

# Consultation

## **RIIO-2 Sector Specific Methodology Annex: Finance**

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This document is an Annex to the RIIO-2 Sector Methodology consultation and should be read alongside it.

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## 1. Introduction

In this chapter we introduce our finance work, summarise inflation expectations, and summarise our working assumptions on the cost of capital. The inflation expectations are central to the other chapters within this document. The cost of capital section summarises the underlying work as presented in the remaining chapters of this document.

### Introduction

1.1 In this chapter, we set out:

- Background to our finance work
- Inflation expectations from the Office for Budget Responsibility (OBR) and
- A summary of our working assumptions for the cost of capital.

1.2 The current consultation does not apply to RIIO-ED2, but represents our latest thinking on the cost of capital for networks. A full consultation for the RIIO-ED2 price control will follow, including on whether the approach applies and whether RIIO-ED2 may warrant a different approach. It will present our best available evidence at that time.

### Background to our finance work

1.3 The costs of operating and developing networks include the financing costs that they incur. These include the returns that we allow for debt and equity investors. We use incentives to encourage companies to drive down costs and improve service quality. These incentives mean that a company's actual return can be higher or lower than its allowed return.

1.4 This document is structured as follows:

- An updated cost of debt methodology (Chapter 2)
- An updated cost of equity methodology (Chapter 3)
- Our approach to financeability (Chapter 4)
- Our approach to corporation tax (Chapter 5)
- The transition to CPIH for the purposes of indexing RAV and calculating returns (Chapter 6), and
- A number of other finance issues (Chapter 7)

1.5 The primary aim of this consultation is to propose an appropriate methodology for setting cost of capital allowances at the final determination stage in 2020. However, for illustrative and business planning purposes, we estimate working assumptions below as if we were to apply our proposals under today's market conditions using the proposed methodologies.

### Inflation expectations: OBR’s October 2018 forecast

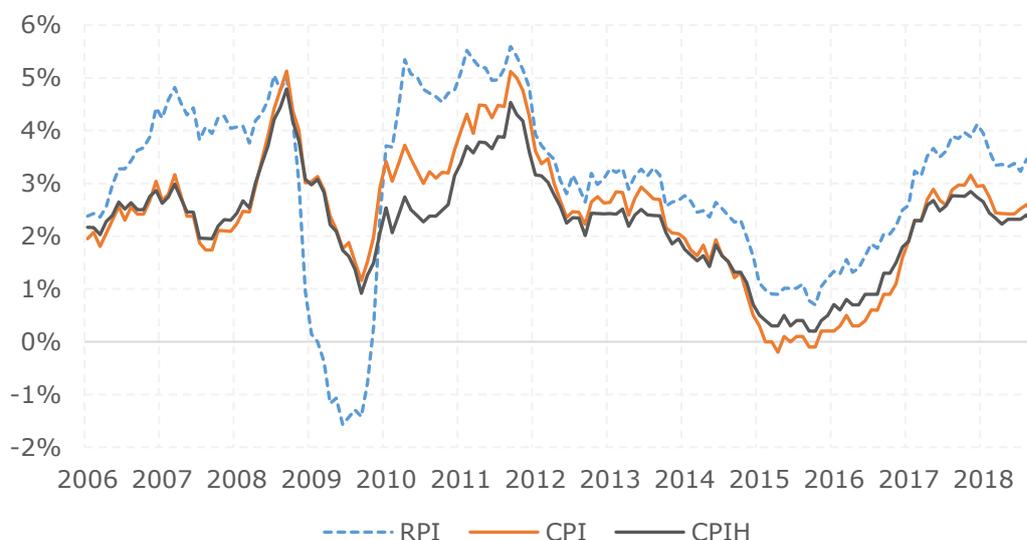
1.6 Inflation forecasts are an important part of our working assumptions for RIIO-2. These forecasts help us estimate many underlying elements of the price control package. Therefore, in advance of presenting our working assumptions for the cost of debt and the cost of equity, we present information from OBR’s October 2018 forecasts, as follows:

**Table 1: Inflation expectations, OBR’s October 2018 forecast<sup>1</sup>**

YE 31st December	2018	2019	2020	2021	2022	2023
CPI	2.58%	2.05%	1.97%	2.12%	2.08%	2.04%
RPI	3.46%	3.14%	3.05%	3.16%	3.11%	3.07%

1.7 At this stage, we focus on 2023, as the longest horizon forecast available, for the purposes of estimating working assumptions for RIIO-2. At this time, and given that we decided in our Framework decision in July 2018 to move away from retail price index (RPI) to consumer price index housing (CPIH), we assume that the forecast for consumer price index (CPI) is equal to expectations for CPIH (as CPI and CPIH have been relatively similar historically, see Figure 1). On this basis, we derive a difference between RPI and CPIH (the RPI-CPIH wedge) of 1.009%<sup>2</sup> based on the OBR forecasts for the year 2023.

**Figure 1: Comparing rates of inflation, monthly (% change over 12 months)**



Source: Office for National Statistics

1.8 Therefore, in the following chapters we refer to a CPIH expectation of 2.04%, an RPI expectation of 3.07%, and an RPI-CPIH wedge of 1.009%.

### A summary of our working assumptions for the cost of capital

1.9 Table 2 below summarises our working assumption for the cost of capital in CPIH terms. In this consultation we propose a methodological process for setting cost of

<sup>1</sup> See CPI and RPI worksheets here: <https://obr.uk/download/historical-official-forecasts-database/>

<sup>2</sup> Derived using the Fisher equation:  $(1+3.07\%) / (1+2.04\%) - 1$ . We display three decimal places solely to allow stakeholders to derive the subsequent tables.

capital allowances at the final determination stage in 2020. However, for illustrative purposes and to inform company business plans, working assumptions are provided below, based on the application of the methodologies being consulted on, and on current market data and evidence.

**Table 2: Working assumptions for the RIIO-GD2 and RIIO-T2 cost of capital in CPIH terms**

Price base	Component	Year-end 31st March					Average	Ref	Source
		2022	2023	2024	2025	2026	'22-'26		
CPIH	Allowed debt return	1.96%	1.79%	1.70%	1.64%	1.59%	1.74%	A	Working assumption as per Table 3
	Allowed equity return	4.00%					4.00%	B	Working assumption as per Table 19
	Notional gearing	60%					60%	C	Working assumption as per 7.21
	Baseline Allowed Return (WACC)	2.78%	2.67%	2.62%	2.58%	2.55%	2.64%	D	$D = A * C + B * (1 - C)$

- 1.10 Given that we decided in our Framework decision to move away from RPI to CPIH we therefore present our working assumption in CPIH terms only. In general, these values are provided for the purpose of business planning only. We propose to update this information in light of changing market conditions and stakeholder feedback.
- 1.11 We estimate the cost saving to consumers associated with a lower cost of capital than in RIIO-1 to be worth approximately £6.5bn<sup>3</sup>, or roughly an average £30/year reduction on consumer bills. This is based on the application of our proposed methodology and working assumptions with current data. Approximately three-quarters of the savings presented are attributed to RIIO-GT2, RIIO-ET2 and RIIO-GD2 which begin in 2021, but the total figure includes RIIO-ED2 for completeness in assessing the potential impact.<sup>4</sup>
- 1.12 Further detail is provided in the subsequent chapters regarding the methodologies we have used to estimate these working assumptions.

<sup>3</sup> Over the RIIO-2 periods in real 21/22 CPIH prices, discounted at 3.5% (as per HM Treasury [Green Book](#) guidance) to the 21/22 financial year.

<sup>4</sup> See appendix within Core Document (preliminary impact assessment of our proposals).

## 2. Cost of debt

In this chapter, we summarise the options we consulted on in our Framework consultation, and the decisions we took in our Framework decision in July 2018. We then propose an update to our methodology and seek stakeholder views on our proposals.

### Introduction

- 2.1 In RIIO-1 the cost of debt allowance is calculated using a rolling average of outturn rates. This benchmark is equal to an average of two iBoxx bond indices (non-financials A rated and non-financials BBB rated). Electricity transmission, gas transmission and gas distribution sectors have allowances that are equal to a 10-year rolling average of historical rates. In addition, there is a company specific arrangement for Scottish Hydro Electric Transmission (SHE-T).
- 2.2 In our RIIO-2 Framework consultation, we sought to establish whether the methodology applied for RIIO-1 remains appropriate for RIIO-2.

### Summary of Framework consultation and Framework decision

- 2.3 In our Framework consultation, we set out proposed cost of debt principles to help guide our methodology. We also listed three options for discussion:
- Option A: Re-calibrate the RIIO-1 indexation policy (we call this full indexation)
  - Option B: Introduce a fixed allowance for existing debt, but index new debt raised during the price control only (we call this partial indexation)
  - Option C: Move to a full pass-through of the actual cost of debt incurred by companies.
- 2.4 In the Framework consultation, we also noted a high bar of evidence would need to be met before we would materially alter our existing approach. In our Framework decision, we confirmed that we would use the proposed principles for setting an allowance for the cost of debt and ruled out Option C, the full pass-through option.
- 2.5 We said we would consult on our preferred way forward in December as part of our sector specific methodology consultation. We stated that we would develop the two remaining options, including the ability to share under/outperformance with consumers. We also stated that the remaining options were flexible enough to be tailored to individual company circumstances, if required.

### Developing the cost of debt methodology

#### Partial Indexation

- 2.6 In considering partial indexation (Option B), we assessed the relative merits of partial indexation in setting ex ante allowances for debt by calculating an embedded debt allowance and adding a forecast new debt allowance using the following formulation:
- $(N) \cdot (CND) + (1-N) \cdot (CED)$
  - N = calculated average share of new debt (ie debt issued during new price control) in the sector's total borrowings during the price control

- CND = forecast average cost of new debt during the price control (iBoxx forecast)
- CED = forecast average cost of embedded debt during the price control.

2.7 The potential benefits of moving to partial indexation include:

- greater flexibility to include debt costs that would otherwise have been outside the trailing average periods of full indexation
- the potential to reduce the difference between allowances and actual debt cost for some companies.

2.8 However, we have identified a number of potential challenges, including:

- the incentive for efficient debt raising could be dampened
- the incentive to consider the long-term impacts of debt decisions and costs could be weakened
- our notional company analysis suggests that partial indexation may introduce larger cost versus allowance variances on a year-to-year basis if there are market movements in interest rates
- a forecast error could be re-introduced due to the fixed allowance needing to be set before the start of RIIO-2 when there would still be scope for rate movements and/or changes to the cost of embedded debt
- we would be required to estimate the proportion of debt that would be raised during the price control relative to the proportion raised previously. This estimation may be incorrect or potentially require true-up
- partial indexation would be less transparent because stakeholders would need to wait for an Ofgem view of embedded debt costs, challenging our principle that the allowance mechanism should be transparent
- the mechanics would be more complex than full indexation, challenging our principle that an allowance mechanism should be simple.

2.9 We have considered whether partial indexation would reduce the need to reanalyse or recalibrate the cost of debt mechanism at each price review. We do not believe a partial indexation mechanism would reduce the need for analysis of actual debt costs versus expected allowances at each price review.

#### Sharing debt outperformance/underperformance within each year

2.10 We considered whether companies should be compelled to share any under/outperformance (versus the cost of debt allowance) each year with consumers. This would involve higher bills for consumers if companies underperformed relative to allowances or lower bills for consumers if companies outperformed relative to allowances.

2.11 We have considered the potential benefits and challenges of debt under/outperformance sharing during each price control year. The potential benefits of sharing include:

- reducing the magnitude of individual company under/outperformance due to differing actual debt costs (because the under/outperformance would be shared with consumers)

- improving credit metrics for some outliers that may otherwise face financeability challenges.

2.12 However, we have identified a number of potential challenges, including:

- implementation issues, particularly an extensive cost verification exercise
- allocating materially more company financing risks to consumers
- exposing consumers to the impacts of companies pursuing higher risk strategies
- the requirement for additional rules/constraints to avoid manipulation, including around gearing levels, intercompany loans, derivatives, foreign currency debt and proportions of inflation linked and conventional debt.

#### Deriving CPIH-based allowances

2.13 The Framework Decision set out our intention to move away from RPI to CPIH for inflation measurement when calculating regulatory asset value (RAV) and allowed returns. In Chapter 6 of this annex (Indexation of RAV and calculation of the allowed return) we discuss our proposal to use CPIH from RIIO-2 onwards (1<sup>st</sup> April 2021 for gas transmission (GT), electricity transmission (ET) and gas distribution (GD)) for the purposes of calculating RAV indexation and allowed returns. We do not propose to phase the move away from RPI.

