

SP Energy Networks 2015–2023 Business Plan

Updated March 2014

Annex

Financing Our Plan

SP Energy Networks

March 2014



**SP ENERGY
NETWORKS**

Financing our plan

March 2014

Issue Date	Issue No.	Document Owner	Amendment Details
14/3/2014	1.0	Garth Blundell	Finalised for submission

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1. Overview

This Annex 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 financeability at a comfortable investment grade credit rating but no higher. This chapter also addresses the questions of what are the appropriate cash flows for the businesses and return to shareholders.

a. Key assumptions and headline proposals

	Section	SP Distribution	SP Manweb
Cost of equity	3.d	6.4%	6.4%
Cost of debt	3.e	iBoxx 10 year trailing average	iBoxx 10 year trailing average
Notional gearing	3.f	65%	65%
Financeability adjustment	3.g	1 period transition	1 period transition
Capitalisation rate	3.g	80%	80%
Dividend yield	3.d	5%	5%
Credit rating	3.g	A3/Baa1	A3/Baa1
Other policies	4 & 5	Per Ofgem	Per Ofgem

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 Baa1, which is at the lower end of the range that underpins Ofgem's cost of debt index and is lower than the A3 rating at fast track. We then considered further external risks, which, if they were to materialise, yield a base rating one notch lower for SP Manweb and material downside risk for SP Distribution.

b. Key conclusions

We conclude that we require a cost of equity of 6.4% to enable us to attract and retain sufficient equity finance to provide, in our view, the necessary investment to maintain network reliability and absorb the forecast expenditure volatility as we facilitate the transition to a low carbon economy. Our risk assessment in section 'h' demonstrates that there is a significant chance, although dependent on the calibration and strength of the IQI incentive, due to be set out in Ofgem's July 2014 initial proposals, that our investors may have to provide a substantial equity injection during RIIO-ED1 to maintain an investment grade credit rating.

In our financial modelling, we assume that the cost of debt is 2.72% which is the value of the iBoxx ten year trailing average, as at 31 October 2013. However, the allowed cost of debt is set in real terms and our debt is primarily nominal (i.e. the coupon includes an inflation component). Our financeability analysis indicates that this mis-match contributes to declining financial ratios. In October 2013, Moody's issued an announcement relating to the impact of persistent low interest rates and a potential need for companies to deleverage to maintain key credit metrics.

We assume 65% notional gearing, which reflects Ofgem's guidelines, however as detailed in our risk assessment section 'h', a lower gearing of 60% is considered for SP Manweb, after consideration of uncertainty around incentives that will be detailed in the July 2014 initial proposals.

Our financeability analysis demonstrates that, following removal of the 2.5% fast track additional income, of SP Distribution £44m and SP Manweb £55m, which was included in our fast track financeability assessment, we need a one period transition to longer depreciation lives.

c. Structure and Objectives of this chapter

In **Section 3** we provide justification for the allowed return used in our business plan. This takes up the bulk of this chapter.

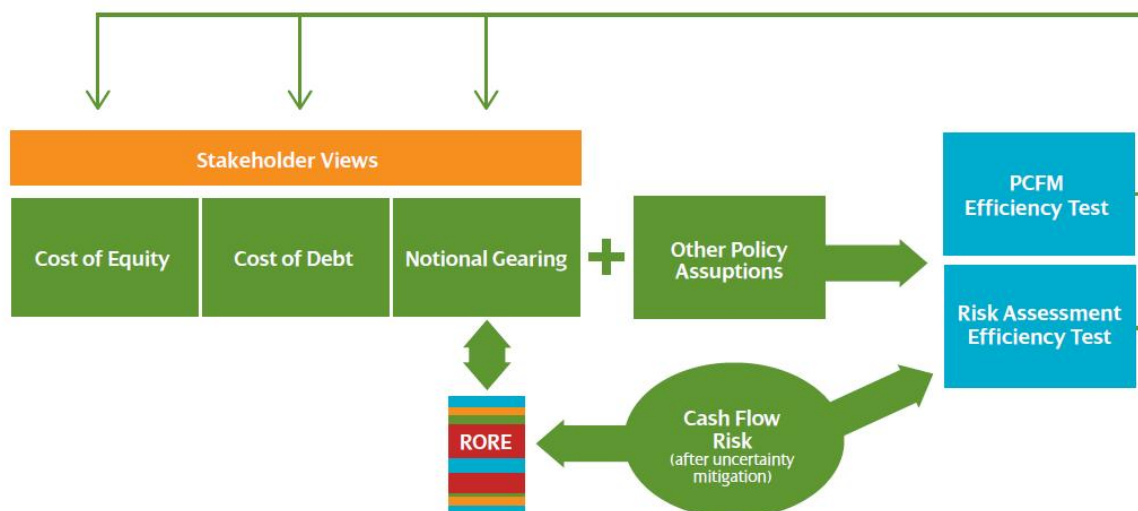
- First, we assess the relative risk of SP Distribution and SP Manweb in comparison with the fast tracked DNOs. We consider differences in the range of Regulatory Return on Equity (RoRE), Real Price Effects (RPEs), financial ratios and other components of risk and the differential impact of the IQI mechanism.
- Second, we respond to Ofgem's recent review of the methodology for assessing the total equity market return

- Third, we present a range of **stakeholder views** around the topic on financing costs to provide context for our other analysis.
- Fourth, we consider the **cost of equity** based on economic and financial principles.
- On the **cost of debt** we have adopted Ofgem's policy of indexation using the 10 year trailing iBoxx average.
- 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.
- Then, we test that our plan is **financeable**. Here we 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 4** we present our plan assumptions around capitalisation and regulatory depreciation.

In **Section 5** 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:



2. Table of linkages

Description

Theme	Output Area	Document	Chapter / Section
Financing			
Cost of equity	Financing	NERA: The Cost of Equity for Scottish Power's Distribution Network Operators at RIIO-ED1	Annex
Risk assessment	Financing	NERA: Risk Modelling for RIIO-ED1	Annex

3. 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 approach¹ to credit ratings to ensure that our overall proposal is financeable and efficiently so.

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

a. Comparison with risk of fast tracked DNOs

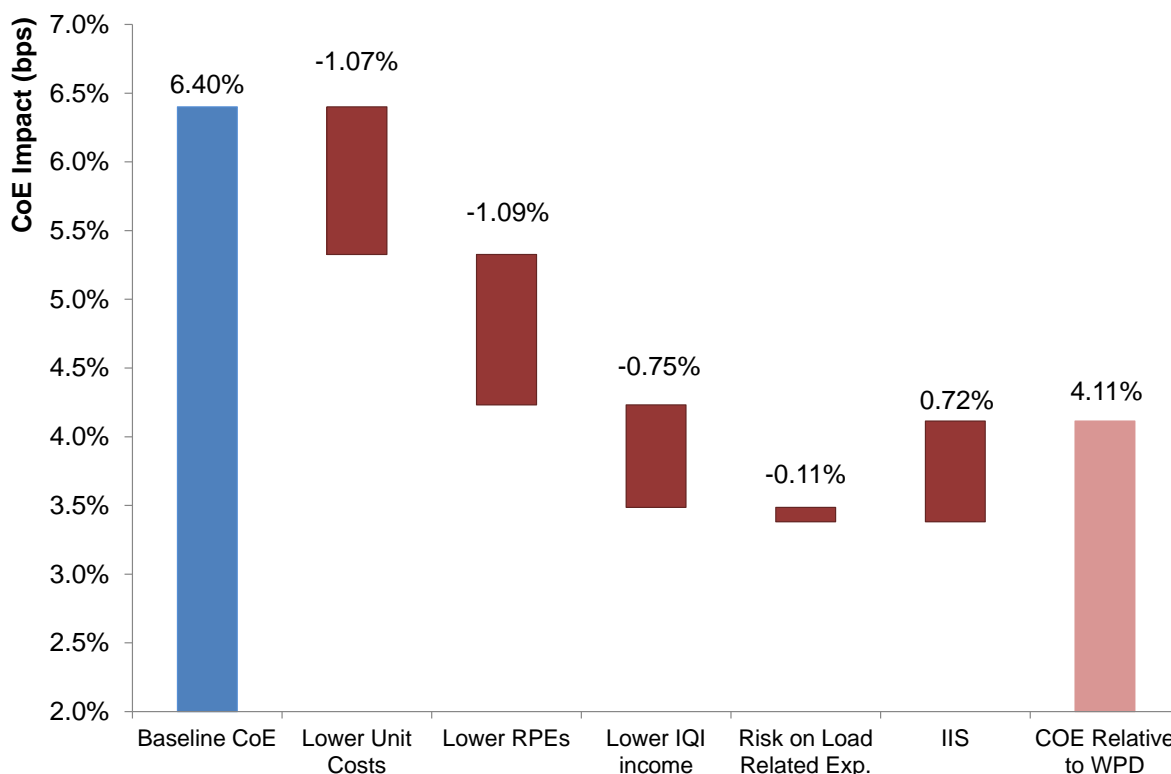
We have assessed the relative risk of SP Distribution and SP Manweb in comparison with the fast tracked DNOs.

We set out that, overall, our equity holders are bearing considerably more risk than WPD and therefore our cost of equity, at a minimum, should be 6.4%, identical to WPD's. After consideration of the inherent higher risk in the standard track process we consider a Cost of Equity higher than 6.4% would not be inconsistent with proportionate regulation. However, we have limited our proposed baseline Cost of Equity to 6.4%, the fast track level, as our equity holders at this level but not below, will absorb this additional risk, to the benefit of customers and stakeholders.

a.1. Value for money

In our value for money section in Chapter 10, we present how our overall set of proposals delivers value for money for the customer. We show that we assume greater risk for a lower expected reward than WPD's fast-tracked plan. As illustrated in Figure 1 below our effective return on equity is around 230bps lower relative to WPD's fast-track plan, or closer to 4%, reflecting our more challenging unit costs, lower real price effects (RPEs), zero IQI income reward, and greater risk in relation to investment to accommodate changing patterns of demand.

Figure 1: We assume greater risk for lower reward than WPD: Our relative return on equity is around 230bps lower than WPD's

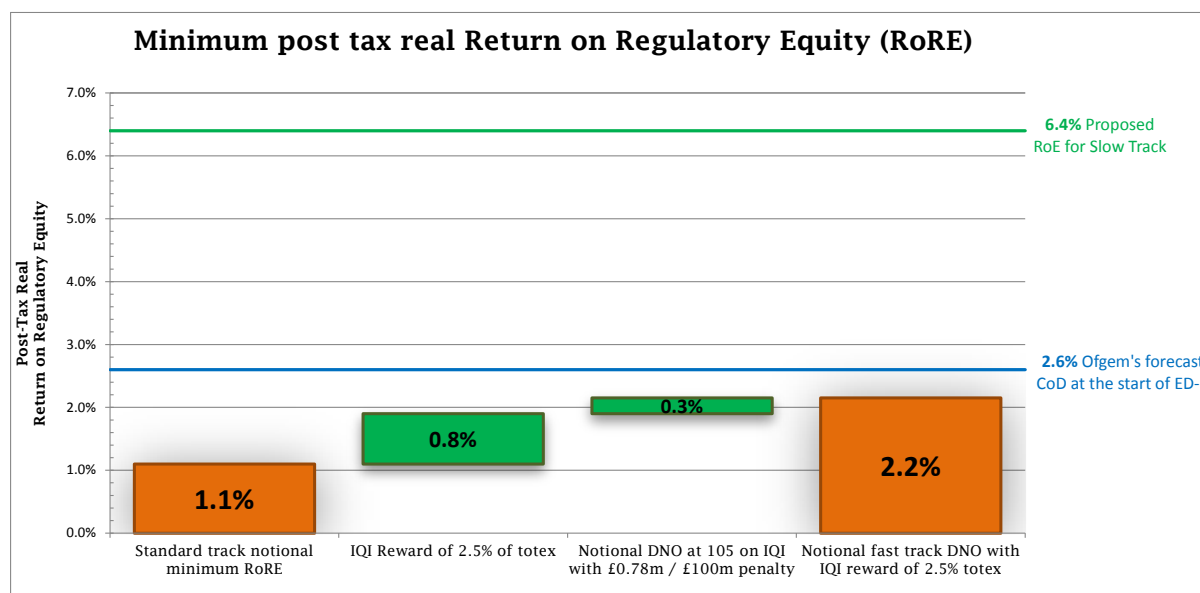


As summarised in the value for money section in Chapter 10, we consider that our plan offers value-for-money for consumers.

We set out below additional evidence to support our statement that our equity holders are adopting considerably more risk than the fast track companies.

Unlike the notional standard track DNO, the fast track DNOs are protected from their Regulatory Return on Equity (RoRE) falling significantly below the cost of debt, which is the normal guide to the acceptable minimum of the RoRE range. We estimate a minimum of c1.1% for the notional standard track DNO's RoRE range. As illustrated below, in Figure 2, this is considerably lower than the 2.6% cost of debt Ofgem forecast for the start of ED-1 and the minimum we calculate for a notional fast track DNO. Figure 2 illustrates our considerably greater downside risk the notional standard track equity holders are exposed to compared to a fast track DNO.

Figure 2: Minimum post-tax real Return on Regulatory Equity (RoRE)



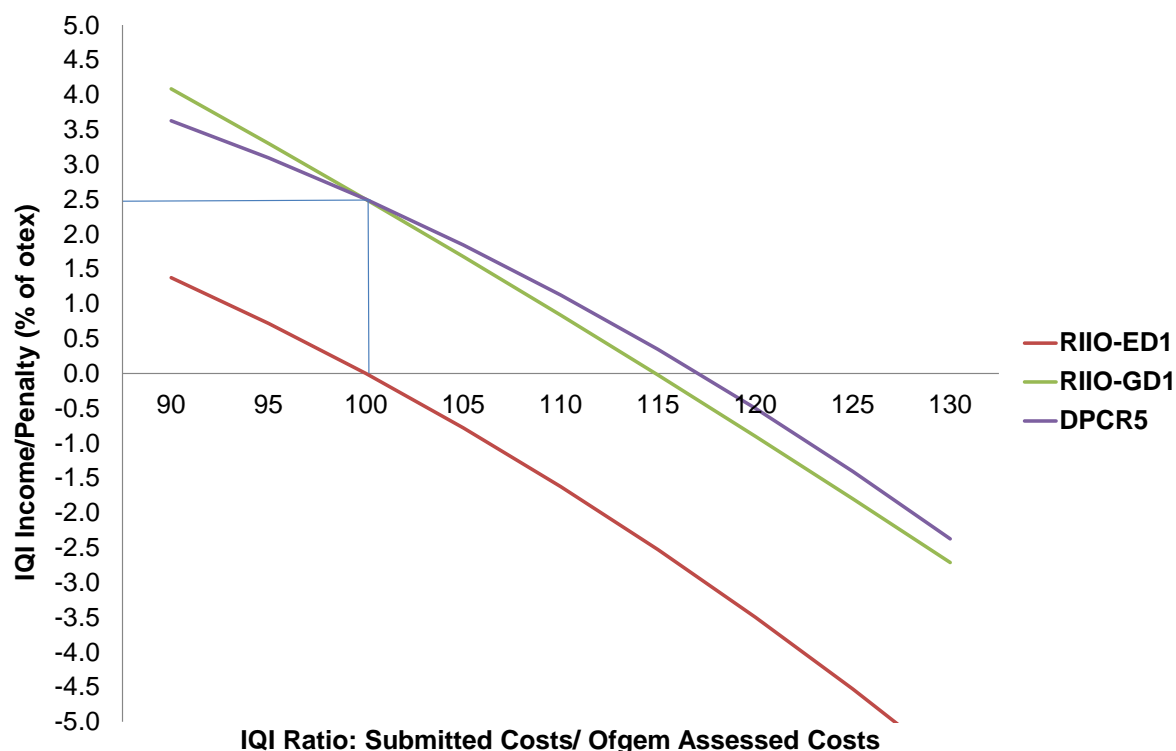
a.2. Totex income allowance is lower than in all previous reviews

Ofgem proposes to set a totex income allowance of zero for those companies where it agrees the submitted costs are efficient: all other companies will receive a totex penalty². This proposed calibration of the IQI menus provides a much lower income/ higher penalty than that adopted by Ofgem at recent price reviews, and much lower than the totex income received by WPD equivalent to 2.5%. For example, at both RIIO-GD1 and DPCR5, the companies considered by Ofgem to have submitted efficient expenditure plans received an income reward of 2.5%, and companies continued to receive a positive totex income with

² Source: Ofgem (March 2013) Strategy decision for the RIIO-ED1 electricity distribution price control : Outputs, incentives and innovation, p. 92 Link: <https://www.ofgem.gov.uk/ofgem-publications/47068/riioed1decoutputsincentives.pdf>

IQI ratios of up to 120. (See Figure 3). In section ‘g.7’ we present the income component of the IQI calibration for previous standard track companies. This shows that, as part of the IQI calibration, in ET1 and GD1, companies with an IQI ratio of c112 received additional income.

Figure 3: RIIO-ED1 IQI matrix provides lower income/higher penalty than previous reviews



There is therefore a far higher risk, under the proposed IQI calibration, that Ofgem’s view of the efficiency of a standard track DNOs totex proposals may result in a penalty with a resultant risk to our financeability (in addition to the penalty applying under the totex incentive mechanism if they do have to spend in excess of the allowance in order to deliver their outputs and, importantly, ensure that they meet their licence obligations regarding continuity of electricity supply). For SP Distribution and SP Manweb this is despite those costs being more efficient by 8%, at 33kV and below, in 76% of the cost we appraised in comparison to the fast track DNOs. In section ‘h’ we set out the material impact on financeability of the IQI assessment.

The IQI assessment is determined by Ofgem’s view of the efficiency of a DNO’s totex forecast. Therefore the robustness of the benchmarking methodology applied, which will underpin the efficiency assessment, is of even greater importance than in the past. Benchmarking by its nature is subjective therefore it is essential Ofgem ensures the assessment is transparent, objective and statistically robust. The fast track assessment included regressions with R-Squared of only 0.24, indicating that on average the model only explains 24% of cost variation. This suggests the regression models used in the fast track

assessment had poor explanatory power, and supports the hypothesis that the regressions omit factors that would explain differences between DNOs' costs for reasons besides "inefficiency".

A standard track DNO's RoRE and financeability is now much more sensitive than in the past to this efficiency assessment. Equity holders of DNOs in the standard track are therefore exposed to significant uncertainty around the cost benchmarking process compared to equity holders of the fast track DNO's who have certainty of IQI additional income. An error in the standard track benchmarking which may result from placing reliance on regressions with very low R-Squared, or omitted variables, or other mis-specifications, would likely lead to a systematic difference, which equity holders will be exposed to for a period of eight years.

This is of considerable risk to standard track equity holders who would be called upon to inject equity if the IQI penalty adversely impacts financeability.

a.3. Real Price Effects (RPEs)

WPD derived its RPE forecasts of commodity prices from First Economics in January 2013. We have asked First Economics to update these forecast and they are now significantly lower. If we had adopted WPD's RPE estimates which were based on a First Economics' January 2013 view our RPE allowance would be £104m higher (SPM £56m plus SPD £48m), equivalent to a c.3% increase in totex, to manage to commodity price increases.

a.4. Financial ratios

Our credit rating analysis demonstrates that our equity holder will need to raise debt with financial ratios, especially PMICR, weaker than WPD's (section g.5).

a.5. Other components of risk

We have identified we bear more risk than WPD in relation to Load indices where WPD triggers reinforcement at more conservative levels.

a.6. Conclusion

As set out above, our equity holders bear considerably more risk than the fast track DNO's, and therefore our cost of equity, at a minimum, is 6.4%, and provides an efficient level of financing to customers.

b. Ofgem's review of the methodology for assessing total equity market returns

Ofgem undertook a consultation³ on their methodology for assessing the equity market return. Our response was supported by a report⁴ from NERA. Ofgem are minded to give greater weight to the influence of current market conditions in relation to the equity market return.

Ofgem have proposed a cost of equity of 6.0% as the reference point for assessing DNOs business plans. We asked NERA to review⁵ Ofgem's arguments. They conclude:

- Ofgem overstates the impact of the RPI effect relative to its consultants' recommendations and the empirical evidence;
- Ofgem's beta estimate is inconsistent with the risks faced by SPEN's DNOs because it fails to account for the pro-cyclicality of risk introduced by its cost of debt index and the relative size of the different capex programmes for the energy networks it regulates

Adjusting for these issues, NERA find that a more plausible range for the cost of capital within the constraints imposed by Ofgem's framework for determining the cost of capital (use of short-run / forward-looking risk-free rates) would have been 6.5% to 7.2% after having adjusted for the RPI effect.

In our view, a wider consideration of contemporary market data would support a significantly higher cost of equity than now proposed by Ofgem but certainly not less than 6.4%. Moreover, our financeability and risk analyses support at least 6.4% as our required cost of equity.

Furthermore, we note that the CC provisional determination for NIE is not yet final and, in recent reports, the CC has selected a point estimate towards the top end of its estimated range.

c. 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

³ Ofgem (2013) "Consultation on our methodology for assessing the equity market return for the purposes of setting RIIO price controls", 6 December

⁴ NERA (2014) "Response to Ofgem's consultation on its methodology for assessing the equity market return for the purpose of setting RIIO price controls", 9 January 2014

⁵ NERA (2014) "The Cost of Equity for Scottish Power's Distribution Network Operators at RIIO-ED1", Appendix E, 14 March

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.
- A further review of responses to Ofgem's consultation on the methodology for assessing the equity market return for the purposes of the RIIO price controls, which included responses from:
 - a. NERA
 - b. Oxera
 - c. Frontier Economics
 - d. CEPA
 - e. Consumer Futures
- 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.
- Monitoring of credit rating agencies' comments on regulated network sectors

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.

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 of 6% to 7.2%.

Consumer Futures believes that contemporary market data is more likely to represent plausible investor expectations as investors will base decisions on alternative investments at the prevailing time rather than on the long run average.

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.”

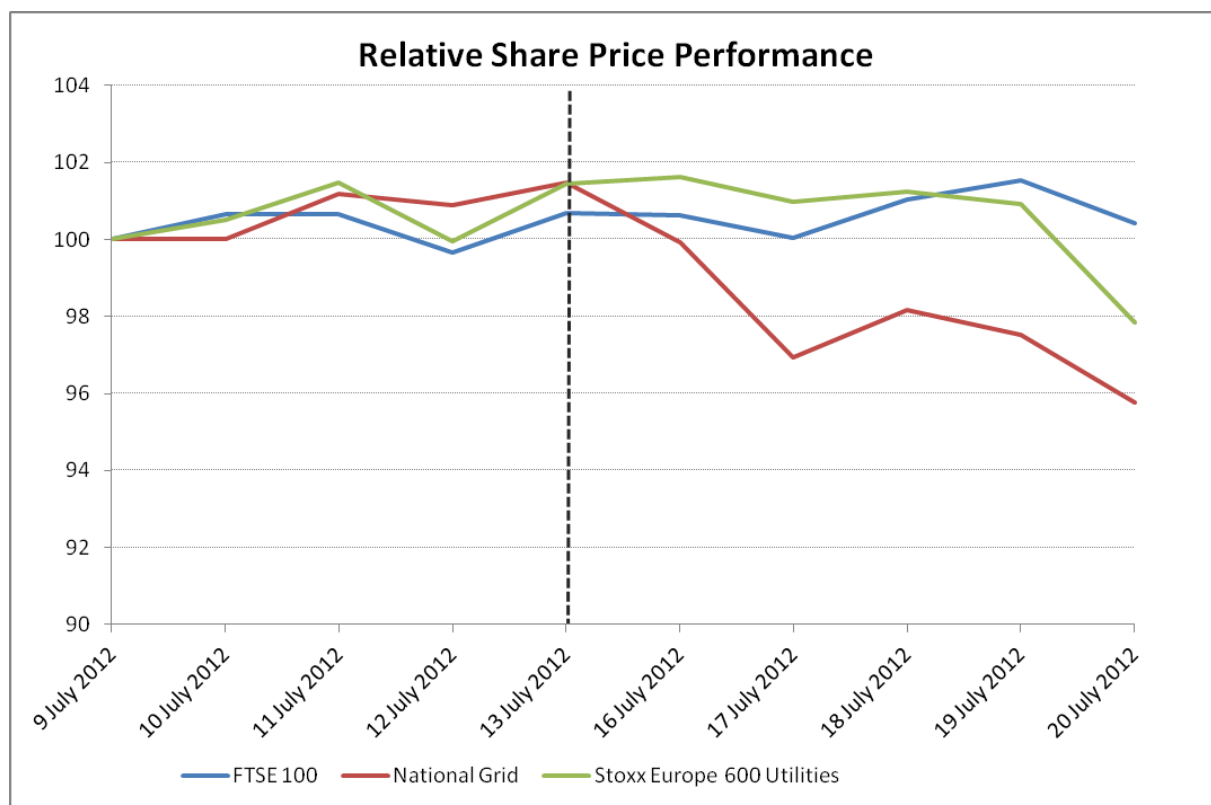
Credit Suisse

“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 4: National Grid’s Relative Share Price Performance



The responses to Water UK’s 2013 investor survey⁶ confirmed the long term nature of the investment and the importance of stability and reliability:

“The most frequently mentioned objectives of investment in the water sector were: stability and reliability (68% of holders of unlisted equity and 53% of bond holders); and the long term nature of the investment (52% of listed equity holders).”

The credit rating agencies have warned that the lower returns, which are estimated by giving greater weight to recent market data, will result in downgrades.

In response to the Competition Commission’s provisional determination for Northern Ireland Electricity (NIE), Fitch announced⁷:

⁶ Indepen (2013) 2013 Survey of Investors in the water sector, A Report by Indepen for Water UK, June

⁷ Fitch (2013) Competition Commission’s Provisional Determination Negative for Northern Ireland Electricity, 23 November

“Fitch Ratings says that it would likely downgrade Northern Ireland Electricity's (NIE) senior unsecured rating to 'BBB+' from 'A-' if the proposal included in the Provisional Determination published by the Competition Commission (CC) on 12 November 2013 materialised in the Final Determination (FD).”

and

“We expect the reduction in cash flow generation, mainly driven by the lower regulatory allowed revenues proposed by the CC of GBP69m (6.4% lower than in UReg's FD), to negatively affect NIE's post-maintenance and post-tax interest cover ratio as calculated by Fitch and limiting the company's financial flexibility.”

Similarly, in response to Ofwat's announcement⁸ of its proposed guidance on risk and reward for PR14, Moody's warned⁹:

“A reduction in allowed returns, below the levels proposed by companies for AMP6, will be credit negative and will result in downward rating pressure”.

Furthermore, in response to Ofwat's publication of that guidance¹⁰, Fitch revised¹¹ the UK water sector's Rating Outlook to Negative from Stable.

“In Fitch's view, Ofwat's more flexible approach to setting price controls, together with its guidance of 3.85% vanilla weighted average cost of capital (WACC) and a minimum range of 3.09% to 4.61% after taking account of incentive income/penalties, will not allow some UK water companies to maintain credit metrics commensurate with existing ratings.”

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.

d. Cost of equity

	SP Distribution	SP Manweb
Cost of Equity	6.4%	6.4%
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

⁸ Ofwat (2013) Change to Ofwat's price review process, Information Bulletin 28/13, 19 December 2013

⁹ Moody's (2013) “Ofwat announcement on change of price review process credit negative for UK water sector”, 20 December

¹⁰ Ofwat (2014) “Setting price controls for 2015-20 – risk and reward guidance”, 27 January

¹¹ Fitch Ratings (2014) “Fitch Revises UK Water Sector Outlook to Negative on Ofwat's Guidance”, Ratings Endorsement Policy, 29 January

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 6.4% real, post-tax.

