NERA
ECONOMIC CONSULTING

Risk Modelling for RIIO-T2

Prepared for Scottish Power Transmission

12 November 2019

CONFIDENTIALITY

Our clients' industries are extremely competitive, and the maintenance of confidentiality with respect to our clients' plans and data is critical. NERA Economic Consulting rigorously applies internal confidentiality practices to protect the confidentiality of all client information.

Similarly, our industry is very competitive. We view our approaches and insights as proprietary and therefore look to our clients to protect our interests in our proposals, presentations, methodologies and analytical techniques. Under no circumstances should this material be shared with any third party without the prior written consent of NERA Economic Consulting.

Project Team

Richard Druce
Zuzana Janeckova
Ambrus Barany
Maximilian Czernin

NERA Economic Consulting
Marble Arch House
66 Seymour Street
London, UK W1H 5BT
+44 207 659 8500
www.nera.com

Contents

1. Introduction and Model Overview

1.1. Introduction

Scottish Power Transmission ("SPT") has commissioned NERA Economic Consulting ("NERA") to develop a financial risk modelling platform for the RIIO-T2 price control review. The main aim of this model is to assess the financeability of SPT over the period from 2021/22 to 2025/26, given the company's cost forecasts and assumptions regarding key regulatory parameters.

The model will be updated and developed further as the RIIO-T2 price review process progresses. For instance, we expect to update the model based on Ofgem's draft and final determinations, to reflect changes to the proposed regulatory framework and to set the regulatory parameters at the levels defined in Ofgem's latest decisions. The risk model will inform SPT's business plan submissions to Ofgem throughout the RIIO-T2 review.

1.2. Context and Model Overview

Ofgem "*has a duty to have regard to the need to secure that companies are able to the finance the activities which are the subject of obligations imposed by or under the relevant legislation"*. According to Ofgem, an "*investment grade credit rating signals a strong likelihood that the company will be able to meet its liabilities*".[1] In addition to Ofgem's duty to ensure that an efficient network company is financeable when setting price controls, regulated companies themselves have licence requirements that require them "*to take all appropriate steps within their power to maintain an investment grade credit rating*".[2]

Against this background, we have developed a risk model to assess the risks around SPT's financeability over the RIIO-T2 period. Our risk modelling involved three key steps:

1. First, we identified the key risk factors for SPT over the RIIO-T2 period, i.e. factors, such as actual totex, incentives and interest rate risk, that have an impact on the company's financial performance. In addition to identifying the risk factors themselves, we also performed research and analysis and drew on SPT's expert judgment to identify probability distributions for each of these risk factors characterising the range of uncertainty around them;
2. Second, we modified SPT's Business Plan model for RIIO-T2, which builds on Ofgem's RIIO-T1 Price Control Financial Model (PCFM), to enable Monte Carlo simulation. We changed the deterministic business plan model into a stochastic risk model capable of running thousands of random simulations based on the probability distributions identified for the key risk factors. We do this using Oracle's Crystal Ball Monte Carlo simulation software. In addition to introducing this stochastic element into the model, we also had to make a number of other changes to the model, such as to explicitly distinguish between allowed cost and actual costs, and to amend the modelling of Ofgem's Annual Iteration Process;
3. Third, we developed the infrastructure to capture probability distributions around key financial ratios, i.e. credit metrics which are used by Ofgem to assess companies'

[1] Ofgem (14 March 2019), Consultation: RIIO-2 Sector Specific Methodology Annex: Finance, p. 55.

[2] Ofgem (14 March 2019), Consultation: RIIO-2 Sector Specific Methodology Annex: Finance, p. 55.

financeability. Building on the modelled probability distributions for the credit metrics, we also estimate probability distributions for SPT's overall credit rating, based on Moody's rating methodology.

The risk model will allow SPT to test whether a given package of regulatory parameters proposed by Ofgem enables SPT to remain financeable, defined by having a sufficiently high probability of meeting the minimum levels of credit metrics required for an investment grade credit rating.