2.14 The current full indexation mechanism uses RPI break-even inflation to deflate the nominal iBoxx indices. Therefore, we think we need to reconsider how we calculate the real cost of debt allowance. We have considered two alternatives for deriving a real CPIH allowance:

(i) Deflating the nominal iBoxx by a measure of break-even inflation. We identify two variants as follows:

- the RIIO-1 RPI break-even approach plus an expected RPI-CPIH wedge. This would deflate the nominal iBoxx yields using RPI break-even and then add a wedge for the expected RPI-CPIH differential
- derive a CPIH gilt from the RPI gilt (by adding an expected RPI-CPIH differential) and then derive a CPIH break-even from the derived CPIH gilt and the nominal gilt. The CPIH break-even measure could then be used to deflate nominal iBoxx yields.

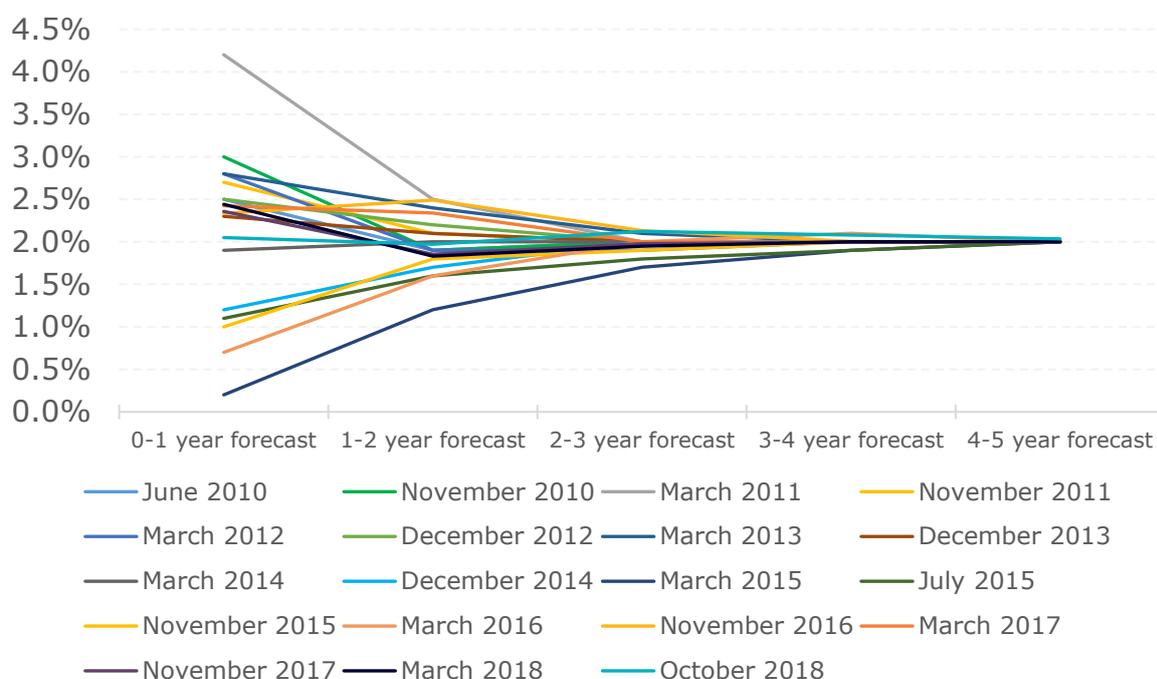
(ii) Deflating the nominal iBoxx in one step by using only an expected value for CPIH.

2.15 Both variants of option (i) retain some consistency with the RIIO-1 mechanism. A potential disadvantage is the requirement for two steps and two long-term inflation assumptions. We note there may be arguments for using the RPI-CPIH wedge when calculating the real CPIH risk-free rate for cost of equity purposes, so both variants of option (i) may result in greater consistency between the cost of debt and the cost of equity methodologies. However, we note some stakeholders have previously identified some concerns with the RPI break-even inflation measure.

2.16 Option (ii) would require an expected value for CPIH only. We are not currently aware of any reliable market-driven forecast of long-term CPIH inflation, but CPI and CPIH have been relatively similar historically. Therefore, it could be assumed

that CPIH expectations will be equivalent to CPI expectations and that the OBR forecast for CPI serves as a reasonable proxy for an assumption of long-term CPIH expectations. We could therefore deflate the nominal iBoxx index into CPIH terms by using the OBR’s forecast of CPI. We demonstrate in Figure 2 below that this forecast has been stable at approximately 2% for the 5-year ahead horizon, for all forecasts back to June 2010.

**Figure 2: OBR forecasts of CPI**



Source: Ofgem analysis of Office for Budget Responsibility Data File

2.17 We propose for both option (i) and option (ii) to mechanise the approach to capture changes in expected inflation by providing for updates in the OBR forecasts as they are published and applying the new 5-year forecast to deflating the nominal iBoxx from each publication date until the next publication date. We would also propose to keep both options under review for a) divergence of out-turn or forecast CPI and CPIH and b) emergence of long-term CPIH forecasts.

2.18 Another technical issue for both options is whether we take into account multiple years of inflation expectations or just one long-term value. For example, we could account for the fact that inflation expectations are different for each future year (eg  $t+1 = 3\%$ ,  $t+2 = 2.5\%$  ...  $t+5 = 2\%$ )<sup>5</sup> or alternatively, we could just use one future year ( $t+5 = 2\%$ ).

Proposals for cost of debt methodology

2.19 We remain of the view that a high bar of evidence would need to be met before we would materially alter our existing approach of full indexation. Given the update provided above, we propose ruling out partial indexation unless new information provides reasons to reassess this position.

2.20 We also propose to rule out an annual within-period debt sharing mechanism. However, we recognise that cyclical price controls always involve some element of

<sup>5</sup> Illustrative figures used for this example.

sharing between companies and consumers, as each price control review gives us the ability to assess historical costs and set new allowances for future periods.

- 2.21 We are still considering whether financial outperformance will form part of the Return Adjustment Mechanisms (RAMs), but we view any debt sharing in this context to be much lower risk for consumers as it would not need to happen for every company in every year, as would be the case with the mechanism we considered in Paragraphs 2.10 to 2.12 above. Within the proposed RAMs framework, debt sharing could only occur if RAMs are implemented in a manner that includes financing costs and if outperformance (or underperformance) is large enough to trigger the RAM.

### **Next steps**

- 2.22 We will continue to assess whether any improvements to the full indexation mechanism could be made, including changes to the trailing average period and changes to the reference benchmark.
- 2.23 We intend to assess the appropriateness of expected allowances by considering company-provided and publicly our Framework decision available information relating to:
- interest and financing costs as submitted by the companies during the Regulatory Financial Performance Report (RFPR) process, with possible adjustments for bond yield to maturity where significantly different to bond coupons
  - information relating to debt maturities, repurchases and refinancings, where appropriate and justified<sup>6</sup>
  - expected new financing requirements and timing.
- 2.24 We will also consider the halo effect, debt issuance costs and whether a smaller company allowance may be appropriate in consideration of frequency and/or costs of issuance compared to that assumed by full indexation. In line with RIIO-1, we may consider adjusted indexation mechanisms (such as that used for SHE-T in RIIO-1) for unusual company-specific circumstances, if appropriate and justified.
- 2.25 We will require more information from the companies in order to estimate the appropriate allowances for RIIO-2, including information on the companies' plans for investment in the networks. After we have business plan information we will assess expected sector debt costs against expected allowances. We will also give due consideration to a range of interest rate scenarios and seek to broadly align expected debt costs and debt allowances across each sector over the long term, with a cross-check of allowances versus expected costs for the RIIO-2 price control period and potential impact on financeability. This is similar to the approach taken in RIIO-1.
- 2.26 We will provide an update in the sector specific methodology decision on the assumptions and proposed mechanism for deflating the nominal iBoxx indices.
- 2.27 Although determinations for cost of debt will depend on our analysis following business plan submission, we recognise that a cost of debt assumption can be helpful for producing business plans. With this in mind, we have calculated a

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<sup>6</sup> In particular, we are aware of significant refinancing costs associated with the sale by National Grid of its Gas Distribution businesses to Cadent. We are considering how refinancing costs should most appropriately be factored into our analysis for RIIO-2 allowances.

working assumption for the cost of debt allowance, using the following assumptions:

- a) deriving the 10-year forward rates from 1<sup>st</sup> November 2018 onwards, using the nominal government yield curve<sup>7</sup> as of 31<sup>st</sup> October 2018, for each future year
- b) adding to a) the average 3-year outturn spread to the 10-year government nominal spot yield (to 31<sup>st</sup> October 2018) for each iBoxx index
- c) Deflating b) by CPIH expectations as follows:
  - For the daily yields to 28<sup>th</sup> September 2018, deflating the nominal iBoxx outturn by 2%, as per OBR’s published forecasts for the longest horizon (t+5) CPI expectation, as at each OBR forecast (typically OBR forecast biannually). For periods prior to OBR’s June 2010 forecast, we assume CPIH expectations were also 2%.
  - For the daily yields from 1<sup>st</sup> October 2018, deflating the nominal iBoxx and the forecast yields by 2.04%, as per the OBR October 2018 CPI forecast for the longest horizon available (t+5).

2.28 This approach results in the following working assumptions for the cost of debt (using a simple 10-year trailing average to the October ending immediately prior to the relevant financial year beginning, as per the RIIO-1 approach):

**Table 3: A working assumption on the cost of debt for RIIO-GD2 and RIIO-T2**

YE 31st March	2022	2023	2024	2025	2026	RIIO-2 Average
10-year Trailing Average (nominal)	4.01%	3.84%	3.74%	3.69%	3.64%	3.78%
10-year Trailing Average (CPIH)	1.96%	1.79%	1.70%	1.64%	1.59%	1.74%

Cost of debt questions

2.29 We welcome stakeholder views on our cost of debt proposals, in particular on the following questions:

- FQ1. Do you support our proposal to retain full indexation as the methodology for setting cost of debt allowances?
- FQ2. Do you agree with our proposal to not share debt out-or-under performance within each year?
- FQ3. Do you have any views on the next steps outlined in Paragraphs 2.22 to 2.25 for assessing the appropriateness of expected cost of debt allowances for full indexation?
- FQ4. Do you have a preference, or any relevant evidence, regarding the options for deflating the nominal iBoxx as discussed at Paragraph 2.14? Are there other options that you think we should consider?

<sup>7</sup> The Bank of England Government Liability Curve.

### 3. Cost of equity

In this chapter, we summarise the methodology we proposed in the Framework consultation, and the decisions we took in the Framework decision. We then propose an update to our methodology and seek stakeholder views on our proposals.<sup>8</sup>

#### Introduction

3.1 The cost of equity is an estimation of the return that equity investors expect. It is a significant part of the price control settlement. It is important because the energy sector requires investors that are willing to invest in utility infrastructure to meet consumer needs. The financial impact of each 10bps (10 "basis points" or 0.10%) on the cost of equity is worth approximately £172m<sup>9</sup> over the course of the RIIO-2 price controls.

#### Summary of Framework consultation and Framework decision

3.2 In the Framework consultation, we referred stakeholders to a study on the cost of capital, jointly commissioned by UK regulators, that was undertaken by a team of academics and practitioners and led by Professor Stephen Wright of Birkbeck College. The study ("the UKRN Study") made 10 recommendations on the cost of capital, and we shared our initial views on these in the framework consultation (see Appendix 2 of the Framework consultation document).<sup>10</sup>

3.3 We also proposed a methodology for estimating the cost of equity, and sought stakeholder views on this.

3.4 In our Framework decision, we decided that we will use the Capital Asset Pricing Model (CAPM) as the approach for estimating the cost of equity and confirmed the following approach:

- to estimate the risk-free rate by using the current yields on long-run index-linked government debt
- to not rule out cost of equity indexation and to develop further our proposed method
- to estimate the Total Market Return (TMR) by considering the historical long-run average of market returns as the best objective estimate of investors' expectations of the future. We also decided to take account of the findings of the Competition Commission in Northern Ireland Electricity (2014) as well as

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<sup>8</sup> We propose to review responses to the other issues such as business plan incentives and anticipatory investment to reflect in the cost of equity methodology as necessary.

<sup>9</sup> This rule of thumb approximation is calculated with £93,000m RAV, 63% gearing (RAV weighted average across sectors as per RIIO-1), and a five-year period:  $0.1\% * (1-63\%) * £93,000 * 5 \text{ years} = £172\text{m}$ . We assume a RAV value of £93,000m (nominal) for illustration purposes. This is obtained by summing the 17/18 NPV neutral RAV return bases across sectors and converting to nominal (£66,113m) and growing by 5% a year to FYE 24/25 ( $£66,113 * (1+5\%)^7$ ). This is approximately the same result as growing each individual sector by their compound average growth rate until FYE 24/25. To convert to nominal, we use average RPI for financial years, where available, and assume 3% growth thereafter. In March, we referred to a RAV of £100,000m, whereas here we use more recent data and lower growth assumptions. Notional gearing of 63% is used, to be consistent with RIIO-1 average. A lower notional gearing assumption for RIIO-2 is made below, but the RIIO-1 gearing is used here to isolate the effect of changing the allowed equity returns alone. Please note Paragraph 1.2 with regard to the inclusion of ED in the RAV. Approximately three-quarters of the savings presented are attributed to GT2, ET2 and RIIO-GD2 which begins in 2021, but the total figure includes ED2 for completeness in assessing the potential impact.