This financing principle was concisely described in the Supreme Court of the United States¹² 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
- Forward looking estimates
- Contemporary market data
- Market Evidence
- Regulatory precedents
- Views of stakeholders

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

d.1. Asset pricing models

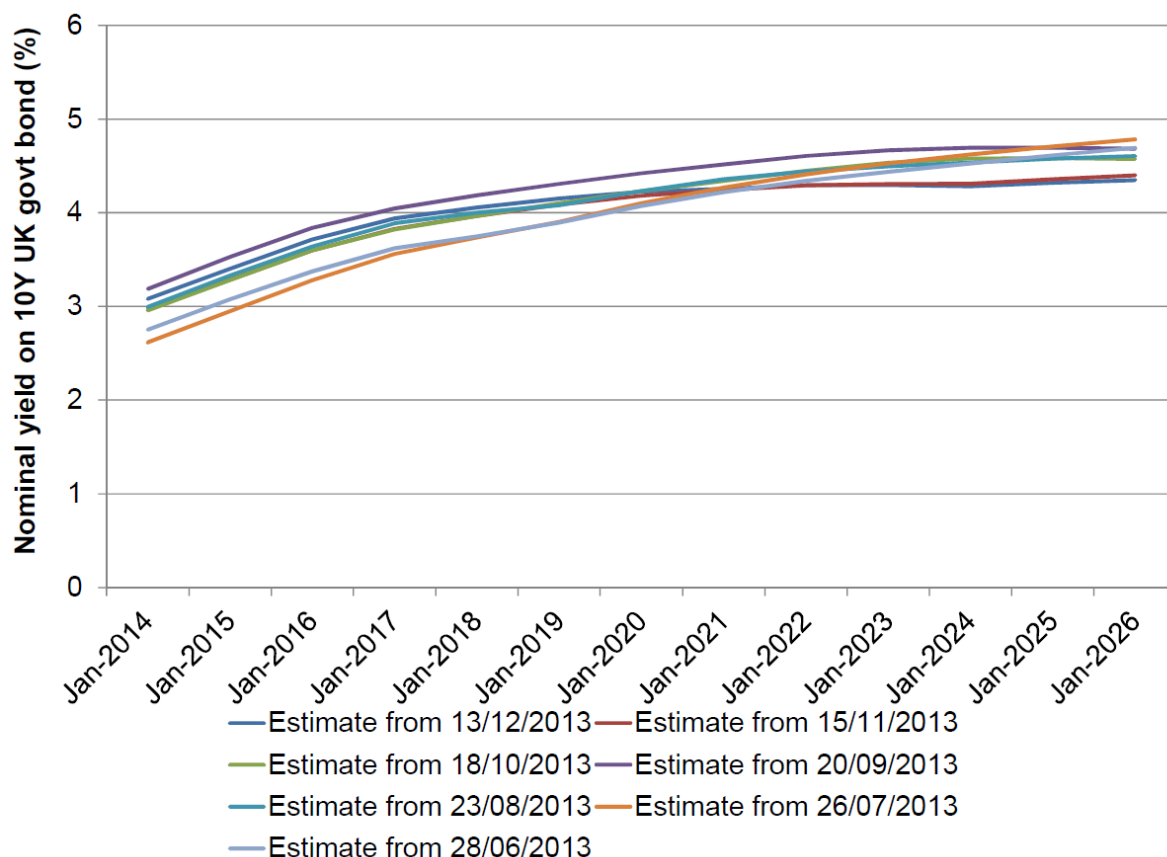
Ofgem’s preferred framework is the Capital Asset Pricing Model (CAPM). This derives the cost of equity by adding the company or sector risk premium to the risk free rate. The risk premium is calculated by applying a measure of relative risk, known as the “beta” factor to the risk premium for the stock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

$$\text{cost of equity} = (\text{risk free rate}) + \text{beta} \times (\text{equity market risk premium})$$

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”.

The forward curve for UK nominal gilts is strongly upward-sloping indicating that the current very low government bond yields are expected to increase significantly during RIIO-ED1, especially following the unwinding of quantitative easing.

¹² *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).

Figure 5: Forward Curve on UK 10 year government bonds


Source: NERA analysis of Bloomberg data

The projected increase in long term interest rates is widely forecast, as quantitative easing is exited. For example, PwC concludes¹³ :

“In summary, whichever method we use there are good reasons to expect 10 year gilt yields to rise significantly over the next decade, perhaps to around 4-5.5% by 2025.”

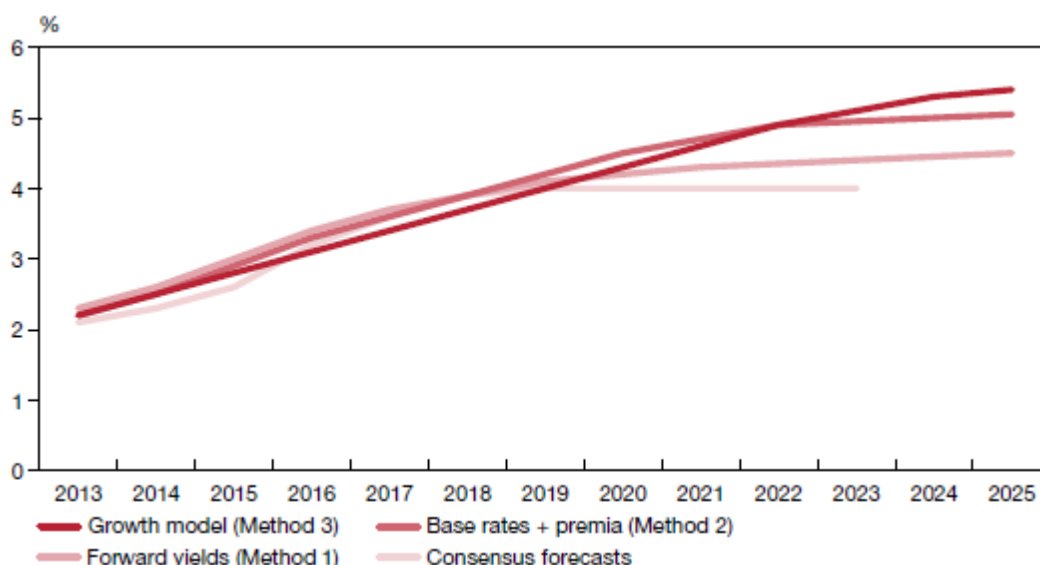
John Hawksorth, chief economist at PwC, said:

“There may not be a speculative bubble in gilts, because there are good reasons for current low rates in terms of risk aversion, the effects of QE, pension fund behaviour and bank regulatory regime changes in recent years.

At the same time, recent yields look unsustainably low in the longer term as risk aversion returns to more normal levels, base rates rise and QE unwinds gradually over the next decade or so. Using various methods, we project a rise in 10 year gilt yields to around 4-5.5% by 2025 as this happens.”

¹³ PwC, “The trillion pound question – are gilts the next bubble to burst?”, Chapter 4, UK Economic Outlook – July 2013

Figure 6: PwC Projections of 10 year gilt yields



Source: Bank of England, PwC analysis, Consensus Economics survey

Similarly, in their 2014 long term assumptions, J P Morgan forecasts¹⁴ :

“For UK government bonds, we lower our forecast for the 10-year equilibrium Gilt yield [to] 4.75%”

Barnett Waddingham, one of the UK’s largest independent firms of actuaries and consultants, predicts¹⁵ :

“From an economic theory perspective gilt rates “should” equate to the long run growth rate of the economy. The chart below [omitted] shows this is broadly correct, focusing on nominal GDP growth compared to nominal yields.

Looking forward, we therefore start with the, perhaps optimistic, view that the long run real growth rate of the economy remains at 2%p.a., in line with the historical average and will not be impacted by adverse demographics expected over the next 20/30 years. If we then assume that the Bank of England meets its inflation target of 2% CPI and allow for some differences between consumer prices, retail prices and the wider GDP deflator, we get our estimate of around 4.5%p.a. for gilt yields.”

Such assumptions are used widely by institutional investors, including pension plans, insurance companies, endowments and foundations.

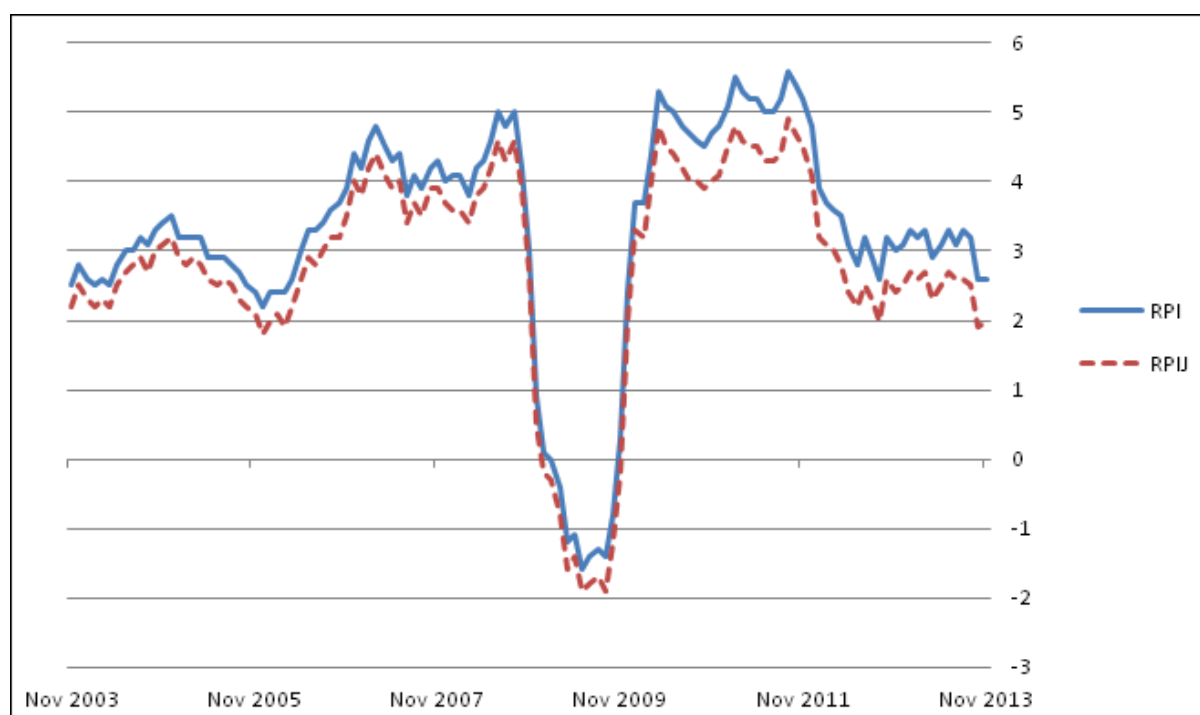
¹⁴ J P Morgan (2013) “Long-term capital market return assumptions - 2014 estimates and the thinking behind the numbers”, December

¹⁵ Barnett Waddingham “013) “The price is right? Gilt-y questions for UK pension funds”, October

Assuming long run RPI inflation of 2.5% to 3% (i.e. 50 to 100bps above the CPI inflation target of 2%), indicates that the 2% real risk free rate, which has been used by Ofgem and other regulators, remains a reasonable assumption for the long term.

However, some stakeholders have drawn attention to the recent increase in the “formula effect” which has increased the gap between the RPI and CPI measures of inflation. The formula effect is shown by comparison of the newly published RPIJ (which calculates inflation from the same dataset of prices as the RPI but using the Jevons¹⁶ formula instead of the Carli¹⁷) with the traditional RPI. Over the last 10 years, the RPIJ 12-month rate has been, on average, 0.47 percentage points lower than the RPI. From January 2010 to November 2013 the formula effect increased by 26bps to an average of 63bps from an average of 37bps prior to then.

Figure 7: RPI and RPIJ 12-month rates



Source: ONS

For the purposes of our CAPM estimate, we have taken the real risk free rate, adjusted for the recent increase in the RPI “formula effect”, to be 1.7%.

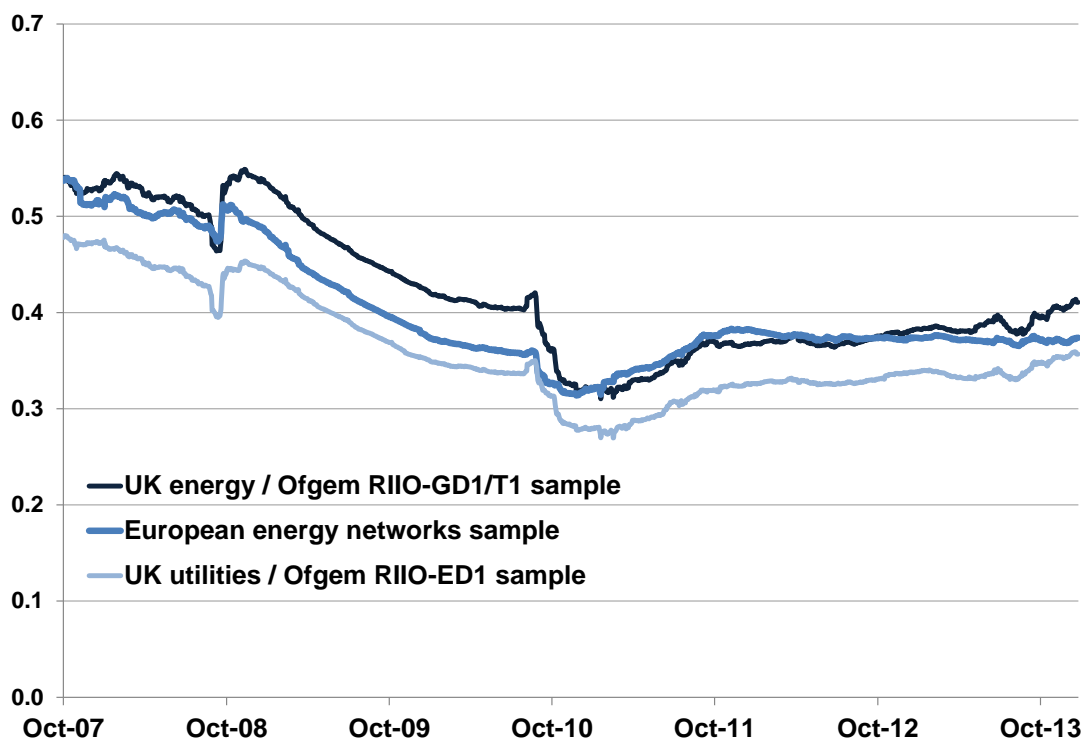
The equity market risk premium is assumed to be 5%, which is consistent with the long run arithmetic average for the UK.

¹⁶ The Jevons formula takes the geometric mean of the rate of change (also known as the ‘geometric mean of price relatives’) or the ratio of the geometric mean prices. Both of these calculations produce the same result.

¹⁷ The Carli formula looks at the rate of change in each store and then takes the average of those changes (also known as the ‘average of price relatives’).

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 0.32 to 0.46 estimated by NERA but we understand that NERA have used a “Blume¹⁸ adjustment” to estimate their betas, which assumes that equity betas revert to one over time.

Figure 8: 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 15 January 2014.

However, in their report for Ofgem, Imrecon reject the use of the Blume adjustment for regulated network companies and they assert¹⁹:

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

In their assessment of relative risk, Oxera conclude²⁰ 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

¹⁸ 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

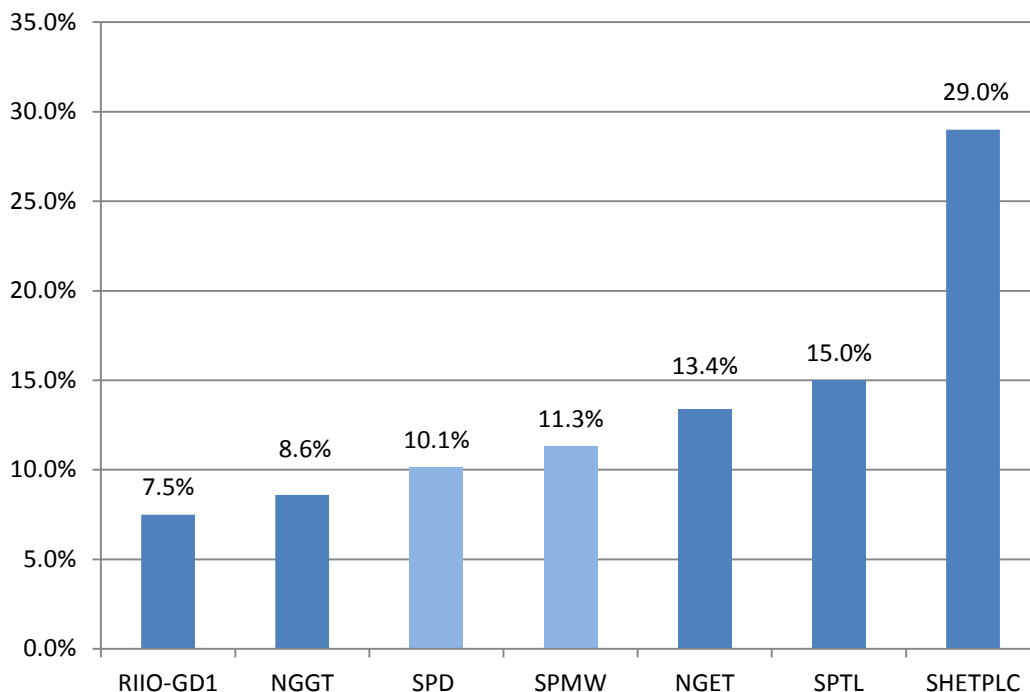
¹⁹ Imrecon (2012) “RIIO reviews – Financeability study”, November, page 25

²⁰ Oxera (2013), “RIIO-ED1 Risk assessment framework”, April 10th

<http://www.ofgem.gov.uk/Pages/MoreInformation.aspx?docid=12&refer=NETWORKS/PRICECONTROLS/WEBFORUM>

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.

Figure 9: Capex to RAV ratios



Source: Ofgem Final Proposals for RIIO-T1 and GD1 and NERA calculation based on data from SPEN’s financial model.²¹

Similarly, in their assessment of relative riskiness, First Economics conclude:²²

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

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 $1.7\% + (0.94 \times 5\%) = 6.4\%$ real, post-tax.

We have cross checked this against other approaches, including:

- Forward looking estimates

²¹ Ofgem (2012): RIIO-T1: Final Proposals for SPT and SHETL – Supporting Document , p.33; Ofgem (2012): RIIO-T1: Final Proposals for NGET and NGG – Supporting Document – Finance, p. 16; Ofgem (2012): RIIO-GD1: Final Proposals– Supporting Document – Finance and uncertainty, p. 15.

²² First Economics (2012), “The Riskiness of the Electricity DNOs under RIIO Relative to Other Regulated Networks”, August http://www.ofgem.gov.uk/Networks/ElecDist/PriceCtrls/riio-ed1/consultations/Documents1/ENA_ED1StratResponse_First%20Economics_relative%20risk.pdf

- Dividend Growth Model (DGM)
- Total market return

d.2. Forward Looking estimates

The onset of the financial crisis in 2008 brought an end to the period of ‘Great Stability’, 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 constructed²³ an aggregate measure of the economic uncertainty faced by households and companies. This is calculated as the first principal component²⁴ of a number of individual published proxy indicators.

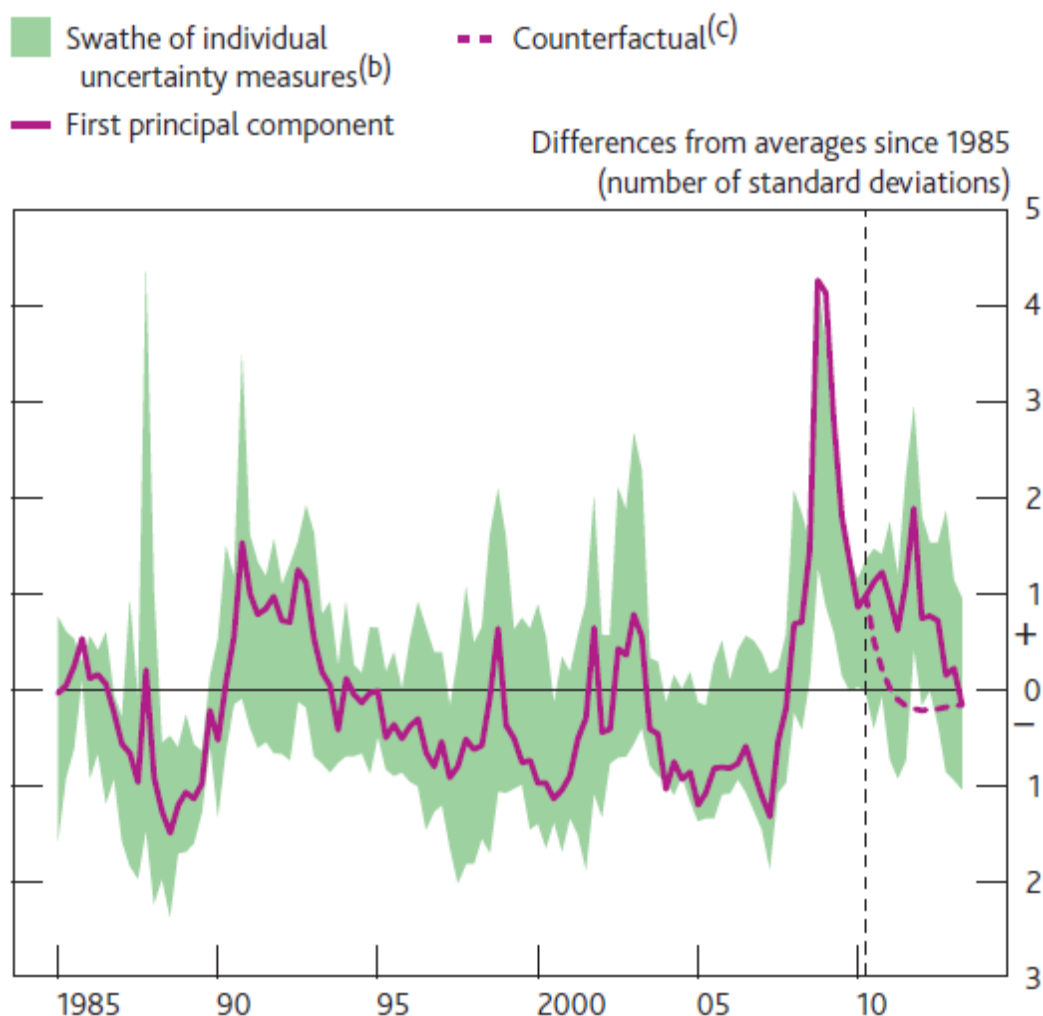
The Bank of England observes:

“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 10, 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.”

²³ 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

²⁴ Principal components analysis is a statistical technique combining individual measures into a single summary uncertainty index. The method involves extracting from a set of related variables a smaller number of new variables, called principal components, which explain most of the variation in the original set. The first principal component accounts for the greatest amount of variation in the original set of variables.

Figure 10: Bank of England's time series of uncertainty indicators


Sources: British Bankers' Association, CBI, CBI/PwC, Consensus Economics, GfK, Institutional Brokers' Estimate System, London Stock Exchange, New York Stock Exchange/London International Financial Futures and Options Exchange (NYSE Liffe), Nexis, ONS, Times Newspapers and Bank of England calculations.

Notes:

- (a) Vertical dashed line is at 2010 Q2, the last full quarter of data available at the time of the August 2010 Inflation Report.
- (b) For a full description of the series used in this swathe see Table B on page 103 of Haddow et al (2013).
- (c) The dashed counterfactual line is constructed using the VAR model²⁵ in Haddow et al (2013), assuming that there were no unexpected developments after 2010 Q2.

²⁵ As well as an uncertainty indicator, the model includes GDP, employment (measured in hours worked), CPI, Bank Rate and a measure of credit conditions to control to some extent for the interdependencies between credit and uncertainty. The model does not control for world demand.

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.”

The Bank of England’s subsequent analysis indicates that there have been further unexpected developments since mid-2010, whereas the MPC’s judgement in the August 2010 Inflation Report was that uncertainty would continue to fall back towards more normal levels.

Ian McCafferty, External Member of the Monetary Policy Committee of the Bank of England explains²⁶:

“For business investment, the mechanism by which a rise in uncertainty operates is simple. Because investment is costly to reverse, when a firm decides to undertake a project, it gives up the option of waiting to gather more information. But that option has a value, which increases with the level of uncertainty about future conditions²⁷. So to give up this “option to wait”, a firm will require a higher rate of return from investment, net of costs, as compensation. In other words, uncertainty reduces the incentive to invest by pushing up on the opportunity cost of undertaking an investment project.”

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:²⁸

“As the graph shows, equity market risk premia were relatively stable around 5.0% before 2008, after which all equity market risk premia have significantly increased. However, based on market observations, equity market risk premia seem to have decreased over the last months up to 30 September 2013.

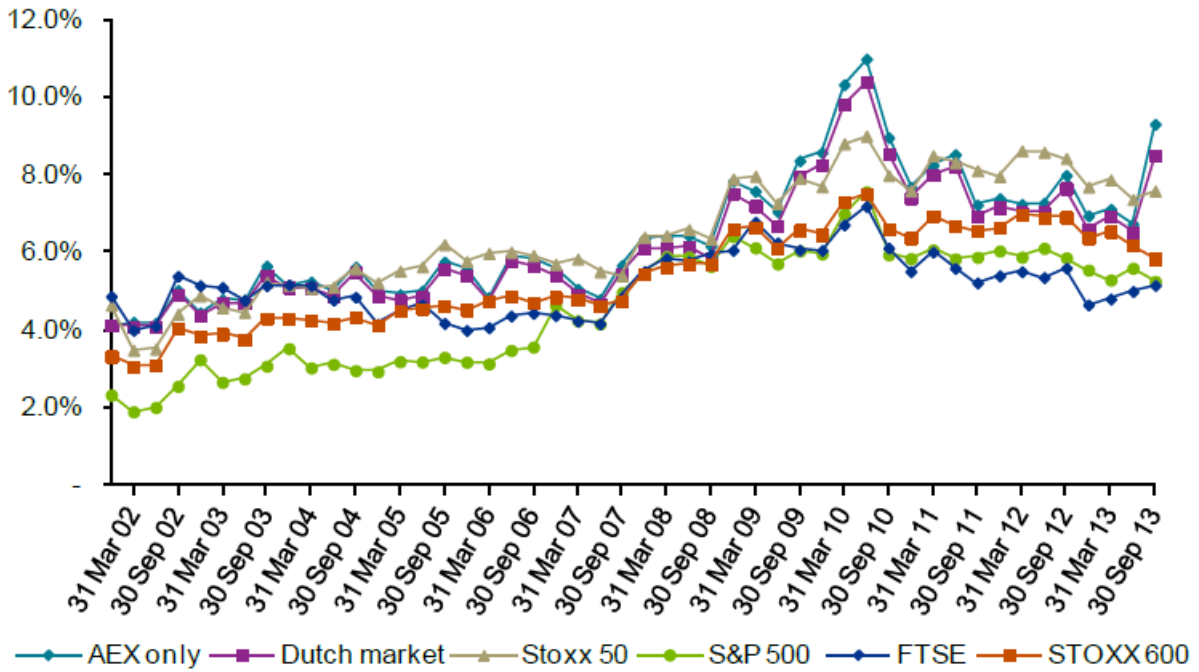
Based on the analyses set out in this report, KPMG Netherlands recommends to use an equity market risk premium of 6.0% as per 30 September 2013 (down from 6.5%).”

²⁶ Ian McCafferty, (2014), “Achieving a sustainable recovery: where next for business investment?”, Speech, 22 January

²⁷ Dixit, A and R Pindyck (1994), “Investment Under Uncertainty”, Chapter 2, Princeton University Press

²⁸ KPMG (2013), “Equity Market Risk Premium – Research Summary”, 13 October

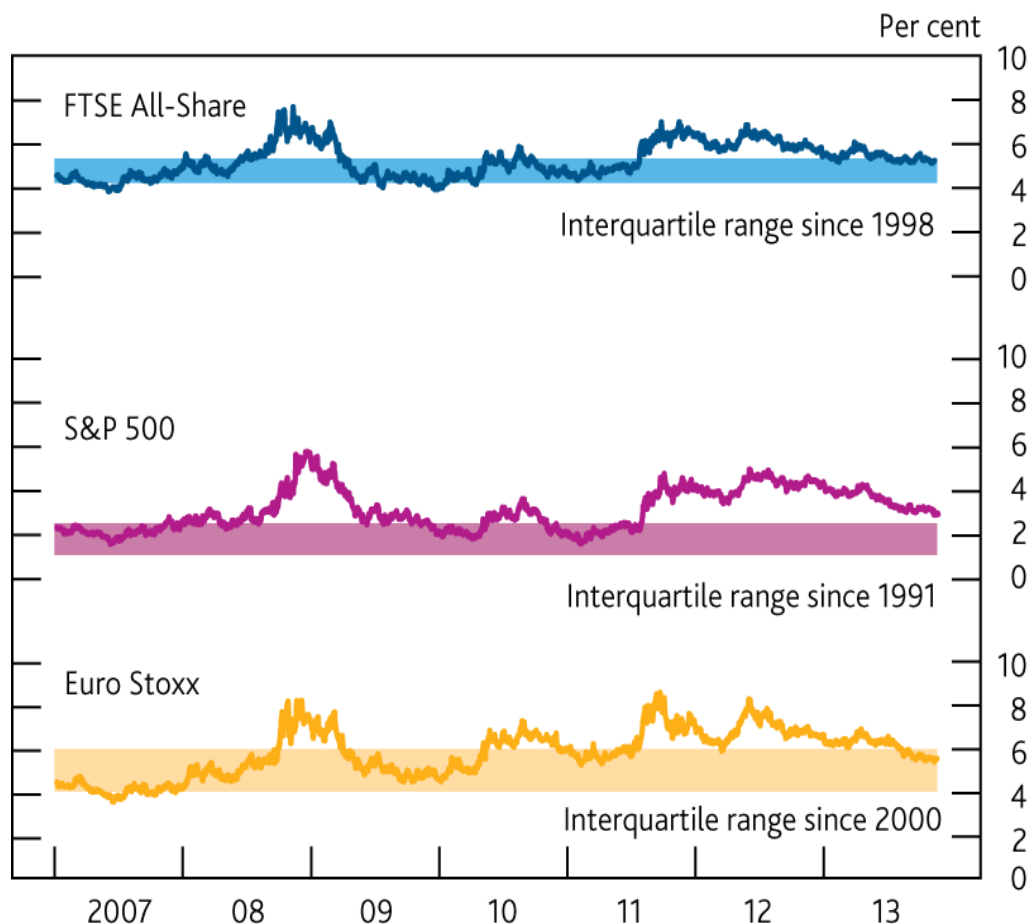
<https://www.kpmg.com/NL/nl/IssuesAndInsights/ArticlesPublications/Documents/PDF/Financial-Services/EMRP-Summary-Oct2013.pdf>

Figure 11: Implied equity risk premium


Source: KPMG

Figure 12 shows the expected ERP for the FTSE All Share as well as other major markets. All markets show a significant increase in the ERP since 2007 with expected ERPs in the UK and the Eurozone exceeding 7% in 2012, and remaining close to 6% for much of 2013 while confirming the long-run DMS numbers over the longer run (since 1998).