2. Identifying and Quantifying Risk Factors

As the first step of the risk modelling, we identified the key risk factors affecting SPT's financial ratios in the RIIO-T2 period, i.e. uncertainties around key input assumptions that feed through to the financial performance of the business. We then identified appropriate probability distributions to attach to each of these risk factors, based on our own analysis and SPT's expert judgement. In this chapter, we discuss the distributional assumptions we have made for each of the five key risk factors affecting SPT's financeability at RIIO-T2, i.e. for:

1. Costs (totex and non-controllable opex);
2. Incentives;
3. CPIH Inflation;
4. The RPI-CPIH wedge; and the
5. Interest rate.

In our modelling, we assume that the above five risk factors are independent of each other, except for costs risk and incentives risk, which we correlate as discussed below.

2.1. Cost Risk

The model distinguishes between two different sets of cost forecasts: (1) allowed costs that are used to calculate SPT's revenue entitlement, which will be determined by Ofgem at RIIO-T2 (and which are currently based on SPT's Business Plan forecasts); and (2) actual costs which feed through the model to determine the impact of any over/underspend relative to the allowance on SPT's credit metrics.

We have modelled uncertainty around SPT's actual costs for both totex and for non-controllable opex (a pass-through item). Based on SPT's expert judgement, we have assumed a triangular distribution around SPT's business plan forecasts for the entire RIIO-T2 period, assuming a ±10 per cent range around SPT's forecasts at the 10th and 90th percentiles of the distribution.[3] We simulate outturn costs for non-controllable opex and for each totex cost category, i.e. for load-related capex, asset replacement capex, other capex, controllable opex and non-op capex.

2.2. Incentives Risk

Ofgem will consider a range of incentive schemes for RIIO-T2 to encourage companies to deliver outputs and improve service quality. Incentive schemes often include a financial reward or penalty element, which creates revenue risk for companies.

SPT has advised us to assume that totex and incentives uncertainty together will amount to ±300 basis points of Return on Regulated Equity (RORE) (at the two extremes of the distribution). We have therefore defined a triangular distribution for incentive revenues that

[3] We have assumed that risks increase over time such that the ±10 per cent range applies over the whole of RIIO-T2. We have also assumed that the ±10 per cent range (at the 10th and 90th percentiles of the distribution) applies to totex and non-controllable opex as a whole, i.e. our modelling implicitly assumes that if outturn totex is 10 per cent higher than forecast, outturn non-controllable opex will also be 10 per cent higher. The same is true for the various categories within totex, e.g. if load-related capex is 10 per cent higher than forecast, so is non-op capex.

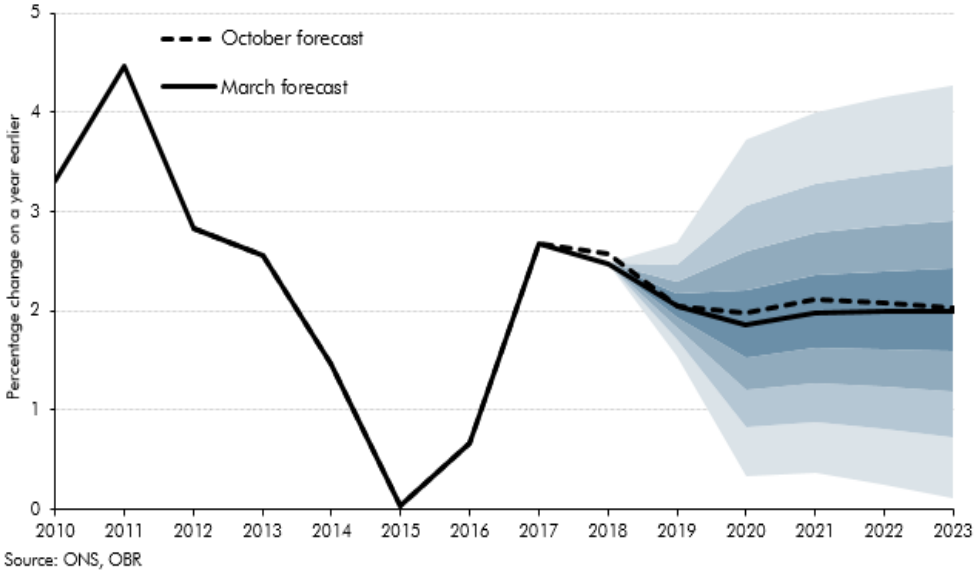
reflects (1) this ±300 basis points of RORE range for totex and incentive revenues combined; and (2) the distribution for totex described above.[4] The mode of this distribution is zero, i.e. the most likely outcome is that SPT's incentive revenues during RIIO-T2 are equal to zero.[5]