<sup>10</sup> <https://www.ukrn.org.uk/wp-content/uploads/2018/11/2018-CoE-Study.pdf>

the forward-looking approaches indicated by other regulators such as Ofwat and the Civil Aviation Authority (CAA)

- to investigate further issues involved in the estimation of beta for network companies, based on issues highlighted in the UKRN report. We also decided to look deeper at the relationship between gearing and beta risk.

3.5 We also decided:

- to distinguish between regulatory allowed return and the regulatory expected return
- to cross-check the outcome of the Capital Asset Pricing Model (CAPM) against Market to Asset ratios (MAR) and returns bid by investors (eg for OFTOs).

### **Developing the cost of equity methodology**

3.6 Since our Framework decision, we have developed an updated methodology for estimating the cost of equity. This methodology involves three sequential steps.

a) Step 1 – the Capital Asset Pricing Model evidence

- Estimate the appropriate values for the CAPM, using the underlying evidence for each parameter: the risk-free rate, TMR and Equity beta.

b) Step 2 - Cross-checking the CAPM results

- Cross-check the results of the CAPM against various sources in the equity investor markets.

c) Step 3 - Expected versus allowed returns

- Implement a distinction between expected and allowed returns.

3.7 In the subsections below we outline the approach to each of the three steps of the proposed methodology. This consultation is focused on the underlying methodology for setting the allowed equity return. Whilst a cost of equity range is derived below for illustrative purposes, the evidence will be updated at draft and final determination stages based on financial market data and other information available in 2020.

## **Step 1 - The Capital Asset Pricing Model evidence**

3.8 The first step is to estimate the returns that investors expect by using the capital asset pricing model (CAPM).

3.9 The CAPM describes the relationship between expected returns and the risk of investing. The UK regulators network (UKRN) Study confirmed that the CAPM, although not without weaknesses, remains the best available model for estimating investor expectations. The report concluded that investors behave as if the CAPM is their benchmark model and recommended that economic regulators should continue to use it as the basis for estimating the cost of capital.

3.10 The CAPM requires inputs for the following three parameters:

- the risk-free rate (RFR)
- total market returns (TMR)
- equity beta ( $\beta$ ).

- 3.11 These parameters are combined in the following way to estimate the cost of equity:
- $CoE = RFR + \beta \cdot (TMR - RFR)$
- 3.12 In line with recommendation 2 from the UKRN Study, we propose to estimate these parameters using a long investment horizon. To do this, we propose that:
- a long-term tenor (of at least 10 years) is appropriate for estimating risk-free rates
  - a long-run average of outturn market returns is the best single objective measure of investor expectations of the TMR
  - it is appropriate to consider the long-run of outturn equity beta estimates, taking into account any structural breaks.
- 3.13 In the subsections below, we outline in further detail our proposed approach to each of these three parameters of the CAPM.

## **Risk-free rate and equity indexation**

- 3.14 In this subsection we propose a methodology for estimating the risk-free rate and propose a method for updating the risk-free rate to reflect changes in UK government bond yields ("equity indexation").

### Introduction

- 3.15 In theory, the risk-free rate is the return for taking zero risk. In practice, the best proxy for a riskless UK investment is the return that investors expect from holding UK government inflation-linked debt (because the UK government is very unlikely to default). This return is also transparent and market-derived. On a daily basis the Bank of England publishes spot rates for UK government bonds of different investment horizons in both nominal and RPI-linked terms.
- 3.16 We make use of this information for setting price controls for UK utilities, recognising that we are setting future period returns for a long horizon investment.

### Summary of Framework consultation and Framework decision

- 3.17 In the Framework consultation, we proposed to estimate the risk-free rate by using yields on long-dated index-linked government bonds. We also sought views from stakeholders on our proposal to index the risk-free rate during RIIO-2 to reflect the change in the observed value. We also noted a recommendation from the UKRN Study that we should estimate the CAPM parameters using a measure of inflation that is consistent with HM Treasury and implemented by the Bank of England for inflation targeting (currently CPI).
- 3.18 In our Framework decision, we decided to estimate the risk-free rate by using the current yields on long-run index-linked government debt. The Framework decision also highlighted our concern that any forecast of the risk-free rate has the potential to be wrong and could result in consumers paying more than necessary, or investors earning lower returns than they should.
- 3.19 The Framework document noted that we wanted to explore the potential to index the cost of equity by adjusting the risk-free rate to reflect market rates. We noted that National Grid showed some support for the possibility of equity indexation,

but with a request that we provide more detail on how it would work. Centrica and Citizens Advice were supportive of equity indexation. Northern Gas Networks (NGN) and UK Power Networks (UKPN) noted that if equity indexation is to be introduced, the option proposed in the Framework consultation is preferred (a fixed TMR and equity beta).

- 3.20 In the Framework consultation, we proposed three indexation options:
- a) indexing to the risk-free rate only
  - b) indexing to the risk-free rate and equity risk premium
  - c) indexing to the risk-free rate and TMR.
- 3.21 We committed to developing our method of indexation to provide more clarity on how it could work.
- 3.22 We explore only option a) further. This is because the risk-free rate is readily accessible and relatively uncontroversial, whereas there is more debate about the nature of the equity risk premium. TMR, when estimated with long-run averages, would be expected to change very little over the price control.
- 3.23 In our Framework decision, we also decided to move away from RPI to CPIH when calculating allowed returns. Therefore, we need to propose a risk-free rate to index to in CPIH terms.

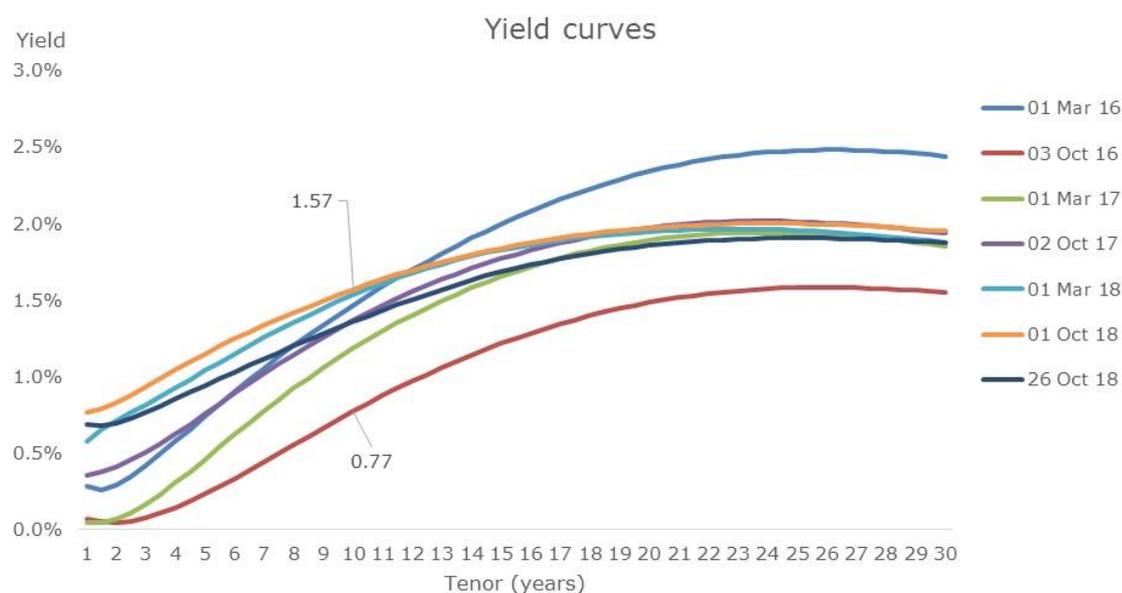
#### Stakeholder views since July

- 3.24 After the publication of the Framework decision in July, we held a workshop with the Energy Networks Association (ENA) (the representative body for the energy networks) where we discussed equity indexation and gathered feedback on the challenges and alternative options.
- 3.25 We also discussed the idea directly with other stakeholders. Citizens Advice were generally supportive of the indexation of the risk-free rate, and were mindful of the risk to consumers of using forward curves and aiming up. However, some investors were concerned that indexation would mean less certainty on returns.

#### Risk-free rate: spot rates and increases implied by forward curves

- 3.26 Below is a review of outturn information on risk-free rates and the implied increases that we derive from spot yield curves.
- 3.27 Figure 3 below demonstrates how the nominal yield curve has tended to flatten over the last few years, implying that there is a lower expectation that the risk-free rate will increase.

**Figure 3: Nominal yield spot curves on various dates**



Source: Bank of England

3.28 Table 4 below shows spot rates for both real and nominal gilts, for various investment horizons from select dates during 2016 and 2018.

**Table 4: Spot risk-free rates for 5, 10, 15 and 20 year tenors<sup>11</sup>**

Spot date/ Tenor	Real spot rates				Nominal spot rates			
	5 yr	10 yr	15 yr	20 yr	5 yr	10 yr	15 yr	20 yr
01 Mar 16	-1.27%	-0.97%	-0.88%	-0.86%	0.74%	1.47%	2.00%	2.34%
03 Oct 16	-2.51%	-2.18%	-2.03%	-1.94%	0.23%	0.77%	1.22%	1.49%
01 Mar 17	-2.51%	-1.97%	-1.78%	-1.69%	0.46%	1.18%	1.66%	1.89%
02 Oct 17	-2.20%	-1.78%	-1.64%	-1.58%	0.76%	1.37%	1.77%	1.98%
01 Mar 18	-1.81%	-1.62%	-1.58%	-1.56%	1.04%	1.54%	1.83%	1.95%
01 Oct 18	-2.05%	-1.73%	-1.63%	-1.58%	1.15%	1.57%	1.84%	1.97%
26 Oct 18	-2.12%	-1.87%	-1.75%	-1.68%	0.94%	1.36%	1.69%	1.86%

3.29 From the table above we derived the implied average increase in spot rates during the RIIO-GD2 and RIIO-T2 price control. The table below shows that at 1<sup>st</sup> March 2016 nominal 10-year gilts were expected to increase by 1.48%, however at 26<sup>th</sup> October 2018, the expectation of increases had fallen, with the nominal forward curve implying increases of 0.65%. Similarly, the expectation implied by real gilts, is low.

<sup>11</sup> <https://www.bankofengland.co.uk/statistics/yield-curves>

**Table 5: Implied increase in risk-free rates for 5, 10, 15 and 20 year tenors**

Spot date/ Tenor	Increase in real rates (to average of 2022-2026)				Increase in nominal rates (to average of 2022-2026)			
	5 yr	10 yr	15 yr	20 yr	5 yr	10 yr	15 yr	20 yr
01 Mar 16	+0.60%	+0.27%	+0.15%	+0.10%	+1.89%	+1.48%	+1.06%	+0.62%
03 Oct 16	+0.72%	+0.44%	+0.31%	+0.24%	+1.41%	+1.15%	+0.81%	+0.48%
01 Mar 17	+1.10%	+0.57%	+0.36%	+0.27%	+1.66%	+1.20%	+0.77%	+0.41%
02 Oct 17	+0.84%	+0.42%	+0.27%	+0.20%	+1.33%	+0.97%	+0.63%	+0.35%
01 Mar 18	+0.36%	+0.15%	+0.10%	+0.09%	+1.00%	+0.69%	+0.41%	+0.23%
01 Oct 18	+0.62%	+0.30%	+0.20%	+0.16%	+0.79%	+0.58%	+0.38%	+0.23%
26 Oct 18	+0.47%	+0.29%	+0.21%	+0.17%	+0.78%	+0.65%	+0.45%	+0.27%

3.30 Table 5 above demonstrates how market data can change materially over a relatively short period of time, highlighting a risk that we estimate future rates at a particular point in time, even though market expectations change materially soon thereafter. We take this as further evidence that equity indexation would protect both investors and consumers from an inaccurate ex ante estimation of the risk-free rate.

3.31 Figure 4 below plots the risk-free rates over the previous 21 years.

**Figure 4: Risk-free rates for 5, 10 and 20 year gilts from 2006 to 2018**



3.32 We can see from Figure 4 that the 20-year gilt is more stable than the 10-year or 5-year gilts. In particular, we note that during the 2008-2009 financial crisis, the 10-year and 5-year gilts both materially increased, whereas the 20-year did not increase as sharply. This is an important consideration for the stability of the cost of equity under any equity indexation approach.