Figure 12: Bank of England estimates²⁹ of equity risk premia



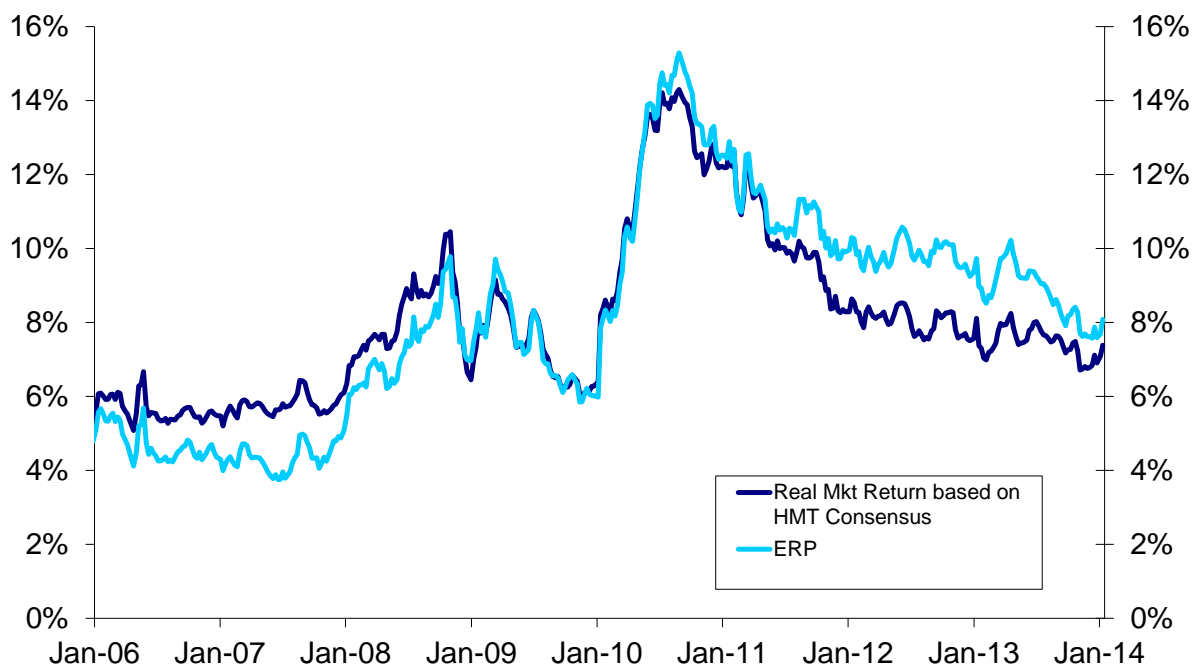
Sources: Bloomberg, Thomson Reuters Datastream and Bank of England calculations.

Note: As implied by a multi-stage dividend discount model.

Bloomberg reports significantly higher ERPs than the Bank of England as can be seen from Figure 13 and Table 1. The Bloomberg DGM shows an ERP of around 8% currently, while confirming numbers closer to the DMS long-run value (5%) for the period before the start of the financial crisis.

²⁹ Bank of England Financial Stability Report, November 2013

Figure 13: UK ERP estimates by Bloomberg



Source: NERA analysis of Bloomberg data and HMT RPI forecasts. ERP as reported by Bloomberg, real market returns obtained by subtracting average expected medium-term inflation (average over the four years reported) from nominal market returns using the Fisher formula.

Table 1 sets out the ERP estimates from different sources over different time frames.

Table 1: ERP estimates over different time horizons (%)

	Spot	1Y	2Y	5Y	10Y	Long-Run (DMS)
Bloomberg	8.1	8.8	9.3	9.8	n/a	5.0
Bank of England	c.5.3	c.5.5	c.6.0	c.5.5	c.5.0	

Source: Bloomberg and Bank of England Financial Stability Report, January 2014. Note: Underlying data for BoE not publicly available (averages estimated). No provider publishes the exact calculation behind its model.

We note that both 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 1 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. Over the longer run the DGM estimates appear broadly consistent with DMS data with a 10-year average of DGM estimates by the Bank of England showing a value around 5.0%.

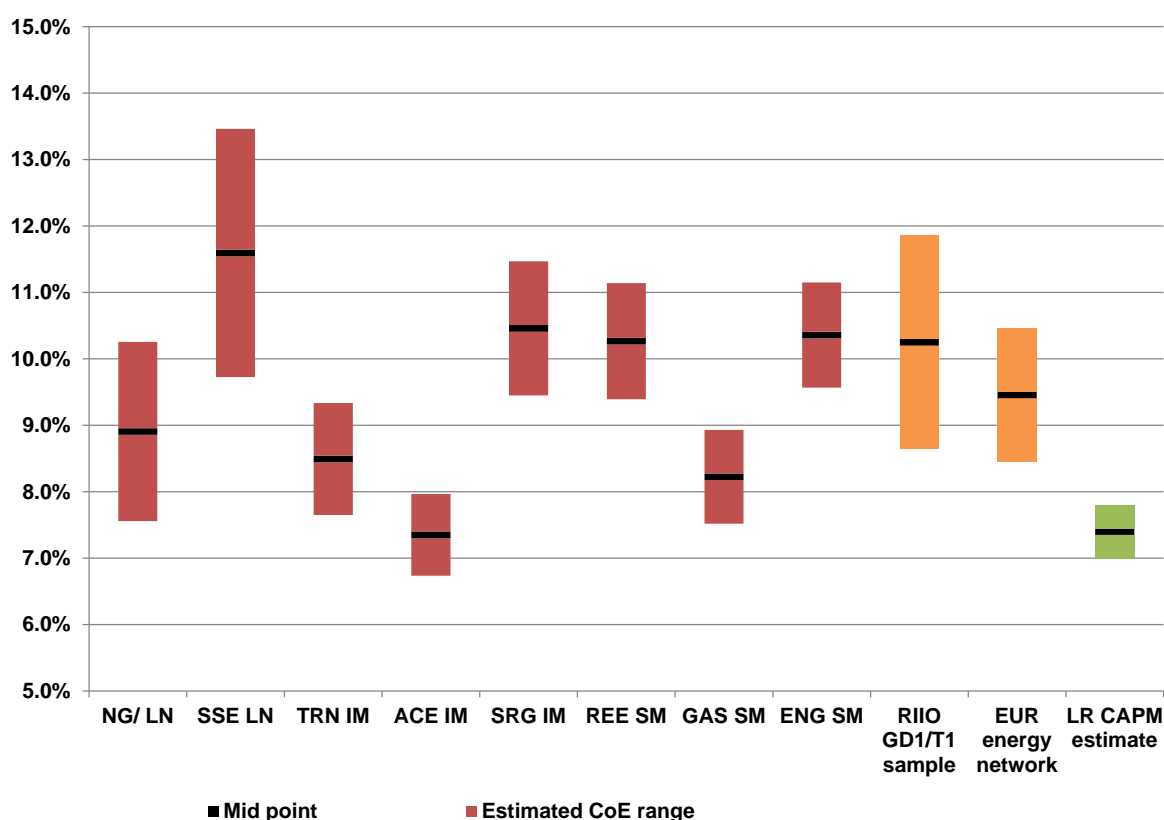
On a forward looking basis, the average estimate of the ERP offsets the currently low real interest rates to give the same estimate of the cost of equity of $0.1\% + 0.94 \times 6.7\% = 6.4\%$ real, post-tax.

d.3. 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.

Figure 14 presents NERA's estimated range of the real post-tax cost of equity for a sample of European energy network companies, re-levered to a notional gearing level of 65%.

Figure 14: NERA Cost of Equity estimates based on DGM



Source: NERA analysis based on Bloomberg data.

For the first three years of the DGM, NERA use Bloomberg consensus analysts' short term DPS forecasts. For the period thereafter, they use long run real GDP growth rate forecast at the time of estimation (that is the real UK GDP growth forecast for the British companies and the real GDP growth forecast for the Euro-zone for the European companies in their sample) or a zero DPS growth rate, respectively.

The upper estimates are determined by the application of real long-run GDP growth rate forecast, while the lower estimates are obtained from DGM estimations with a zero long-run DPS growth assumption³⁰.

In its report³¹ 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 conclude that our 6.4% cost of equity is at the bottom of the range of estimates produced by the DGM for comparator companies.

d.4. Comparison with US return on equity

In the US, electricity utilities have an average return on equity of 9.6%, at 50% gearing. This is shown in Table 2:

³⁰ The range is wider for UK companies because the expected GDP growth is higher and thus the spread between the lower and upper estimates is larger.

³¹ 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>

Table 2: US Electric Utility Return on Equity

Utility	S&P LT Credit Rating	Authorised Return on Equity (%)	Debt/Total Cap (%)
Maui Electric Company, Limited	BBB-	9.0	42
United Illuminating Company	BBB	9.15	49
Niagara Mohawk Power Corporation	N/A	9.3	40
Potomac Electric Power Company	BBB+	9.36	51
Cross Texas	N/A	9.6	N/A
Wind Energy Transmission Texas	N/A	9.6	N/A
Baltimore Gas and Electric Company	BBB	9.75	51
Atlantic City Electric Company	BBB+	9.75	57
Avista Corporation	BBB	9.8	51
Puget Sound Energy, Inc.	N/A	9.8	53
Tucson Electric Power Company	N/A	10.0	59
Consumers Energy Company	BBB	10.3	48
Average		9.6%	50%
Real Cost of Equity		8.0%	

Source: NERA analysis of Bloomberg and US utility company data, Consensus Economics (October 2013); Note: To calculate the real cost of equity, we assume an inflation assumption of 1.5%, from the Consensus Economics estimate for the US for 2013. We apply the Fisher formula to calculate the real cost of equity from the nominal return on equity. In our analysis, we exclude all companies with generation assets accounting for more than 50% of total assets, in order to compare with the CC NIE and Ofgem RIIO-ED1 determinations.

The table above shows that the average real cost of equity for US electric utilities is 8.0% at 50% gearing.

d.5. Total market return

As Smithers & Co noted³², 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 evidence³³ 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.

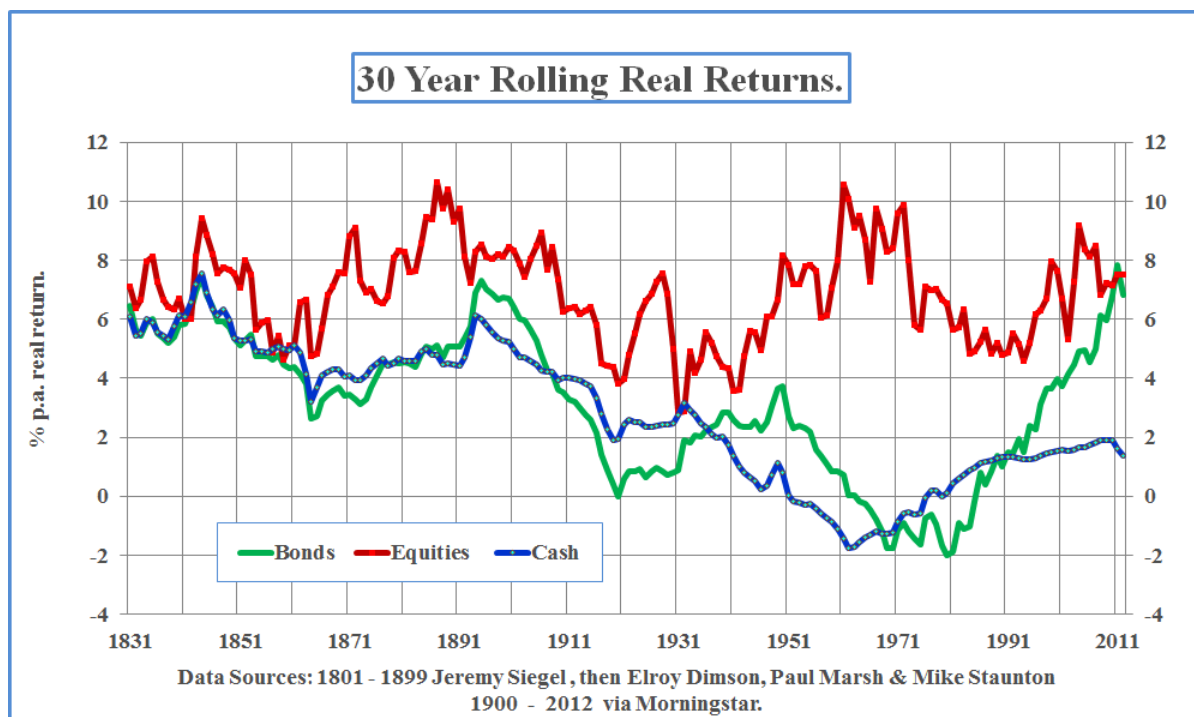
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v. Whilst point ii) necessarily applies that in my approach (and that of UK regulators), the (estimated) MRP and the risk-free rate must move in opposite directions, this phenomenon cannot be directly observed, since the true MRP is inherently unobservable. However there is a considerable body of academic research that would suggest indirect evidence of this negative relationship, both by looking at economic determinants of the MRP, and at the properties of implied risk premia on other assets, such as corporate and government bonds.”

Stephen Wright has produced an updated chart from the Smithers’ report (commissioned by the UK economic regulators and the OFT), which demonstrates the relative stability of total equity market returns over two centuries.

³² 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

³³ 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

Figure 15: Relative stability of total equity market returns


In their recent³⁴ report for Ofgem, Wright and Smithers conclude:

“Thus both historical and more recent evidence point to the same conclusion: in contrast to the stock return there is no evidence of stability in the risk-free rate, at any maturity. As a direct implication, there is no evidence of stability of the market equity premium. Without such evidence, there is no empirical basis for the assumption that falls in risk-free rates should translate to falls in expected market returns.”

Alan Gregory (formerly reporting panel member of the UK Competition Commission, from 2001-2009, and an External Advisor to the UK Competition Commission’s Finance and Regulation Group) in his own recent evidence³⁵ 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

³⁴ Wright, S and Smithers A (2014) The Cost of Equity Capital for Regulated Companies: A Review for Ofgem, February

³⁵ 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%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’ estimated³⁶ the implied arithmetic mean for total market returns using an adjustment to the geometric mean to reflect the volatility of market returns:

$$\text{Arithmetic Total Market Return} = \text{Geometric Total Market Return} + \frac{1}{2} \text{Equity Market Variance}$$

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%

Wright and Smithers have recently again endorsed³⁷ this approach:

“In light of the distortions introduced by direct arithmetic averaging, we continue to advocate deriving return estimates from compound average returns. A deliberate decision

³⁶ 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

³⁷ Wright, S and Smithers A (2014)The Cost of Equity Capital for Regulated Companies: A Review for Ofgem, February

then needs to be made on how much to adjust for the impact of return volatility on the arithmetic average. In MMR we argued for an adjustment of 1 to 2 percentage points, depending on how much account regulators wish to take on predictability of returns. We see no reason to change this recommendation.”

d.6. Contemporary market data

Recently, it has been suggested that greater weight should be given to contemporary market data. Ofgem undertook a consultation³⁸ on their methodology for assessing the equity market return. Our response was supported by a report³⁹ from NERA. Ofgem are minded to give greater weight to the influence of current market conditions in relation to the equity market return.

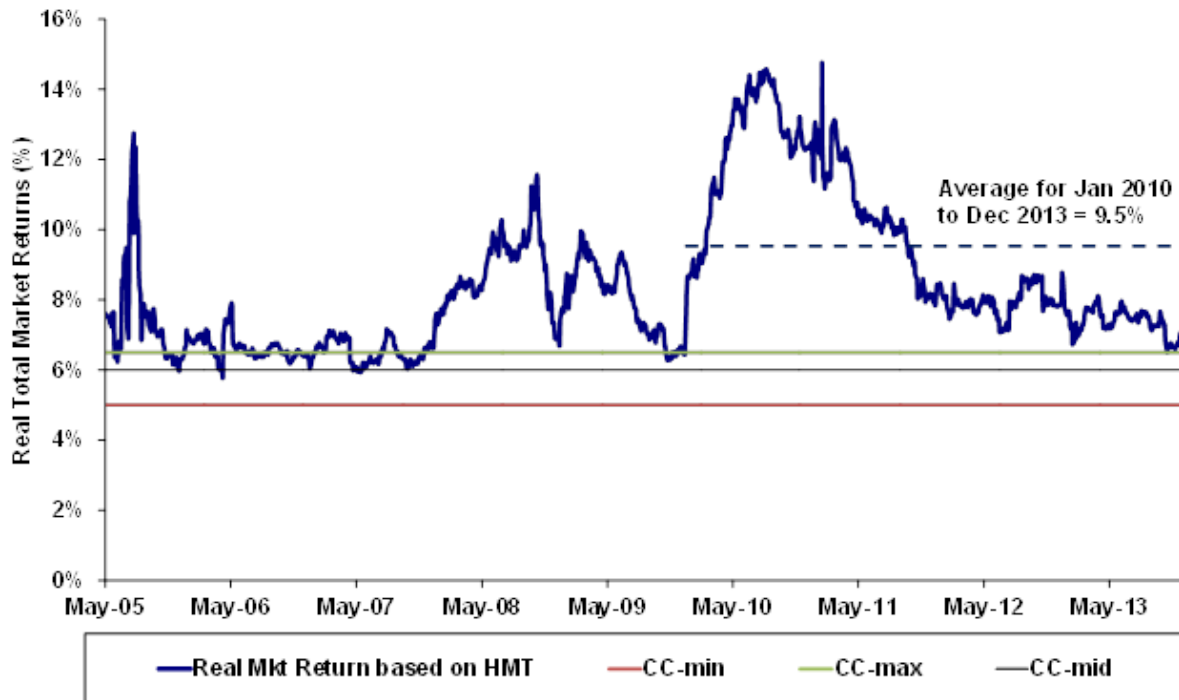
Nevertheless, Wright and Smithers have warned of the difficulties in trying to use recent evidence.

“Thus even while there is evidence of predictability (albeit extremely limited) and hence variation over time in econometric predictions of market returns, this does not necessarily translate to market expectations of the market return, which is what we should be seeking to measure. There is thus no straightforward, systematic, transparent and replicable way of incorporating “recent evidence” into estimates of the market cost of equity.”

Based on the last four years of data, Bloomberg evidence on the total market return shows an average level of 9.5%, way above the CC’s provisional estimate of 6%.

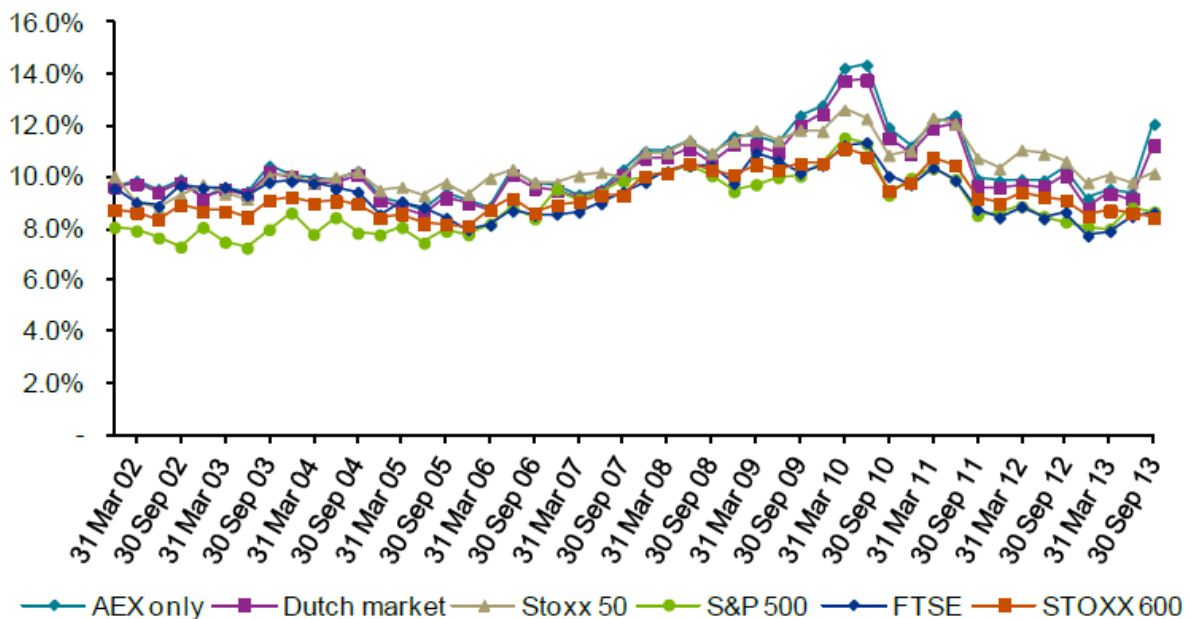
³⁸ Ofgem (2013) “Consultation on our methodology for assessing the equity market return for the purposes of setting RIIO price controls”, 6 December

³⁹ NERA (2014) “Response to Ofgem’s consultation on its methodology for assessing the equity market return for the purpose of setting RIIO price controls”, 9 January 2014

Figure 16: Bloomberg estimates of real market returns


Source: NERA analysis of Bloomberg and HMT data and CC decision

Likewise, KPMG’s estimates of the implied equity return peaked during 2010 but have increased again during 2013.

Figure 17: KPMG estimates of implied equity return


Source: KPMG, Equity Market Risk Premium – Research Summary, p4, 16 October 2013

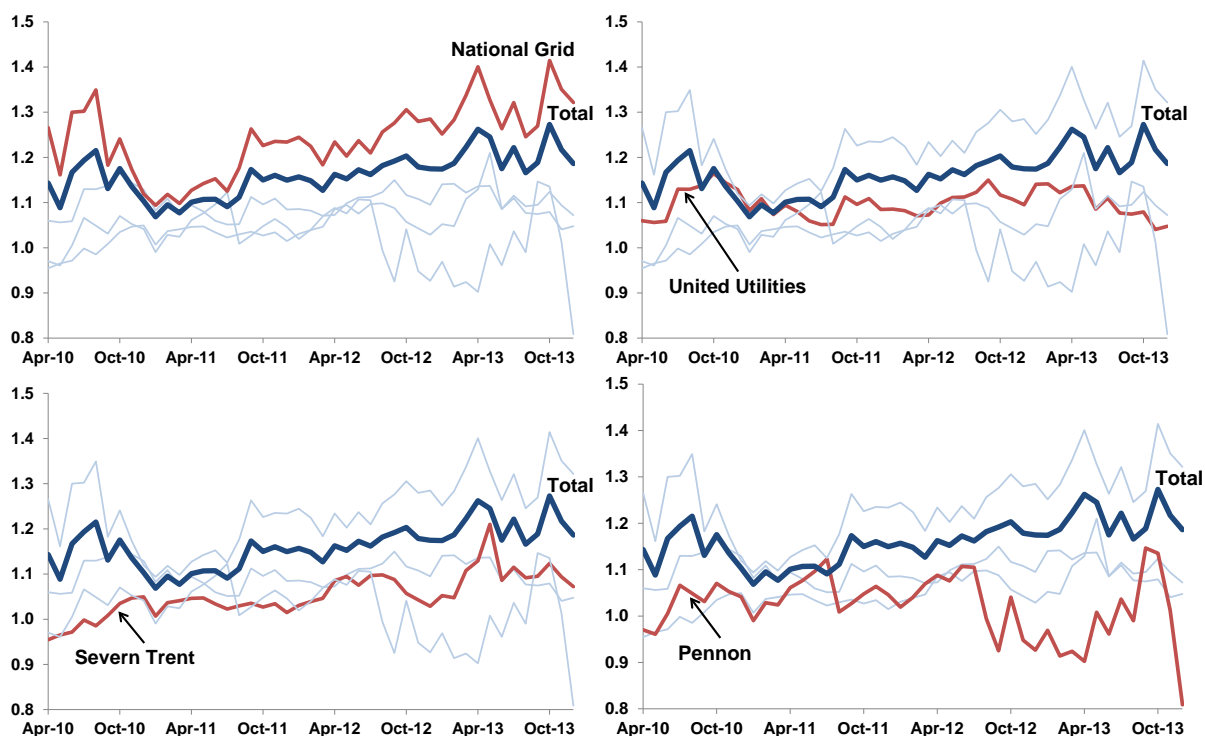
d.7. Other models

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 Xia⁴⁰ (2006), we have not relied on these approaches. 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.

d.8. 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 18: MARs for UK Network Companies



Source: Bloomberg, Ofgem RIIO-ED1 Financial Model, National Grid Annual Reports, Ofwat RCV publications, Analyst reports, NERA calculations.

⁴⁰ Brennan, M and Xia, Y (2006), 'Risk and valuation under an Intertemporal Capital Asset Pricing Model', *Journal of Business*, 79:1

Figure 18 shows that from April 2010 onwards, MARs have been between 1.0 and 1.25 for the average of the listed network companies with the top end of this range reflecting the May 2013 spike in valuations following the announcement of a takeover approach for Severn Trent that, temporarily, also pushed up the price for other network companies. Over the period, the pattern for individual companies has been more volatile with the range of MARs ranging from 0.91 to 1.40. Some of this range is a function of the variability of estimates of the value of the non-regulated or non-UK businesses, especially for National Grid and Pennon, but there has been significant volatility even for companies with limited non-regulated business.

Moreover, there are no continuously traded entities that solely reflect the value of UK 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.

The use of market transaction evidence as basis for estimating the market WACC presents additional problems over the ones presented by MARs. In particular, there is generally limited information in relation to the value assigned to non-regulated businesses, as well as outperformance assumptions. One important consideration and source of value may be outperformance in relation to tax.

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 England⁴¹ 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 study⁴² 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.

⁴¹ Gregory, D (2013) “Private equity and financial stability”, Bank of England Quarterly Bulletin, Q1, March

⁴² Imrecon (2012) “RIIO reviews – Financeability study”, November, page 24

http://www.ofgem.gov.uk/Networks/GasDistr/RIIO-GD1/ConRes/Documents1/GD1_FinanceabilityStudy_DEC12.pdf

d.9. Regulatory precedents

The risk-free rates and market risk premia used by regulators are set out in Tables 3 and 4 below.

Table 3: Real risk-free rates used in recent price controls

Decision year	2006	2007	2007	2008	2008	2009	2009	2010	2011	2011	2011	2012	2013	2014	2014
Price control	Ofgem: TPCR4	CAA: Heathrow /Gatwick	Ofgem: GDPCR	ORR: PR08	CAA: Stansted	Ofwat: PR09	Ofgem: DPCR5	CAA: NATS	Ofcom : MCT	Ofcom: WBA	Ofgem: TPCR4 Rollover	Ofgem: RIIO T1/GD 1	ORR: PR13	CAA: Heathrow &Gatwick	Ofwat : PR14
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%	1.75%	0.5%	1.25%

Source: Joint Regulators’ Group⁴³, ORR⁴⁴, CAA⁴⁵, and Ofwat⁴⁶

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 4: Market risk premia used in recent price controls

Decision year	2006	2007	2007	2008	2008	2009	2009	2010	2011	2011	2011	2012	2013	2014	2014
Price control	Ofgem: TPCR4	CAA: Heathrow /Gatwick	Ofgem: GDPCR	ORR: PR08	CAA: Stansted	Ofwat: PR09	Ofgem: DPCR5	CAA: NATS	Ofcom: MCT	Ofcom: WBA	Ofgem: TPCR4 Rollover	Ofgem: RIIO T1/GD1	ORR: PR13	CAA: Heathrow &Gatwick	Ofwat : PR14
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%	5.0%	5.75%	5.5%

Source: Joint Regulators’ Group, ORR, CAA and Ofwat⁴⁷,

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

d.10. 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 4.19% to 6.34% with energy companies notably having a higher dividend yield than water companies.

⁴³ 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>

⁴⁴ ORR (2013) Periodic Review 2013: Final determination of Network Rail's outputs and funding for 2014-19, Table 13.1, p491, October

⁴⁵ CAA (2014) Estimating the cost of capital: a technical appendix for the economic regulation of Heathrow and Gatwick from April 2014: Notices of the proposed licences, CAP 1140, Figure 7.1, p52, January

⁴⁶ Ofwat (2014) Setting price controls for 2015-20 – risk and reward guidance, Table 8, p24, January

⁴⁷ JRG(2013), Table 3.2, ORR(2013), Table 13.1, CAA(2014), Figure 7.1 and Ofwat (2014), Table 8

Table 5: Dividend yields for UK network comparators

Company	Dividend Yield
National Grid	5.22%
SSE	6.34%
Pennon	4.19%
Severn Trent	4.65%
United Utilities	4.81%
Average	5.04%

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

- clientele effects⁴⁸
- signalling and asymmetric information⁴⁹
- term premium
- agency theory⁵⁰ 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 68bps higher for those with maturities of 10-15 years compared with those of 5-7 years.