2.3. Inflation (CPIH) Risk

Ofgem has confirmed that it will move to CPIH indexation for the RIIO-T2 period. Hence, allowed revenues in the model are indexed in each year of RIIO-T2 based on a forecast of CPIH inflation. Ofgem's current CPIH forecasts are based on the Office for Budget Responsibility's (OBR's) CPI forecasts from its March 2019 Economic and Fiscal Outlook, as Ofgem assumes that the best proxy for CPIH inflation is CPI inflation.[6]

We define a distribution for CPIH inflation forecasts using the OBR's March 2019 Economic and Fiscal Outlook, which includes a fan chart of CPI inflation and an associated table with CPI forecasts until 2023 for selected percentiles of the probability distribution.[7] Our central forecast (at the 50th percentile of the OBR's forecasts) coincides with Ofgem's CPIH forecasts.

Figure 2.1: We Model CPIH Forecast Risk Based on the OBR's Fan Chart



Source: OBR, March 2019 Economic and Fiscal Outlook: Charts and tables, Chart 3.18.

4 This gives a range for incentives risk of about ±175 basis points of RORE (at the two extremes of the distribution).

5 Because of the need to achieve a ±300 basis points of RORE range in total for totex and incentives uncertainty, we assume the two risks are perfectly negatively correlated. In other words, when outturn totex is at the 90th percentile of the totex distribution, incentive revenues are at the 110th percentile of the probability distribution for incentives.

6 Ofgem (24 May 2019), Decision: RIIO-2 Sector Specific Methodology – Core document, p. 128.

7 The OBR provides CPI forecasts for the 10th, 20th, …, 80th and 90th percentiles of the distribution. We derive a forecast for each percentile by linear interpolation and extrapolation. We then simulate random numbers between 0 and 100 and select CPI forecasts associated with the same percentiles. Since the OBR's forecasts extend to 2023, we use the 2023 forecasts for later years of the price control (in line with Ofgem's approach).

2.4. RPI-CPIH Wedge Risk

The wedge between CPIH and RPI forecasts is an important risk factor in RIIO-T2, due to (1) Ofgem's move to CPIH indexation from RPI indexation; and (2) since index-linked debt (ILD) is indexed to RPI, not CPIH. Ofgem assumes a wedge of 1.049%, based on the difference between the OBR's CPI and RPI forecasts for 2023.[8]

We model the uncertainty around the RPI-CPIH wedge forecast assuming a normal distribution around Ofgem's forecast of 1.049% based on a standard deviation of 1.08%, estimated as the standard deviation of the historical annual (financial year) RPI-CPIH wedge since the Bank of England began targeting inflation at 2% (in 1997).[9]

SPT's Business Plan model, based on the RIIO-T1 PCFM, did not include separate modelling of nominal and ILD debt.[10] We have therefore modified the functionality of the PCFM, to separate out the modelling of index-linked and nominal debt costs. As part of modelling the cost of index-linked debt, we have incorporated the risk of the RPI-CPIH wedge deviating from Ofgem's forecast.[11]

2.5. Interest Rate Risk

Risk around future interest rates creates risk around the allowed cost of debt, given Ofgem's approach to linking the allowance to the actual evolution of yields on the benchmark A/BBB iBoxx 10+Y corporate non-financials index during the RIIO-T2 period. Risk around future interest rates also creates risk around the allowed cost of equity, given Ofgem is proposing to introduce cost of equity indexation at RIIO-T2.[12]

2.5.1. Cost of debt projections for RIIO-2

We project future iBoxx rates as the sum of projected real (CPIH) risk-free rates and projected debt premia.

