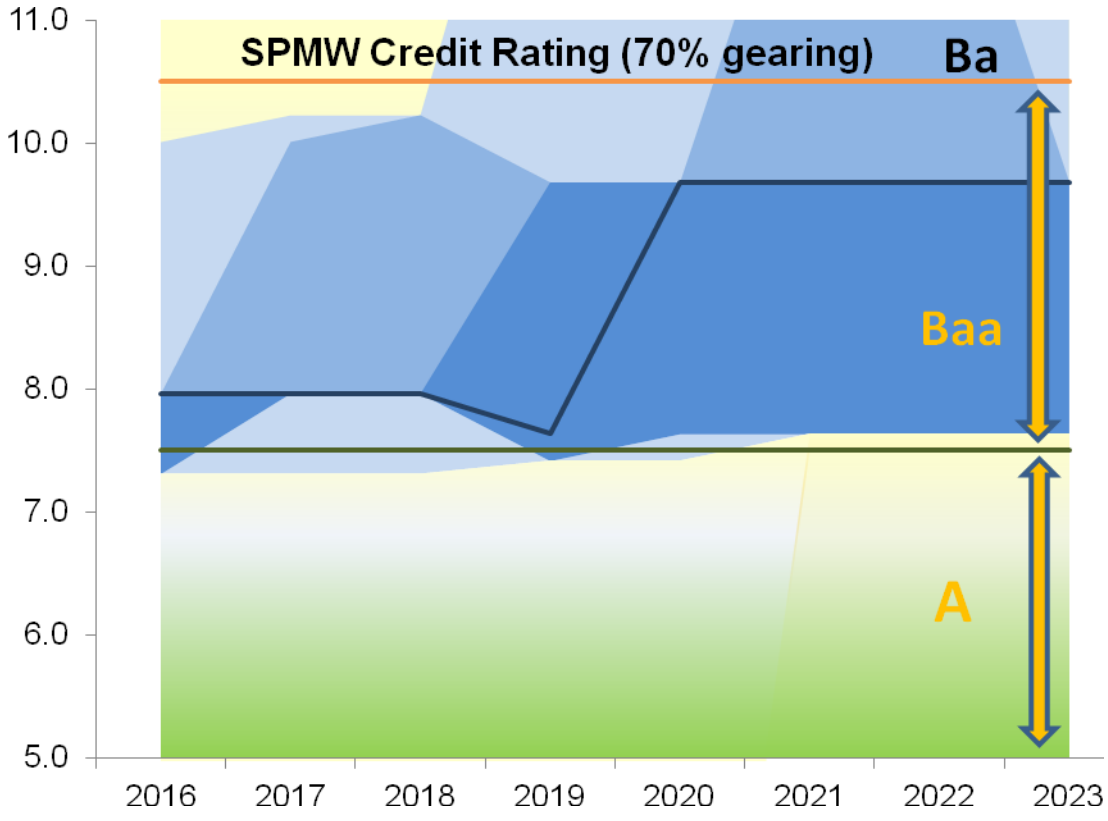
Alternative Levels of Gearing

As with our RoRE risk analysis, we consider the impact of varying the level of gearing. Specifically, we consider the impact of a 5% increment in gearing from 65% to 70%.

For both SP Distribution and SP Manweb, the Figure 21 show that the probability of ratings well below Baa1 becomes much more substantial at 70% than at 65% Gearing.

Figure 21: Fan Chart Showing credit ratings including External Risk at 70% Gearing





A gearing level of 70% leads to a significant probability of a credit rating inconsistent with the allowed cost of debt which targets the range A3 to Baa1. 65% is therefore the optimal level of gearing.

In summary, we have demonstrated by this Risk Analysis that our plan, and in particular a notional gearing of 65% should ensure a business sufficiently securely funded that the normal operation of RIIO-ED1 incentives is unlikely to lead to financial distress when coupled with adverse shocks from external risks.

Section 3 – Evolution of the Regulatory Asset Value (RAV)

This section sets out our business plan assumptions impacting the evolution of the Regulatory Asset Value (RAV). In all cases our assumptions are consistent with RIIO principles and fully adhere to Ofgem's strategy decisions.

Whilst the RAV is a very important building block in the calculation of regulatory revenues it is not related to the Net Book Value of assets that would appear in a DNO's Regulatory Accounts. The RAV evolves according to various assumptions discussed here, which are not necessarily reflective of accounting rules and conventions.

3.1 Totex & Capitalisation

Our total expenditure (totex) comprises of the categories prescribed by Ofgem. Within our plan a fixed 80% of totex is allocated to the RAV for both SP Distribution and SP Manweb.

This was calculated with reference to the expenditure projections over the RIIO-ED1 period and applying an asset life threshold to distinguish between 'slow' and 'fast money'.

Table 23: RIIO-ED1 Expenditure Projections and Inferred Capitalisation Rate

SPD	15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23	Total
Totex (£M)	220.9	222.8	227.2	221.8	220.0	211.3	211.4	213.5	1748.9
Capex	180.2	181.9	186.5	181.5	178.9	169.6	170.6	172.2	1421.2
Inferred Capitalisation Rate	81.6%	81.6%	82.1%	81.8%	81.3%	80.3%	80.7%	80.7%	81.3%

SPM	15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23	Total
Totex (£M)	296.7	313.6	284.3	274.6	282.7	279.5	260.5	238.4	2230.1
Capex	247.8	265.3	236.5	226.5	233.9	230.6	211.9	188.9	1841.2
Inferred Capitalisation Rate	83.5%	84.6%	83.2%	82.5%	82.7%	82.5%	81.3%	79.3%	82.6%

As a double check we have compared the above ED1 period inferred capitalisation rates with those experienced in the first three years of DPCR5 2010/11, 2011/12 and 2012/13 (unaudited). These are shown in the table below.