⁴⁸ Scholz, John Karl, A Direct Examination of the Dividend Clientele Hypothesis, *Journal of Public Economics* 49, 261–285, 1992

⁴⁹ Bhattacharya, S. Imperfect information, dividend policy, and “the bird in the hand” fallacy. *Bell Journal of Economics*, 10, 259-270, 1979

⁵⁰ Easterbrook, F. H. Two agency-cost explanations of dividends. *American Economic Review*, 74, 650-659, 1984

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 presented⁵¹ 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.”

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 Lecture⁵² 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.

⁵¹ Andrew Haldane and Richard Davies, “The Short Long”, Speech, 29th Société Universitaire Européenne de Recherches Financières Colloquium: New Paradigms in Money and Finance?, Brussels, May 2011

⁵² 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>

d.11. Conclusion

Following detailed modelling and consideration of advice from economic consultants we estimate the cost of equity to be 6.4% real, post-tax. We have cross-checked this estimate using a variety of approaches that also support 6.4%.

In addition, in the financeability section, we set out why 6.4%, which is used for the fast-track decision for WPD, is proportionate and necessary for financeability. Our assessment of relative risk demonstrates that we bear significantly more risk, arising from differences in:

- the range of Return on Regulatory Equity (RoRE),
- Real Price Effects (RPEs),
- financial ratios,
- other components of risk, and
- the differential impact of the IQI mechanism.

Nevertheless, our analysis of Return on Regulatory Equity (RoRE) shows that we do not have the opportunity to earn double digit returns.

Our cost of equity of 6.4% strikes a balance between the financing requirements of SP Manweb and SP Distribution and the need to provide investment to meet our customers' requirements for safe and reliable electricity supplies from our networks. This is 30bps below Ofgem's determinations of 6.7% for DPCR5 and RIIO-GD1, in December 2012, reflecting the reduction in the risk free rate. However, our analysis of financeability and Return on Regulatory Equity (RoRE) leads us to conclude that Ofgem's recent proposal of 6.0%, which is at the bottom of the range that they published in the strategy decision for RIIO-ED1, would not provide a sufficient return to persuade investors to finance an equity injection, which will likely be necessary to maintain an investment grade credit rating, after the consideration of risk (section 'h'). In particular, such risks arise from the IQI mechanism, volatility in load expenditure as we facilitate the move to a low carbon economy, the mismatch between actual debt costs, in nominal terms, and those allowed through indexation of the real cost of debt.

e. Cost of Debt

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

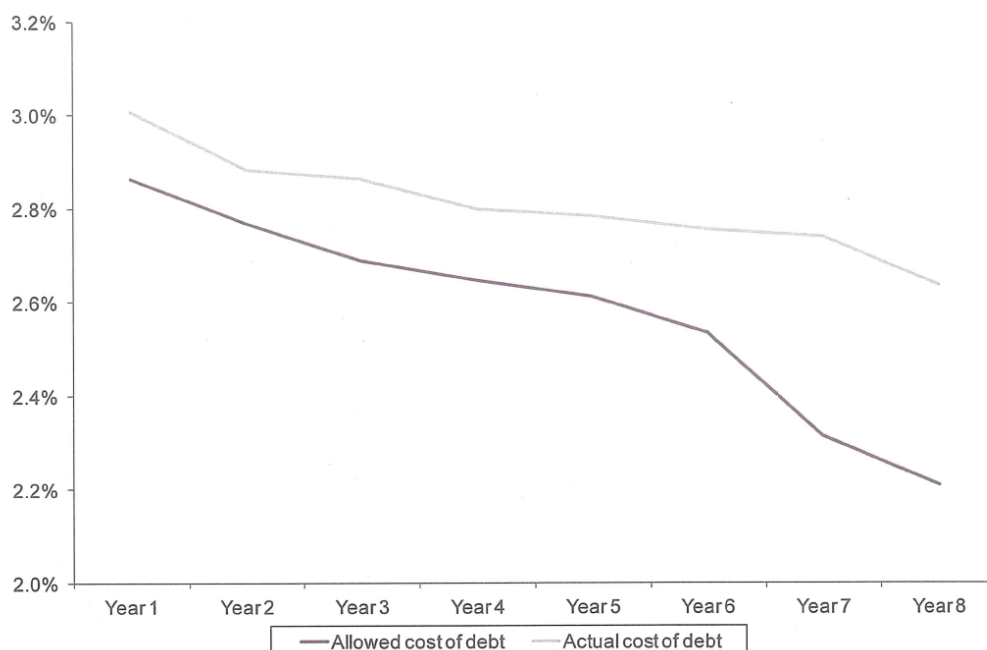
We use Ofgem’s proposed index for the cost of debt. This is calculated from the ten year rolling average of the yields on iBoxx A and BBB rated sterling non-financial bond indices, with a maturity of more than ten years, less the “break even inflation rate”, calculated from UK index linked gilts.

In our business plan we have based our ‘static’ modelling (section ‘g’) on a cost of debt of 2.72% per annum, which is the value of the iBoxx ten year trailing average, as at 31 October 2013, as prescribed by Ofgem for comparability reasons. Nevertheless, the cost of debt index is expected to continue to fall, at least until 2020/21, and remain below 2.72% throughout RIIO-ED1. However, Ofgem use a projected cost of debt of 2.6% in their fast track financial model for WPD, which reflects their forecast for the first year of RIIO-ED1. This will reduce the vanilla WACC to 3.9%.

Furthermore, 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 19: 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 conclude⁵³:

“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 rates⁵⁴

⁵³ Oxera (2012), “RIIO-ED1 consultation on strategy – Financial issues, November 16th http://www.ofgem.gov.uk/Networks/ElecDist/PriceCtrls/riio-ed1/consultations/Documents1/ENA_ED1StratResponse_Oxera_Financial_Issues.pdf

⁵⁴ First Economics (2012), “Ofgem’s Cost of Debt Index and the Cost of Equity” 8th June

- “Break-even inflation” is not a sufficiently robust or accurate measure to calculate the real cost of debt⁵⁵
- 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 formula⁵⁶

e.2. Risk assessment of cost of debt

Previous analyses by First Economics⁵⁷ and Moody’s⁵⁸ have highlighted the mismatch between the allowed cost of debt, which is set in real terms, and the nominal interest rate payments which arise from the majority of DNO debt. First Economics conclude that financing difficulties arise when regulators’ fund only part of companies’ nominal interest payments in price controls.

Moody’s warns that persistent low real interest rates could increase credit risk for UK regulated utilities. The combination of low real interest rates and the UK regulatory framework has a potentially negative effect on companies’ liquidity. This risk arises because regulated firms earn an allowed rate of return calculated in real prices but fund themselves predominantly through vanilla fixed-rate bonds that include an inflation component leading to a mis-match.

This mis-match leads to a substantial and growing shortfall in the cost of debt allowance relative to the nominal interest rate payments which will have to be made to lenders by SP Manweb and SP Distribution as presented in the distribution graphs below. These show that the annual shortfall grows year by year and the cumulative shortfall in the funding of nominal interest payments, at the median, reaches £360m for SPM and £290m for SPD, by the end of RIIO-ED1.

Shareholders will be required to fund this mis-match by reinvesting funds and accepting lower dividends or providing an equity injection. Although shareholders benefit from a corresponding increase in the value of the RAV, through RPI indexation, they will require a higher return on such reinvested funds, as receipt of their return is delayed beyond the end of RIIO-ED1.

http://www.ofgem.gov.uk/Networks/ElecDist/PriceCntrls/riio-ed1/consultations/Documents1/ENA_ED1StratResponse_First%20Economics_Paper3_Debtindex.pdf

⁵⁵ 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

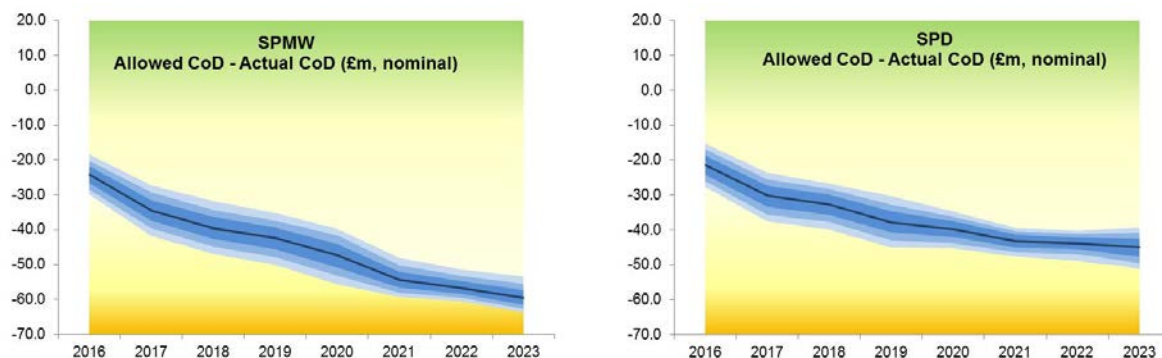
⁵⁶ First Economics (2012), “Benchmark vs Actual Cost of Debt in 2011”, 8th June

http://www.ofgem.gov.uk/Networks/ElecDist/PriceCntrls/riio-ed1/consultations/Documents1/ENA_ED1StratResponse_First%20Economics_Paper1_Benchmark.pdf

⁵⁷ First Economics (2010), “Financeability: An Update”, April, and (2013) “Equity Financeability: A report prepared for Water UK”, March

⁵⁸ Moody’s (2013) “Low Real Interest Rates Reveal Risks of Funding Choices of UK Regulated Utilities”, Special Comment, October 9, and (2013) “UK Regulated Utilities: Cash Flow Vulnerable to Low Real Interest Rates”, Special Comment, October 9

Figure 20: Shortfall in cost of debt allowance



The distribution above have been calculated using an approach developed by NERA, which is a simplified version of the widely used Heath-Jarrow-Morton (HJM) framework for modelling interest rate uncertainty. This approach to projecting interest rates is founded on “expectations theory”, which states that forward interest rates can be used for forecasting future interest rates. We have included the cost of debt in our risk assessment in section ‘h’.

In this modelling, the cost of debt is determined by the interest rate of embedded and new debt and the amounts of debt outstanding. The Financial Risk Model accounts for uncertainty around both the interest rate and the amount of debt issued over ED1.

- The cost of SPEN’s embedded debt reflects the terms on which it was issued.
- For new debt, we assume it is issued at the cost of debt prevailing at the time of issuance. This means we assume SPEN issues GBP-denominated debt, rated at A/BBB with a maturity of 10 years.

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.

e.3 Conclusion

We have implemented the iBoxx 10 year trailing average, in accordance with Ofgem’s guidance, but reflected the resulting risks in our financeability and RoRE analyses.

Nevertheless, shareholders will have to finance the shortfall in the funding of nominal interest payments, which arise during RIIO-ED1 from the mis-match with the allowed real return, by reinvesting funds and accepting lower dividends or providing an equity injection, to maintain an investment grade credit rating. This results in a delayed return to shareholders, which exposes them to greater political risk.

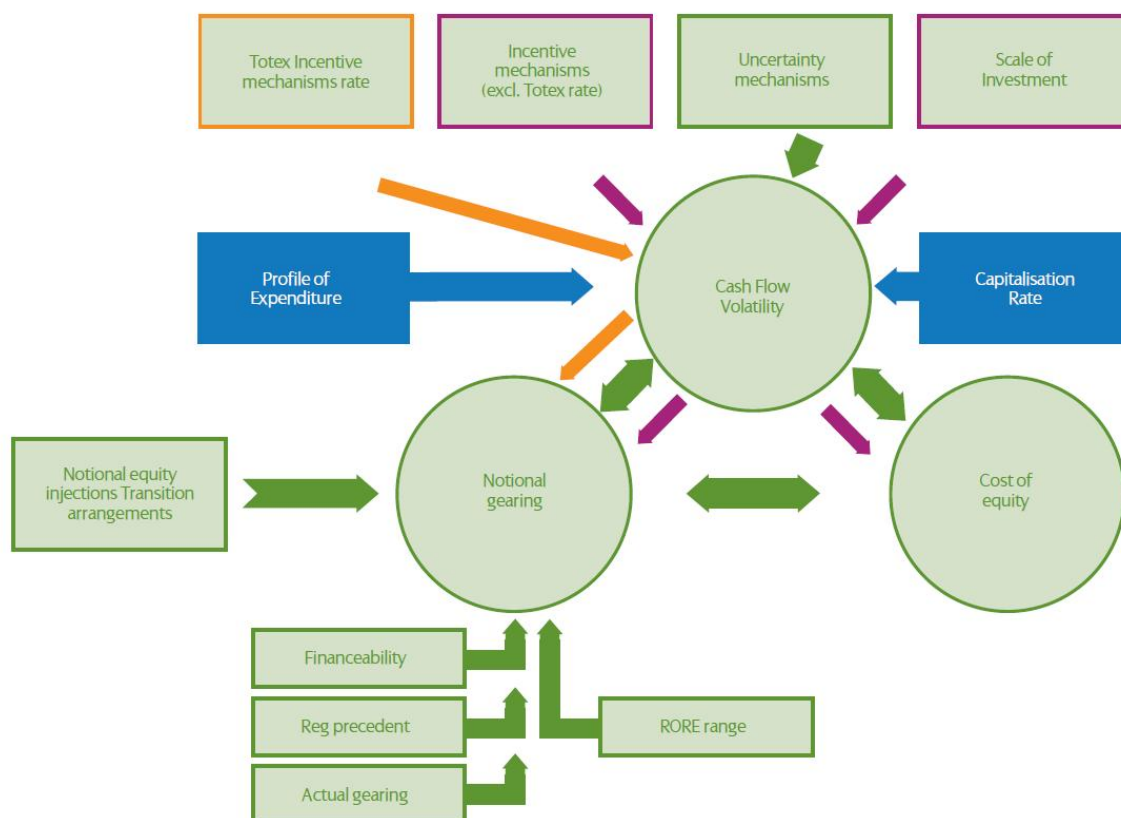
f. Notional Gearing & Return on Regulatory Equity (RoRE)

	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 Decision⁵⁹ methodology diagram to show the wider range of interactions.

Figure 21: Setting notional gearing



⁵⁹ RIIO-ED1 Strategy Decision Supplementary Annex: Financial Issues
<http://www.ofgem.gov.uk/Networks/ElecDist/PriceCtrls/riio-ed1/consultations/Documents1/RIIOED1DecFinancialIssues.pdf>

f.1. Cash Flow Volatility

Cash flow volatility is affected by:

- Scale of investment
- 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.

f.2. 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 3.d. This cost of equity is dependent on the systemic (non-diversifiable) risk as reflected (under CAPM) in the asset beta.

f.3. 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 minus and plus 5% (i.e. 60% and 70% gearing).

Precedent has demonstrated that, at least 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 saw no appreciable increase in risk in the

transition to the RIIO-GD1 regulatory framework. However, Ofgem have indicated that their proposed lower cost of equity, which is below 6.4%, would reduce cash flows and adversely impact credit metrics. Ofgem have suggested that companies may wish to adopt lower gearing levels that would enable them to maintain appropriate credit metrics under a wide range of market conditions. We explore this further in our financeability and risk assessments. 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 3.g and 3.h and Annex, Risk Modelling for RIIO-ED1.

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 3.h and Annex, Risk Modeling for RIIO-ED1 .

f.4. Return on Regulatory Equity (RoRE)

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.

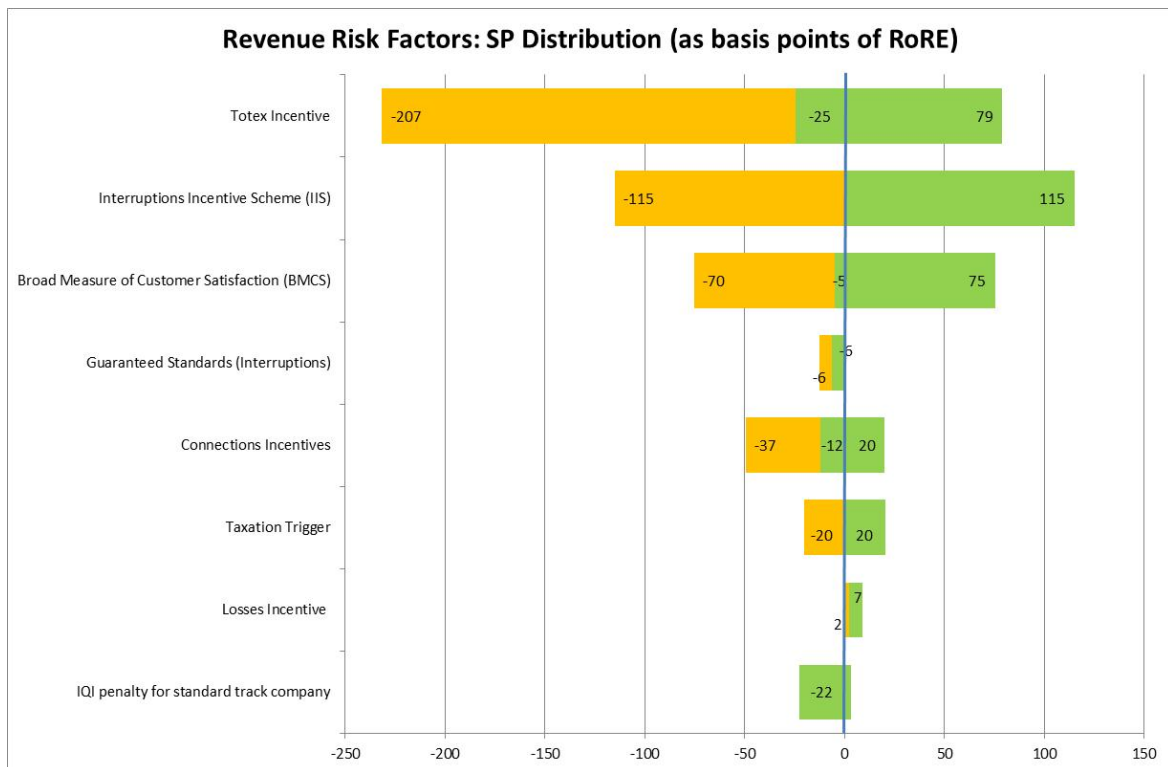
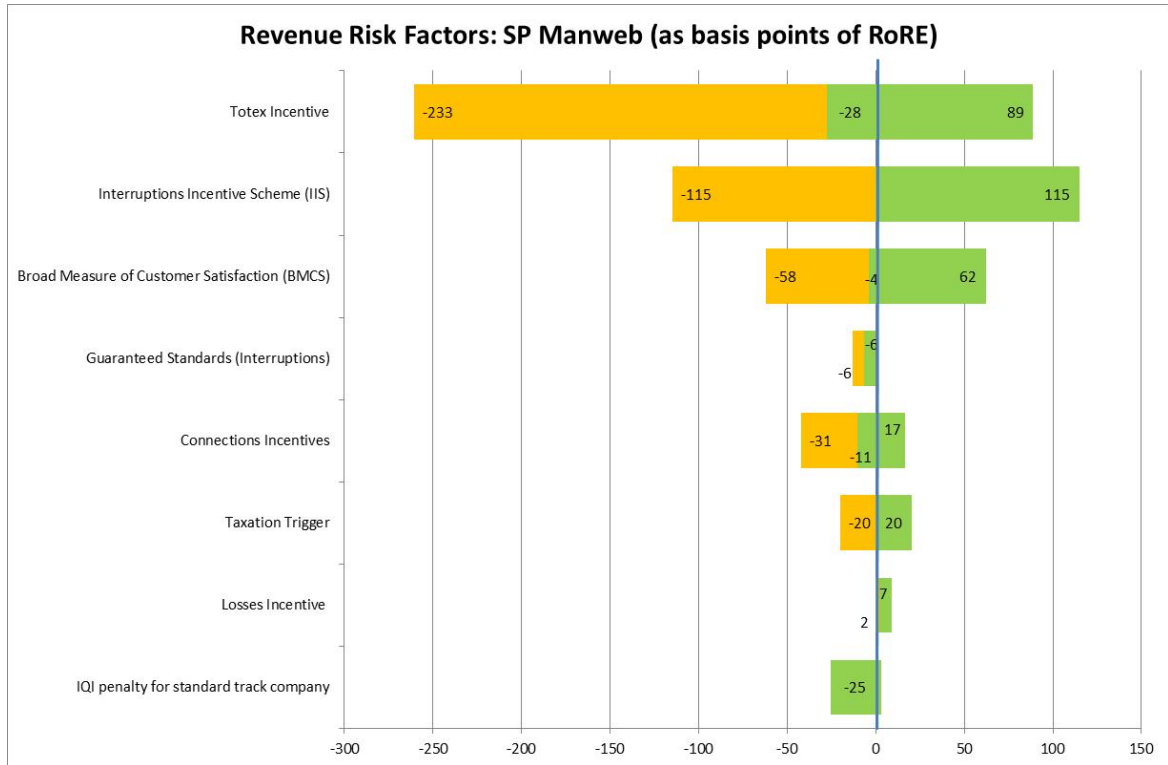
In accordance with Ofgem's Strategy Decision for RIIO-ED1 and the RIIO principle, the overall financial package should ensure a moderate possibility of low double-digit returns for shareholders (as measured by the return on the notional proportion of the RAV that is financed by equity), with a minimum return around the cost of debt. 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.

The assumptions underlying our RoRE analysis are summarised below

For an average DNO:			
	SP Manweb	SP Distribution	
Base Revenue (average p.a.)	£320m	£343m	As calculated by PCFM
Equity RAV (annual average)	£616m	£547m	As calculated by PCFM
Gearing	65%	65%	Base Scenario
Efficiency Incentive Rate	58%	58%	
Totex (average p.a.)	£250m	£197m	Plan Totex
IQI additional income	-0.78% of Totex for an average DNO with IQI ratio of 105	-0.78% of Totex for an average DNO with IQI ratio of 105	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 quartile benchmark.
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	-£1m p.a. -13bps	-£1m p.a. -13bps	Connections Reliability
Taxation Trigger Deadband	20 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 1/14 th of total fund.

We show the relative impact of the most material RIIO-ED1 risks as basis points of RoRE in Tornado Charts in Figure 22.

Figure 22: Tornado charts for risk factors



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 23.

f.5. Offset in Return on Regulatory Equity

Our calibration of the effect of the incentive and penalty mechanisms for RIIO-ED1 results in an offset to the allowed return of around 70bps.

Table 6: Offset in Return on Regulatory Equity

Incentive mechanisms	Standard Track	Fast track
IQI income adjustment Based on the average DNO with an IQI ratio of 105	22bps	-
Difference between the allowed expenditure set at an IQI ratio of 101.25 but with the DNOs planned expenditure of 105	25bps	-
Guaranteed standard penalties	13bps	4bps
Other incentives	10bps	8bps
Total offset	70bps	11bps

These reduce the expected Return on Regulatory Equity by 70bps from 6.4% to 5.7% for an average DNO.

f.6. Comparison to fast-track Return on Regulatory Equity

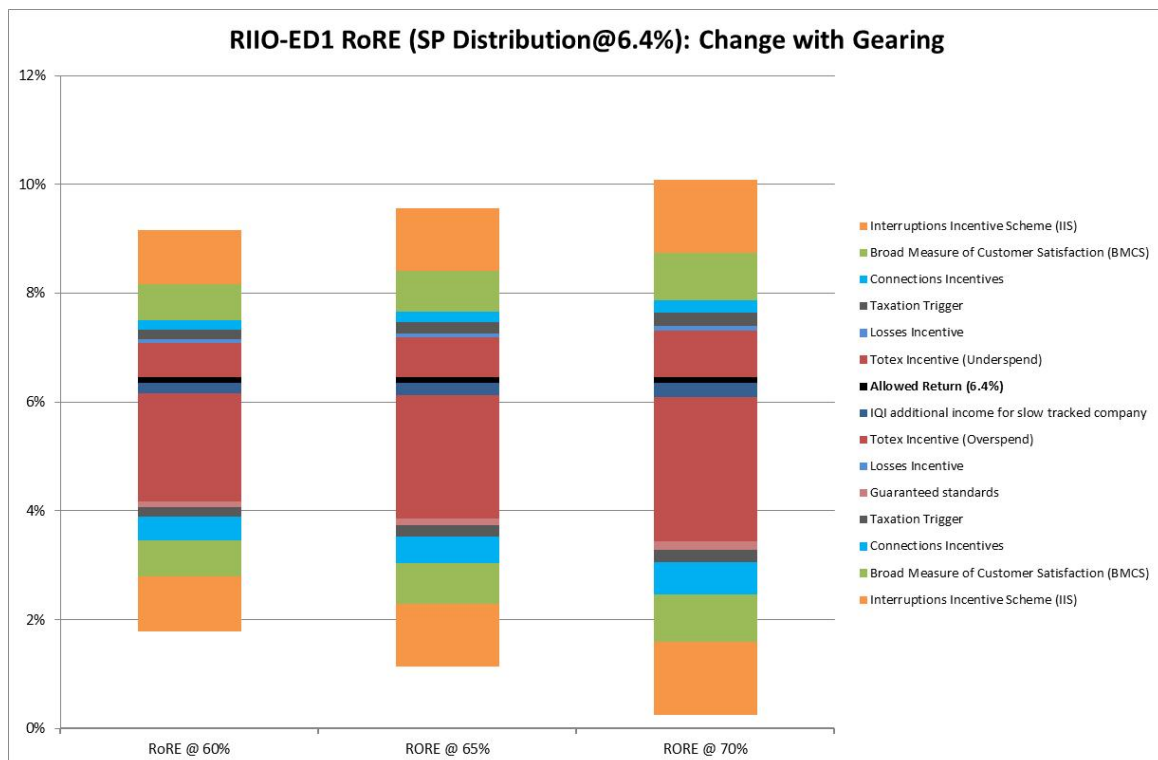
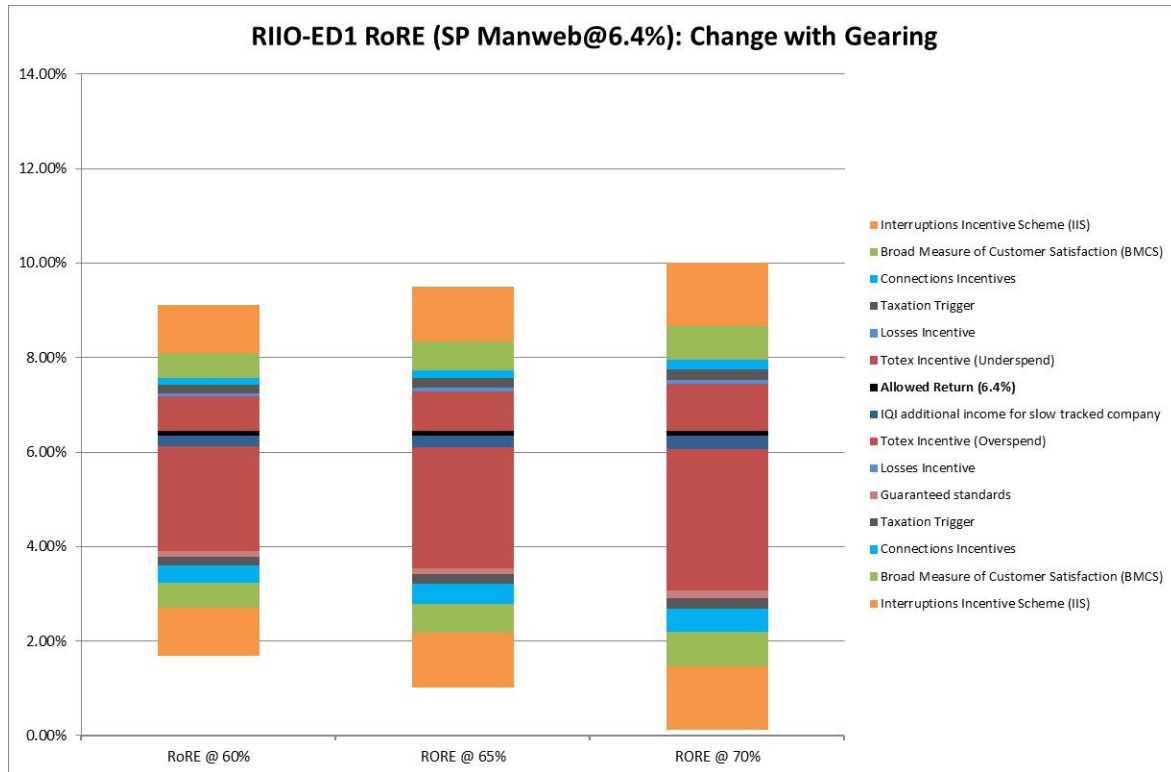
The range of feasible RoRE at 65% gearing extends to a maximum of 9.2% for SP Manweb and 9.3% for SP Distribution . These are well below the returns of 13.2% to 14.7% available to WPD’s DNOs, even when adjusted for their fast-track reward of around 100bps. They are also significantly below the returns of 10.5% to 10.8% available to the best performing companies in RIIO-GD1. On the downside, RoRE could fall to a minimum of 1.0% for SP Manweb and 1.1% for SP Distribution (compared with a Cost of Debt likely to fall from 2.6% at the start of RIIO-ED1.)

f.7. Conclusions for optimal level of gearing

This indicates that our required Cost of Equity of at least 6.4%, with Gearing of 65%, is 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 23.