---

8 Ofgem (24 May 2019), Decision: RIIO-2 Sector Specific Methodology – Finance, p. 7.

9 We have found, based on regression analysis using ONS data, that the level of CPIH inflation has no statistically significant impact on the RPI-CPIH wedge. We have therefore assumed a normal distribution around Ofgem's central forecast for the wedge, using a standard deviation derived based on historical data. We have used all data points since the BoE began targeting inflation at 2%, because (1) it is not clear that the RPI formula change of 2010, which had an impact on the level of the wedge, would have had an impact on the standard deviation of the wedge; (2) using only data from after the 2010 RPI formula change would not give enough data points to estimate a robust standard variation for the wedge; (3) there is limited difference in the average wedge in the period before and after the RPI formula change, suggesting that it is appropriate to derive the standard deviation over the full period. As a cross-check, we have also derived the standard deviation of the wedge in a way that controls for the slight change in the average wedge due to the RPI formula change. This approach gives an almost identical result (1.08%) to the simple standard deviation estimate (1.08%).

10 Instead, nominal and ILD costs are modelled jointly, with total interest costs spread between cash and accrued, based on a notional ILD share assumption.

11 Specifically, we added the cost of the RPI-CPIH wedge deviating from Ofgem's expectation to the cash cost of index-linked debt, in line with the assumption that rating agencies may not recognise the full benefit of RPI inflation accretion in calculating ratios under the move to CPIH indexation of the RAV.

12 Ofgem (24 May 2019), Decision: RIIO-2 Sector Specific Methodology – Finance, p. 121.

Projecting future risk-free rates

We project future real (CPIH) risk-free rates over the RIIO-T2 period based on nominal forward rates derived by Bloomberg from UK nominal Treasury yields, deflated using a long-term CPI inflation assumption of 2 per cent based on OBR data.[13] We use the forward rates derived from Bloomberg data as our central forecast (at the 50th percentile of the distribution).

We model uncertainty around the central forecast assuming a normal distribution with a standard deviation of 1.96 per cent in the last year of RIIO-T2, derived based on the annualised standard deviation of daily yields on 10-year UK nominal gilts calculated over the last 10 years. We then perform a Monte Carlo simulation of the interest rate in the last year of the RIIO-T2 period based on the above distribution, and calculate a corresponding simulated path for the interest rate for each year of the RIIO-T2 period by tracing back the simulated forecast to the beginning of the RIIO-T2 period, in line with the expected profile of the central forecast.[14]

Projected debt premium

We forecast the debt spread for the A/BBB iBoxx 10Y+ corporate non-financials index based on the historical relationship between the debt spread and the level of the risk-free rate. Our analysis reveals a negative correlation between the debt spread and the level of the risk free rate, which we reflect in our projections of the debt spread. This results in the actual (real) cost of debt being less volatile than the simulated risk free rate, due to the inverse correlation between the debt spread and the level of the simulated real risk free rate.