3.33 In addition, we note the long-term nature of equity investment and the typical 45-year RAV depreciation horizon, implying an asset life close to 22.5 years. Our proposal and working assumption therefore is to use the 20-year gilt.

### Equity indexation

3.34 In this section, we discuss the following equity indexation issues:

- practical challenges
- potential benefits
- proposals for how equity indexation could work.

#### Practical challenges for indexing the cost of equity to the risk-free rate

3.35 Equity indexation is appealing in terms of allowing the price control settlement to react to changing market circumstances, but implementing it would require addressing practical issues.

- The Debt Management Office does not at this time issue CPIH or CPI-linked bonds. Only nominal and RPI-linked gilts are directly observable. Therefore, we would need to decide how to derive a CPIH real risk-free rate from the available information. Two options for this are as follows<sup>12</sup>:
  - to derive CPIH real from RPI-linked gilts by adding an expected RPI-CPIH wedge
  - to derive CPIH real from nominal gilts using only a forecast for CPIH.
- We are not aware of an independent CPIH forecast that we could use to inform our judgements of the risk-free rate, or the cost of equity in CPIH terms.
- The difference between CPIH and RPI may change over time. With the wedge approach we would need to decide if both the risk-free rate and the wedge would vary from year to year.
- We would need to decide which tenor(s) to assess for changes. This would involve determining which investment horizon was best suited for equity indexation or price control setting purposes.
- We would need to decide the relevant period of time to measure the risk-free rate. For example:
  - we could take the average of a reporting year ending 31<sup>st</sup> March. This would align with: the end of RIIO-1 and the beginning of RIIO-2, the approach to the price control financial model, and the associated reporting templates – all of which have years ending 31<sup>st</sup> March
  - we could take the average of a year ending 31<sup>st</sup> October. This would be consistent with the current approach to the RIIO-1 cost of debt
  - we could take the average of a particular calendar month rather than an average for a full year. This approach would allow us to use the most up-to-date information on investor expectations prior to a financial year beginning – with the use of a full calendar month reflecting the potential that a shorter period of time – such as a day or a week, potentially being unrepresentative of the risk-free rate or unrepresentative of investor expectations. Using the calendar month of October would allow time for the administrative task of confirming allowed returns in advance of a financial year beginning on 1<sup>st</sup> April the following year.

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<sup>12</sup> Note that these options and the technical issues arising are similar to those identified above at Paragraphs 2.13 to 2.18 regarding the CPIH real cost of debt.

- We would need to decide if the cost of equity would be set in advance of a year beginning, or whether the risk-free rate allowed should reflect the rates that materialised within a given year. For example, the cost of equity for a year beginning 1<sup>st</sup> April could be confirmed during the immediately preceding November, using only outturn information available to November, rather than being confirmed at some later date based on outturn data within the relevant year.

3.36 These practical challenges are relevant to the approach we propose below.

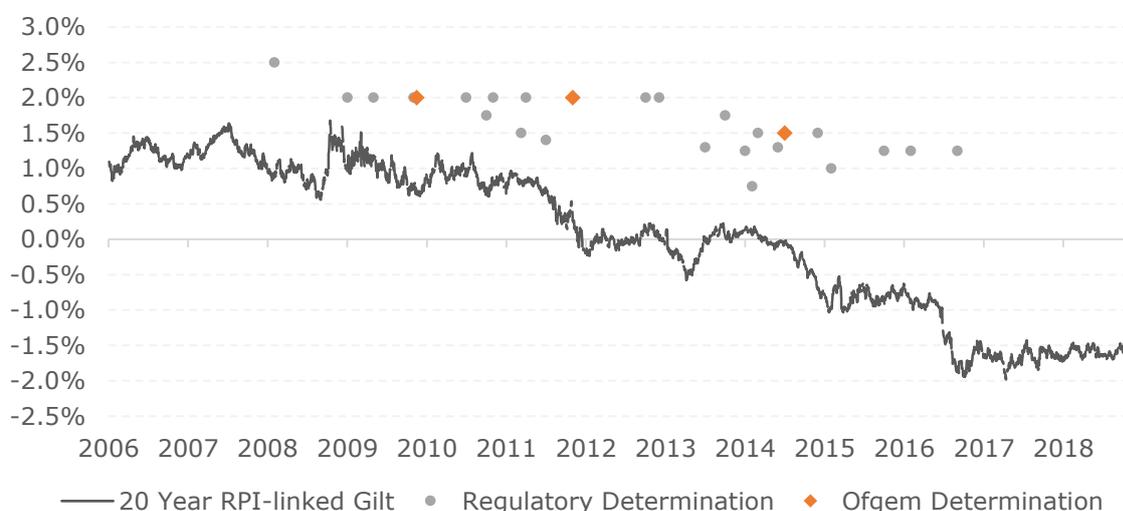
Potential benefits of indexing the cost of equity to the risk-free rate

3.37 In this section, we outline the potential benefits of equity indexation by considering the outcome of previous price controls and the potential for material errors in RIIO-2. We then estimate the cost to consumers of these errors.

3.38 If we assume an equity beta close to 1, then any changes in the risk-free rate have a relatively small impact on the cost of equity. In RIIO-1, the equity beta was in the range of 0.90 to 0.95. Therefore, even though the risk-free rate has turned out to be materially different (more than 200bps less) than the values assumed for RIIO-1 (2% and 1.5%), the impact on the cost of equity, if we assume an equity beta of 0.9, is relatively modest, at approximately 20bps. In RIIO-1 terms this error can be valued at about £50m (nominal) per year.<sup>13</sup>

3.39 Figure 5 below shows the scale of the difference between risk-free rates and the values assumed by regulators.

**Figure 5: The RPI risk-free rates: gilts versus regulatory precedents**



3.40 However, the smaller the equity beta, the more important the risk-free rate becomes. For example, if we assume an equity beta of 0.65 for RIIO-2, and if we assume that the outturn risk-free rate is 200bps different from forecasts, this

<sup>13</sup> £50m is estimated as follows: 2% \* (1-0.90) \* (1-63%) \* £71,086m, where 63% and £71,086m are estimated average values for notional gearing and nominal RAV between FYE 2016 and FYE 2023. We round down to £50m and ignore any related tax impact.

would imply an error of 70bps on the cost of equity. In RIIO-2 terms this error can be estimated at £240m (nominal) per year (or £1,204m over 5 years).<sup>14</sup>

3.41 In Table 6 below, we repeat this calculation to demonstrate the impact that a risk-free rate error could have over the course of 5 years in RIIO-2, using an equity beta range from 0.6 to 0.78, for changes to the risk-free rate up to 100bps.

**Table 6: Potential cost over 5-year period of an inaccurate risk-free rate forecast**

Equity Beta	Change in risk-free rate					
	1.00%	0.80%	0.60%	0.40%	0.20%	0.00%
0.6	£688m	£551m	£413m	£275m	£138m	£0m
0.65	£602m	£482m	£361m	£241m	£120m	£0m
0.72	£482m	£385m	£289m	£193m	£96m	£0m
0.78	£379m	£303m	£227m	£151m	£76m	£0m

3.42 Given that the risk-free rate has in the past been difficult to accurately forecast, and that any ex ante estimation could be more than 100bps different from the outturn rates, we observe that the potential error could be materially greater than £400m over a 5-year period.

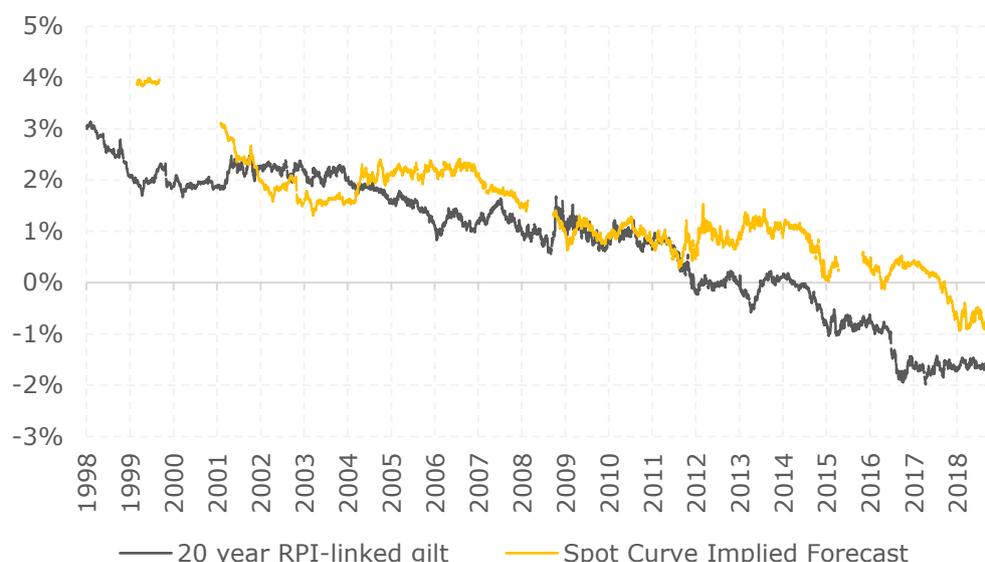
3.43 We are mindful of the risk that any forecast of the risk-free rate can quickly become out-of-date. We therefore set out two options:

- estimate how rates could increase, perhaps based on market implied increases coupled with a subjective judgement on whether market implied forecasts might be too high or too low. Sometimes, regulators have “aimed up” on the market implied rates, given the risk of outturn rates could turn out to be higher than market implied expectations
- alternatively, we could future-proof our determination such that market values could automatically be reflected in the prices that consumers pay (and investors receive).

3.44 The gilt yield spot curve typically implies an increase in rates from the spot rate. Figure 6 below compares the outturn 20-year risk-free rate with the forecasts implied by the forward curve 3 years prior. The difference is approximately 59bps since 2001, and about 125bps since 2013 (the start of the RIIO-1 period).

<sup>14</sup> £1,204m is calculated as follows: 2% \* (1-0.65) \* (1-63%) \* £93,000m \* 5 years. Other values in Table 6 are calculated in the same way, where the equity beta value can change, from 0.60 to 0.78, while gearing and RAV remain constant, at 63% and £93,000m respectively. We retain gearing at 63% to be consistent with the weighted average for RIIO-1 and to isolate only the impact of changing beta.

**Figure 6: A comparison of the 20-year gilt outturn with the implied forecast 3 years prior<sup>15</sup>**



- 3.45 One of the primary benefits of indexation is to remove the need to forecast using yield curves or aim up. Given the long-term cost to consumers of an inaccurate forecast, we propose indexation may be a better approach.
- 3.46 Given the above evidence, that the risk-free rate is difficult to forecast and that the resulting error can be material, we propose to use a spot rate for the risk-free rate and to adjust the cost of equity for any changes in the 20-year real gilt, where:

$$\text{Change in cost of equity} = (1 - \beta) \cdot \text{Change in risk free rate}$$

#### Proposals for equity indexation

- 3.47 At this stage, given the potential material advantages of equity indexation, we propose the following approach for updating the cost of equity to reflect changes in the risk-free rate.
- To use RPI-linked bond spot prices, as published by Bank of England, for the 20-year investment horizon.
  - To use OBR forecasts for RPI and CPI, from its annual March publication, to calculate the difference between RPI and CPI<sup>16</sup> as forecast by OBR.
  - To assume that the difference between RPI and CPIH is equal to the difference between RPI and CPI as forecast by OBR (where the calendar year forecasts by OBR in March are not subsequently updated by subsequent OBR forecasts in the following November or the following March – ie the OBR forecasts must be an expectation, not an outturn, of the difference between RPI and CPI).

<sup>15</sup> Gaps in the spot curve implied forecast are due to gaps in the published Bank of England yield curve data, typically in the three year real zero coupon rate.

<sup>16</sup> Typically, OBR does not forecast beyond a 5-year horizon, and we note that OBR updates this forecast on a biannual basis.

- To convert the 20-year RPI-linked bond prices into a CPIH equivalent, using outturn data on RPI-linked bonds, as published by the Bank of England, after adjustment for the forecast published by OBR.
- To use the daily average CPIH-derived risk-free rate for the month of October each year.
- To publish an update on the allowed cost of equity for each financial year four months in advance (by 30<sup>th</sup> November) of the relevant financial year beginning.