Figure 23: Return on Regulatory Equity (RoRE) “layer cake”



The conclusions are similar for both SP Distribution and SP Manweb.

At 60% gearing, the potential for RoRE outperformance is constrained. The absolute maximum achievable is only 8.9% for SP Manweb and 9.0% for SP Distribution. This indicates that 60% gearing would not provide SPEN with even the remotest chance of earning double-digit returns, contrary to all previous RIIO settlements.

At 70% gearing, the minimum of the RoRE range is around 250bps below the present level of the Cost of Debt Index, at 0.1% for SP Manweb and 0.25% for SP Distribution. We conclude that 70% gearing would result in excessive risk of financial distress.

We conclude that a cost of equity below 6.4%, at 65% gearing, would result in excessive risk of financial distress.

g. Financeability

	SP Distribution	SP Manweb
Financeability Adjustment	Single period depreciation transition	Single period depreciation transition
Capitalisation rate	80%	80%
Target Credit rating	A3/Baa1	A3/Baa1

g.1. 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 before risk. 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 sections g.2 to g.6, 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).

Ofgem's economic model assesses an individual standalone company and 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. Financeable also means that a company needs to be able to raise the required financing in the financial markets in order to deliver its Licence commitments and expected expenditure resulting from the ED1 price control settlement.

SP Distribution and SP Manweb are competing in the financial markets with other electricity and gas network companies; in order to be able to compete on equal terms it needs to be ensured that the implied credit ratings for SP Distribution and SP Manweb in the final proposals are no worse than the implied credit ratings afforded to other electricity and gas networks in recent RIIO price control settlements, which are allowed the same cost of debt index.

Based on Moody's rating methodology⁶⁰ for regulated electric and gas networks the recent RIIO price control final proposals result in an implied rating of comfortable Baa1/A3 – this is explained in section g.1.2 on RIIO regulatory precedent; therefore the ED1 final proposals for SP Distribution and SP Manweb need to achieve an implied credit rating of at least comfortable Baa1.

g.1.1 Context

In sections 3 and 4 of the RIIO-ED1 Strategy decision document (Financial Issues reference 26d/13) Ofgem set out their approach to assessing financeability.

“In setting price controls, we are required to have regard to the ability of efficient network companies to secure financing to facilitate the delivery of their regulatory obligations. We define this ability as indicated by a notional efficient network company attaining a ‘comfortable investment grade’ credit rating (i.e. in the BBB to A range).” Ofgem state that they will use equity and credit metrics as part their overall financeability assessment; and “also take into account the qualitative factors considered by rating agencies as part of their overall rating assessment, for example business risk and regulatory environment, as well as Ofgem’s own RORE analysis.” ... “Financeability analysis is focused on the upcoming price control period.” Ofgem apply “a notional financial structure to the licensees” and the “financeability analysis applies only to the licensee.” The three major credit rating agencies (Fitch, Moody’s and Standard & Poor’s) focus on a basket of five main credit metric ratios - “These metrics account for around a third of rating agencies’ rating assessment.” ; and “all three rating agencies told us that they do not expect every issuer to meet every ratio at all times ... we expect companies similarly to exercise judgement in their business plans and we do not require all ratios to be achieved in every year of the price control in order to produce a financeable plan”. “We also expect companies to recognise the role of other factors in the rating assessment made by rating agencies and the proportion of the rating affected by the credit metrics.”

In respect of RAV depreciation, Ofgem have set the economic life for new investment from 1 April 2015 at 45 years. However, Ofgem say:

“we are committed to ensuring that efficient networks are able to raise the finance they require, both equity and debt, in a timely manner. We recognise that, even with the policy of applying the change in asset lives to new assets only, transitional arrangements may be required. DNOs to justify ... the transitional arrangements that they believe are necessary to ensure financeability. Our preference is to manage any transition period over one price

⁶⁰ Moody's Investors Service (2009), “Regulated Electric and Gas Networks”, Rating Methodology, August

control period; our prime driver for the period of transition will be financeability considerations.”

g.1.2 RIIO Regulatory Precedent

As stated above, in section g.1. above “target credit rating”, the recent RIIO price control proposals for regulated electricity and gas network companies result in an implied rating of A3 based on Moody’s rating methodology. In section g.2. below on “financeability assessment” we set out in detail how we have followed Moody’s rating methodology for SP Distribution and SP Manweb. In our assessment of the implied credit ratings for the recent RIIO price control proposals we have mainly assumed that the qualitative factors are the same as those that we have applied to SP Distribution and SP Manweb. The only exceptions are in respect of “Revenue Risk” and “Cost Efficiency” for the ET1 and GT1 companies which we have assessed as Aaa and A as opposed to Aa and Baa for the GD1 and ED1 companies; the impact is to reduce the overall rating score for the ET1 and GT1 companies by 0.26. The following tables compare the Moody’s Notional Credit Rating for those companies who have had price control final proposals under RIIO.

Table 7: Implied credit ratings for RIIO price control proposals

Fast Track	Additional IQI Income £m (Real)	Cost of Equity	Gearing	Credit Rating Score	Implied Credit Rating
ET1					
SPTL	42.2	7.0%	55%	6.85	A3
SHETL	30.7	7.0%	55%	7.32	A3
ED1					
WMID	52.7	6.4%	65%	7.62	Baa1
EMID	52.8	6.4%	65%	6.65	A3
Swales	28.1	6.4%	65%	6.65	A3
Swest	42.9	6.4%	65%	6.65	A3
Average ED1					A3

Standard Track	Additional IQI Income £m (Real)	Cost of Equity	Gearing	Credit Rating Score	Implied Credit Rating
ET1					
NGET	93.1	7.0%	60%	7.41	A3
GT1					
NGGT	-10.3	6.8%	62.5%	6.61	A3
GD1					
East	10.9	6.7%	65%	7.15	A3
London	10.1	6.7%	65%	7.64	Baa1
North West	8.2	6.7%	65%	7.55	Baa1
West Midlands	6.4	6.7%	65%	7.55	Baa1
Northern	24.6	6.7%	65%	6.68	A3
Scotland	16.4	6.7%	65%	6.22	A2
Southern	33.4	6.7%	65%	6.68	A3
Wales & West	10.9	6.7%	65%	7.64	Baa1
Average GD1				7.55	Baa1

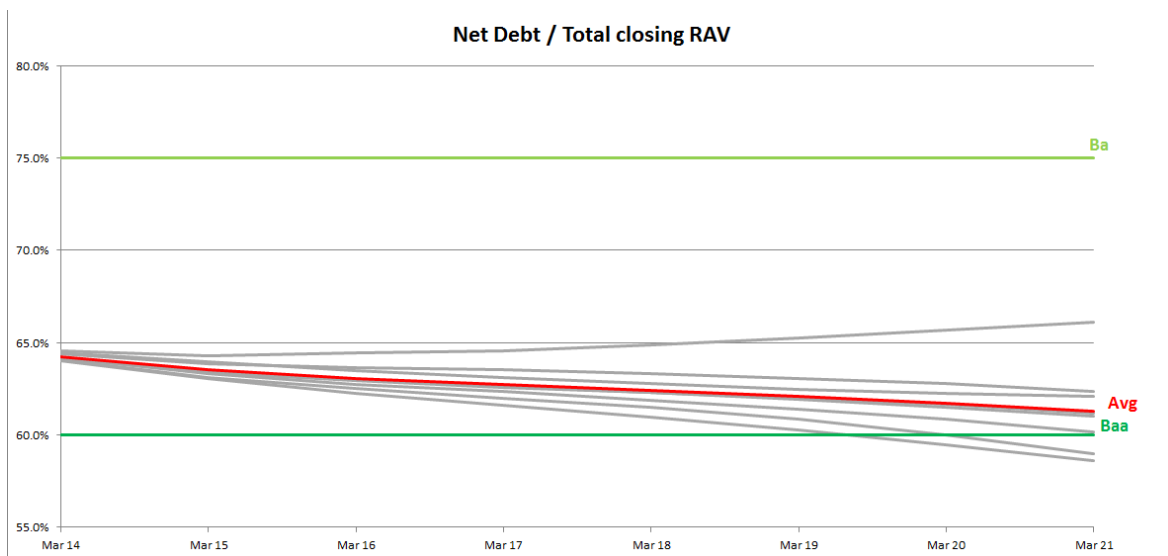
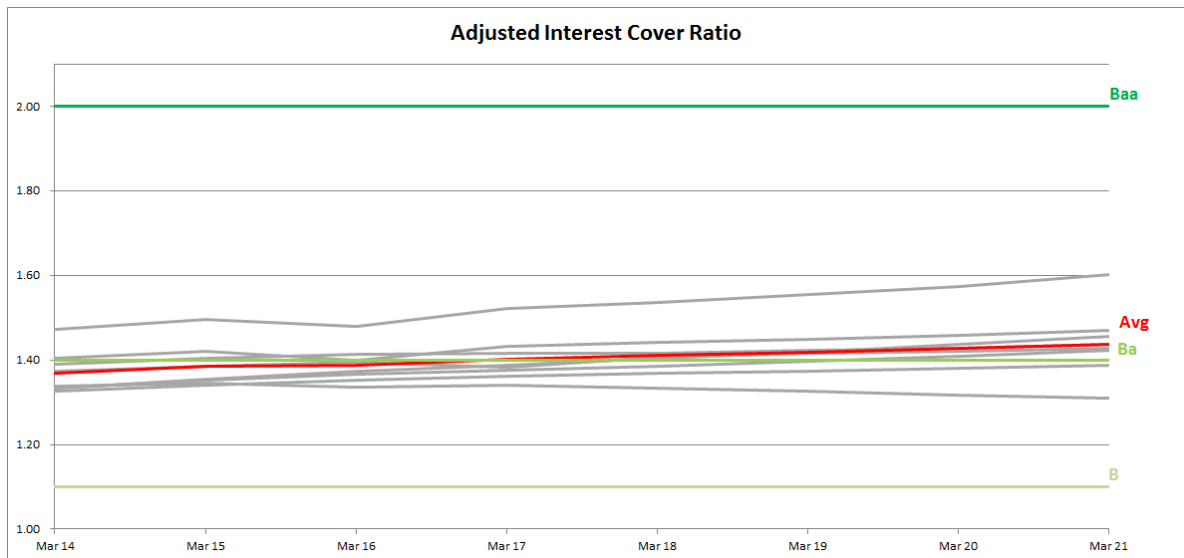
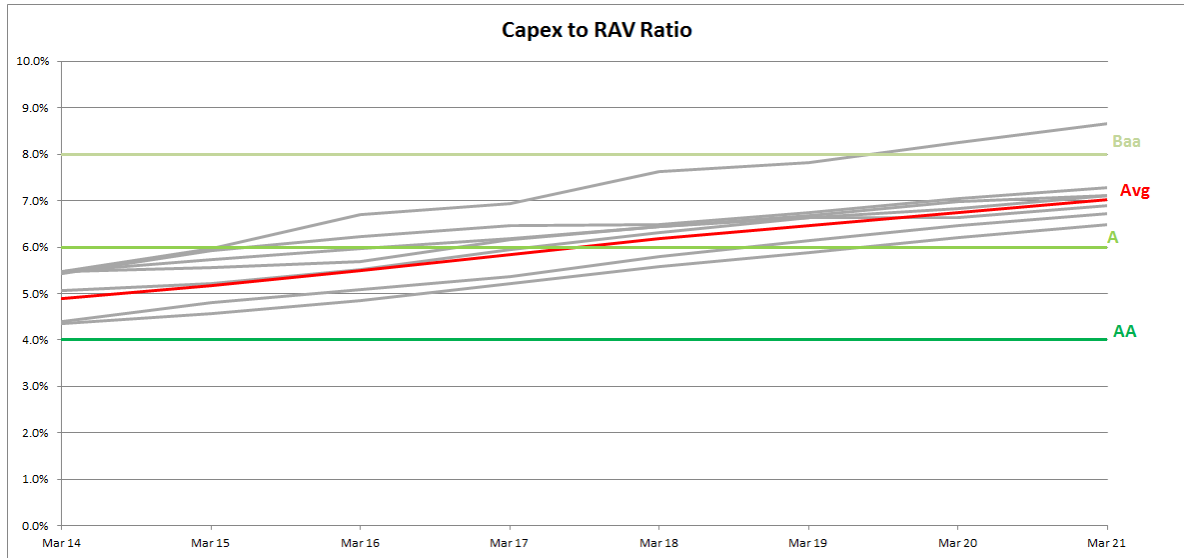
For the four ED1 companies owned by WPD we have used the financial model published by Ofgem to accompany WPD's RIIO-ED1 fast track decision, which was published in February 2014. In order to ensure consistency, we have modified the WPD fast track decision financial model to reflect the standard track financial assumption in respect of cost of debt of 2.72%. The credit ratios reflect unprofiled revenues as these represent the underlying cash flows and ensure comparability which would otherwise be distorted by different profiling assumptions.

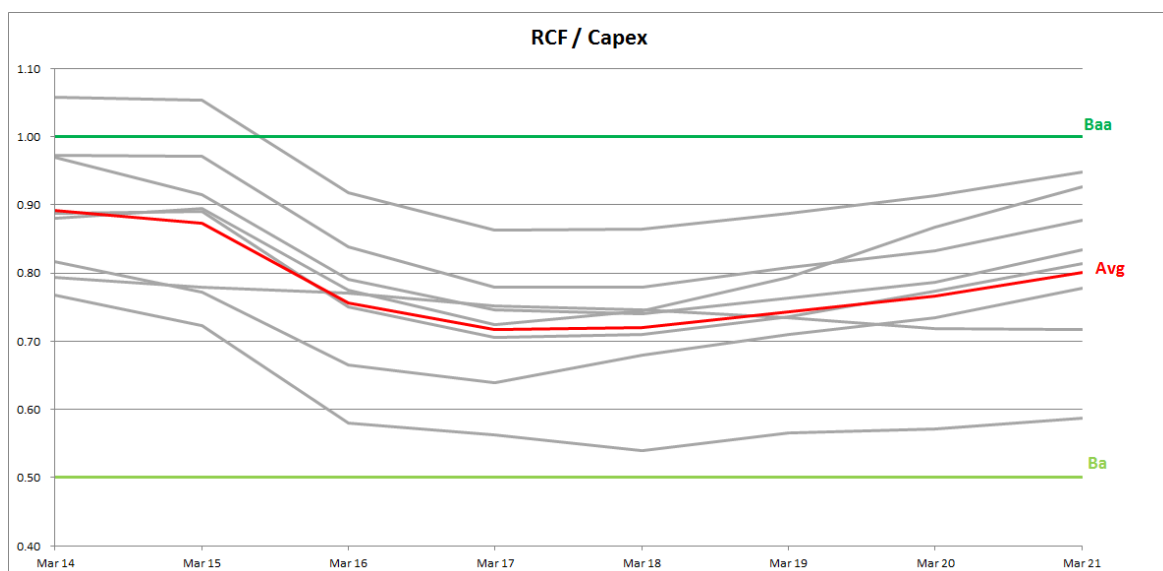
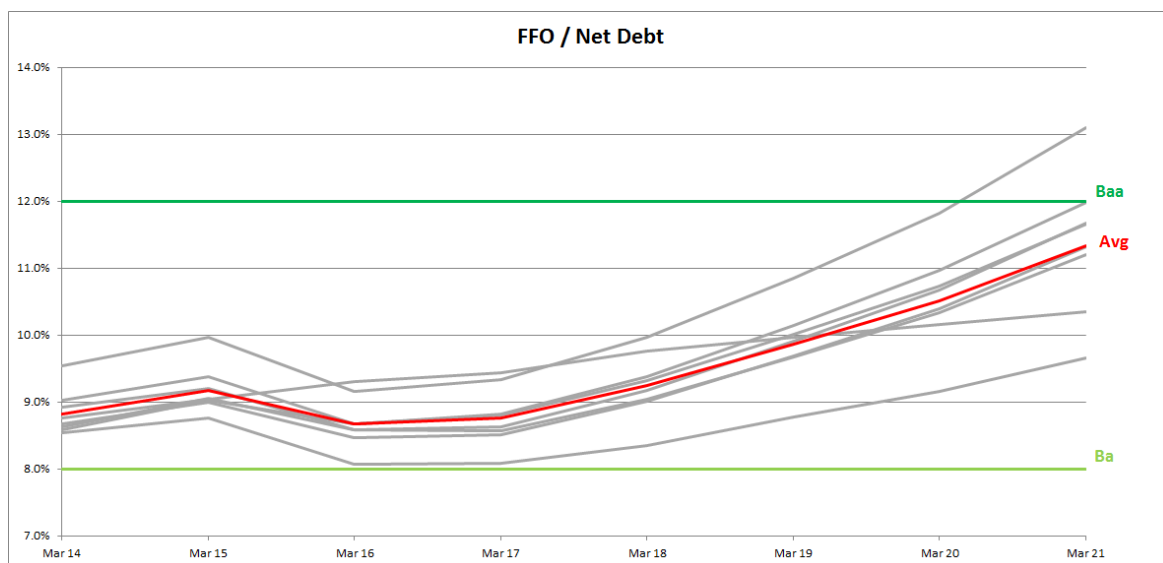
From the above it can be seen that the ET1, GT1, GD1 (on average) and ED1 (fast track only) companies mainly have an implied credit rating of comfortable Baa1/A3; hence our justification that the ED1 final proposals for SP Distribution and SP Manweb need to achieve an implied credit rating of at least comfortable Baa1.

It is worth noting that, despite a negative additional IQI income allowance of -£10.3m (reflecting an IQI ratio of 122.6), NGGT's standard track final proposals resulted in an implied upper quartile A3 credit rating based on Moody's rating methodology. It is also worth noting that all the other standard track companies received significant positive additional IQI income allowances in their final proposals base revenue allowances reflecting IQI ratios ranging between 106.1 and 112.4.

As noted above we have mainly assumed, in our assessment of the implied credit ratings, that the qualitative factors are the same as those that we have applied to SP Distribution and SP Manweb. These qualitative factors have a weighting of 60% and contribute broadly the same score for all companies to the overall credit rating score. The remaining factors that will influence the final credit rating score are the four key credit metrics used in Moody's rating methodology which have a weighting of 40% towards the overall score and therefore could have a significant impact. We now examine each of the credit ratios resulting from the recent RIIO price control proposals for regulated electric and gas networks. Whilst all four key ratios for the ET1 and GT1 companies deliver comparable ratings to those for the GD1 and ED1 companies, we have not included the ET1 and GT1 analysis below because comparability is influenced by the lower gearing levels for these companies ranging between 55% and 62.5% compared with 65% for the GD1 and ED1 companies.

The following graphs show the key credit ratios for the eight GD1 companies together with the GD1 average and comparison with Moody's rating band – for example for the Capex to RAV ratio the Aa rating band is 4% to 6% and the A rating band is 6% to 8% etc.

Figure 24: Key credit ratios for RIIO-GD1




The following table shows the average credit ratios for the GD1 companies.

Table 8: Average credit ratios for RIIO-GD1

Ratio	31 Mar 2014	31 Mar 2015	31 Mar 2016	31 Mar 2017	31 Mar 2018	31 Mar 2019	31 Mar 2020	31 Mar 2021
Capex to RAV ratio	4.90%	5.17%	5.50%	5.83%	6.18%	6.46%	6.74%	7.02%
Adjusted interest cover ratio	1.37	1.39	1.39	1.40	1.41	1.42	1.43	1.44
Net Debt / Total closing RAV	64.2%	63.5%	63.1%	62.7%	62.4%	62.1%	61.7%	61.3%
FFO / Net Debt	8.8%	9.2%	8.7%	8.8%	9.2%	9.9%	10.5%	11.3%
RCF / Capex	0.89	0.87	0.76	0.72	0.72	0.74	0.77	0.80

As demonstrated in the graphs above these ratios imply an average rating for the GD1 companies of:

- Capex to RAV rating of mid Aa to A
- Adjusted interest cover rating of upper quartile Ba to Baa
- Net Debt to RAV rating of comfortable Baa

- FFO to Net Debt rating of comfortable Baa (moving from lower quartile to upper quartile)
- RCF to Capex rating of comfortable Ba

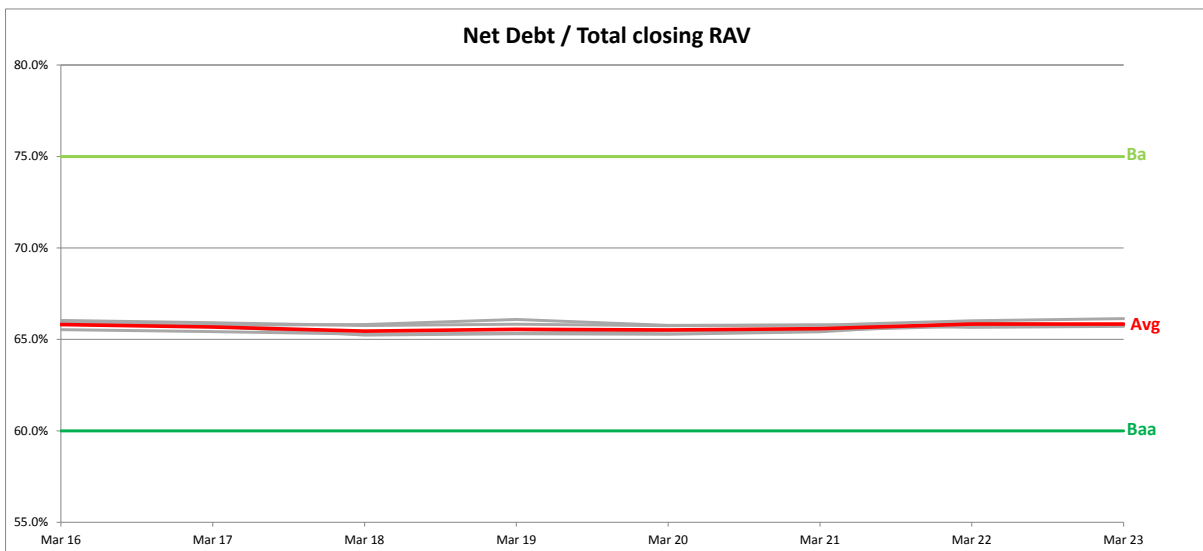
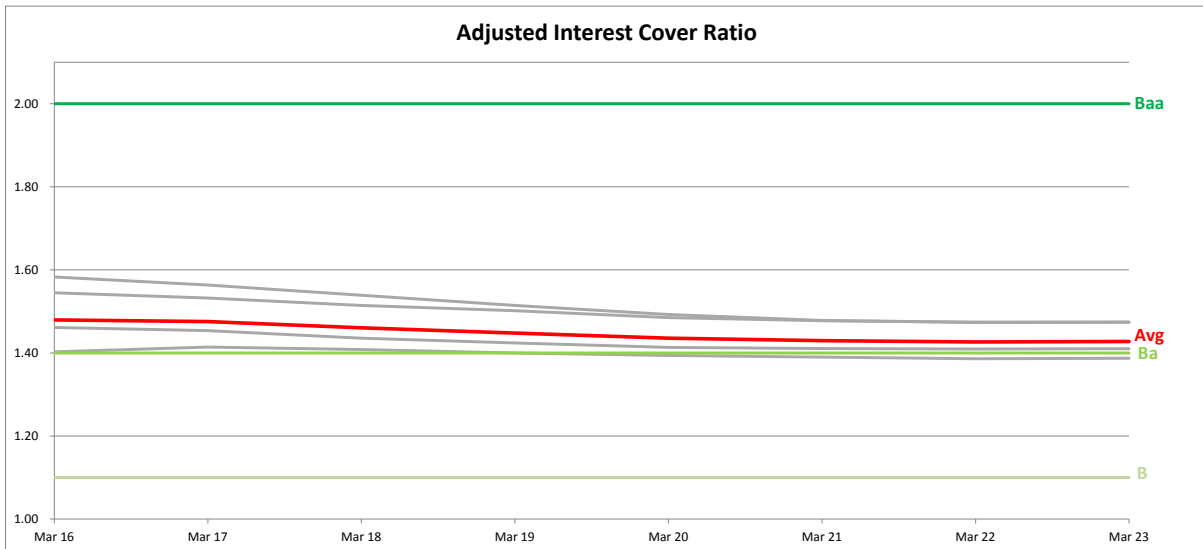
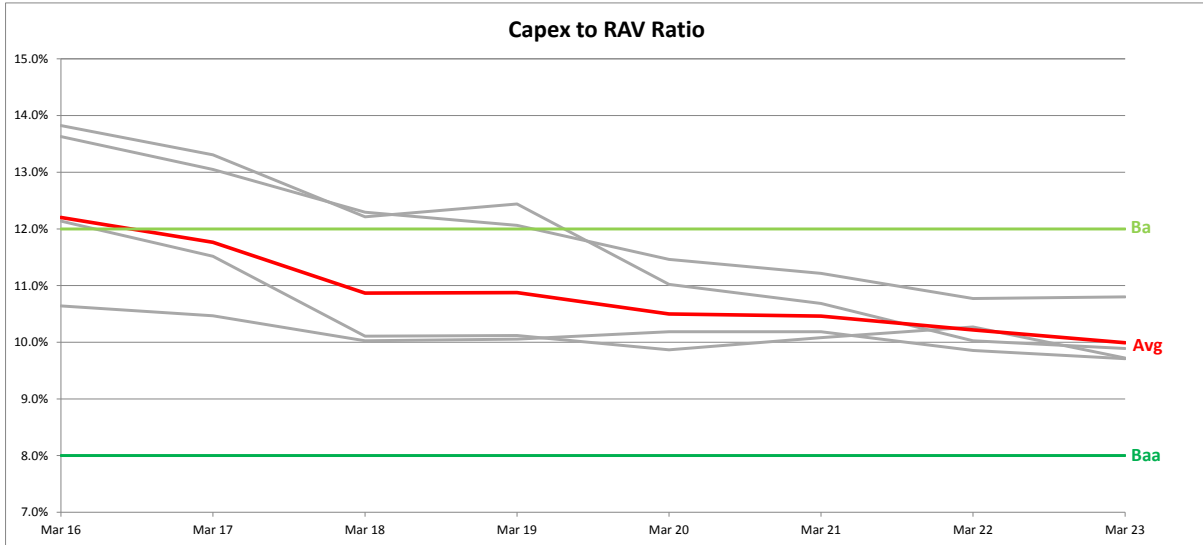
The key credit metric ratings are shown in the table below.

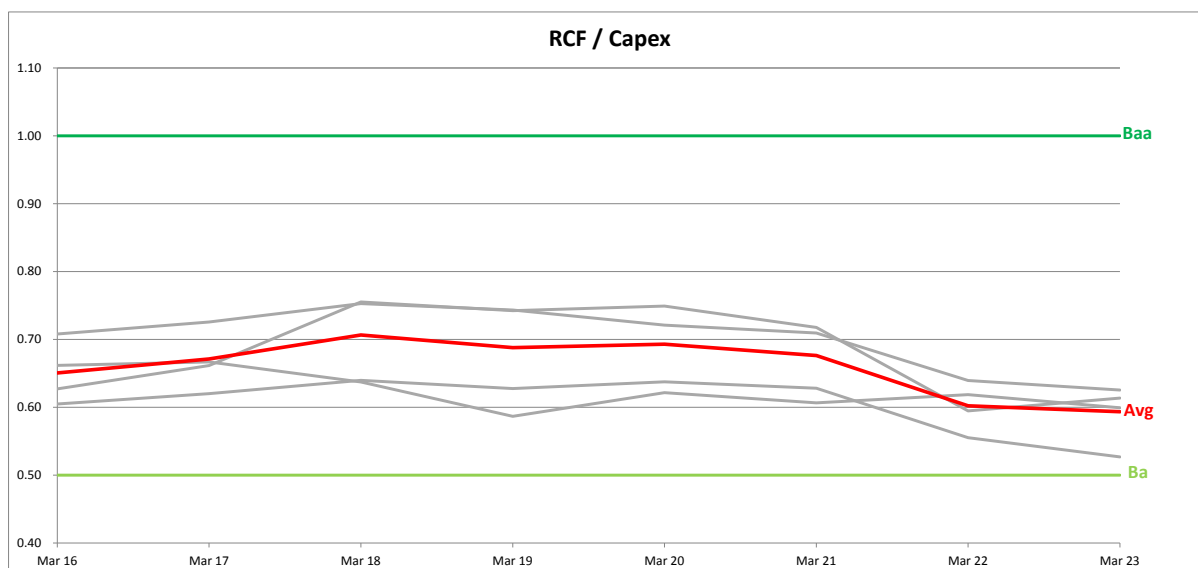
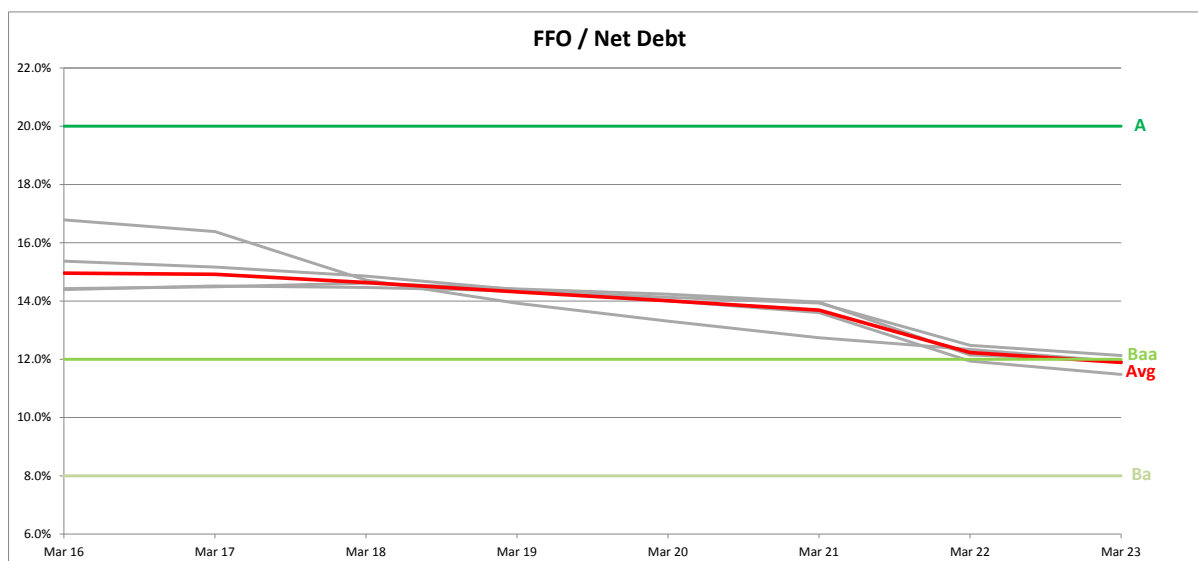
RIIO-GD1 - Average			
	A	Baa	Ba
Factor 4: Key Credit Metrics (40%)			
a) Adjusted Interest Cover Ratio (3 Year Avg) – 15%			1.38
b) Net Debt / RAV (3 Year Avg) – 15%		61.7%	
c) FFO / Net Debt (3 Year Avg) – 5%		8.9%	
d) RCF / CAPEX (3 Year Avg) – 5%			0.7
Rating			
Indicated Rating from Grid factors 1-4		Baa1	
Credit rating score		7.55	

The credit ratios are influenced by the treatment of a significant element of totex as repex; this treatment is not replicated in the electricity distribution companies therefore comparability is slightly tarnished. However this lack of comparability does not affect the overriding average credit rating for the GD1 companies of comfortable Baa1 (a credit rating score of 7.55).