Projected allowed cost of debt

We calculate the projected allowed cost of debt using the "trombone" index proposed by Ofgem, which starts as a 11-year average of the iBoxx benchmark bond yields to calculate the allowance for the first year of RIIO-T2, and increases the averaging period by 1 year in each year of RIIO-T2, reaching a 15-year averaging period by the end of RIIO-2.[15] We update the allowed cost of debt during the RIIO-T2 period in line with the simulated forecast cost of debt as described above. For the historical years which feed into the allowed trombone index and which are already known now, we take the historical iBoxx index values and deflate them to real CPIH terms using historical forecasts of long-term inflation from the OBR of 2 per cent.[16]

---

13 We use a maturity of 10-years for the forward nominal risk-free rate.

14 We trace back the simulated path of interest rates by calculating how far the simulated interest rate for the last year of RIIO-T2 is from the central forecast, measuring the distance as a multiple of standard deviations (i.e. how many standard deviations away is the simulated forecast from the central forecast). We then apply the same distance, measured in multiples of standard deviations, to the standard deviation calculated for each of the years in RIIO-T2 and add it to the central forecast for that year to calculate the corresponding simulated interest rate for that year. Given the standard deviation of the forecasts increases with the forecasting horizon, our approach results in an increasing uncertainty profile over time.

15 Ofgem (24 May 2019), Decision: RIIO-2 Sector Specific Methodology – Finance, p. 19.

16 OBR (13 March 2019), Historical official forecasts database, URL: https://obr.uk/docs/dlm_uploads/Historical_official_forecasts_database_March_2019.xlsx. Last accessed on 28 June 2019.

Our approach for projecting allowed cost of debt for RIIO-T2 follows a slightly different methodology compared to Ofgem's approach described Sector Specific Methodology Decision for RIIO-T2.[17] However, our central projections are very close to Ofgem's central projections, 2 bps higher on average over RIIO-T2.[18]

2.5.2. Cost of equity projections for RIIO-2

We update the allowed cost of equity following the methodology for cost of equity indexation as set out by Ofgem in the Sector Specific Methodology Decision for RIIO-T2.[19] We align our central projections of the real risk-free rate used for cost of equity indexation with Ofgem's projections.[20] We then simulate uncertainty around these central projections using the same method as for modelling uncertainty for the cost of debt described in the previous section.

[17] Ofgem (24 May 2019), Decision: RIIO-2 Sector Specific Methodology – Finance, Chapter 2.

[18] Ofgem (24 May 2019), Decision: RIIO-2 Sector Specific Methodology – Finance, p. 19.

[19] Ofgem (24 May 2019), Decision: RIIO-2 Sector Specific Methodology – Finance, Chapter 3.

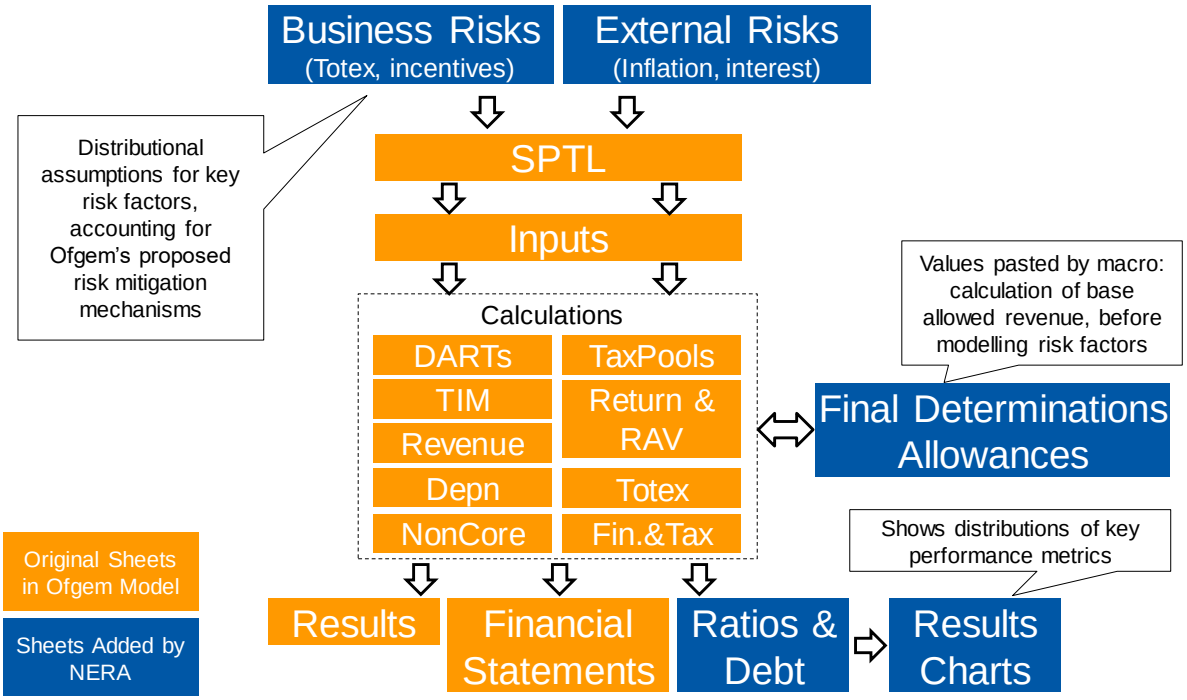
[20] Ofgem (24 May 2019), Decision: RIIO-2 Sector Specific Methodology – Finance, p. 122.