Table 24: DPCR5 Historic Inferred Capitalisation Rate

SPD	10/11	11/12	12/13	3 year Average
Regulatory Reporting Inferred Capitalisation Rate	84.8%	83.3%	83.1%	83.7%

SPM	10/11	11/12	12/13	3 year Average
Regulatory Reporting Inferred Capitalisation Rate	80.0%	78.5%	82.5%	80.3%

Table 24 demonstrates that the forecast capitalisation rate is in line with the historic capitalisation rate.

We have no evidence that adjusting for assets associated with technical innovation would materially alter the results. Our financial proposals do not use an adjustment of capitalisation rates as a means to manage financeability issues. In our view where a financeability issue exists it is preferable to address this either by equity injection or by using a single alternative lever and to use a means for which there is regulatory precedent.

We have considered all of the above information and have adopted a capitalisation rate of 80% for both SPD and SPM because this is the average rate inferred in the ED1 Expenditure Projections table.

3.2 Asset Lives & Depreciation

Our base assumption is to recognise a move to regulatory depreciation using average economic asset lives of 45 years for new assets with straight line depreciation. Existing assets continue to be depreciated over 20 years.

As noted above our analysis suggests that both SP Distribution and SP Manweb are financeable at a comfortable investment grade credit rating without the need for any transitional arrangements or other financeability adjustments.

Section 4 – Financial Policies

4.1 Taxation

The Ofgem policy decisions effecting taxation are in the main modelled automatically in the Price Control Financial Model. Our business plans fully reflect all policies that are well established and understood.

The tax allowance in the Price Control Financial Model is calculated on the basis of the decisions set out in section 5 of the RIIO-ED1 Strategy decision document (Financial Issues reference 26d/13) and clarification with Ofgem of a number of points in those decisions. The majority of the decisions set out in section 5 of the RIIO-ED1 Strategy decision document (Financial Issues reference 26d/13) are modelled automatically in the Price Control Financial Model. However, specific inputs to the Price Control Financial Model are required in respect of the attribution of qualifying expenditure to capital allowances pools and the resetting of opening capital allowances pools; the calculation of these is discussed in the following paragraphs.

4.1.1 – Attribution of costs to capital allowances pools

The following table shows the generic (i.e. the average of the combined SP Distribution and SP Manweb costs) allocation of costs between the capital allowances pools during the RIIO-ED1 period. The costs are those included in the price control financial model and specifically exclude non regulated activities (metering, de minimis and excluded services etc) consistent with the separate reporting in the RRP/BPDT of these non regulated activities. The forecast allocations are consistent with the modelling of totex in the price control financial model which removes related party margin from costs and allocates pension costs 100% to revenue as, for the purposes of the regulatory financial model, these are fully deductible in the year of cash spend. Neither SP Distribution nor SP Manweb are party to the Non Load agreement therefore there is no allocation of expenditure to the Deferred Revenue pool.

Generic %	General	Special rate	Revenue	Non Qualifying
Load	0.0%	90.8%	1.7%	7.6%
Non-Load-asset replacement	0.0%	89.1%	2.7%	8.1%
Non load - other/non op	88.3%	4.8%	0.4%	6.5%
Faults	0.0%	69.5%	30.5%	0.0%
Tree cutting	0.0%	34.0%	66.0%	0.0%

Opex	3.7%	40.7%	52.3%	3.3%

The following table compares the above allocations of capex to the pools with the average allocations (excluding non regulated activities) in the most recent three years submitted HMRC tax computations i.e. for the periods ending 31st December 2009 to 2011.

Generic	General	Special rate	Non qualifying
Capex allocations £m	252.9	2780.3	229.27
Capex allocations %	7.75%	85.22%	7.03%
Average HMRC %	0.79%	94.26%	4.94%
Variance %	6.96%	-9.04%	2.08%

The ED1 forecast tax pool allocations to the general pool are higher than the HMRC average due to higher forecast expenditure in respect of BT 21 Century and operational information technology details of which can be found in the expenditure section. The non qualifying allocation is higher due to increased expenditure on buildings.

4.1. 2 – Opening capital allowance pool balances

Consistent with the aim of the price control model to model costs used to derive Distribution (DUoS) revenues the opening capital allowances pool balances specifically exclude balances relating to non regulated activities (metering, de minimis and excluded services etc) consistent with the separate reporting in the RRP/BPDT of these non regulated activities.

The following table shows the opening capital allowances tax pools as at 1st April 2015.

Capital allowances pools at 1st April 2015 £m	General	Special rate
SP Distribution	32.9	1053.4
SP Manweb	26.0	1164.6

4.2 Pensions

Our business plans fully reflect Ofgem's pensions methodology as set out in various documents and consultations since 2009.

Our pension costs are calculated on the basis of the decisions set out in section 6 of the RIIO-ED1 Strategy decision document (Financial Issues reference 26d/13) and clarification of a number of points in those decisions in a presentation by Ofgem and subsequent meetings/correspondence with Ofgem.