It is worth noting that Moody’s rating methodology takes the average of the worst three consecutive years in assessing an overall rating for a particular ratio. In respect of the adjusted interest cover ratio (as demonstrated in the graph and the credit ratio table above) the average for the GD1 companies is Ba in the first three years only of GD1 and thereafter becomes Baa. So it could be argued that the rating of Ba for adjusted interest cover used in the assessment of the indicated rating of Baa1 is misleading as the long term outlook is Baa. Adjusting this rating to Baa1 results in an overall indicated rating of an upper quartile A3 score of 6.58 which is more reflective of the GD1 position as FFO/Net Debt is comfortable Baa1.

The following graphs show the key credit ratios for the four WPD ED1 fast track companies together with the ED1 average and comparison with Moody’s rating band and reflecting the adjustment noted above in respect of cost of debt.

Figure 25: Key credit ratios for the WPD fast track companies and ED1 average




The following table shows the average credit ratios for the four WPD ED1 fast track companies.

Ratio	Mar-16	Mar-17	Mar-18	Mar-19	Mar-20	Mar-21	Mar-22	Mar-23
Capex to RAV ratio	12.20%	11.76%	10.87%	10.87%	10.50%	10.46%	10.22%	9.99%
Adjusted interest cover ratio	1.48	1.48	1.46	1.45	1.44	1.43	1.43	1.43
Net Debt / Total closing RAV	65.8%	65.7%	65.5%	65.6%	65.5%	65.6%	65.8%	65.8%
FFO / Net Debt	15.0%	14.9%	14.6%	14.3%	14.0%	13.7%	12.2%	11.9%
RCF / Capex	0.65	0.67	0.71	0.69	0.69	0.68	0.60	0.59

As demonstrated in the graphs above these ratios imply an average rating for the four WPD ED1 fast track companies of:

- Capex to RAV rating of Baa
- Adjusted interest cover rating of Baa
- Net Debt to RAV rating of comfortable Baa

- FFO to Net Debt rating of A (borderline Baa in the last year)
- RCF to Capex rating of Ba

The key credit metric ratings are shown in the table below.

RHIO-ED1 – Average four WPD fast track			
	A	Baa	Ba
Factor 4: Key Credit Metrics (40%)			
a) Adjusted Interest Cover Ratio (3 Year Avg) – 15%		1.43	
b) Net Debt / RAV (3 Year Avg) – 15%		65.5%	
c) FFO / Net Debt (3 Year Avg) – 5%	12.6%		
d) RCF / CAPEX (3 Year Avg) – 5%			0.62
Rating			
Indicated Rating from Grid factors 1-4	A3		
Credit rating score	6.65		

The average credit ratios for the four WPD ED1 fast track companies are those that are required to deliver an overall implied credit rating of comfortable A3 (a credit rating score of 6.65) for WPD pre risk; hence our justification that the ED1 final proposals for SP Distribution and SP Manweb need to achieve similar credit ratios in order to deliver an implied credit rating of at least comfortable Baa1 and be able to absorb risk.

g.2. Financeability Assessment

We have primarily followed Moody’s rating methodology 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 summarise our assessment of the qualitative sub-factors for each of our licensees.

Table 9.1: Rating factors for SP Distribution

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	X					
b) Asset Ownership Model		X				
c) Cost and Investment Recovery			X			
d) Revenue Risk		X				
Factor 2: Efficiency & Execution Risk (10%)						
a) Cost Efficiency				X		
b) Scale and Complexity of Capital Programme				X		
Factor 3: Stability of Business Model & Financial Structure (10%)						
a) Ability and Willingness to Pursue Opportunistic Corporate Activity			X			
b) Ability and Willingness to Increase Leverage				X		
c) Targeted Proportion of Operating Profit Outside Core Regulated Activities	X					

Table 9.2: 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	X					
b) Asset Ownership Model		X				
c) Cost and Investment Recovery			X			
d) Revenue Risk		X				
Factor 2: Efficiency & Execution Risk (10%)						
a) Cost Efficiency				X		
b) Scale and Complexity of Capital Programme				X		
Factor 3: Stability of Business Model & Financial Structure (10%)						
a) Ability and Willingness to Pursue Opportunistic Corporate Activity			X			
b) Ability and Willingness to Increase Leverage				X		
c) Targeted Proportion of Operating Profit Outside Core Regulated Activities	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.

g.3. 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 concluded⁶¹:

“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.

g.4. 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

⁶¹ Moody’s Investors Service (2013), “UK Gas Distribution Networks: Transition to RIIO Is Credit Neutral”, Special Comment, March 8

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%
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.

g.5. 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.

g.6. 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 'h' 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 'd' to 'f'. 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.

g.7. Price Control Financial Model Results

g.7.1. Additional Income

The inclusion of the additional income of 2.5% of total expenditure in our "fast track" proposal meant that we could deliver an efficient financing plan for each of SP Distribution and SP Manweb and maintain an investment grade credit rating without the need to employ any financial levers. In our standard track proposals we include additional income of 0% of total expenditure. The impact on revenues is set out in the following table:

Additional Income revenues (£m 12/13 prices)	Fast track	Standard track
SP Distribution	43.5	0.0
SP Manweb	55.5	0.0
Total	99.0	0.0

The additional income total of £99.0m had a significant impact on the overall upper quartile A3 implied credit ratings for both SP Distribution and SP Manweb in our fast track proposals.

The following two tables show the comparable IQI additional income allowances for the recent RIIO price control proposals for fast track and standard track regulated electricity and gas network companies. It is worth noting that all the standard track companies, with the exception of NGGT who have an IQI ratio of 122.6, received significant positive additional IQI income allowances in their final proposals base revenue allowances reflecting IQI ratios ranging between 106.1 and 112.4 contributing significantly to their investment grade credit ratings.

Fast Track	Allowed Totex £m (Real)	IQI ratio	IQI Incentive Strength	Additional Income £m (Real)	Implied Credit Rating
ET1					
SPTL	1689	100.0	50%	42.2	A3
SHETL	1228	100.0	50%	30.7	A3
ED1					
WMID	2106	100.0	70%	52.7	Baa1
EMID	2111	100.0	70%	52.8	A3
Swales	1123	100.0	70%	28.1	A3
Swest	1715	100.0	70%	42.9	A3
Average ED1					A3

Standard Track	Allowed Totex £m (Real)	IQI ratio	IQI Incentive Strength	Additional Income £m (Real)	Implied Credit Rating
ET1					
NGET	11291	112.4	46.89%	93.1	A3
GT1					
NGGT	1705	122.6	44.36%	-10.3	A3
GD1					
East	2088	111.8	63.04%	10.9	A3
London	1885	111.8	63.04%	10.1	Baa1
North West	1587	111.8	63.04%	8.2	Baa1
West Midlands	1249	111.8	63.04%	6.4	Baa1
Northern	1660	106.1	63.98%	24.6	A3
Scotland	1324	107.6	63.73%	16.4	A2
Southern	2671	107.6	63.73%	33.4	A3
Wales & West	1670	111.0	63.17%	10.9	Baa1
Average GD1					Baa1

In our standard track business plan we have assumed IQI additional income of zero. There is currently extreme uncertainty regarding this as Ofgem have not concluded how they will calculate this for standard track companies. There is a possibility that Ofgem's view of the efficiency of our totex proposals may result in a penalty with a resultant risk to our financeability (in addition to the penalty applying under the totex incentive mechanism if we do have to spend in excess of the allowance in order to deliver our outputs and, importantly, ensure that we meet our Licence obligations regarding continuity of supply).

Standard track companies in ET1, GT1 and GD1 all received additional income as part of final proposals base revenue reflecting how close the companies' totex proposals were to Ofgem's view of their totex requirements as set out in the table above.

g.7.2. 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. 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 the "Evolution of the Regulatory Asset Value (RAV)" section 4).

	SP Distribution	SP Manweb
Capitalisation rate	80%	80%

g.7.3. Asset lives and depreciation

Under our 'fast track' proposal we found that the inclusion of the additional income of 2.5% of total expenditure meant that we could deliver an efficient financing plan for each of SP Distribution and SP Manweb and maintain an investment grade credit rating without the need to employ any financial levers i.e. without the need for any transitional arrangements in respect of RAV asset lives or other financeability adjustments.

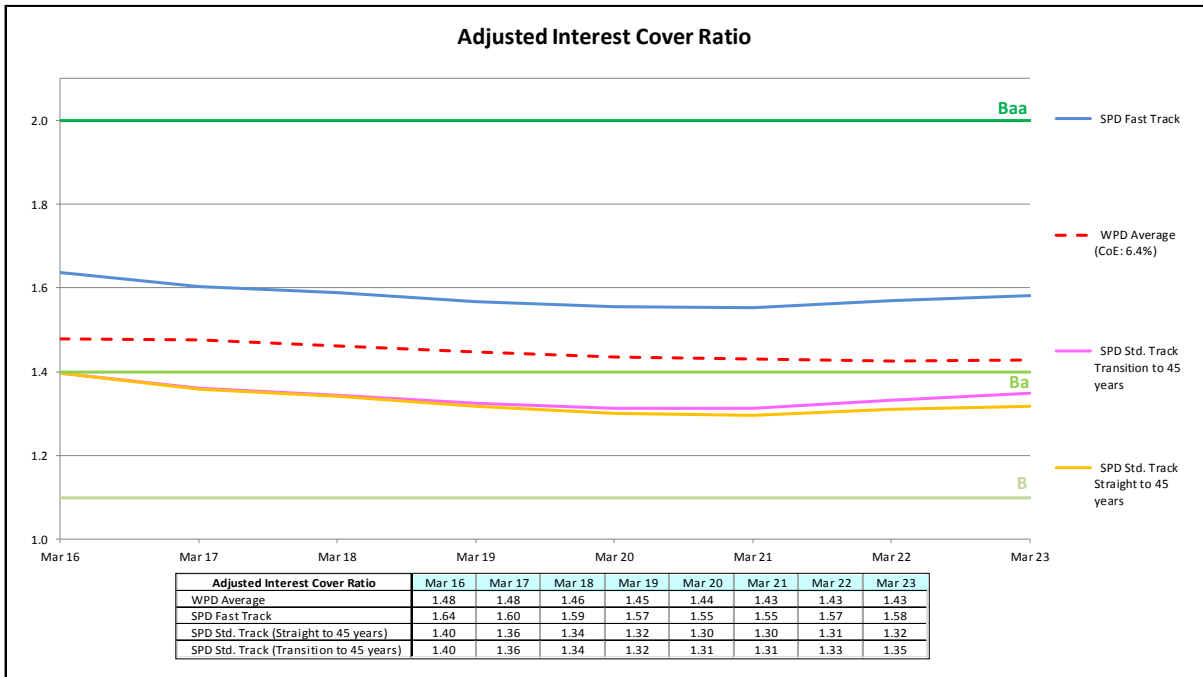
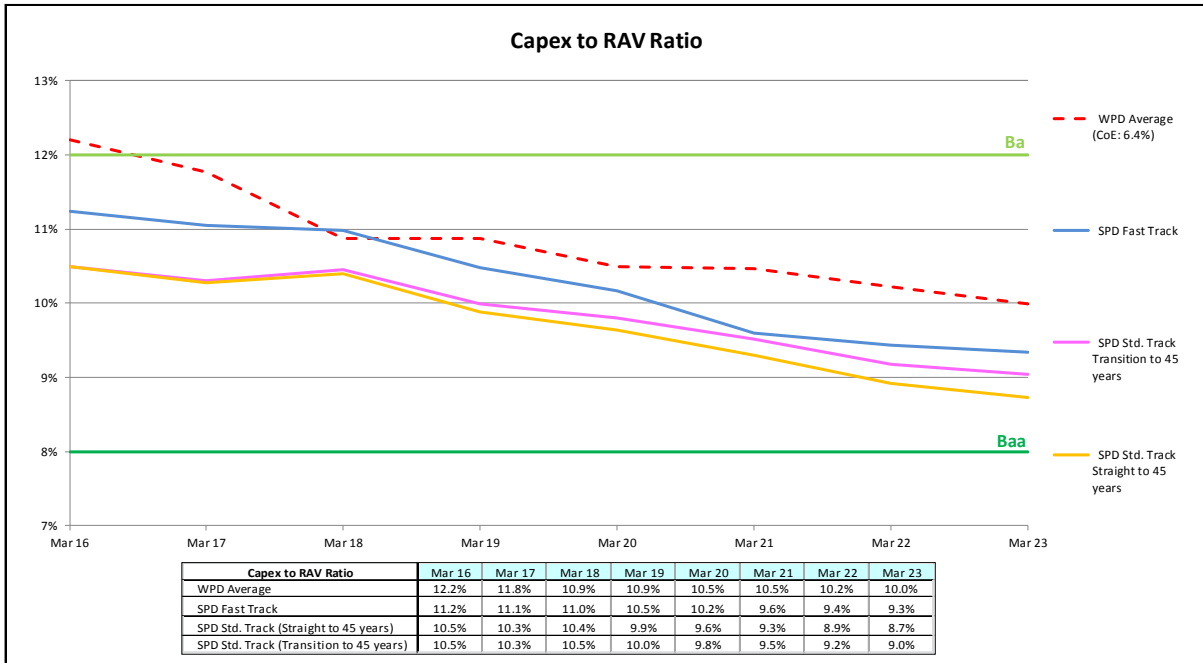
However, under our 'standard track' proposal we do not include the additional income of 2.5% of total expenditure. In arriving at our Moody's notional credit rating score we have maintained the non credit metric ratio factors at the same level as in our 'fast track' proposal. As noted in section 3 of the RIIO-ED1 Strategy decision document (Financial Issues reference 26d/13) the credit metric ratios account for around a third of rating agencies' rating assessment therefore these will have a significant impact on the overall rating; we found that these moved appreciably when the additional income was removed.

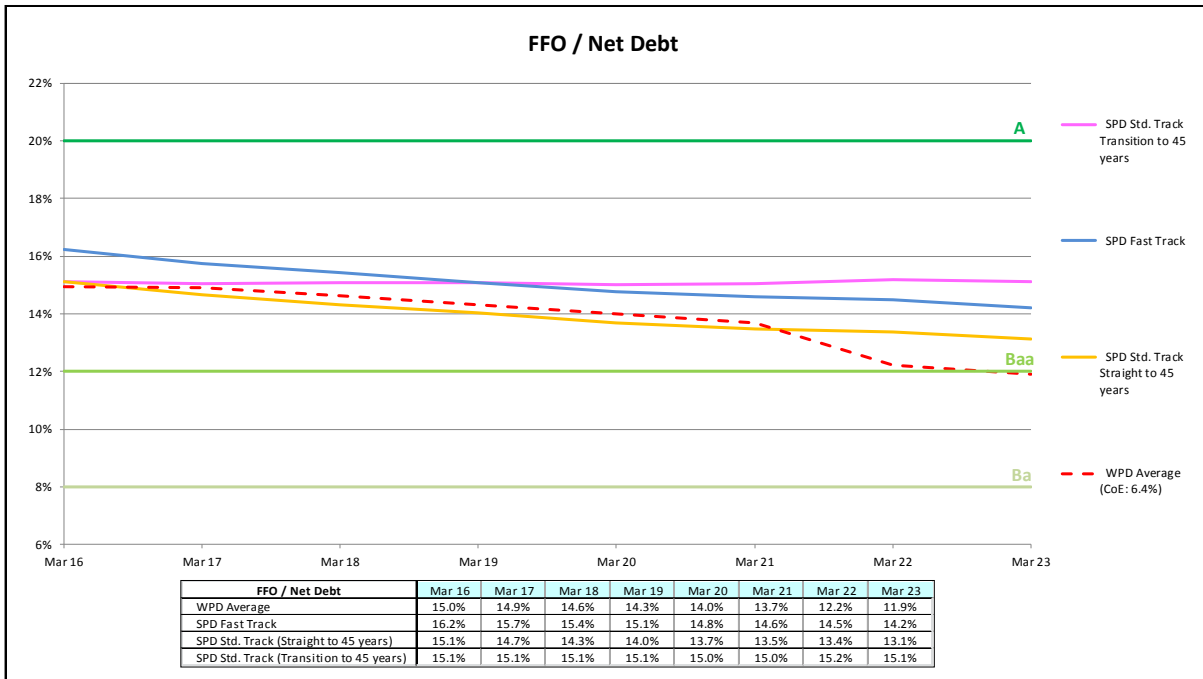
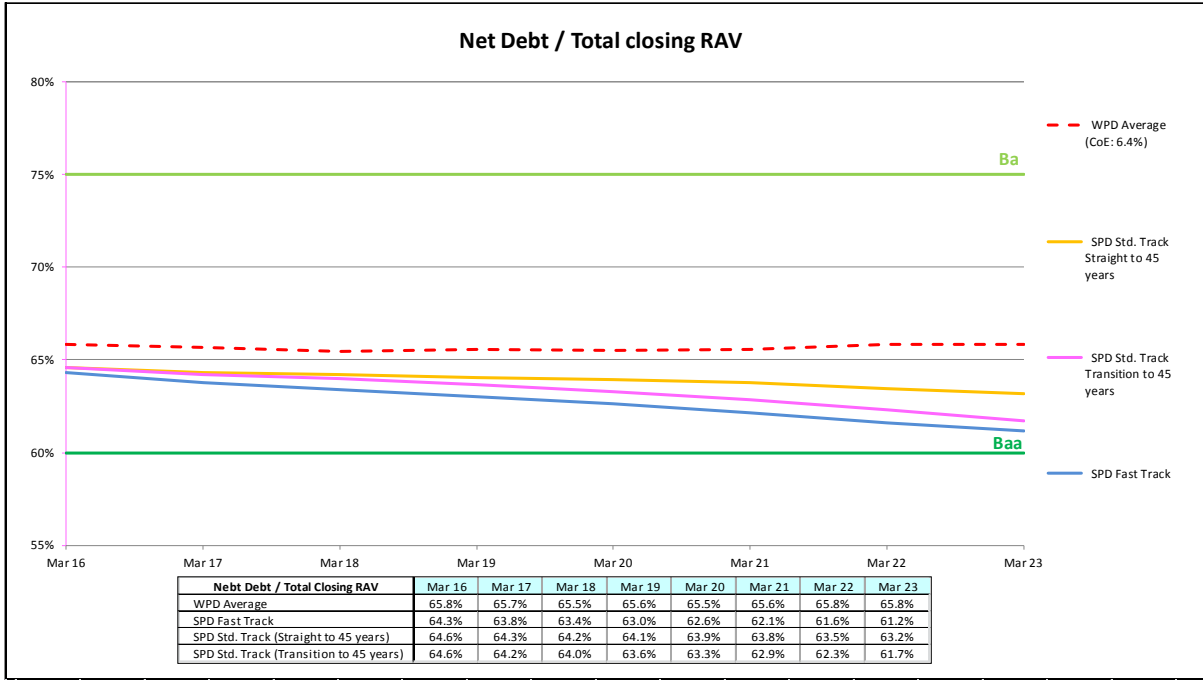
The following sets of five graphs for each of SP Distribution and SP Manweb compare:

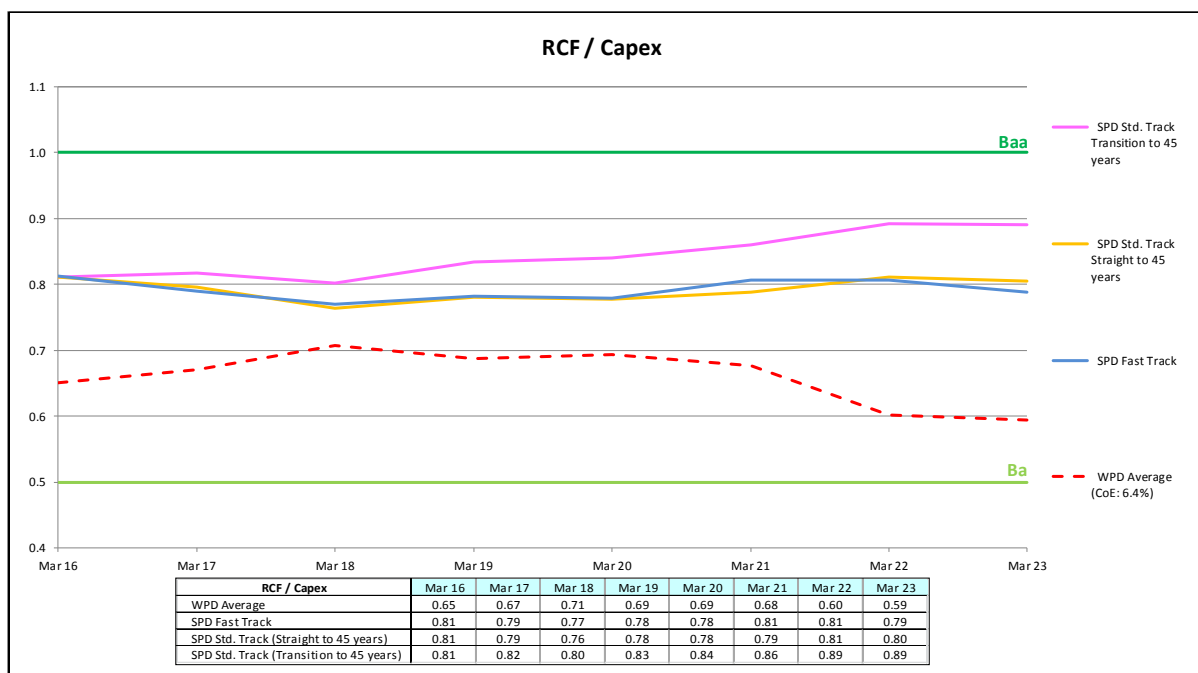
- Our fast track proposal as submitted last July – an efficient financing plan maintaining a comfortable investment grade credit rating;
- WPD average for the four fast track companies as discussed above
- Our standard track – straight to 45 years with no additional income
- Our standard track – transition to 45 years over ED1 with no additional income

The WPD average and our standard track ratios reflect 6.4% cost of equity and 2.72% cost of debt.

The following are the comparative graphs for SP Distribution.

Figure 26: Key credit ratios for SP Distribution






The following table compares the 4 key credit metrics used by Moody's in their rating assessment.

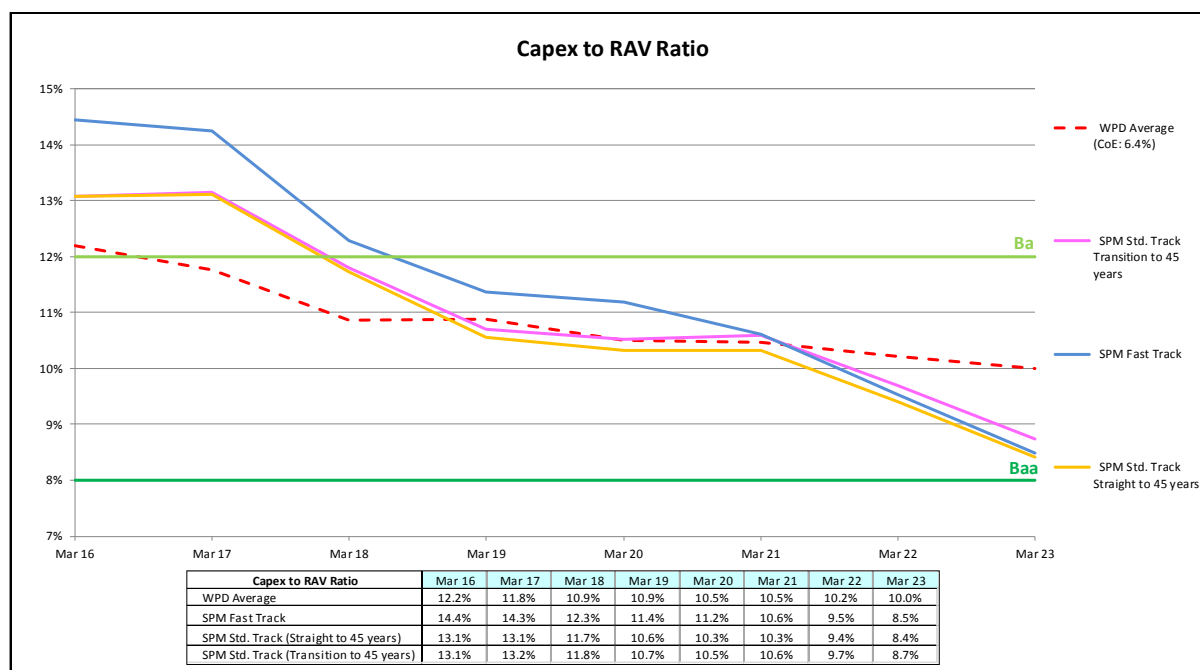
SP Distribution	Fast track			WPD			Straight to 45			Transition		
	A	Baa	Ba	A	Baa	Ba	A	Baa	Ba	A	Baa	Ba
Factor 4: Key Credit Metrics (40%)												
a) Adjusted Interest Cover Ratio (3 Year Avg) – 15%		1.56			1.43				1.30			1.32
b) Net Debt / RAV (3 Year Avg) – 15%		61.6%			65.5%			63.5%			62.3%	
c) FFO / Net Debt (3 Year Avg) – 5%	14.4%			12.6%			13.3%			15.0%		
d) RCF / CAPEX (3 Year Avg) – 5%			0.78			0.62			0.77			0.81
Rating Indicated Rating from Grid factors 1-4	A3			A3				Baa1			Baa1	
Credit rating score	6.65			6.65				7.62			7.62	

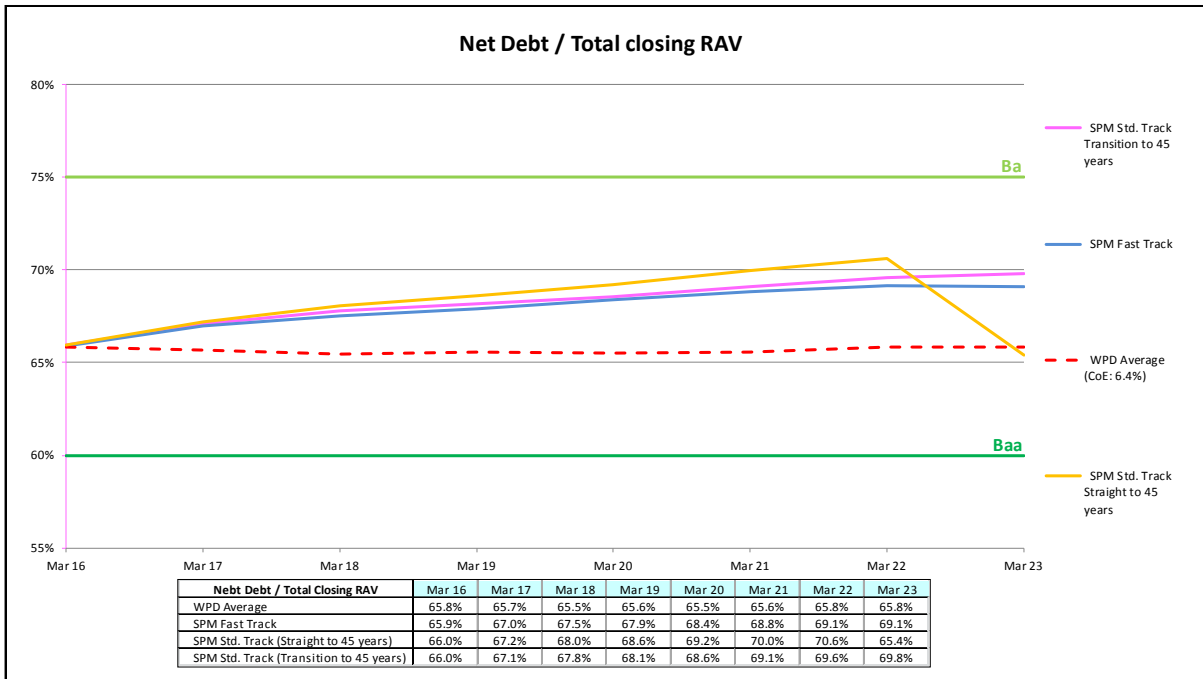
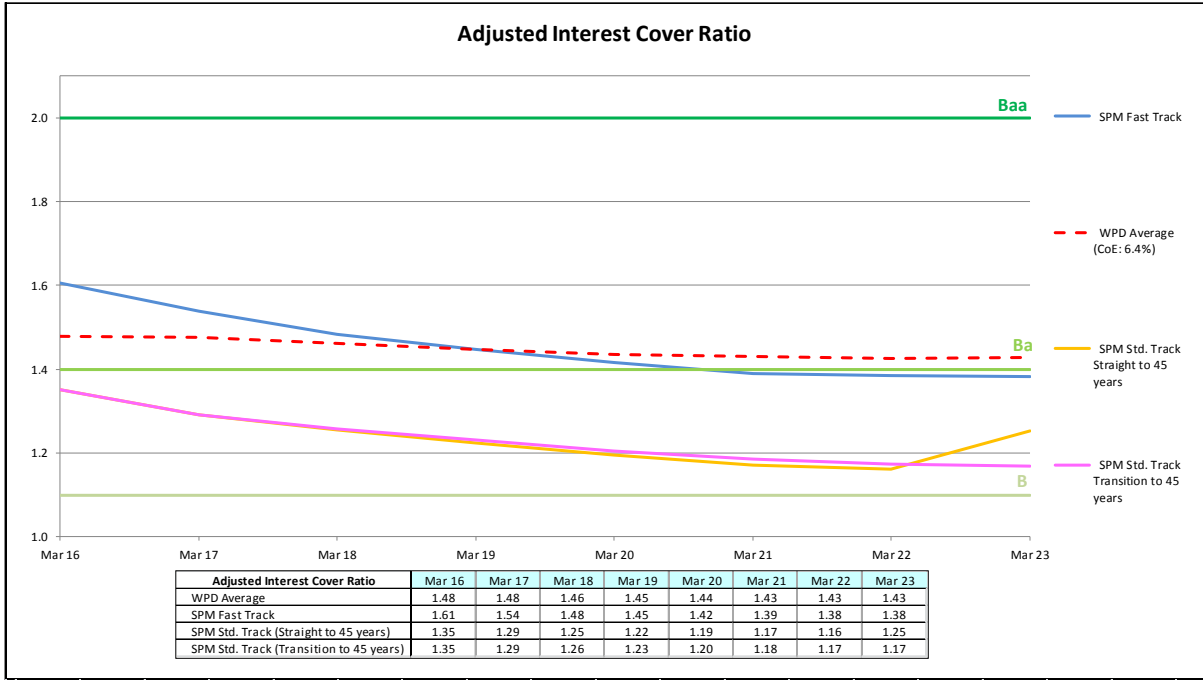
Compared with WPD, adjusted interest cover for SP Distribution looks stretched and declines over the course of ED1 even with transition although this ratio is calibrated to be neutral to changes in depreciation profile. A better indicator of the impact of transition is shown by FFO/Net Debt which improves with transition to a comfortable A rating across the ED1 period and comparable levels to our fast track proposals.