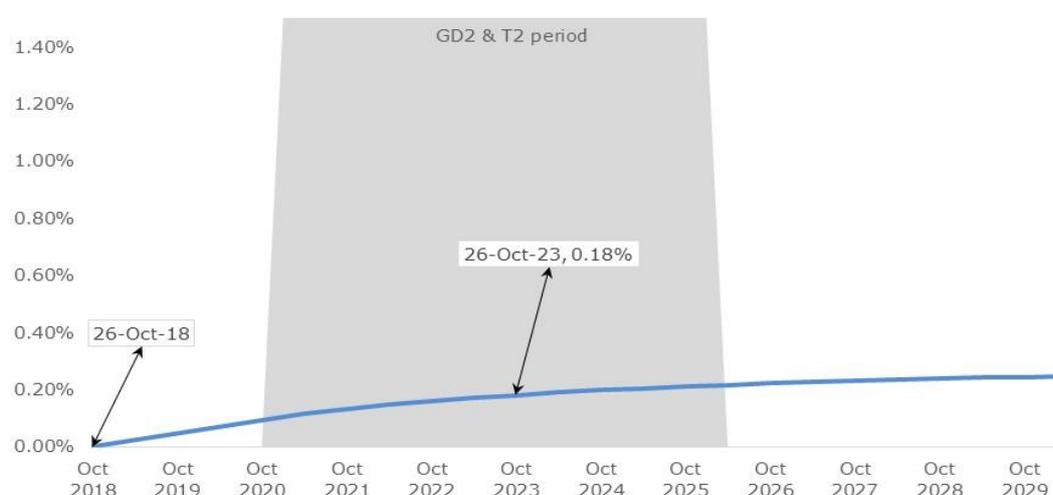
- 3.48 For the first year of RIIO-GD2 and RIIO-T2 (beginning 1<sup>st</sup> April 2021), we propose to set the risk-free rate equal to the average for the month of October 2020. Similarly, for the second year of RIIO-GD2 and RIIO-T2 (beginning 1<sup>st</sup> April 2022), we propose to set the risk-free rate equal to the average for the month of October 2021. In this way, the cost of equity would reflect the latest information available to us on investor expectations.
- 3.49 For the purpose of this document we do not use the average of October 2018. To allow stakeholders to more easily reconcile to the derived forward rates as set out below, we use a spot rate (26<sup>th</sup> October 2018) of -1.68%.<sup>17</sup>

**Table 7: Working assumption for the risk-free rate**

	RPI spot rate
Risk-free rate	-1.68%

- 3.50 In recognition that risk-free rates may be higher in RIIO-2, we now demonstrate the forward curve as at 26<sup>th</sup> October 2018. Using a 20-year tenor, we derive the implied increase for each future year of RIIO-2. We find an implied increase of 18bps by October 2023 (the mid-point of RIIO-GD2 and RIIO-T2), as illustrated in Figure 7 below.

**Figure 7: Implied increase in 20-year RPI-linked gilts as of 26<sup>th</sup> October 2018**



Source: Ofgem analysis of Bank of England data

<sup>17</sup> We note that the average for the October 2018 month is similar (-1.58%).

3.51 The data shown in Figure 7 is presented in table format for each year of RIIO-GD2 and RIIO-T2 as per Table 8 below.

**Table 8: Implied increase in 20yr RPI-linked gilts for each year of RIIO-GD2 and RIIO-T2**

Year-end 31st March	2022	2023	2024	2025	2026
Implied increase <sup>18</sup> as of 26 <sup>th</sup> Oct 2018	0.09%	0.13%	0.16%	0.18%	0.20%

3.52 However, we present these values for demonstrative purposes only, noting that forecasts are not necessary to set the risk-free rate, given the methodology we propose.

#### Risk-free rate questions

- FQ5. Do you agree with our proposal to index the cost of equity to the risk-free rate only (the first option presented in the March consultation)?
- FQ6. Do you agree with using the 20-year real zero coupon gilt rate (Bank of England database series IUDLRZC) for the risk-free rate?
- FQ7. Do you agree with using the October month average of the Bank of England database series IUDLRZC to set the risk-free rate ahead of each financial year?
- FQ8. Do you agree with our proposal to derive CPIH real from RPI-linked gilts by adding an expected RPI-CPIH wedge?

## Total Market Returns

3.53 In this section we outline the proposed methodology for estimating the TMR. We provide an update on the stakeholder views we have received alongside a summary of the evidence we have considered. Based on the evidence available at this time, we estimate a range for the TMR, for the purposes of providing a working assumption for business planning, using the methodology we propose.

#### Introduction

3.54 The TMR is an estimation of the return that investors expect for taking the market-average level of risk.

#### Summary of the Framework consultation and Framework decision

3.55 In the Framework consultation, we proposed to estimate the TMR by considering the historical long-run average of market returns as the best single objective estimate of investors' expectations of the future. We proposed to take account of the findings of the Competition Commission in the Northern Ireland Electricity

<sup>18</sup> Note that the increase to 26<sup>th</sup> October 2023 (0.18%) as per Figure 7 is presented within the column for the year ending 31<sup>st</sup> March 2025, to be consistent with our proposed approach to use information from the October immediately preceding the beginning of a financial year. Other years are calculated in a similar way – taking the increase to the 26<sup>th</sup> October date that immediately precedes the financial year beginning. In the absence of data from Bank of England regarding tenors less than 2.5 years, we have derived the increase for the 2022 year by assuming linear growth for the first three years, and applying a fraction of 2/3 to 0.13%. Note that we present this as a demonstration only – the actual methodology will use the average of an outturn October month not the forward curve derived value for a given day – as presented here.

appeal (2014) as well as forward-looking approaches indicated recently by other regulators such as Ofwat and CAA.

- 3.56 The Framework consultation referred to the UKRN Study, and an estimation of the long-run historical average for TMR being 6-7% in CPI terms (and 5-6% in RPI terms).
- 3.57 In our Framework decision, we decided to implement our preferred TMR approach – that the best objective measure of TMR is the long-run outturn average, while also placing due weight on forward-looking approaches. In our Framework decision we also decided to calculate the allowed return, and therefore the TMR, in CPIH terms.

#### Issues raised by stakeholders on TMR

- 3.58 Stakeholders broadly supported our approach to TMR. In particular, the network companies agreed with our proposal to focus on long-run outturn averages. For example, Northern Powergrid and UK Power Networks agreed with our proposal to use an historic TMR, while National Grid referred to a TMR of 7.0% in RPI terms and Cadent referred to a TMR of 6.5% in RPI terms. However, the network companies made detailed arguments about how the average should be calculated, while also raising issues about outturn and expected inflation.
- 3.59 In our discussions and meetings with the ENA, the network companies highlighted three primary issues with our interpretation of the long-run outturn data, as follows.
- a) First, the companies argue that there has been an unfair 1% drop in the estimate of TMR relative to previous price control decisions (which were RPI-based). The issue the companies have highlighted is that the UKRN Study recommended a TMR range in real terms that should be applied in a CPI/CPIH framework, whereas previous studies<sup>19</sup> by Stephen Wright et al. recommended a real TMR range to be applied in an RPI framework. The expected difference between RPI and CPI is approximately 1% and therefore, the TMR recommendation from 2018, when re-stated in RPI terms for comparison with previous recommendations, is reduced by 1% for the expected difference between RPI and CPI.
  - b) Secondly, the companies argue that the inflation value used by the UKRN group to deflate the nominal returns into a real-terms equivalent is unreliable and upwardly biased, resulting in a lower real return. The UKRN Study preferred the outturn measure of inflation as published by the Bank of England, rather than the outturn measure of inflation created by Dimson Marsh and Staunton.
  - c) Thirdly, the companies argue that the conversion of geometric returns to arithmetic returns is inaccurate and lower than previous conversions. The companies highlight an apparent change in methodology. In previous studies by Stephen Wright et al. the authors recommended that the increase, from geometric to arithmetic averages, should be 100bps to 200bps. However, in

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<sup>19</sup> See: *A study into certain aspects of the cost of capital for regulated utilities in the U.K.*, S. Wright, R. Mason & D. Miles, dated 2003 <https://www.ofgem.gov.uk/ofgem-publications/50794/2198-jointregscoc.pdf> . Also, see: *Report on the cost of capital*, S. Wright, R. Mason, S. Satchell, K. Hori & M. Baskaya, dated 2006 <https://www.ofgem.gov.uk/ofgem-publications/56022/15576-smithersco.pdf>

the 2018 UKRN Study, the companies noted the following argument within the UKRN Study:

- “We would, however, argue that the case for an adjustment to arithmetic averages as large as 2 percentage points (which was implied by the upper end of MMW’s range) is distinctly weakened if regulators wish to set returns on a consistent basis at a relatively long (eg, 10-year) horizon), given that (as noted in MMW) long-horizon returns have distinctly lower volatility than would be the case in a random walk stock market.”
- “...we suggest a modest downward adjustment of the original range proposed by MMW, to a range of 6-7%, primarily reflecting a smaller adjustment from geometric to arithmetic returns.”

3.60 We also held bilateral meetings with stakeholders to get further insight into TMR estimation issues. We consulted with the ENA and their associated consultants (Oxera and NERA); we heard critique from ENA members regarding the use of Dividend Discount Models in terms of the assumed dividend growth rates. We noted concerns about whether forecasts of future dividend growth should be based on analyst estimates, UK GDP or world GDP. The ENA provided further work by NERA on TMR in late November 2018.

#### The UKRN Study recommendation on TMR (6%-7% CPI)

3.61 Since our Framework decision, we have sought to clarify the UKRN Study with Professor Stephen Wright of Birkbeck College. We asked for clarification on the issues raised by the network companies, with a particular focus on the issues listed above at Paragraph 3.59.

3.62 Professor Wright confirmed that the range proposed at page E-125 of the UKRN Study is 6-7% in CPI terms, and that it is fair to interpret this as 5-6% in RPI terms, given the expected future difference between RPI and CPI. Professor Wright explained that the UKRN report did not state a TMR in RPI terms because to do so would contradict the recommendation (see page 8 of the UKRN Study) that regulators should estimate the weighted average cost of capital (WACC) using a measure of inflation that is chosen by HM Treasury and implemented by Bank of England for inflation targeting - this measure is currently CPI.

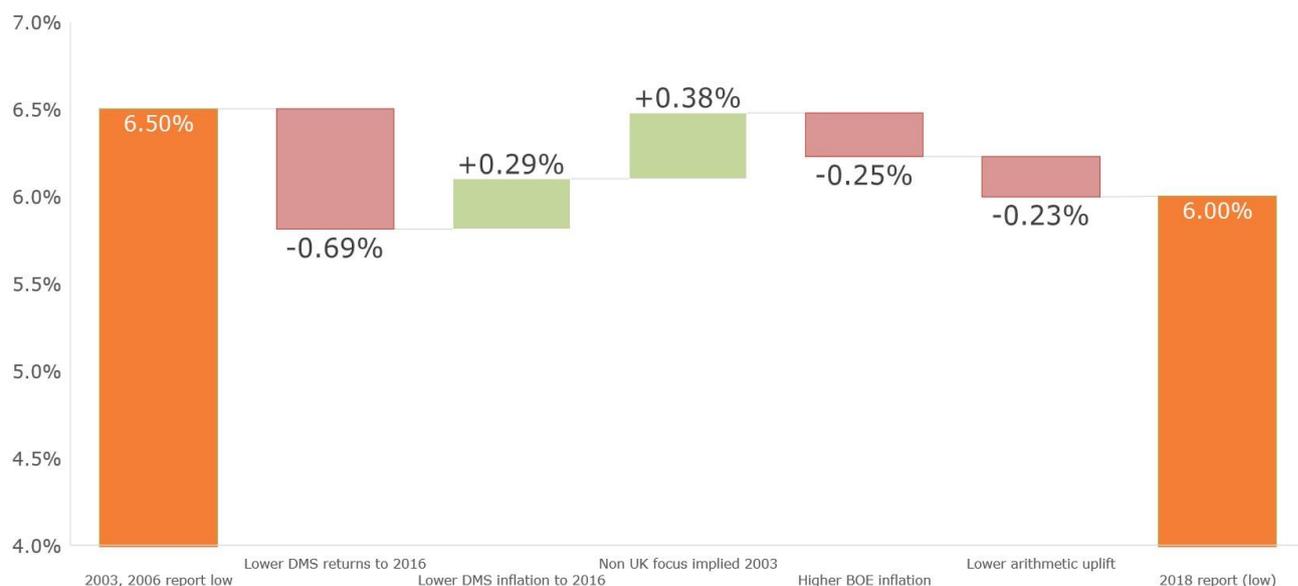
3.63 In advice to Ofgem from Professor Stephen Wright and other academics, dated 2003 and 2006<sup>20</sup>, the real return range is 50bps larger than the 6-7% range recommended in the 2018 UKRN Study. We note that most, but not all, of the 50bps difference could be explained by (i) a different measure of historical inflation and (ii) from a lower uplift from geometric to arithmetic returns (two of the issues identified by the network companies as presented above at Paragraph 3.59).