3. Modelling Approach

3.1. Overview of Model Structure

The Monte Carlo simulation tool we developed for SPT is based on SPT's Business Plan model for RIIO-T2, which builds on Ofgem's regulatory PCFM for RIIO-T1. We have restructured and added to this model in order to transform the deterministic regulatory model into a risk model that explicitly distinguishes between actual and allowed costs and can simulate random variation of the key risk factors using Oracle's "Crystal Ball" software.

Figure 3.1: Illustration of the Main Changes to PCFM to Incorporate Monte Carlo Model Framework



Source: NERA illustration

Figure 3.1 illustrates the structural changes we have undertaken to get from the SPT Business Plan model to a Monte Carlo model framework. Key changes include:

- Differentiating between actual costs and allowed costs, and turning input factors into stochastic variables.
  - Final determination (FD) totex allowances are linked into the SPTL sheet, currently based on SPTL's business plan forecasts.[21] These allowances then feed through the existing financial model to calculate FD allowed revenues.

[21] We will update these values over time as the RIIO-T2 process progresses, e.g. with SPT's updated business plan forecasts and with Ofgem's draft and final determinations allowances.

  - Actual costs are modelled as stochastic variables in the "Business risk inputs" sheet. From the "Business risk inputs" sheet, simulated costs feed through into the financial statements worksheets. By accounting for risk mitigation mechanisms such as the totex incentive mechanism, we avoid the potential for overstating the risk exposure of the business;
- Modelling of the Annual Iteration Process that updates allowed revenue (see Section 3.3) in line with outturn simulated totex, including the use of a macro to calculate, and then fix across all iterations of the Monte Carlo simulation, the FD allowances;
- Modelling of external risk factors, such as the cost of debt, cost of equity or inflation. E.g. we simulate the prevailing cost of debt as described in Section 2.5 and model explicitly how this feeds into the "trombone" cost of debt index, and hence the allowed cost of debt;
- Ensuring that the model correctly reflects the move from RPI to CPIH indexation of the RAV at the start of RIIO-T2;
- Introducing changes to modelling of interest costs, separately modelling nominal and ILD and incorporating RPI-CPIH wedge risk in the calculation of ILD interest costs; and
- Generating distributional charts for key financial ratios and financeability metrics. As we discuss in Section 3.4, the model recalculates all relevant ratios and records how these ratios vary from one iteration to the next. The analysis of the realised values resulting from thousands of iterations allows the derivation of probability distributions for each financial metric.

3.2. Modelling of Finance and Tax for Notional SPT

Our modelling of credit metrics and financeability is based on a notionally financed SPT. Specifically, we assume that at the start of the price control period the amount of debt in the business is set equal to the assumed notional gearing level of 60 per cent, multiplied by the RAV. We model actual cost of debt in line with the allowed CoD for the notional company, and use an ILD debt share of 25 per cent, based on Ofgem's assumptions for the notional company.[22]

In line with Ofgem's modelling approach, the model injects new equity to ensure that modelled gearing does not exceed assumed notional gearing by more than a user-specified threshold amount. By increasing this threshold amount, the model in practice includes the functionality to turn off equity injections. We have introduced functionality in the model to allow the user to apply various alternative scenarios for the dividend yield.