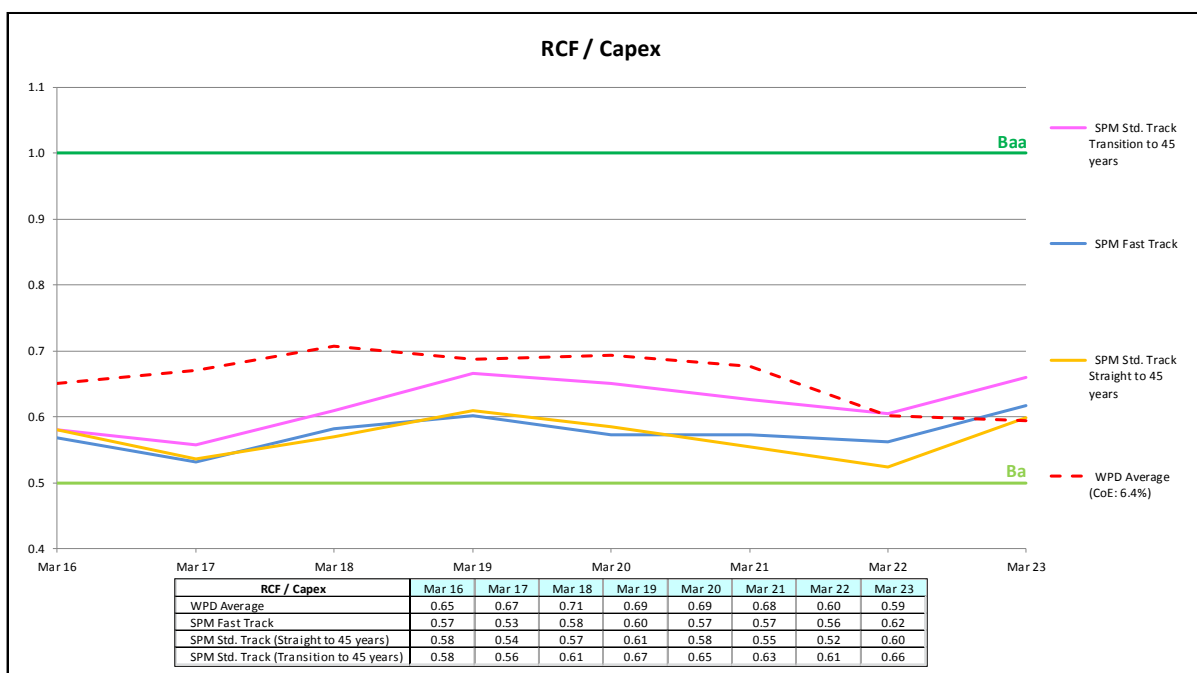
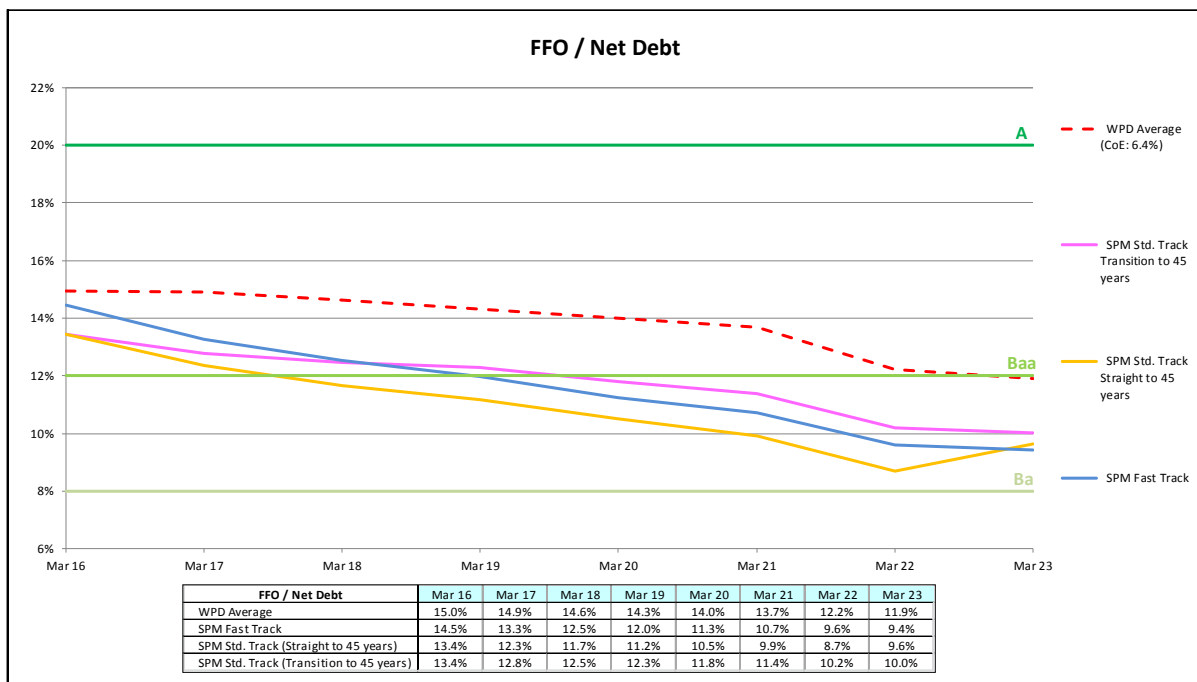
The table above suggests that SP Distribution achieves a much lower overall rating than the WPD companies pre risk; and this is also before the impact of any IQI settlement adjustments to income for SP Distribution. Therefore transition is justified for SP Distribution to give the company security against potential risk shocks to financeability. The four WPD fast track companies have far greater protection as, in addition to transition, they have much greater RPE allowances of c3.0% of totex and additional income equivalent to 2.5% of totex.

The following are the comparative graphs for SP Manweb

Figure 27: Key credit ratios for SP Manweb







The following table compares the 4 key credit metrics used by Moody's in their rating assessment.

SP Manweb	Fast track			WPD			Straight to 45			Transition		
	A	Baa	Ba	A	Baa	Ba	A	Baa	Ba	A	Baa	Ba
Factor 4: Key Credit Metrics (40%)												
a) Adjusted Interest Cover Ratio (3 Year Avg) – 15%			1.39		1.43				1.18			1.18
b) Net Debt / RAV (3 Year Avg) – 15%		66.8%			65.5%			67.1%			67.0%	
c) FFO / Net Debt (3 Year Avg) – 5%		9.9%		12.6%				9.4%			10.5%	
d) RCF / CAPEX (3 Year Avg) – 5%			0.56			0.62			0.55			0.58
Rating Indicated Rating from Grid factors 1-4	A3			A3				Baa1			Baa1	
Credit rating score		7.75		6.65				7.75			7.75	

Compared with the WPD average all the ratios look stretched for SP Manweb. Both adjusted interest cover and FFO/Net Debt deteriorate progressively over the course of ED1 and both are significantly lower than WPD even after including transition. Adjusted interest cover is borderline B rating by the end of the period compared with comfortable Baa for fast track.

In the straight to 45 years scenario an equity injection of £110.6m is required in 2022/23 which is the reason for the improvement in the adjusted interest cover, Debt to RAV and FFO/Net Debt ratios in that year.

The overall indicated rating is upper quartile Baa1 after the inclusion of transition (significantly lower than the WPD companies pre-risk). This could easily worsen with a few adverse risk shocks or as a result of the impact on revenues of the IQI settlement particularly as adjusted interest cover is already borderline B rating. Therefore transition is required.

g.7.4. Financeability summary

The financeability analysis in section g.7.3. “asset lives and depreciation” justifies the need for a one period transition in respect of depreciation lives for both SP Distribution and SP Manweb in order to maintain investment grade credit rating pre risk. However the ratios are severely stretched, particularly in SP Manweb, and it needs to be ensured that the final proposals ensure comfortable investment grade credit rating after assessing for risk including the impact on revenues of the information quality incentive settlement. The calibration/strength of the IQI incentive will not be known until initial proposals are published in July 2014. This may mean additional financial levers need to be considered at final proposals e.g. gearing or the capitalisation rate.

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

	SP Distribution	SP Manweb
Cost of Equity	6.4%	6.4%
Cost of Debt	2.72%	2.72%
Gearing	65%	65%
Vanilla WACC	4.0%	4.0%
Asset lives additions from 1.4.2015	Transition over ED1	Transition over ED1
Capitalisation rate	80%	80%
IQI Additional Income	Zero	Zero
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	Baa1	Baa1

g.7.5. Revenue Profiling

All of the financeability assessments above reflect unprofiled revenues to ensure direct comparability of the ratios based on the underlying cash flows. However, 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	322.2	337.9	340.6	345.5	345.7	345.3	344.9	342.7	339.4
%		4.9%	0.8%	1.5%	0.1%	(0.1%)	(0.1%)	(0.6%)	(1.0%)
SPM	403.6	307.7	319.4	322.0	323.3	325.1	330.6	315.4	313.2
%		(23.8%)	3.8%	0.8%	0.4%	0.6%	1.7%	(4.6%)	(0.7%)

- 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 enough volatility to warrant a profiling adjustment to smooth revenues over ED1 by adjusting revenues on a NPV neutral basis.

- 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 Distribution and 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
SPD	322.2	342.7	342.7	342.7	342.7	342.7	342.7	342.6	342.6
%		6.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
SPM	403.6	319.5	319.5	319.5	319.5	319.5	319.5	319.4	319.4
%		(20.8%)	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 profiled revenue for SP Distribution and SP Manweb.

g.7.6. 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	1546.9	1566.6	1588.7	1603.3	1615.8	1624.5	1628.7	1633.4
NPV neutral RAV base	1505.7	1526.5	1547.0	1565.1	1578.4	1588.9	1595.2	1599.6
Return on RAV	60.3	61.2	62.0	62.7	63.3	63.7	63.9	64.1
Depreciation	139.4	141.5	143.9	145.4	145.7	145.8	145.3	143.0
Fast Pot	40.6	40.3	41.5	40.0	39.6	38.6	37.4	36.9
Non Controllable	63.8	63.7	63.8	63.2	62.7	62.8	62.1	61.8
Other	38.6	36.0	31.5	31.4	31.4	31.8	33.9	36.8
Revenue	342.7	342.7	342.7	342.7	342.7	342.7	342.6	342.6

Cash Flow £m Nominal	15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23
Revenue	385.8	394.7	405.3	415.9	427.2	439.7	453.8	467.9
Operating costs	(139.5)	(143.5)	(149.4)	(151.5)	(155.1)	(158.8)	(161.2)	(165.1)
Cash flow from operations	246.3	251.2	255.9	264.4	272.1	280.9	292.6	302.8
Interest paid	(53.1)	(55.1)	(57.3)	(59.6)	(61.8)	(63.8)	(65.6)	(67.1)
Tax paid	(15.0)	(14.1)	(13.6)	(13.5)	(13.1)	(13.3)	(14.3)	(15.0)
Funds from Operations	178.2	182.0	185.0	191.3	197.2	203.8	212.7	220.7
Dividends paid	(29.7)	(31.0)	(32.3)	(33.7)	(35.0)	(36.3)	(37.5)	(38.8)
Retained Cash Flow	148.5	151.0	152.7	157.6	162.2	167.5	175.2	181.9
Capex	(177.8)	(182.1)	(193.4)	(192.2)	(195.9)	(197.3)	(196.7)	(200.4)
Debt Movement	(29.3)	(31.1)	(40.7)	(34.6)	(33.7)	(29.8)	(21.5)	(18.5)

Credit/Equity Metrics	15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23
FFO/Interest	3.8	3.7	3.7	3.6	3.6	3.6	3.7	3.7
PMICR using RAV depreciation	1.5	1.4	1.3	1.3	1.3	1.3	1.3	1.4
Net Debt:RAV	64.3%	63.9%	63.8%	63.6%	63.3%	63.0%	62.4%	61.7%
FFO/Net Debt	15.6%	15.3%	14.9%	14.9%	14.8%	14.8%	15.1%	15.4%
RCF/Net Debt	12.9%	12.6%	12.2%	12.1%	12.0%	12.1%	12.3%	12.5%
RCF/Capex	0.8	0.8	0.8	0.8	0.8	0.8	0.9	0.9
Regulated Equity/EBITDA	2.5	2.5	2.6	2.7	2.7	2.7	2.8	2.8
Regulated Equity/Regulated Earnings	7.8	8.5	9.1	9.4	9.8	10.1	10.0	10.1

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	1611.1	1695.9	1761.0	1807.5	1855.7	1909.6	1961.9	1997.8
NPV neutral RAV base	1541.1	1620.8	1694.5	1749.4	1795.9	1845.9	1898.0	1941.3
Return on RAV	61.8	65.0	67.9	70.1	72.0	74.0	76.1	77.8
Depreciation	132.8	138.3	142.9	146.7	147.2	148.3	138.0	138.8
Fast Pot	52.7	55.8	52.0	48.3	48.8	50.5	47.5	43.7
Non Controllable	33.9	33.7	33.3	32.7	32.2	32.5	32.0	31.8
Other	38.3	26.7	23.4	21.7	19.3	14.2	25.8	27.3
Revenue	319.5	319.5	319.5	319.5	319.5	319.5	319.4	319.4

Cash Flow £m Nominal	15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23
Revenue	359.9	368.8	379.0	389.4	399.7	410.9	423.4	436.6
Operating costs	(118.1)	(125.1)	(124.2)	(122.9)	(126.7)	(133.1)	(132.7)	(131.3)
Cash flow from operations	241.8	243.7	254.8	266.5	273.0	277.8	290.7	305.3
Interest paid	(54.9)	(60.2)	(65.9)	(70.8)	(75.6)	(81.1)	(86.8)	(91.7)
Tax paid	(11.4)	(9.0)	(7.3)	(6.4)	(5.2)	(4.1)	(3.5)	(3.2)
Funds from Operations	175.5	174.5	181.6	189.3	192.2	192.6	200.4	210.4
Dividends paid	(30.9)	(33.5)	(35.9)	(38.0)	(40.2)	(42.6)	(45.2)	(47.5)
Retained Cash Flow	144.6	141.0	145.7	151.3	152.0	150.0	155.2	162.9
Capex	(230.8)	(252.1)	(242.2)	(232.2)	(241.9)	(258.1)	(250.3)	(237.1)
Debt Movement	(86.2)	(111.1)	(96.5)	(80.9)	(89.9)	(108.1)	(95.1)	(74.2)

Credit/Equity Metrics	15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23
FFO/Interest	3.6	3.4	3.3	3.2	3.1	2.9	2.9	2.8
PMICR using RAV depreciation	1.5	1.3	1.2	1.2	1.1	1.0	1.2	1.2
Net Debt:RAV	65.4%	66.5%	67.3%	67.9%	68.5%	69.6%	69.9%	69.8%
FFO/Net Debt	14.5%	13.0%	12.4%	12.1%	11.5%	10.6%	10.4%	10.4%
RCF/Net Debt	11.8%	10.3%	9.8%	9.5%	8.9%	8.1%	7.9%	7.9%
RCF/Capex	0.6	0.6	0.6	0.7	0.6	0.6	0.6	0.7
Regulated Equity/EBITDA	2.5	2.6	2.6	2.6	2.6	2.7	2.7	2.7
Regulated Equity/Regulated Earnings	7.5	9.0	9.6	10.1	11.4	13.4	14.3	14.4

g.7.7. 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)					1.28	
b) Net Debt / RAV (3 Year Avg)				62.4%		
c) FFO / Net Debt (3 Year Avg)			14.8%			
d) RCF / CAPEX (3 Year Avg)					0.8	
Rating						
Indicated Rating from Grid factors 1-4				Baa1		
Credit rating score				7.62		

SP Manweb	Aaa	Aa	A	Baa	Ba	B
Factor 4: Key Credit Metrics (40%)						
a) Adjusted Interest Cover Ratio (3 Year Avg)					1.12	
b) Net Debt / RAV (3 Year Avg)				66.4%		
c) FFO / Net Debt (3 Year Avg)				10.4%		
d) RCF / CAPEX (3 Year Avg)					0.6	
Rating						
Indicated Rating from Grid factors 1-4				Baa1		
Credit rating score				7.75		

g.8. 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 the 'standard track' proposal excluding the additional income resulted in a requirement for utilisation of the one period transition financial lever in order to ensure an investment grade credit rating. However we also considered various alternative scenarios.

g.8.1 Capitalisation Rates

We considered an alternative to our empirically justified 80% capitalisation rate. We tested the impact of 5% lower which had similar financeability impacts to those for transition to 45 years regulatory asset lives.

g.8.2 Notional Gearing

Our primary justification for a gearing level of 65% was explained in section 3.f. We modelled gearing at 2.5% and 5% lower and found the impact improved financeability and may be a possible lever at final proposals to mitigate the impact of any downside risk. We

further tested and rejected gearing of 70% as part of our probabilistic assessment described in section 3.h.

g.8.3 Cost of Debt

Ofgem asked all DNOs to model the allowed cost of debt at a standard 2.72%. We believe that the index will move significantly lower during the RIIO-ED1 price control 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 3.e.

h. 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-Risk Modelling for RIIO-ED1.

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.

h.1. 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)	6.4%
Cost of Debt (real, indexed)	2.72%
Notional Gearing	65%
Dividend Yield (on equity proportion of RAV)	5%
Capitalisation Ratio	80%
Depreciation allowance move to 45 years	Single period transition

Our cost of equity assumption of 6.4% (real, post-tax) is the same as for the WPD fast-track decision and 30bps points below that set for DPCR5 and RIIO-GD1. We justify this value in section 'd'.

We have followed Ofgem's guidance for RIIO-ED1 and assumed 2.72%, which is the value of the 10 year trailing average to 31 October 2013, 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).

DNOs have embedded debt costs which arise from commitments entered into before the introduction of debt indexation. These commitments may not match the duration of the iBoxx index, and DNOs do not have unlimited discretion to issue debt at what, in retrospect, could be identified as an optimal time. In addition, as referred to in the earlier debt section 'e', previous analysis⁶² by First Economics has highlighted the mismatch between the allowed cost of debt, which is set in real terms and the nominal interest rate payments which arise from the majority of DNO debt. This leads to a substantial and growing shortfall in the cost of debt allowance relative to the nominal interest rate payments which will have to be made to lenders by SPM and SPD.

For the above two reasons, we model the actual interest cost imposed by the embedded historic debt. This has been included in our risk modelling to ensure a complete distribution of possible RIIO-ED1 financeability outcomes.

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

⁶² First Economics (2010), "Financeability: An Update", April and (2013) "Equity Financeability: A report prepared for Water UK", March

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).

h.2. 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 except for the IQI incentive and Totex incentive mechanism to account for the additional penalty applying if we do have to spend in excess of the allowance in order to deliver our outputs and, importantly, ensure that we meet our licence obligations regarding continuity of electricity supply. As raised earlier in the financeability section we found the IQI incentive has a material impact on credit ratings and is therefore included. A Totex sensitivity is included as while efficiency of expenditure is within the control of the DNO, the scale of future expenditure is also subject to external uncertainty (for example the uptake of LCT) . We include any proposed uncertainty mechanisms in our modelling.

The external risks considered are:

Risk	Comment	Modelling approach
Totex Uncertainty (including Real Price Effects (RPEs))	DNOs are exposed to uncontrollable changes in costs due to uncertainty about the future. Costs may inflate at a rate different from RPI.	We apply a triangular distributed shock to Totex centred on a mean of zero. This shock represents a combination of RPE risk and other future uncertainty impacts on Totex. We include the mitigating effect of any uncertainty mechanisms
IQI	The notional average DNO will, by definition, be below the quartile. There will be an “additional income” penalty with immediate impact on cash flow	We simulate an industry average IQI score of 105.
Cost of Debt	DNOs have embedded debt which was subject to market conditions at time of issue. New debt is refinanced at market rate rather than a trailing average of historic rates.	We calculate debt cost based on the historic embedded debt, with new debt issued at the prevailing iBoxx rate (forecast)
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.

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 both to the range of outcomes and to the median (50th percentile) rating score.

The median will by its construction take one of the discrete numeric values leading to a final rating.

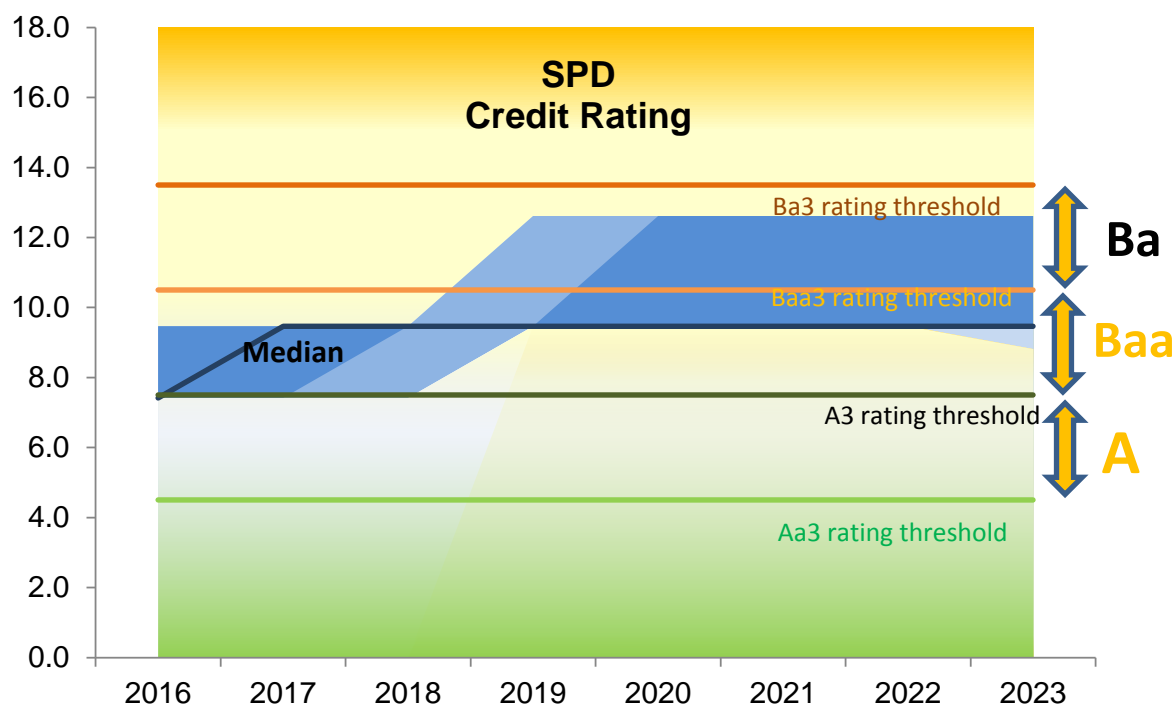
The median can therefore be taken to indicate a "central" and actual rating score, but may mask the fact that the financeability position is very close to a jump between discrete values (and possibly rating bands).

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.

h.3. SP Distribution

The distribution of credit rating outcomes generated by simulation is shown as a fan chart in Figure 28 for SP Distribution and Figure 32 for SP Manweb with the assumption the IQI assessment is 105 and the DNO is required to spend their full totex forecast.

Figure 28: Fan Chart showing SPD credit rating including External Risk with an IQI assessment of 105 and expenditure at 105

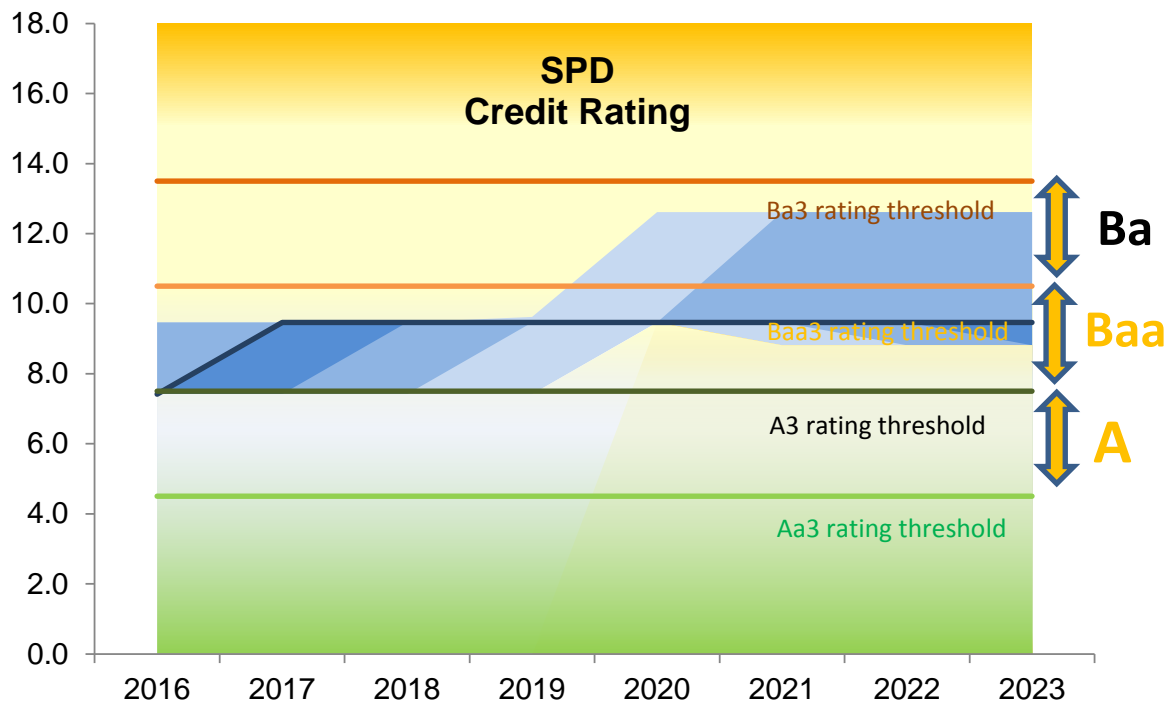


The central path for SP Distribution (the median) is shown as a dark line which (using Moody's methodology) commences at the A3 / Baa1 boundary and declines from 2017 onwards to the Baa2/Baa3 border for the majority of the period. At the median position we are therefore forecasting an investment grade credit rating will be maintained but the distribution of the graph shows there is a material risk at the 75% percentile that a combination of adverse outcomes could lead to a credit rating inconsistent with the allowed cost of debt.