4.2.1– Established deficit

For both the ScottishPower Pension Scheme (SPPS) and the Manweb Group of the Electricity Supply Pension Scheme (Manweb Scheme) a roll forward valuation to 31st December 2012 has been produced from the previous formal triennial valuations dated 31st March 2009 reflecting the requirements set out in Appendix 6, paragraph 1.38 of the RIIO-ED1 Strategy decision document (Financial Issues reference 26d/13). We have used the method set out in the Pension Deficit Allocation Methodology (PDAM) to determine the split of liabilities and assets between pre (Established) and post (Incremental) cut-off date of 31 March 2010. The PDAM was prepared by the Corporate Actuary with a Scheme Actuary peer review. The Regulatory fraction agreed at DPCR5 Final proposals was used to determine the element of the Established deficit that relates to the regulated businesses 57.4% for SPD and 79.7% for SPM (amended to 80.0% as agreed with Ofgem). The funding allowance of the regulatory portion of the Established deficit reflects a 2.6% discount rate spread evenly over the 12 years from 1st April 2013. The following table is a summary of the calculation of the Established Deficit annual funding allowance included in the Price Control Financial Model noting that these allowances will be reset at 1 April 2015 (and triennially thereafter) on completion of the reasonableness review of actual 31st March 2013 triennial valuations (and triennially thereafter) and in accordance with the annual iteration process.

Established Deficit Annual allowance	**SPPS**	**Manweb Scheme**
Liabilities	£3,064m	£1,191m
Assets	£2,624m	£917m
Deficit	-£440m	-£274m
PDAM – pre 31/3/10 pensionable service	-£371m	-£266m
PDAM – post 31/3/10 pensionable service	-£69m	-£8m
Regulatory fraction	57.4%	80.0%
Regulatory proportion of pre 31/3/10 deficit	-£213.0m	-£212.8m
SPD annual allowance 12 years from 1 April 2013 at discount rate of 2.6%	£20.6m p.a.	
SPM annual allowance 12 years from 1 April 2013 at discount rate of 2.6%		£20.6m p.a
SPM regulatory proportion adjusted to limit funding to 5% LPI pension increases only		-£200.0m
SPM annual allowance restricting funding to 5% LPI pension increases only		£19.4m p.a.

Ofgem have applied an adjustment in their provisional view of the DPCR5 true-up by restricting funding to 5% LPI pension increases only. This impacts on the Manweb Scheme as full RPI increases are funded for in the valuation. Ofgem have separately confirmed that, if

the full (uncapped) RPI increases are subsequently regarded as efficient, the adjustment will be reversed. To ensure consistency we have applied the same approach in calculating the RIIO-ED1 established deficit annual allowance. The estimated impact on the total deficit for the Manweb Scheme is £17m of which £16m relates to the established deficit resulting in the restricted annual allowance for SP Manweb of £19.4m p.a.

4.2.2 – Incremental deficit

The incremental deficit is included in totex and benchmarked as part of total totex. Consistent with the calculation of the Established deficit, this has been calculated based on a roll forward of the 31st March 2009 triennial valuation to 31st December 2012. The following table is a summary of the calculation of the Incremental Deficit included in totex in the Price Control Financial Model.

Incremental Deficit Annual allowance	**SPPS**	**Manweb Scheme**
Liabilities	£3,064m	£1,191m
Assets	£2,624m	£917m
Deficit	-£440m	-£274m
Possible annual deficit reduction contributions	£52m p.a.	£31m p.a.
pre 31/3/10 deficit	£43m p.a.	£30m p.a.
post 31/3/10 deficit	£9m p.a.	£1m p.a.
SPD Post 2010 regulated proportions	16.9%	34.5%
SPM Post 2010 regulated proportions	16.9%	34.9%
SPD incremental deficit payments over 8 years from 1st April 2013	£1.5m p.a.	£0.3m p.a.
SPM incremental deficit payments over 8 years from 1st April 2013	£1.5m p.a.	£0.3m p.a.

The possible annual deficit reduction contributions required from the company are based on a similar structure to the existing schedule of contributions e.g. 8 year recovery plan and future asset outperformance as per the 31st March 2009 valuation. The post 2010 regulated proportion is based on labour cost information, employer history (i.e. who the employee worked for post 31st March 2010) and applying the PDAM methodology and then the two schemes are split by licensee.

4.2.3 – Ongoing future service costs (Employer Contribution rates) – Defined benefit schemes

The possible contribution rates for future service accrual for 2013/14 (based on the estimated 31st March 2012 triennial valuation) are shown in the following table:

Scheme	SPPS	Manweb scheme
Pension and death benefits (excluding expenses)	37.0%	36.5%
Employee	5.0%	5.5%
Employer	32.0%	31.0%

Projections of defined benefit scheme employer contribution rates (excluding expenses) are set out below:

Scheme	12/13	13/14	14/15	15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23
SPPS %	20.8	32.0	30.5	30.5	31.7	31.7	31.7	34.0	34.0	34.0	36.1
Manweb %	23.9	31.0	29.5	29.5	30.8	30.8	30.8	33.4	33.4	33.4	35.7

It should be noted that the 2012 valuation basis has not yet been agreed. Initial contribution rates provided by the Trustees are higher than those quoted above. Our expectations are that, through a combination of negotiation on assumptions and/or liability mitigation exercises post valuation, the future service costs will be lower than those proposed by the Trustees. The rates quoted above are our best estimate of the likely outcome of these actions. The increases in rates over the period are as a result of the actuarial methods adopted.