3.3. The Annual Iteration Process

The RIIO-T2 regulatory framework will include an Annual Iteration Process (AIP) that updates the allowed revenue for regulated companies, as actual data becomes available on their actual performance, costs and output levels. In Ofgem's model, the AIP works iteratively: as actual data for one year becomes available, allowed revenues for subsequent years are updated (with a lag).

[22] Ofgem (24 May 2019), Decision: RIIO-2 Sector Specific Methodology – Finance, p. 86.

We model the Annual Iteration Process differently, given that actual data is simulated by the model for all years of the RIIO-T2 period with each simulation. We have developed a macro that calculates baseline Final Determinations Allowances, assuming no uncertainty and that actual costs are equal to allowed costs at the level forecast in the Business Plan. It then saves the values in the "SavedResults" sheet, which it can then compare against recalculated allowed revenue at each subsequent simulation.

The model then sets actual revenue equal to the Final Determinations Allowances for the first years of the price control period, and adjusts actual revenue with a two-year lag once actual outturn allowed revenue is generated from the simulation, i.e. after accounting for simulated costs and the risk mitigation mechanisms (such as the totex incentive mechanism). Specifically, the model calculates an incremental change to Final Determinations base revenue, known as the "MOD" term for each period, which is determined as the delta between actual and allowed revenue, inflated (or deflated) at the WACC.[23]

3.4. Financeability Outputs

The output of our risk modelling is a series of probability distributions for the various credit metrics of companies' financial performance that Ofgem uses to assess financeability (see Table 3.1 below). These credit metrics are also used by ratings agencies to set credit ratings.[24]

Table 3.1: Key Credit Metric Outputs from the Risk Modelling

Ratio	Definition
Credit Ratios	
FFO interest cover ratio (cash interest only)	(FFO + Net cash interest paid) / Net cash interest paid
Post-Maintenance Interest Cover Ratio	(FFO - RAV Depreciation + Net cash interest paid) / Net cash interest paid
Gearing	Closing Net Debt / Closing RAV
FFO / Net debt	(FFO + Net inflation interest paid) / Closing Net Debt
RCF / Net Debt	(Retained Cash Flow + Net inflation interest paid) / Closing Net Debt

Source: NERA, Moody's (16 March 2017), Rating Methodology: Regulated Electric and Gas Networks, p.4.

Ratings agencies set companies' credit ratings based on an assessment of a series of quantitative factors (i.e. the financial ratios in Table 3.1 above) and qualitative factors. As an output from the risk modelling, we have therefore also estimated the probability distribution

[23] While Ofgem's deterministic model calculated the MOD term only for one year at each time and saved historical values, our Financial Risk Model incorporates the functionality to recalculate base revenue each year for the whole RIIO-T2 period.

[24] We use Moody's definitions to estimate these credit metrics, because, as we discuss below, we estimate probability distributions for SPT's credit rating based on Moody's methodology.

of SPT's approximate overall credit rating during the RIIO-T2 period, based on Moody's ratings methodology.[25]

Table 3.2 below shows the weight Moody's attaches to each qualitative and quantitative factor in its ratings methodology, and shows our assumed rating for SPT for each qualitative factor, as provided by SPT.[26]

We estimate SPT's Moody's rating using the simulation of quantitative factors generated within the Monte Carlo model, which also get compared (for each individual simulation) to Moody's published thresholds for each ratio. Hence, we can identify for each simulation what sub-rating would be achieved by SPT for each financial metric. The qualitative metrics do not adjust across simulations.