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

SP Distribution (ED-1 IQI calibration)								
	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23
Median	7.42	9.47	9.47	9.47	9.47	9.47	9.47	9.47
Median Rating	A3	Baa2	Baa2	Baa2	Baa2	Baa2	Baa2	Baa2

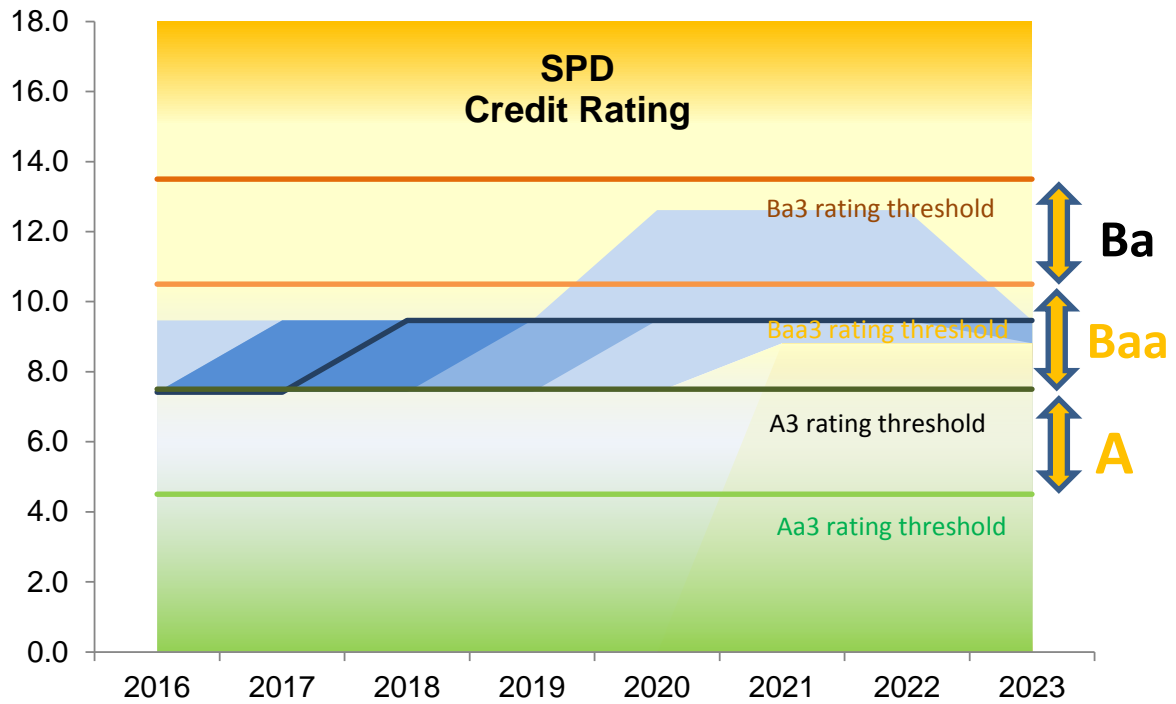
Figure 29: Fan Chart showing SPD credit rating including External Risk with an IQI assessment of 105 and expenditure at an allowance 101.5



The graph above presents the scenario that SP Distribution’s expenditure is at the allowance of 101.5, following an assessment of 105. This is a marginal improved view than figure 28 where the expenditure assumption is at the DNO’s forecast level rather than allowance. The distribution of the graph shows that at the 88% percentile from 2021 a combination of adverse outcomes could lead to a credit rating inconsistent with the allowed cost of debt.

As we referred earlier in this section the IQI incentive reward/penalty has a material ‘A symmetric’ impact on financeability in the standard track phase of this price control. Figure 30 below incorporates the IQI calibration utilised in the recent GD-1 RIIO price control. The credit rating distribution below materially improves under these assumptions.

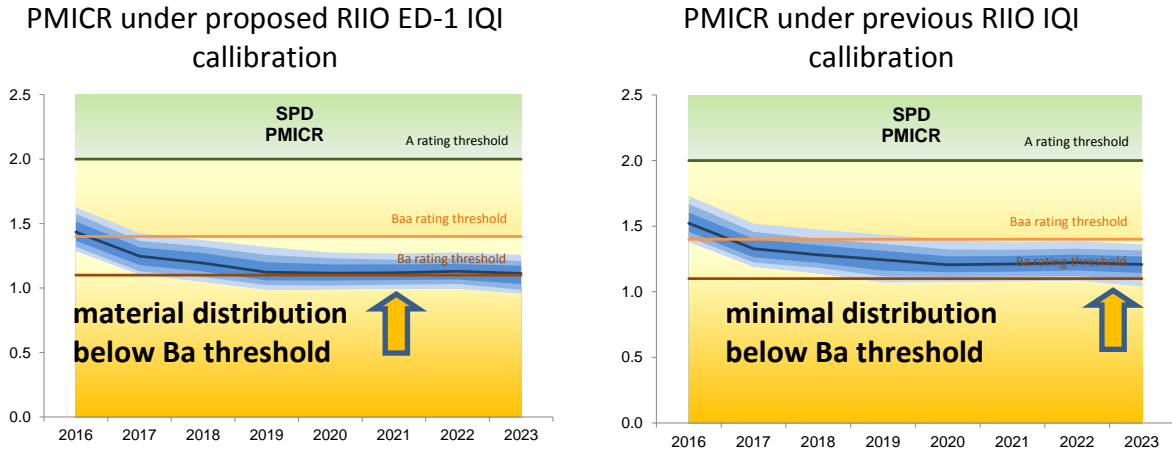
Figure 30: Fan Chart utilising GD-1 IQI calibration showing SPD credit rating including External Risk



At the median position using the GD-1 IQI calibration the forecast credit rating maintains Baa1 until 2017 before reducing to the Baa2/Baa3 for the remainder of the period but the risk of a credit rating below investment grade is much reduced and at the 95% percentile in 2020 to 2022.

The additional income penalty / reward impacts all the main credit ratios, however, it is the post maintenance interest cover ratio (PMICR) that is most materially impacted. From the distributions below it can be seen, adopting the ED-1 proposed IQI, left-hand graph, that from 2019 onwards at the 25% percentile the PMICR ratio will be below the level of a Ba rating credit ratio. The graph on the right presents the PMICR following established RIIO IQI calibrations and the risk is materially reduced and only at the 5% percentile.

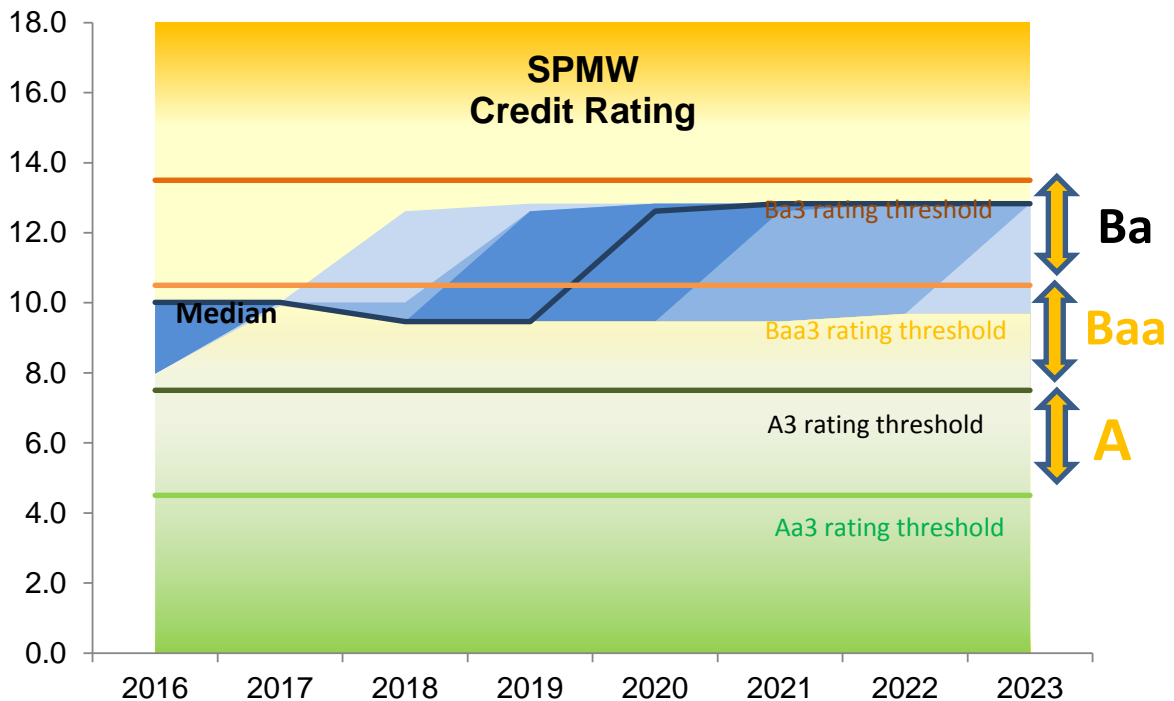
Figure 31: Fan Charts comparing SPD's PMICR under the IQI calibration proposed for ED-1 and GD-1 IQI.



h.4. SP Manweb

The distribution of credit rating outcomes generated by simulation is shown as a fan chart in Figure 4.

Figure 32: Fan Chart Showing SPM credit rating including External Risk



The central path for SP Manweb (the median) is shown as a dark line within the Baa band until 2019 before dropping materially below investment grade into the Ba band for the remainder of the period. As highlighted earlier in the 'static' modelling section the credit

ratios for SP Manweb are weaker than SP Distribution before any risk is modelled. The distribution of the graph above shows that the likelihood of a credit rating within investment grade progressively deteriorates from median in 2019 to only at the 25% percentile for 2020 & 2021, dropping further to the 13% percentile at 2022 and 5% percentile in 2023.

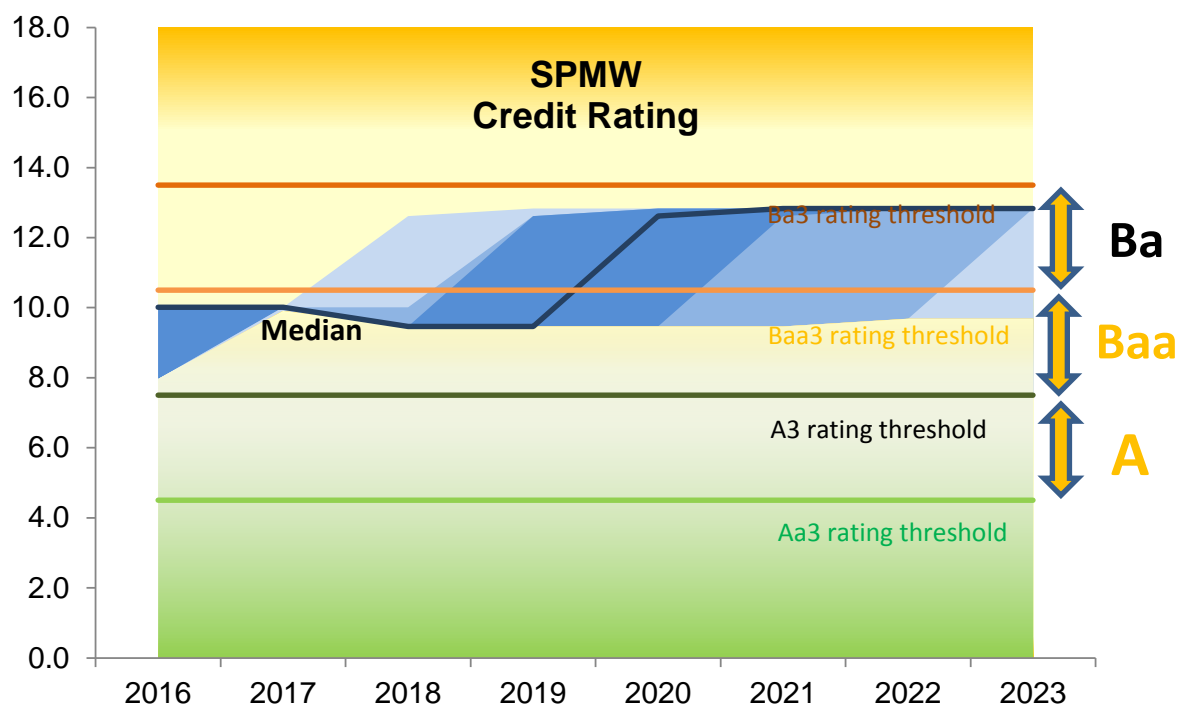
Clearly the credit rating is inconsistent with the i-Boxx allowed cost of debt. To mitigate this forecast combination of adverse outcomes it has been calculated an equity injection of c.£190m would be required to maintain an investment grade rating for the period. The COE therefore needs to be maintained, at least, at the modelled 6.4%, as it is highly likely SP Manweb will need to attract equity, after the inclusion of risk, to maintain an investment grade credit rating in the period.

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

SP Manweb (ED-1 IQI calibration)								
	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23
Median	10.01	10.01	9.47	9.47	12.62	12.83	12.83	12.83
Median Rating	Baa3	Baa3	Baa2	Baa2	Ba3	Ba3	Ba3	Ba3

Similar to SPD the IQI incentive reward/penalty has a material impact on financeability and the credit rating is very sensitive to deductions in revenue. Figure 5 below incorporates the IQI calibration utilised in the recent GD-1 RIIO price control as in figure 2 above for SPD. The median credit rating distribution below materially improves under these assumptions to Baa and investment grade for the majority of the period until 2022. There is still material risk, with this IQI calibration, that exposes equity holders to the possibility, at the 75% percentile, the company from 2021 onwards will require an injected equity to maintain an investment grade rating.

Figure 33: Fan Chart showing SPM credit rating including External Risk with an IQI assessment of 105 and expenditure at an allowance 101.5

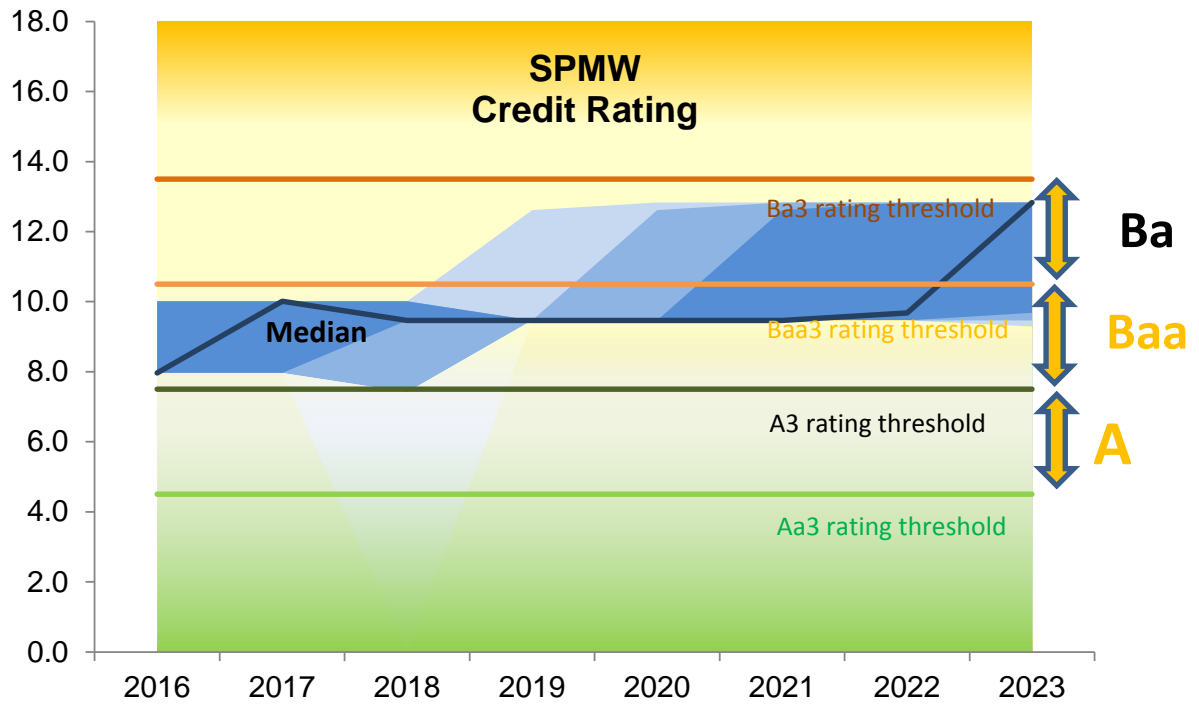


The graph above presents the scenario that SP Manweb’s expenditure is at the allowance of 101.5 following an assessment of 105. This is a marginal improved view than Figure 32, where the expenditure assumption is at the DNO’s forecast level rather than allowance. The median is within the Baa band until 2021 before dropping materially below investment grade into the Ba band for the remainder of the period.

the likelihood of a credit rating within investment grade progressively deteriorates from median in 2020 to only at the 25% percentile for the remainder of the period.

As we referred earlier in this section the IQI incentive reward/penalty has a material ‘Asymmetric’ impact on financeability in the standard track phase of this price control. Figure 2 below incorporates the IQI calibration utilised in the recent GD-1 RIIO price control. The credit rating distribution below materially improves under these assumptions.

Figure 34: Fan Chart utilising GD-1 IQI calibration showing SPMW credit rating including External Risk



As with SPD it is the post maintenance interest cover ratio (PMICR) that is most materially impacted. From the distributions below it can be seen, adopting the ED-1 proposed IQI, left-hand graph, that after 2019 at the median the PMICR ratio will be below the level of a Ba rating credit ratio. The graph on the right presents the PMICR following previous IQI calibrations and the risk is materially reduced from 2020 and at the 25% percentile.

Figure 35: PMICR under proposed RIIO ED-1 IQI calibration

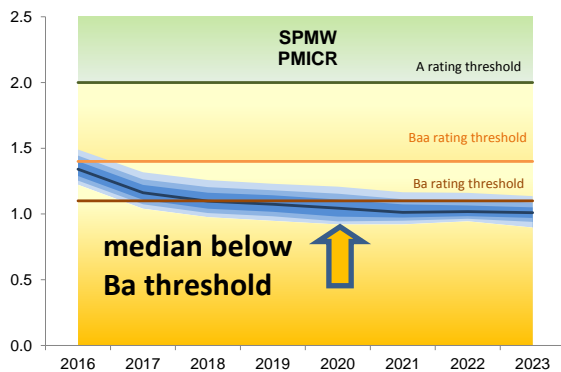
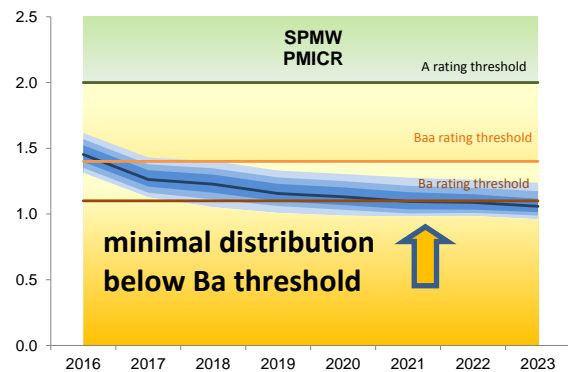


Figure 36: PMICR under previous RIIO IQI Callibration



h.5. Conclusion

In summary, we have demonstrated by this risk analysis that our plan incorporating a notional gearing of 65%, is materially affected by Ofgem's calibration of the IQI incentive. The distribution of external risk based on the proposed ED-1 IQI calibration, presented above in SP Distribution Figure 28 and SP Manweb Figure 32, show a material risk that both SP Distribution and SP Manweb's credit ratings, as assessed using Moody's methodology's quantitative and qualitative factors, are at a level inconsistent with the allowed cost of debt. Under such outcomes equity holders will be required to inject equity and the 6.4% CoE assumption, consistent with the fast track DNO, will be necessary to compensate equity holders of both SP Distribution and SP Manweb for bearing this higher level of risk. In addition, the CoE assumption needs to be maintained to attract the likely additional equity to maintain an investment grade credit rating.

Under the base risk modelling for SP Manweb, inclusive of the proposed ED-1 IQI, we have identified that equity injections of c£190m would be required to reduce gearing to c.60%. This would be necessary to ensure SP Manweb is securely funded, so that the normal operation of proposed RIIO-ED1 incentives is unlikely to lead to financial distress, when coupled with adverse shocks from external risks.

There remains an inherent uncertainty around the base assumption of 65% gearing for SP Manweb until the IQI mechanism is finalised. Only on the final calibration of the IQI mechanism will we be able to 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.

4. 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.

a. Totex and 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

SP Distribution	15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23	Total
Totex (£M)	202.8	201.5	207.5	200.0	197.8	193.2	186.8	184.6	1574.1
Capex	164.7	162.7	168.4	161.4	158.6	153.7	147.8	145.2	1262.4
Inferred Capitalisation Rate	81.2%	80.7%	81.1%	80.7%	80.2%	79.6%	79.1%	78.7%	80.2%

SP Manweb	15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23	Total
Totex (£M)	263.3	278.9	259.9	241.6	244.2	252.7	237.7	218.4	1996.8
Capex	215.4	231.0	212.0	193.6	195.7	204.6	189.7	169.6	1611.6
Inferred Capitalisation Rate	81.8%	82.8%	81.6%	80.1%	80.1%	80.9%	79.8%	77.7%	80.7%

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. These are shown in the table below.

Table 10: DPCR5 Historic Inferred Capitalisation Rate

SP Distribution	10/11	11/12	12/13	3 year Average
Regulatory Reporting Inferred Capitalisation Rate	84.8%	83.3%	82.9%	83.7%

SP Manweb	10/11	11/12	12/13	3 year Average
Regulatory Reporting Inferred Capitalisation Rate	80.0%	78.5%	79.5%	79.4%

Table 10 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 SP Distribution and SP Manweb because this is the average rate inferred in the ED1 Expenditure Projections table.

b. Asset Lives and 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.

However, as noted above our analysis suggests that both SP Distribution and SP Manweb are not financeable at a comfortable investment grade credit rating unless transitional arrangements or other financeability adjustments are applied. We have looked at other options such as changing the capitalisation rate to 75% but we consider that a straight line transition approach moving from 20 years to 45 years over the course of RIIO-ED1 is the most appropriate; this also has the benefit of mitigating any financial shocks in future price control periods.

Asset life applied to RAV additions acquired in each year of RIIO-ED1							
2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23
23.125	26.25	29.375	32.5	35.625	38.75	41.875	45.0

5. Financial Policies

a. 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.

a.1. Attribution of costs to capital allowances pools

The following tables show the 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 for tax purposes 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.

SP Distribution %	General	Special rate	Revenue	Non Qualifying
Load	0.0%	89.8%	0.0%	10.2%
Non-Load-asset replacement	0.0%	95.1%	0.0%	4.9%
Non load - other/non op	81.6%	9.7%	0.0%	8.7%
Faults	0.0%	76.8%	23.2%	0.0%
Tree cutting	0.0%	35.9%	64.1%	0.0%
Controllable Opex	4.3%	49.0%	43.7%	3.0%
Pension costs	0.0%	0.0%	100.0%	0.0%

SP Manweb %	General	Special rate	Revenue	Non Qualifying
Load	0.0%	91.0%	0.0%	9.0%
Non-Load-asset replacement	0.0%	94.0%	0.0%	6.0%
Non load - other/non op	86.1%	8.0%	0.0%	5.9%
Faults	0.0%	72.0%	28.0%	0.0%
Tree cutting	0.0%	21.5%	78.5%	0.0%
Controllable Opex	4.2%	43.8%	48.9%	3.0%
Pension costs	0.0%	0.0%	100.0%	0.0%

The following table shows the generic (i.e. the average of the combined SP Distributuion and SP Manweb costs) allocation of costs between the capital allowances pools during the RIIO-ED1 period. These are the Non Load agreement allocations at Final Proposals assuming no changes to our business plan totex.

Generic %	General	Special rate	Revenue	Non Qualifying
Load	0.0%	90.5%	0.0%	9.5%
Non-Load-asset replacement	0.0%	94.4%	0.0%	5.6%
Non load - other/non op	84.2%	8.7%	0.0%	7.1%
Faults	0.0%	74.6%	25.4%	0.0%
Tree cutting	0.0%	27.4%	72.6%	0.0%
Controllable Opex	4.3%	46.3%	46.4%	3.0%
Pension costs	0.0%	0.0%	100.0%	0.0%

The following tables compare the above allocations of capex to the pools with the average allocations (excluding non regulated activities) in the most recent four years submitted HMRC tax computations i.e. for the periods ending 31st December 2009 to 2012.

SP Distribution	General	Special rate	Non qualifying
Capex allocations £m	96.7	1094.4	67.4
Capex allocations %	7.66%	87.00%	5.34%
Average HMRC %	0.38%	94.72%	4.90%
Variance %	7.27%	-7.70%	0.43%

SP Manweb	General	Special rate	Non qualifying
Capex allocations £m	132.0	1384.8	94.8
Capex allocations %	8.19%	85.93%	5.88%
Average HMRC %	0.84%	94.58%	4.58%
Variance %	7.35%	-8.65%	1.30%

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.

a.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	29.7	1057.3
SP Manweb	25.1	1177.2

b. 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.

b.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
SP Distribution annual allowance 12 years from 1 April 2013 at discount rate of 2.6%	£20.6m p.a.	
SP Manweb annual allowance 12 years from 1 April 2013 at discount rate of 2.6%		£20.6m p.a
SP Manweb regulatory proportion of pre 31/3/10 deficit adjusted to limit funding to 5% LPI pension increases only		£200.0m
SP Manweb 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.

b.2. Incremental deficit

The incremental deficit is included in totex and benchmarked as part of total totex. Consistent with the calculation of the ongoing future service costs, this has been calculated based on the 31st March 2012 triennial valuations which were finalised on 29 July 2013 (SPPS) and 28 August 2013 (Manweb). 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	£3,060m	£1,234m
Assets	£2,546m	£864m
Deficit	-£514m	-£370m
Annual deficit reduction contributions	£49.6m p.a.	£30.0m p.a.
pre 31/3/10 deficit	£46.3m p.a.	£29.6m p.a.
post 31/3/10 deficit	£3.3m p.a.	£0.4m 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 10 years from 1 st April 2013	£0.55m p.a.	£0.15m p.a.
SPM incremental deficit payments over 10 years from 1 st April 2013	£0.55m p.a.	£0.15m p.a.

The annual deficit reduction contributions required from the company are based on a 12 year recovery plan and have been calculated using the 31st March 2012 valuation assumptions as set out in the schemes' statement of funding principles. 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.

b.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)	36.0%	35.6%
Employee	5.0%	5.5%
Employer	31.0%	30.1%

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	27.6	31.0	31.0	32.3	32.3	32.3	34.6	34.6	34.6	36.7
Manweb %	23.9	27.5	30.1	30.1	31.5	31.5	31.5	34.0	34.0	34.0	36.4

It should be noted that the revised rates are payable from August 2013 and September 2013 in respect of the SPPS and Manweb schemes respectively; so the rates for 13/14 are a weighted average. 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 (3.4% on earnings between LEL and UAP). 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.

b.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).

b.5. Pension scheme administration costs

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

Both SPPS and Manweb are now paying fixed flat administration expenses of £1.7m p.a. and £1.3m p.a. respectively. The table below assumes 3% inflation p.a. (i.e. reducing expenses in real terms).

Scheme	12/13	13/14	14/15	15/16	16/17	17/18	18/19	19/20	20/21	21/22	22/23
SPPS £m	1.4	1.7	1.6	1.6	1.5	1.5	1.4	1.4	1.3	1.3	1.3
Manweb £m	1.3	1.3	1.2	1.2	1.2	1.1	1.1	1.1	1.0	1.0	1.0

b.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.

c. Price Control Financial Model

Our business plan revenues have been calculated in the version of the model issued to us by Ofgem on 17th January 2014. We have made no amendments to the model other than clarifications received from Ofgem.

c.1. 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 one period transition
Capitalisation	Yes	Inferred per Ofgem guidance on approach
Taxation	Yes	Well established approach
Pensions	Yes	Well established approach
Dividends	Yes	'Vanilla' PCFM approach

6. 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.