The rates increase due to a change between the proportion of pre/post 2028 discount rates. There is a lower rate post 2028, so increasing costs. Additionally, based on the projected unit calculation methodology, the rates are expected to increase over time due to increases in the average age of the membership.

In January 2013 the Government announced the planned introduction of a single tier pension from 1st April 2016. The state second pension will close and, as a result, contracting out of the state second pension will come to an end for defined benefit pension schemes. As a result the employer National Insurance rate will increase by 3.4% for each contracted out employee up to an upper limit – currently £40,040. We have reflected this extra 3.4% cost in our totex submission. In most industries, employers have the opportunity to recover this additional NI cost by reducing employee costs in other ways e.g. increasing employee contribution rate or reducing the annual accrual rate. The electricity industry is subject to Protected Persons Regulations which means that it is very difficult to change scheme benefits without a majority of members approving. The Government is consulting on whether the Protected Persons Regulations should be relaxed to enable employers to amend scheme rules to compensate for their increased NI costs. So, it may be possible for the employer to reduce pension costs from April 2016 to compensate for the cessation of contracting out and the increase in NI payment. At this stage, the outcome on the proposed override on Protected Persons is unclear so we have assumed that the employer is able to reduce pension costs by 50% of the anticipated increase in NI. It is estimated that this would equate to approximately 1% of total pensionable salaries and this reduction in pension costs is reflected in the year ending 31st March 2017.

4.2.4 – Ongoing future service costs (Employer Contribution rates) – Defined contribution schemes

Projections of defined contribution scheme employer contribution rates (excluding expenses) are set out below:

Scheme	12/13	13/14	14/15	15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23
Average	8.7%	7.7%	7.7%	8.1%	7.8%	7.8%	7.8%	7.8%	7.8%	7.8%	7.7%

These rates are an average. The average rate would be expected to reduce after auto enrolment as these members will initially be on the lowest contribution rates. We have allowed for the impact of the "Old Stakeholder" contribution rate increasing from 2015/16 by 3% (overall impact expected to be approximately 0.4% increase); employer contribution rate for these members increases from 8% to 11% for service over 10 years (to 25 years).

4.2.5 – Pension scheme administration costs

These are in addition to the employer ongoing future service contribution rates.

For SPPS we have assumed that the 1% allowance continues as an addition to the contribution rate over the period.

For the Manweb scheme we have assumed £1m increasing in line with RPI; so £1m flat profile over RIIO-ED1 in current terms.

4.2.6 – Pension Protection Fund (PPF) levy costs

Our forecast PPF levies are set out in the following table:

£m	12/13	13/14	14/15	15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23
SPPS											
Fixed	0.2	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Risk based	1.0	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Manweb											
Fixed	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Risk based	1.1	0.7	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6

Estimated figures for 2013/14 are based on the current view allowing for mitigation actions (e.g. submission of 2012 s179 PPF valuation and deficit reduction contributions). Estimates from 2014/15 are based on the average of the previous 5 years levies. It is assumed that levies increase at least in line with RPI, so in current terms a flat profile has been used. Actual levies will vary subject to changes in PPF scaling factors etc which are set so that the PPF collects the total levies it requires based on the funding position of the PPF.

4.3 Price Control Financial Model

Our business plan revenues have been calculated in the version of the model issued to us by Ofgem on 2nd May 2013. We have made no amendments to the model other than clarifications received from Ofgem. Our business plans were finalised on 4th June 2013 therefore any subsequent Ofgem updates to models or revisions of previous decisions on financial policies are not included in our business plan on the understanding that the annual iteration process blue box amendments will cater for these.

Summary of Financial Policy Issues

Financial Policy Issue	**Adherence with Ofgem Policy?**	**Comment**
Cost of Debt Index	Yes	'Vanilla' Indexation
Cost of Equity & Gearing	Yes	Within range & reflecting cash flow risk
Asset Lives	Yes	To 45 years with no transition
Capitalisation	Yes	Inferred per Ofgem guidance on approach
Taxation	Yes	Well established approach
Pensions	Yes	Well established approach
Dividends	Yes	'Vanilla' PCFM approach

Glossary

A

Annual iteration Process

The annual iteration process is the process of annually updating the variable (blue box) values in the price control financial model and running the model in order to provide updated MOD values.

C

Capital Expenditure (Capex)

Expenditure on investment in long–lived distribution assets, such as underground cables, overhead electricity lines and substations.

Capital Asset Pricing Model (CAPM)

A theoretical model that is widely used to estimate the cost of equity. This derives the cost of equity by adding the company or sector risk premium to the risk free rate. The risk premium is calculated by applying a measure of relative risk, known as the "beta" factor to the risk premium for the stock market as a whole.

D

Defined Benefit Scheme

A pension scheme where the benefits that accrue to members are normally based on a set formula taking into account the final salary and accrual of service in the scheme. It is also known as a final salary pension scheme.

Defined Contribution Scheme

A pension scheme where the benefits that accrue to members are based on the level of cash contributions made to an individual account; the returns on those funds are used to provide a cash amount to purchase an annuity on retirement.

Dividend Growth Model (DGM)

A theoretical model that is widely used, in the United States and elsewhere, to estimate the cost of equity. This derives the cost of equity as the discount rate which sets the present value of projected future dividends equal to the current share price.