We derive SPT's overall credit rating for each simulation by combining the sub-ratings for the individual factors based on Moody's rating methodology (including the factor weightings in Table 3.2 and penalties for lower rating scores for individual factors). Finally, we estimate the probability distribution around SPT's overall rating based on credit rating estimates for each individual simulation.

Table 3.2: Rating Factor Weighting and Rating Value Assumptions

	Rating Factors	Factor Weighting	Rating for SP
1	**Regulatory Environment and Asset Ownership Model**		
	Stability & predictability of regulatory regime	15%	Aaa
	Asset ownership model	5%	Aa
	Cost and investment recovery	15%	A
	Revenue risk	5%	Aa
2	**Scale and Complexity of Capex**		
	Scale and complexity of capital programme (Capex/RAV)	10%	simulated
3	**Financial Policy**		
	Financial policy	10%	Baa
4	**Key Credit metrics**		
	PMICR	10%	simulated
	Net Debt/RAV	12.5%	simulated
	FFO/Net Debt	12.5%	simulated
	RCF/Net debt	5%	simulated
	Total	**100%**	

Sources: SPT, Moody's (16 March 2017), Rating Methodology: Regulated Electric and Gas Networks, p.4.

In addition to the credit metrics and the credit rating discussed above, Ofgem also relies on equity metrics in its assessment of companies' financeability. Our risk modelling therefore

[25] We use Moody's methodology due to its clear approach to combining credit metrics with qualitative factors to determine the overall credit rating.

[26] We understand that SPT itself is not rated by Moody's. However, SPT provided us with their view of Moody's likely rating for each qualitative factor. We consider these ratings to be sensible, based on Moody's ratings methodology and our experience of the qualitative ratings of other regulated network companies in Great Britain.

also produces the probability distributions for a series of equity metrics, as set out in Table 3.3 below.

Table 3.3: Equity Ratios

Ratio	Definition
Equity Ratios	
RORE* (Notional gearing, Allowed CoD)	(EBIT – tax – (Allowed CoD * debt RAV)) / Equity RAV
Regulated Equity / EBITDA	(Closing Net Debt + Closing RAV) / EBITDA
Regulated Equity / PAT	(Closing Net Debt + Closing RAV) / Profits after tax
Dividend Cover Ratio	Profits after tax / Dividends paid

*Source: NERA, Ofgem (26 March 2019), Financeability Assessment for RIIO-2: Further Information. *: Note that we use Ofgem's definition of RORE (see above) which (1) does not take into account the impact of capex (i.e. slow pot) overspend or underspend on equity investor returns; and (2) calculates interest based on allowed CoD. Ofgem's RORE therefore excludes some sources of equity investor outperformance (and underperformance) and hence understates RORE variation.*

Qualifications, assumptions and limiting conditions

This report is for the exclusive use of the NERA Economic Consulting client named herein. This report is not intended for general circulation or publication, nor is it to be reproduced, quoted or distributed for any purpose without the prior written permission of NERA Economic Consulting. There are no third party beneficiaries with respect to this report, and NERA Economic Consulting does not accept any liability to any third party.

Information furnished by others, upon which all or portions of this report are based, is believed to be reliable but has not been independently verified, unless otherwise expressly indicated. Public information and industry and statistical data are from sources we deem to be reliable; however, we make no representation as to the accuracy or completeness of such information. The findings contained in this report may contain predictions based on current data and historical trends. Any such predictions are subject to inherent risks and uncertainties. NERA Economic Consulting accepts no responsibility for actual results or future events.

The opinions expressed in this report are valid only for the purpose stated herein and as of the date of this report. No obligation is assumed to revise this report to reflect changes, events or conditions, which occur subsequent to the date hereof.

All decisions in connection with the implementation or use of advice or recommendations contained in this report are the sole responsibility of the client. This report does not represent investment advice nor does it provide an opinion regarding the fairness of any transaction to any and all parties.

NERA
ECONOMIC CONSULTING

NERA Economic Consulting
Marble Arch House
66 Seymour Street
London, UK W1H 5BT
+44 207 659 8500
www.nera.com