3.64 However, these two issues do not account for the entire 50bps. Figure 8 below presents our interpretation of how the TMR recommendation has changed from 2003 to 2018. We present this as our interpretation of the advice we have received and the drivers of change between previous TMR recommendations and the current TMR recommendation.

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<sup>20</sup> See footnote 19.

**Figure 8: A reconciliation of the TMR recommendations (2018 UKRN Study compared with studies dated 2003 and 2006)**



3.65 Further information on this reconciliation is provided in Appendix 2 below.

3.66 Table 9 below summarises our interpretation of the UKRN Study regarding the TMR.

**Table 9: Advice on TMR as per the 2018 UKRN Study**

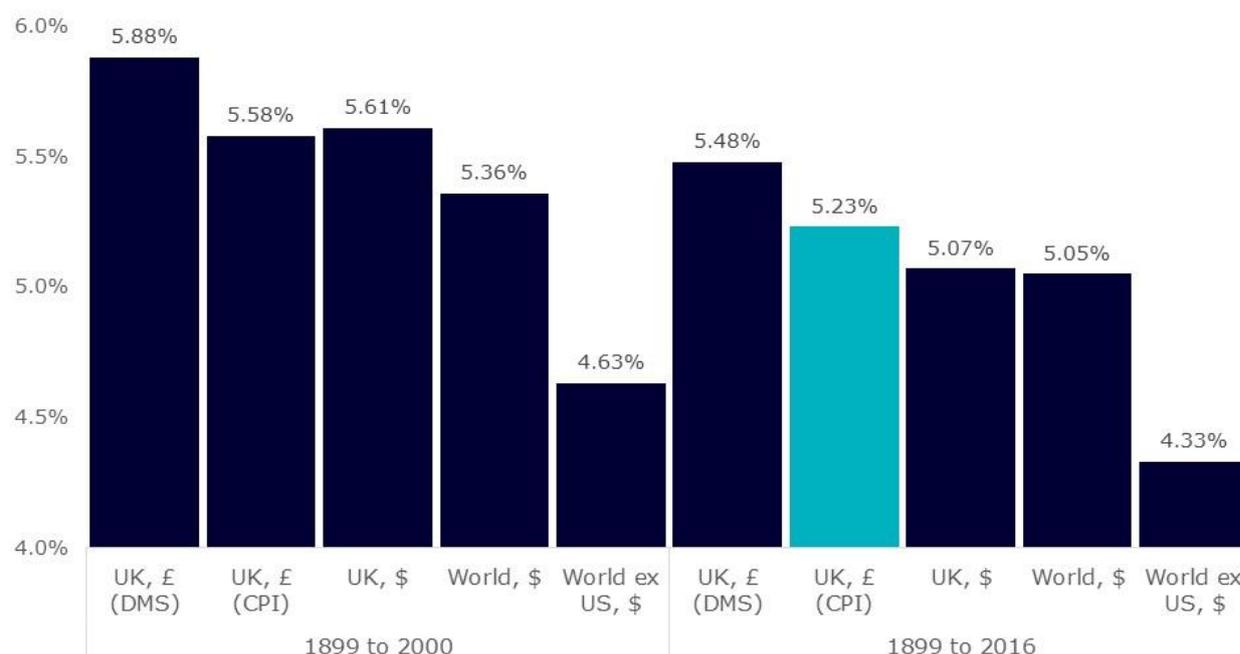
	UKRN Study (CPI)	
	Low	High
TMR	6.00%	7.00%

Cross-checking the TMR range with long-run outturn averages measured in US dollar (\$) terms

3.67 We now check if the range proposed by the UKRN Study is consistent with other evidence of long-run outturn averages. Figure 9 below demonstrates that UK returns, measured geometrically in GBP and deflated using CPI as per the Bank of England, are similar to returns for both the World and UK markets measured on a US dollar basis.

3.68 One of the benefits of cross-checking to UK returns in US dollar terms is that Purchasing Power Parity (PPP) should hold in the long-run (minimising any potential bias of UK inflation measurement). Similarly, the benefit of cross-checking to World returns in US dollar terms is that both PPP and international equity flows should be material in the long-run (again minimising any potential bias arising from UK inflation measurement).

**Figure 9: Geometric returns over the long run**



3.69 We find that UK returns (measured in GBP and deflated using the Bank of England CPI)<sup>21</sup> are broadly consistent with US dollar-based returns for both the UK and World markets. We also find that long-run averages are lower over the 116-year period to 2016 than they were over the 100-year period to 2000. If we assume an uplift from geometric to arithmetic of up to 200bps, these US dollar-based returns are consistent with the 6-7% CPI as recommended by the UKRN study.

3.70 This cross-check should therefore assuage the two concerns raised above, at 3.59b) and 3.59c), for the following reasons.

- We agree that the Bank of England’s measure of inflation results in a larger (25bps) adjustment to nominal returns than the Dimson Marsh Staunton measure of inflation – however this change brings real returns into line with the two US dollar-based measures of returns.
- The (lower) uplift from geometric to arithmetic (77bps for the low end, to 177bps for the high end) is not materially different from the previous approach of using 100bps to 200bps. Figure 9 above demonstrates that if stakeholders disagree with a longer-horizon approach and that a higher uplift from geometric to arithmetic should be maintained, a 100bps to 200bps adjustment to US dollar-based returns would also result in a range of approximately 6-7% real.

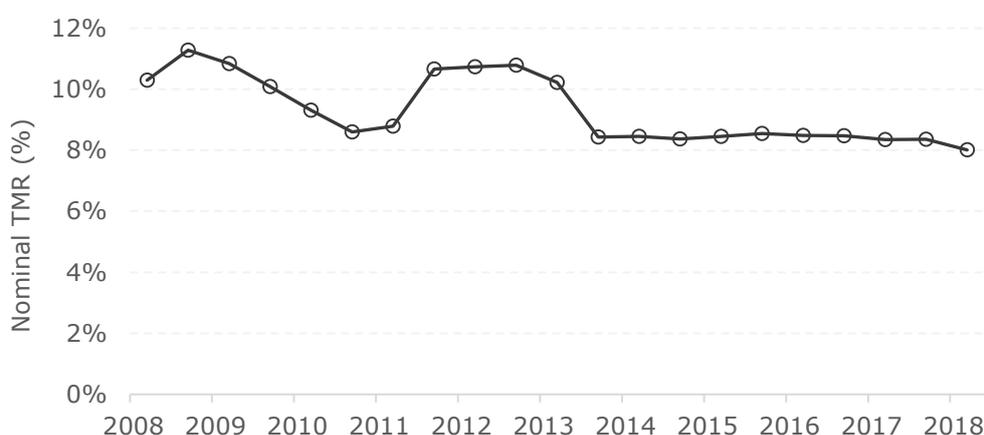
Cross-checking the TMR range with the Dividend Growth Model

3.71 In recent years, the Competition Commission (in the Northern Ireland Electricity determination in 2014) and Ofwat (in its 2017 Final Methodology for PR19) have placed more emphasis on contemporary evidence, including forward-looking measures of TMR.

<sup>21</sup> We highlight this measure in Figure 9 as this is the measure that the UKRN Study focuses on.

- 3.72 One forward-looking approach, used by other regulators including CAA and Ofwat, is to consider the present value of future cashflows from corporate dividends, incorporating share buy-backs and the estimated growth of these cashflows. These inputs can be combined within a dividend discount model (DDM)/ dividend growth model (DGM) to estimate investor expectations of the TMR.
- 3.73 In March 2018, our consultant, Cambridge Economic Policy Associates (CEPA), recommended that its DDM implied a TMR range of 7.4% to 8% nominal<sup>22</sup> when excluding share buy-backs (otherwise 7.9% to 8.5% including buy-backs). This evidence is lower than the 8-9% nominal we interpret from the UKRN Study.
- 3.74 Since March, CEPA has updated its DDM to produce a range of updated estimates. These estimates now reflect updated dividend yields and further sensitivities on growth rates, including UK growth and international growth.
- 3.75 Figure 10 below demonstrates CEPA’s updated results for its preferred DDM model. It shows that using CEPA's preferred forecast parameters estimates of future TMR have fallen over time.

**Figure 10: CEPA’s preferred DDM model**



- 3.76 We provide further detail on CEPA’s DDM and the associated analysis and sensitivities, at Appendix 3 below.

Cross-checking the TMR range: investment managers and advisors

- 3.77 Investment professionals, such as portfolio managers and pension consultants, estimate the TMR in order to advise clients and allocate funds. Table 10 below lists recent forecasts by these professionals.

**Table 10: Estimates of medium-term and long-term nominal UK TMR – asset managers and financial organisations**

Author	Description	Nominal Estimate	Source
Blackrock	5yr return, UK large cap (current)	7.1%	<a href="https://www.blackrock.com/institutions/en-gb/insights/charts/capital-market-assumptions">https://www.blackrock.com/institutions/en-gb/insights/charts/capital-market-assumptions</a>
Old Mutual	LT UK equity (Oct 2018)	6.8%	<a href="https://www.oldmutualwealth.co.uk/Adviser/investment-and-funds/investment-process/strategic-asset-allocation/latest-asset-allocation-quarterly-reviews/">https://www.oldmutualwealth.co.uk/Adviser/investment-and-funds/investment-process/strategic-asset-allocation/latest-asset-allocation-quarterly-reviews/</a>

<sup>22</sup> Paragraph 7.43 of our March consultation refers to a TMR range in RPI terms of 4.4% to 5% - we simply add 3% here to present in nominal terms.

Nutmeg	10yr+ UK equity (Sept 2017)	6.8%	<a href="https://www.nutmeg.com/nutmegonomics/how-we-forecast-potential-investment-returns/">https://www.nutmeg.com/nutmegonomics/how-we-forecast-potential-investment-returns/</a>
Aberdeen AM	UK expected equity returns, 10yr (Dec 2017)	5.9%	<a href="http://www.aberdeen-asset.co/static_files/documents/d7aa3904-a37e-4da5-bce0-5e0bf3601a84/1/54037-cd-long-term-investment-outlook---2018-gbp.pdf#_ga=2.16774262.1778392166.1539079636-1593114588.1539079636">http://www.aberdeen-asset.co/static_files/documents/d7aa3904-a37e-4da5-bce0-5e0bf3601a84/1/54037-cd-long-term-investment-outlook---2018-gbp.pdf#_ga=2.16774262.1778392166.1539079636-1593114588.1539079636</a>
Vanguard	Long Term ie 10yr UK expected equity returns (Jan 2018)	4.5%	<a href="https://www.vanguardinvestor.co.uk/articles/latest-thoughts/markets-economy/why-investors-prepare-for-lower-returns">https://www.vanguardinvestor.co.uk/articles/latest-thoughts/markets-economy/why-investors-prepare-for-lower-returns</a>
Schroders	30yr UK expected returns (Jan 2018)	7.3%	<a href="https://www.schroders.com/en/sysglobalassets/digital/insights/2017/pdf/2018_long_run_forecasts_cb.pdf">https://www.schroders.com/en/sysglobalassets/digital/insights/2017/pdf/2018_long_run_forecasts_cb.pdf</a>
JP Morgan	Long Term UK expected returns (Sept 2018) <sup>23</sup>	7.75%	<a href="https://am.jpmorgan.com/us/institutional/institutional/ltcma-equity-market-assumptions">https://am.jpmorgan.com/us/institutional/institutional/ltcma-equity-market-assumptions</a>
Aon Hewitt	10yr UK projected nominal equity returns (June 2018)	6.4%	<a href="http://www.aon.com/getmedia/ee7748ad-6c76-462b-ba45-63601949dd81/Capital-Market-Assumptions-30-June-2018.aspx">http://www.aon.com/getmedia/ee7748ad-6c76-462b-ba45-63601949dd81/Capital-Market-Assumptions-30-June-2018.aspx</a>
FCA	10-15yr UK projected equity returns (Sept. 2017) <sup>24</sup>	6-7%	<a href="https://www.fca.org.uk/publication/research/rates-return-fca-prescribed-projections.pdf">https://www.fca.org.uk/publication/research/rates-return-fca-prescribed-projections.pdf</a>
Willis Towers Watson	5yr Developed Market equity	6.8%	<a href="https://www.willistowerswatson.com/-/media/WTW/PDF/Insights/2017/04/five-year-capital-market-outlook-2017.pdf">https://www.willistowerswatson.com/-/media/WTW/PDF/Insights/2017/04/five-year-capital-market-outlook-2017.pdf</a>
<b>Average<sup>25</sup></b>		<b>6.59%</b>	

3.78 We note that each of these forecasts is significantly lower than the 8-9% nominal TMR range we derive from inflating the UKRN Study by forecast CPI. These are in line with lower forward-looking measures and further reinforce the recommendation to reduce the long-term TMR range in the manner described herein.