E

ED1

Prefix/Suffix designating an item relevant to the RIIO-ED1 (electricity distribution) price control review which will be applicable for the eight years running from 1 April 2015.

ED1 Price Control Financial Model (PCFM)

The model of that name:

(a) that the Authority will use to determine ex ante base revenues; and

(b) that the Authority will use to calculate appropriate changes to the licensee's base revenue through an Annual Iteration Process that will determine the value of the term MOD.

Equity risk premium (ERP)

The market Equity Risk Premium (ERP) measures the additional return required by investors to compensate them for the risk of holding a widely diversified portfolio of equities over and above the risk-free rate.

F

Fast money

The proportion of Totex which is not added to the licensee's RAV balance and is effectively included in the licensee's revenue allowance for the year of expenditure

I

Incentive Strength

The incentive strength represents the percentage that a licensee bears in respect of an overspend against allowances or retains in respect of an underspend against allowances.

K

Kilowatt hours (kWh)

Kilowatt is a measure of energy equal to one thousand watts; kilowatt hour is a measure of energy consumed over time.

M

MOD Term

The term represents the incremental change to base revenue for the Relevant Year concerned. The value of the MOD term is calculated through the annual iteration of the ED1 Price Control Financial Model and is specified in a direction given by the Authority by 30 November in each Relevant Year.

N

Net Present Value (NPV)

Net present value is the discounted sum of future cash flows, whether positive or negative, minus any initial investment.

Net Present Value (NPV) neutral

Alternative revenue profiles are net present value neutral if they have the same NPV. This term is usually used in the context of spreading revenues over time (i.e. a price control period) where the costs that they represent have already been incurred, or in comparing different profiles of allowed revenue.

O

Ofgem

The Office of the Gas and Electricity Markets Authority.

P

Pension Protection Fund

The fund, established under the provisions of the Pensions Act 2004, to provide compensation to members of eligible defined benefit pension schemes, when there is a qualifying insolvency event in relation to the employer, and where there are insufficient assets in the pension scheme to cover the Pension Protection Fund level of compensation.

Pension Scheme Administration

The range of activities that pension scheme trustees are required by legislation to undertake or commission in running the pension scheme. It includes, without limitation, the keeping of scheme records, scheme management and administration, scheme policy and strategy, the provision of information to scheme members, the calculation and payment of benefits and liaison with tax and regulatory authorities, and the preparation of valuations. It does not include investment management fees which are remunerated by deduction from investment returns; or any activities which are the responsibility of the licensee, such as advisors to the licensee on managing or advising it on any and all aspects of its relationship with the trustees including recovery plans.

Pension scheme established deficit

The difference between assets and liabilities, determined at any point in time, attributable to pensionable service up to the end of the respective Cut-Off Dates and relating to Regulated Business Activities under Pension Principle 2. The term applies equally if there is a subsequent surplus.

Pension scheme incremental deficit

The difference between the assets and liabilities, determined at any point in time, attributable to post Cut-Off Date pensionable service and relating to Regulated Business Activities. The term also applies equally where there is a surplus for the post cut-off date regulated Notional incremental deficit sub-fund

R

RAV – Regulatory Asset Value

A financial balance representing expenditure by the licensee which has been capitalised under regulatory rules. The licensee receives a return and depreciation on its RAV in its price control allowed revenues.

Relevant Year

A year beginning on 1 April.

RIIO

Revenue = Incentives + Innovation + Outputs.
Ofgem's framework for the economic regulation of energy networks.

RIIO-ED1 (Electricity Distribution)

The price control arrangements which will apply to Electricity Distribution licensees from 1 April 2015 until 31 March 2023.

S

Slow money

The proportion of Totex which is added to the licensee's RAV balance on which the licensee receives a revenue allowance to cover finance (WACC) and depreciation costs.

T

Time Value of Money Adjustment

A multiplier used when the award or application of a financial value, attributable to a particular year, is deferred until a later year, even where the deferral is routine and in accordance with a price control mechanism.

In basic terms, for any one year, the multiplier is (1+X) where:

- X is the WACC for the licensee applicable to the period of deferral

Totex Incentive Mechanism (TIM)

TIM is the financial reward (or penalty) that companies are given in allowances for under or over spend on Totex. For RIIO-ED1 Final Proposals opening base revenues will be modelled on the basis that actual Totex expenditure levels are expected to equal allowed Totex expenditure levels (allowances). If actual (outturn) expenditure differs from allowances, for any Relevant Year during the Price Control Period, the TIM provides for an appropriate sharing of the incremental amount (whether an overspend or underspend) between consumers and licensees.

Totex

The aggregate net network investment, net network operating costs and indirect costs.

Totex Capitalisation Rate

The percentage of Totex which is added to RAV (slow money)

Triennial Valuation

An actuarial valuation of a pension scheme which has been carried out to meet the requirements of Section 224(2)(a) of the Pensions Act 2004 and which details in a written report, prepared and signed by the Scheme Actuary, the value of the scheme's assets and Technical Provisions. Actuarial valuations are usually produced triennially but the term may also refer equally to any full actuarial valuation that is not an Updated Valuation.

V

Vanilla WACC

See WACC.

W

WACC

The Vanilla Weighted Average Cost of Capital is Ofgem's preferred way of expressing the rate of return allowed on the Regulatory Asset Values (RAV) of price controlled network companies. The use of Vanilla WACC means that the company's tax cost is separately calculated as a discrete allowance so that only the following have to be factored in:

- the pre-tax cost of debt - ie the percentage charge levied by lenders, and
- the post tax cost of equity – ie the percentage return equity investors expect to actually receive,

weighted according to the price control gearing assumption.

"Real Vanilla WACC" is used which gives a lower percentage than "Nominal Vanilla WACC" would (when inflation is positive). This is because inflation isn't taken into account in the determination of the Real Vanilla WACC percentage since revenue allowances (which include the Vanilla WACC return) are separately RPI indexed.

Appendix 1 – Financeability Scenarios.

Here we provide the detailed outputs form our 'static' financeability testing described above. Each scenario changes a single parameter from the base case in isolation. For completeness we include other scenarios which we tested that are not described above but which were not considered wholly relevant in arriving at the conclusions of our assessment.

Note that base proposal and all scenarios are pre profiling for both licensees.

Base Financing Proposal									
SPM									
Ratio									
Capex to RAV ratio	14.4%	14.3%	12.3%	11.4%	11.2%	10.6%	9.5%	8.5%	11.5%
Adjusted interest cover ratio	1.61	1.54	1.48	1.45	1.42	1.39	1.38	1.38	1.46
Net Debt / Total closing RAV	65.9%	67.0%	67.5%	67.9%	68.4%	68.8%	69.1%	69.1%	68.0%
FFO / Net Debt	14.5%	13.3%	12.5%	12.0%	11.3%	10.7%	9.6%	9.4%	11.7%
RCF / Capex	0.57	0.53	0.58	0.60	0.57	0.57	0.56	0.62	0.58
SPD									
Ratio									
Capex to RAV ratio	11.2%	11.1%	11.0%	10.5%	10.2%	9.6%	9.4%	9.3%	10.3%
Adjusted interest cover ratio	1.64	1.60	1.59	1.57	1.55	1.55	1.57	1.58	1.58
Net Debt / Total closing RAV	64.3%	63.8%	63.4%	63.0%	62.6%	62.1%	61.6%	61.2%	62.8%
FFO / Net Debt	16.2%	15.7%	15.4%	15.1%	14.8%	14.6%	14.5%	14.2%	15.1%
RCF / Capex	0.81	0.79	0.77	0.78	0.78	0.81	0.81	0.79	0.79

1 Period Transition in asset lives to 45 years								
SPM								
Ratio								
Capex to RAV ratio	14.4%	14.3%	12.4%	11.5%	11.4%	10.9%	9.8%	8.8%	11.7%
Adjusted interest cover ratio	1.61	1.54	1.49	1.46	1.43	1.41	1.40	1.39	1.46
Net Debt / Total closing RAV	65.9%	66.9%	67.3%	67.4%	67.7%	67.9%	68.0%	67.8%	67.4%
FFO / Net Debt	14.5%	13.8%	13.4%	13.2%	12.6%	12.3%	11.2%	11.0%	12.7%
RCF / Capex	0.57	0.55	0.62	0.66	0.64	0.65	0.64	0.70	0.63
SPD									
Ratio									
Capex to RAV ratio	11.2%	11.1%	11.1%	10.6%	10.3%	9.8%	9.7%	9.7%	10.4%
Adjusted interest cover ratio	1.64	1.61	1.60	1.58	1.57	1.58	1.60	1.63	1.60
Net Debt / Total closing RAV	64.3%	63.7%	63.2%	62.6%	61.9%	61.2%	60.4%	59.6%	62.1%
FFO / Net Debt	16.2%	16.2%	16.2%	16.2%	16.2%	16.3%	16.4%	16.3%	16.3%
RCF / Capex	0.81	0.81	0.81	0.83	0.84	0.88	0.88	0.87	0.84

Capitalisation 75%										
SPM										
Ratio										
Capex to RAV ratio		13.7%	13.6%	11.8%	11.0%	10.9%	10.4%	9.3%	8.3%	11.1%
Adjusted interest cover ratio		1.61	1.55	1.51	1.47	1.45	1.42	1.41	1.40	1.48
Net Debt / Total closing RAV		65.6%	66.3%	66.7%	66.8%	67.1%	67.4%	67.6%	67.5%	66.9%
FFO / Net Debt		14.7%	13.6%	13.0%	12.5%	11.8%	11.3%	10.2%	9.9%	12.1%
RCF / Capex		0.61	0.57	0.62	0.64	0.61	0.61	0.60	0.65	0.61
SPD										
Ratio										
Capex to RAV ratio		10.6%	10.5%	10.5%	10.1%	9.8%	9.3%	9.2%	9.2%	9.9%
Adjusted interest cover ratio		1.64	1.62	1.61	1.60	1.59	1.59	1.62	1.64	1.61
Net Debt / Total closing RAV		64.0%	63.2%	62.6%	61.9%	61.3%	60.6%	59.8%	59.2%	61.6%
FFO / Net Debt		16.4%	16.1%	15.9%	15.7%	15.5%	15.5%	15.5%	15.3%	15.8%
RCF / Capex		0.87	0.84	0.82	0.84	0.83	0.86	0.86	0.84	0.85