#### An update on Ofgem’s view of TMR

3.79 We find that long run out-turn averages tend to give higher TMR results than DDM values or expert opinions. This is because the long run averages include periods of very high returns and periods of low returns, whereas DDM and expert opinions tend to weigh more heavily more recent information, both of which indicate that returns will be lower in the future than the long run averages.

3.80 Both the DDM and expert forecasts indicate that we are currently in a period of low returns, and we are mindful that, at this moment, the long run outturn may be upwardly biased. However, we are also mindful of the benefit to investors and consumers of predictability and stability in regulatory policy and judgements. Therefore, we propose to maintain our approach of placing most weight on the average of long run returns, as the most objective measure of investor expectations.

<sup>23</sup> 5.75% nominal plus 2.0% inflation.

<sup>24</sup> The FCA report states “For UK equity investments we expect a narrow range of real equity returns of 3.5% to 4.5%”. The FCA define “real” as relative to a GDP deflator measure of inflation, which it expects to be 2.5%. To convert the FCA values into nominal terms, we add 2.5% to the low (3.5%) and high (4.5%) end of the “real” range.

<sup>25</sup> Taking FCA at the midpoint of 6.5%.

- 3.81 Whilst we understand company arguments that the UKRN study appears to reduce real returns by 1% by stating real returns on a CPI basis instead of an RPI basis, we note that most measures of inflation are relatively similar over the period of the 20<sup>th</sup> century and that CPI did not exist in its current form for the majority of those 100 years. However, the UKRN study focuses on the expected value of real returns, rather than the expected value of inflation.
- 3.82 We are not at this stage persuaded by arguments that we should rely on Dimson Marsh Staunton inflation data rather than the Bank of England inflation data. We are also not persuaded that the uplift from geometric to arithmetic is too low. The cross-checks on US dollar-based returns indicate that, if anything, the long-run data points to a lower TMR than 6-7% CPI.
- 3.83 We also draw attention to the reconciliation<sup>26</sup> of the TMR, which highlights a number of positive variances that are incorporated in the update. For example, the 2003 approach of adjusting the UK returns downwards to bring them into line with US dollar-based and world returns, is not part of the updated UKRN study recommendation. This benefits the companies by assuming a higher TMR than those measured on a US dollar-basis (for both UK and world returns).

Working assumption for TMR

- 3.84 Taking into account each of the various issues identified above, our current methodology for TMR indicates as a working assumption a range of 6.25% to 6.75% in CPIH terms.
- 3.85 We present this in Table 11 below, as a working assumption to inform business planning and subject to consultation and reassessment at the initial and final determination stages of the price control.

**Table 11: TMR range in CPIH terms**

	CPIH	
	Low	High
TMR	6.25%	6.75%

TMR questions

- FQ9. Do you have any views on our assessment of the issues stakeholders raised with us regarding outturn inflation, expected inflation, and the calculation of arithmetic uplift (from geometric returns)?
- FQ10. Do you have any views on our interpretation of the UKRN Study regarding the TMR of 6-7% in CPI terms and our 6.25% to 6.75% CPIH real working assumption range based on the range of evidence?
- FQ11. Do you have any views on our reconciliation of the UKRN Study to previous advice received on TMR as outlined at Appendix 2?

<sup>26</sup> See Appendix 2.

## Equity beta

### Introduction

3.86 The equity beta measures undiversifiable risk for which investors expect additional returns. In the context of RIIO-2, it represents the amount of risk that network owners cannot diversify away, even when they hold many different types of investment, including other network utilities, in a portfolio. The CAPM uses the equity beta as a scaling factor, where a higher equity beta results in more weight being applied to the TMR with less weight applied to the risk-free rate.

### Summary of the Framework consultation and Framework decision

3.87 In the Framework consultation, we proposed that we would estimate forward looking equity betas by looking at the historic correlations between the share prices of regulated utilities and a stock market index such as the FTSE All-Share index. We proposed to consider informing our estimate of equity beta by making use of sophisticated econometric techniques such as those referenced in the UKRN report, to filter out noise from the underlying datasets.

3.88 We referred to CEPA's recommendation that the RIIO-2 equity beta should be in the range of 0.7 to 0.8, while highlighting that further work was due to be undertaken. We also proposed to investigate the appropriate measures of translating between raw equity betas and notional (asset or equity) betas for network companies.

3.89 In the Framework decision, we noted that National Grid said there are strong grounds for not making changes to the established methods generally used in previous price controls. We also noted that Centrica and Citizens Advice supported investigating equity beta issues further: Citizens Advice also issued a research paper called "Things can only get beta".<sup>27</sup>

3.90 We decided to investigate further the issues involved in estimating equity beta for the network companies and we also re-iterated our intention to consider further the relationship between gearing and beta risk.

### Issues raised by stakeholders on Equity beta

3.91 Since our Framework decision, we have held bilateral meetings and workshops with stakeholders, and shared the outputs of consulting work.

3.92 We have also continued to review the submissions made by:<sup>28</sup>

- NERA on behalf of National Grid (dated 30<sup>th</sup> April 2018 and 1<sup>st</sup> May 2018) and by NERA for Cadent (dated 1<sup>st</sup> May 2018)
- Oxera on behalf of the Energy Networks Association (dated 28<sup>th</sup> February 2018 and 1<sup>st</sup> May 2018).

3.93 In general terms, the arguments were as follows.

- That the recommendation from the UKRN report to use a long period of history, is not appropriate. In NERA's view, "relying on data since 2000 for

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<sup>27</sup> <https://www.citizensadvice.org.uk/about-us/policy/policy-research-topics/energy-policy-research-and-consultation-responses/energy-policy-research/things-can-only-get-beta-an-opportunity-to-get-financing-costs-right-for-consumers/>

<sup>28</sup> <https://www.ofgem.gov.uk/publications-and-updates/riio-2-framework-consultation> see [https://www.ofgem.gov.uk/system/files/docs/2018/06/tos\\_sos\\_and\\_ena\\_responses\\_riio-2\\_frameowrk\\_consultation.zip](https://www.ofgem.gov.uk/system/files/docs/2018/06/tos_sos_and_ena_responses_riio-2_frameowrk_consultation.zip)

estimating betas ignores changes in risk over time and leads to downward biased estimates for UK water and energy comparators". NERA recommended that "asset betas are estimated based on recent data, eg a period of 2 to 5 years".

- That relying on low frequency data (eg quarterly or monthly instead of daily) leads to "less precise beta estimates", where NERA refer to precision "as measured by standard errors". NERA also claim that results can change dramatically when the choice of the starting day is changed in a trivial manner.
- That NERA see "no merit in using asset beta estimates from 2011 to 2014 to estimate the asset beta for RIIO-2" because "the betas for regulated utilities declined as investors became more risk-averse...as a result of the flight-to-quality".
- That the use of estimated equity betas, as opposed to re-levered equity beta at notional gearing, is inconsistent with theory and good practice. NERA argued that: "we do not consider the MPW approach has any merit" adding "the use of an unadjusted equity beta reflecting companies' actual gearing would be inconsistent with the notional weights used to calculate the weighted average cost of capital". NERA also argued that "if the regulator were to determine the cost of capital based on listed companies' actual capital structure decisions, this would undermine incentives to optimise capital structure and minimise financing costs".
- That GARCH (an advanced econometric technique) "produces similar results as OLS when same time frames and data frequency used, which questions the benefit of more complex GARCH approach for regulation".
- That the re-levering of beta in the Framework consultation was, in Oxera's view, unrealistic, particularly when using a notional gearing assumption of 50%.
- That our advisers, CEPA, had been, in Oxera's view, wrong to ignore beta evidence from non-UK comparators given the limited number of utility stocks listed in the UK market (which they noted were principally Scottish and Southern Electric (SSE), National Grid plus the 3 water companies).
- That it was questionable, in Oxera's view, to use GARCH analysis in favour of the more conventional estimates using Ordinary Least Squares (OLS).

3.94 Citizens Advice also made recommendations regarding equity beta, as follows.

- That the analysis should be extended beyond two pure play utilities (Severn Trent and United Utilities) and potentially include international comparators, where appropriate.
- Further empirical work should be done to estimate the appropriateness of the GARCH model and/or the use of the OLS model at lower frequencies.
- Regulators should consider whether continued employment of standard OLS model for daily data can be econometrically justified.
- Further work should be done to examine what the debt beta assumption should be.

- Further research should be done to consider, and if possible measure, the extent to which the reduced equity costs associated with using an observed beta is offset by the negative incentives it could give companies regarding their capital structure.
- Regulators should never set a beta higher than the observed beta. Citizens Advice argue that if firms are engaging in gaming that benefits themselves at the expense of consumers, then regulators are free to penalise them at the next price control.

#### Updated evidence on equity beta

3.95 To address the issues raised by stakeholders, many of which are technical in nature, we instructed Dr Donald Robertson of the University of Cambridge to extend the work he began during his assistance for the UKRN Study. In his work, he assessed 15 FTSE companies, 5 of which own a material stock of UK network assets (SSE, National Grid, Pennon, Severn Trent and United Utilities). These 5 are the available proxies for estimating the equity beta of the privately held UK energy network companies.

3.96 In his report, Dr Robertson highlights:

- differences between the two econometric techniques (OLS and GARCH)
- the theory of using different frequencies of data (daily, weekly or monthly)
- the impact of assessing beta over different time periods.

3.97 We shared Dr Robertson's report with stakeholders, to help them understand the issues and recommendations arising from that report.

3.98 Dr Robertson argues:

- if data is to be used to inform decision-making, then the data should be used in a way that respects the statistical framework
- a view on whether equity beta is time-varying is central for choosing whether one statistical technique, such as OLS, is favoured over another, such as GARCH. Put simply, OLS is not designed to capture time-varying properties within the data, whereas GARCH is better equipped to deal with time complexities
- if beta is believed to be a constant, the best strategy is probably to use OLS with a full sample of data, at the highest frequency where accurate measurement is possible, unless there is evidence of a clear structural break in the nature of the underlying business
- if, however, beta is believed to be time-varying, then estimation can still be done by OLS but other techniques may be more appropriate. Dr Robertson argues that there is overwhelming evidence that beta is time-varying, in which case, OLS is incorrectly specified for the data, and the model will display heteroscedasticity
- the intended use of beta estimates is an important consideration in deciding how to use the raw data. If, for example, equity beta estimates are required for short horizon purposes, such as quarterly portfolio optimisation, then OLS estimations with high frequency data, using short periods of outturn data, may be appropriate

- if the intended use of equity beta estimates is to inform the likely values at longer horizons, it will be necessary to specify some model for the time evolution of beta. GARCH models account for time variation directly and therefore have advantages (over OLS). Estimations using the GARCH model also provide a good estimate of the long run while allowing us to understand the short-run dynamics of beta
- over the longer run of data, both OLS and GARCH can return good estimations of long-run beta
- simulations show that if the real world has GARCH-like properties, then estimation over the short run using OLS, will probably overestimate the true beta.

3.99 To help stakeholders consider these findings further, we have published Dr Robertson's report alongside this consultation.

3.100 To further supplement Dr Robertson's work, and to address a number of issues that remained outstanding, we commissioned an additional study on equity beta estimation issues, in collaboration with other UKRN members.

3.101 This further work was conducted by Indepen Limited, a consultancy firm, in conjunction with a number of other academics, including:

- Dr Melvyn Weeks, Senior Lecturer in Economics, University of Cambridge
- Professor Seth Armitage, Professor of Finance, University of Edinburgh
- Professor Sudi Sudarsanam, Emeritus Professor of Finance, Cranfield School of Management.

3.102 We shared the Indepen study with other regulators for comment to help collaborate on the relevant estimation issues. The Indepen study is designed to address a number of issues not addressed in Dr Robertson's work.