Capitalisation 85%									
SPM									
Ratio									
Capex to RAV ratio	15.2%	14.9%	12.8%	11.7%	11.5%	10.9%	9.7%	8.6%	
Adjusted interest cover ratio	1.60	1.52	1.46	1.42	1.39	1.37	1.54	1.46	
Net Debt / Total closing RAV	66.2%	67.6%	68.3%	68.9%	69.6%	70.1%	65.5%	65.5%	
FFO / Net Debt	14.2%	12.9%	12.1%	11.5%	10.7%	10.2%	10.6%	10.0%	
RCF / Capex	0.53	0.50	0.55	0.56	0.54	0.54	0.58	0.61	
SPD									
Ratio									
Capex to RAV ratio	11.9%	11.6%	11.4%	10.9%	10.5%	9.8%	9.6%	9.5%	
Adjusted interest cover ratio	1.63	1.59	1.57	1.54	1.52	1.51	1.52	1.53	
Net Debt / Total closing RAV	64.6%	64.3%	64.2%	64.0%	63.9%	63.6%	63.3%	63.0%	
FFO / Net Debt	16.0%	15.4%	14.9%	14.5%	14.1%	13.8%	13.6%	13.2%	
RCF / Capex	0.76	0.74	0.72	0.73	0.73	0.76	0.76	0.74	

Gearing 70%									
SPM									
Ratio									
Capex to RAV ratio	14.4%	14.3%	12.3%	11.4%	11.2%	10.6%	9.5%	8.5%	11.5%
Adjusted interest cover ratio	1.44	1.39	1.34	1.31	1.28	1.26	1.28	1.27	1.32
Net Debt / Total closing RAV	70.6%	71.5%	71.8%	72.1%	72.4%	72.7%	72.9%	72.7%	72.1%
FFO / Net Debt	12.9%	11.8%	11.2%	10.7%	10.1%	9.6%	8.7%	8.5%	10.4%
RCF / Capex	0.56	0.52	0.57	0.59	0.56	0.56	0.56	0.61	0.57
SPD									
Ratio									
Capex to RAV ratio	11.2%	11.1%	11.0%	10.5%	10.2%	9.6%	9.4%	9.3%	10.3%
Adjusted interest cover ratio	1.47	1.44	1.42	1.40	1.39	1.39	1.40	1.41	1.41
Net Debt / Total closing RAV	69.3%	68.7%	68.3%	67.8%	67.4%	66.9%	66.3%	65.9%	67.6%
FFO / Net Debt	14.4%	14.0%	13.7%	13.4%	13.1%	12.9%	12.8%	12.5%	13.3%
RCF / Capex	0.80	0.77	0.76	0.77	0.76	0.79	0.79	0.77	0.78

Gearing 60%										
SPM										
Ratio										
Capex to RAV ratio		14.4%	14.3%	12.3%	11.4%	11.2%	10.6%	9.5%	8.5%	11.5%
Adjusted interest cover ratio		1.88	1.71	1.65	1.60	1.57	1.53	1.51	1.72	1.65
Net Debt / Total closing RAV		61.1%	62.5%	63.2%	63.7%	64.4%	64.9%	65.4%	60.1%	63.2%
FFO / Net Debt		16.7%	14.9%	14.0%	13.4%	12.6%	12.0%	10.7%	12.3%	13.3%
RCF / Capex		0.59	0.54	0.59	0.61	0.58	0.58	0.57	0.68	0.60
SPD										
Ratio										
Capex to RAV ratio		11.2%	11.1%	11.0%	10.5%	10.2%	9.6%	9.4%	9.3%	10.3%
Adjusted interest cover ratio		1.92	1.80	1.79	1.76	1.75	1.74	1.77	1.78	1.79
Net Debt / Total closing RAV		59.3%	58.9%	58.6%	58.2%	57.9%	57.4%	56.9%	56.5%	58.0%
FFO / Net Debt		18.7%	17.8%	17.5%	17.1%	16.7%	16.6%	16.5%	16.2%	17.1%
RCF / Capex		0.85	0.80	0.79	0.80	0.79	0.82	0.82	0.80	0.81

Cost of Equity 6.5%										
SPM										
Ratio										
Capex to RAV ratio		14.4%	14.3%	12.3%	11.4%	11.2%	10.6%	9.5%	8.5%	11.5%
Adjusted interest cover ratio		1.58	1.51	1.46	1.42	1.39	1.36	1.36	1.36	1.43
Net Debt / Total closing RAV		66.0%	67.1%	67.7%	68.2%	68.7%	69.2%	69.6%	69.6%	68.3%
FFO / Net Debt		14.3%	13.1%	12.4%	11.8%	11.1%	10.5%	9.4%	9.2%	11.5%
RCF / Capex		0.56	0.53	0.58	0.60	0.57	0.57	0.55	0.61	0.57
SPD										
Ratio										
Capex to RAV ratio		11.2%	11.1%	11.0%	10.5%	10.2%	9.6%	9.4%	9.3%	10.3%
Adjusted interest cover ratio		1.62	1.58	1.56	1.54	1.52	1.52	1.54	1.55	1.55
Net Debt / Total closing RAV		64.4%	63.9%	63.6%	63.3%	63.0%	62.6%	62.1%	61.7%	63.1%
FFO / Net Debt		16.1%	15.6%	15.3%	14.9%	14.5%	14.4%	14.2%	13.9%	14.9%
RCF / Capex		0.81	0.78	0.76	0.77	0.77	0.80	0.80	0.78	0.78

Cost of Equity 7.0%										
SPM										
Ratio										
Capex to RAV ratio		14.4%	14.3%	12.3%	11.4%	11.2%	10.6%	9.5%	8.5%	11.5%
Adjusted interest cover ratio		1.64	1.57	1.52	1.49	1.46	1.43	1.42	1.42	1.49
Net Debt / Total closing RAV		65.8%	66.8%	67.2%	67.5%	67.9%	68.2%	68.5%	68.4%	67.5%
FFO / Net Debt		14.6%	13.5%	12.7%	12.2%	11.5%	11.0%	9.8%	9.7%	11.9%
RCF / Capex		0.58	0.54	0.59	0.61	0.58	0.58	0.57	0.63	0.59
SPD										
Ratio										
Capex to RAV ratio		11.2%	11.1%	11.0%	10.5%	10.2%	9.6%	9.4%	9.3%	10.3%
Adjusted interest cover ratio		1.67	1.64	1.63	1.61	1.60	1.60	1.62	1.64	1.63
Net Debt / Total closing RAV		64.2%	63.6%	63.1%	62.6%	62.1%	61.5%	60.9%	60.3%	62.3%
FFO / Net Debt		16.4%	16.0%	15.7%	15.4%	15.1%	15.0%	14.9%	14.6%	15.4%
RCF / Capex		0.82	0.80	0.78	0.79	0.79	0.82	0.82	0.80	0.80

Other Scenarios Less Relevant to our Conclusions

CoD average 1.91%									
SPM									
Ratio									
Capex to RAV ratio	14.4%	14.3%	12.3%	11.4%	11.2%	10.6%	9.5%	8.5%	11.5%
Adjusted interest cover ratio	1.67	1.62	1.58	1.56	1.55	1.55	1.55	1.55	1.58
Net Debt / Total closing RAV	65.9%	67.0%	67.5%	67.8%	68.3%	68.7%	69.0%	68.9%	67.9%
FFO / Net Debt	14.5%	13.3%	12.6%	12.0%	11.3%	10.8%	9.7%	9.5%	11.7%
RCF / Capex	0.57	0.53	0.58	0.60	0.58	0.58	0.57	0.62	0.58
SPD									
Ratio									
Capex to RAV ratio	11.2%	11.1%	11.0%	10.5%	10.2%	9.6%	9.4%	9.3%	10.3%
Adjusted interest cover ratio	1.70	1.69	1.69	1.69	1.70	1.73	1.76	1.78	1.72
Net Debt / Total closing RAV	64.3%	63.8%	63.4%	63.0%	62.7%	62.2%	61.8%	61.4%	62.8%
FFO / Net Debt	16.2%	15.7%	15.4%	15.1%	14.7%	14.5%	14.4%	14.1%	15.0%
RCF / Capex	0.81	0.79	0.77	0.78	0.78	0.80	0.80	0.78	0.79

4 yr Transition in Assest Lives to 25 Years								
SPM								
Ratio								
Capex to RAV ratio	14.4%	14.3%	12.4%	11.5%	11.3%	10.8%	9.7%	8.6%
Adjusted interest cover ratio	1.61	1.54	1.49	1.45	1.43	1.40	1.39	1.38
Net Debt / Total closing RAV	65.9%	66.9%	67.3%	67.6%	68.0%	68.3%	68.6%	68.5%
FFO / Net Debt	14.5%	13.6%	13.1%	12.7%	12.0%	11.4%	10.3%	10.1%
RCF / Capex	0.57	0.55	0.61	0.63	0.60	0.61	0.59	0.65
SPD								
Ratio								
Capex to RAV ratio	11.2%	11.1%	11.0%	10.6%	10.3%	9.7%	9.6%	9.5%
Adjusted interest cover ratio	1.64	1.61	1.59	1.58	1.56	1.57	1.59	1.60
Net Debt / Total closing RAV	64.3%	63.7%	63.2%	62.7%	62.2%	61.6%	61.0%	60.4%
FFO / Net Debt	16.2%	16.1%	16.0%	15.8%	15.5%	15.4%	15.4%	15.1%
RCF / Capex	0.81	0.81	0.80	0.81	0.81	0.84	0.84	0.82

Gearing 55%								
SPM								
Ratio								
Capex to RAV ratio	14.4%	14.3%	12.3%	11.4%	11.2%	10.6%	9.5%	8.5%
Adjusted interest cover ratio	2.19	1.92	1.83	1.78	1.73	1.95	1.82	1.80
Net Debt / Total closing RAV	56.4%	58.0%	58.9%	59.6%	60.3%	55.7%	56.4%	56.5%
FFO / Net Debt	19.2%	16.8%	15.8%	15.0%	14.1%	15.6%	13.6%	13.3%
RCF / Capex	0.62	0.55	0.60	0.62	0.59	0.64	0.61	0.66
SPD								
Ratio								
Capex to RAV ratio	11.2%	11.1%	11.0%	10.5%	10.2%	9.6%	9.4%	9.3%
Adjusted interest cover ratio	2.25	2.03	2.02	1.99	1.97	1.97	2.00	2.01
Net Debt / Total closing RAV	54.4%	54.0%	53.7%	53.4%	53.1%	52.7%	52.2%	51.8%
FFO / Net Debt	21.7%	20.3%	19.9%	19.5%	19.1%	18.9%	18.8%	18.5%
RCF / Capex	0.88	0.82	0.80	0.81	0.81	0.84	0.84	0.82