3.103 The results of the Indepen study can be summarised as follows:

- a focus on understanding equity betas over a longer time period is appropriate and that in all cases analysis "over at least the last five and probably the last ten years is desirable and consequently any programme should commence with an evaluation of structural breaks"
- there is evidence of structural breaks in the data, and therefore caution is required when interpreting the long-run outturns. All of the UK network companies showed structural breaks at some point in the period of the Global Financial Crisis of 2008-09. Indepen recommends that it is appropriate to use relatively more recent periods that are free from structural breaks. However, given the time varying (and mean reverting) nature of observed betas, and the need for the regulator to make longer-term forecasts, as long a time period as possible is recommended when estimating betas
- in choosing a frequency of data observations (for example, daily or monthly), there is a trade-off between noise and signal. High frequency data, such as daily, may introduce statistical problems such as heteroscedasticity. Although low frequency data may reduce the heteroscedasticity issue, it may introduce others such as potentially reduced estimator precision. Indepen found that there is a heteroscedasticity problem for all network companies when using daily or weekly data observations

- the choice of estimation approach depends on the characteristics of the data. If heteroscedasticity is not an issue, then it is possible to use OLS or Least Absolute Deviations (LAD) to avoid outliers being unduly influential
- GARCH models are preferred to Kalman filters or methods that adjust OLS (such as Blume and Vasicek). However, GARCH models come in many forms, and any one GARCH specification may not, based on statistical criteria, be suitable for all companies
- accounting information did not, given the initial analysis and approach by Indepen, appear to provide a useful cross-check to the share price data. Significantly more research would be required before such information could be used to inform any equity beta estimation for a regulatory determination
- international comparators may have limited value for estimating UK equity betas. Significant care needs to be taken when assessing international data and any use of international comparators would need to consider the following issues:
  - the similarity of the country-specific risk environment
  - the impact of difference tax regimes and business environments
  - the impact of the financial structure and tax regime of the comparator company
  - whether the international data should be assessed over a different time frame than the UK data, given the potential for different structural breaks.
- The de-gearing of raw beta estimates and re-gearing to a notional level may introduce a number of issues. The Indepen recommendation is that regulators should be willing to exercise judgement in terms of comparing the effects of de-gearing and re-gearing, with the original raw beta estimates from the market. In particular, Indepen highlight that:
  - there may not be a linear relationship between asset betas, equity betas and debt betas
  - even if there is a linear relationship, the traditional approach does not consider the possibility that relative gearing (to the overall market) may be more important than the absolute value of gearing for a company at a given point in time
  - debt betas should be used if de-gearing and re-gearing is undertaken. Further research is required on estimating debt betas although there is regulatory precedent and academic support for debt betas in the range of 0.05 to 0.22
  - it is potentially inconsistent to de-gear raw betas using one definition of gearing (Net debt / Enterprise Value (EV)) and then re-gear equity betas using a different definition of gearing (Net debt / RAV). If the Enterprise Value is larger than RAV, then by de-gearing and re-gearing, the notional equity beta may be overestimated. For the relatively pure play UK utility companies, recent EV/ RAV ratios have been about 1.1x and these are reflective of average values since

2015.<sup>29</sup> Therefore, it may be appropriate to adjust the observed EV gearing for the purpose of re-gearing betas to a notional RAV gearing level.

- It may be important to decompose beta estimates to reflect that listed stocks may include non UK-regulated businesses. For example, National Grid has a material business in the United States and SSE has substantial exposure to non-network businesses (such as energy generation and retail).
- Overall, Indepen recommend an observed equity beta close to 0.6 based on the optimum observation period using ten years' data. A wider range of 0.55-0.70 arises from the use of longer periods (with the issue of structural breaks) or shorter periods (omitting potentially relevant information).

3.104 To help stakeholders consider these findings further, we have published Indepen's report alongside this consultation.

*An update on Ofgem's methodology for estimating equity beta*

3.105 In light of the findings of the two consultancy studies on equity beta, we provide an update below on our current thinking with regards to the issues raised by stakeholders.

3.106 We address the arguments made by NERA and Oxera as follows:

- we disagree with the argument that only the most recent periods of history are relevant. We are estimating beta for a five-year period starting in several years' time and we know that short-term estimates of beta are not stable. In our view, we would wish to consider all relevant periods of history to assess whether, and the degree to which, we can rely on the data for estimating risk for RIIO-2
- we disagree with the argument that we should not use beta estimates for the period 2011 to 2014. This period may be no less valuable - in fact, it may be more valuable because we can better understand how investors perceive risk in network utilities during periods of economic uncertainty or financial turbulence
- we disagree with the argument that only high frequency observations are relevant. Instead, we propose to consider both high frequency and lower frequency observations, in light of the trade-off between noise and signal, and in light of the statistical issues of heteroscedasticity that are more prevalent in high frequency observations
- we disagree with the argument that relying on low frequency data may result in less precise beta estimates; this may not necessarily be the case. Low frequency data may have fewer issues than high frequency data – a higher signal to noise ratio may compensate for any loss of information
- we disagree with the argument that long periods of outturn data should not be used. Long periods of outturn data may in fact be more appropriate for price control purposes than short periods of time. The UKRN Study proposed that we should use long-run horizons for all the CAPM parameters (on the basis of

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<sup>29</sup> Using closing share prices on October 19<sup>th</sup> 2018 we calculated the EV to Regulatory Assets ratio of United Utilities as 1.07x and of Severn Trent as 1.11x. We have not included the pension fund deficits in the Enterprise Value of the two companies although this adjustment is commonly made. Adjusting for unregulated businesses by deducting that value from Enterprise Value, CEPA estimated that MARs since January 2015 average 1.161x for Severn Trent and 1.086x for United Utilities.

consistency). We also note that NERA's proposal on equity beta (to take shorter periods of time) is inconsistent with its proposal on TMR – where NERA argue that we should use long-run evidence. In our view, there is a trade-off between (i) assessing all available data, and (ii) discarding inappropriate data

- we disagree with the argument that the consideration of raw equity betas (absent the effect of any gearing adjustments) has no merit. Raw beta estimations are more reflective of actual investor costs and avoid the potential for the effects of gearing to be misunderstood
- we agree with NERA that OLS and GARCH techniques can provide similar estimations of equity beta, particularly when using a long period of outturn data
- we agree with NERA that it may be worthwhile to consider international comparators. However, we find that international comparisons may create additional issues, such as considering how exchange rates and regulatory frameworks differ over time, relative to UK benchmarks.

3.107 To summarise, we are not at this stage convinced that the arguments from NERA or Oxera materially influence our methodology on estimating equity beta.

3.108 We address the recommendations from Citizens Advice (CA) as follows:

- we agree with CA that the analysis should extend beyond the two pure-play companies (Severn Trent and United Utilities). The work by Dr Robertson includes 5 network companies (and 10 other non-network FTSE companies for comparison) and the work by Indepen includes the same 5 network companies alongside BT, which we do not consider to be an appropriate comparator
- we agree with CA that we should carefully consider the available statistical techniques, including OLS and GARCH. The work by Dr Robertson and by Indepen highlight that in certain situations, both models can be safely used, whereas in other situations, we should place more weight on one model rather than another. The Indepen work also identifies other statistical options and where these may be appropriate, alongside the argument that GARCH can take multiple different forms to reflect the underlying dataset for each company
- we agree with CA that we should consider the weaknesses of the standard OLS model. The work by Dr Robertson and by Indepen demonstrate that we should apply caution to any high frequency OLS estimates
- we agree with CA that we should consider carefully what the debt beta assumption should be, noting that this issue is tied with the de-gearing and re-gearing question. We note that the debt beta impact can be material and that previous regulatory estimates of debt beta are in the range 0.05 to 0.22<sup>30</sup>

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<sup>30</sup> Economic regulation of capacity expansion at Heathrow: working paper on the cost of capital and incentives CAP 1674 <http://publicapps.caa.co.uk/docs/33/CAP1674WorkingPaperH7R3WACC.pdf>, Paragraph 53, p.27. The Competition Commission used a range of 0.09 to 0.19 in its Heathrow (2007) determination and 0.1 to 0.22 in its Stansted (2008) determination see: Competition Commission 2008: Stansted Price Control Review Final Report Appendix L, page L35 (debt beta 0.1 to 0.22) [https://webarchive.nationalarchives.gov.uk/20140403005111/http://www.competition-commission.org.uk/assets/competitioncommission/docs/pdf/non-inquiry/rep\\_pub/reports/2008/fulltext/539a1.pdf](https://webarchive.nationalarchives.gov.uk/20140403005111/http://www.competition-commission.org.uk/assets/competitioncommission/docs/pdf/non-inquiry/rep_pub/reports/2008/fulltext/539a1.pdf)

- we continue to think carefully about CA’s recommendation to use raw betas rather than adjusting raw betas for actual and notional gearing. CA highlighted that there may be some incentive issues with using raw betas. We find that it is difficult to decompose the raw beta for real-world effects that are different from our regulatory model. We also find that de-gearing and re-gearing could boost notional betas to a level materially above observed market values. For example, if actual gearing is 50% and notional gearing is 60%, the equity beta can be increased by 0.15 (from 0.7 to 0.85 when assuming a debt beta of 0.1). We note the CA’s recommendation that regulators should never set notional betas above the observed values. We note from the Indepen study that de-gearing and re-gearing should be applied but that raw beta values should also be employed as a cross check.

*A working assumption for equity beta, given our updated methodology*

3.109 At this stage, our working assumption on equity beta is a range of 0.60 to 0.70 on a raw equity beta basis. We note that this range is slightly above the Indepen recommendation.<sup>31</sup> Whilst there is evidence of raw beta values below 0.6, these are based on longer-term estimates including periods that display structural breaks. The shorter-term (5-year) data imply raw betas of up to 0.7. Whilst we are concerned that a short-term approach ignores relevant information, we have conservatively used a range of 0.6-0.7 as our current working assumption. This will be reviewed in light of consultation responses and beta values at determination. The 0.6-0.7 raw beta working assumption range implies a re-gearred notional equity beta range of 0.65 to 0.76 using our working assumptions for adjusted gearing, debt beta and notional gearing, as illustrated in Table 12 below.

**Table 12: Notional equity beta range**

	Low	High	Ref	Source
Raw Equity beta	.60	.70	A	Broadly in line with Indepen recommendation as per executive summary of its report, as discussed above.
Gearing: net debt / Enterprise Value (EV)	50.8%	50.8%	B	Average of the gearing of 5 utility companies (SSE, NG, UU, SVT, PNN) taken as of October 19 <sup>th</sup> 2018 treating the SSE hybrid security as debt but not including pension fund deficits.
EV / RAV	1.1	1.1	C	Average EV/ RAV for purest play utilities (UU and SVT) on October 19 <sup>th</sup> 2018
Adjusted gearing	56%	56%	D	$D = C * B$
Debt beta	.15	.10	E	Narrowed from regulatory precedent

<sup>31</sup> See the executive summary of the Indepen report which recommends a broad range of 0.55 to 0.7 and a narrow range of 0.57 to 0.65, with 0.6 as the central estimate.

Asset beta	.35	.36	F	$F = A * (1 - D) + E * D$
Notional Gearing	60%	60%	G	Working assumption
Notional equity beta <sup>32</sup>	.646	.762	H	$H = [ F - (G * E) ] / (1 - G)$

3.110 We invite views from the companies and other stakeholders, and we will update our views, after we have received more information, including proposed business plans, and our assessment of the overall risk of the RIIO-2 price control as a whole.

3.111 We note that there is a significant body of evidence being presented to stakeholders as part of this consultation, in the form of two consultancy studies, alongside our considered thoughts on the arguments made during the Framework consultation and subsequent engagement. We also note the scale of the impact that our equity beta assumption has on investor returns and consumer charges. Therefore, we welcome further input from stakeholders on these issues during the consultation period.

3.112 At this stage we do not identify a central estimate and our working assumption is to assume a consistent equity beta range across the sectors and companies but this will be reviewed following receipt of business plans.

#### Equity beta questions

FQ12. Do you have any views on our assessment of the issues that stakeholders raised regarding beta estimation, including the consideration of: all UK outturn data, different data frequencies, long-run sample periods, advanced econometric techniques, de-gearing and re-gearing, and the focus on UK companies?

FQ13. What is your view on Dr Robertson’s report?

FQ14. What is your view on Indepen’s report?

FQ15. What is your view of the proposed Ofgem approach with respect to beta?

#### **Summary of CAPM evidence for the cost of equity**

3.113 Table 13 below provides a summary of the CAPM evidence for each of the key underlying parameters, as discussed above. This range is reflective of the current evidence available to us, and should be interpreted as a working assumption, for the purposes of business planning only, to be updated in due course.

3.114 The RPI and nominal ranges are provided for information only.

<sup>32</sup> We present the notional equity beta to three decimal places solely to allow the subsequent calculation in Table 13 to be displayed to two decimal places.

**Table 13: CAPM-implied cost of equity range**

	RPI		CPIH		Nominal		Ref	Source
	Low	High	Low	High	Low	High		
Notional equity beta <sup>33</sup>	.646	.762	.646	.762	.646	.762	A	Table 12
Total Market Return (TMR) <sup>34</sup>	5.189%	5.684%	6.25%	6.75%	8.417%	8.928%	B	Table 11 (CPIH source)
Risk-free rate (RFR) <sup>35</sup>	-1.68%	-1.68%	-0.69%	-0.69%	1.34%	1.34%	C	Table 4 (RPI source, 20yr tenor as of 26th Oct 2018)
CAPM-implied cost of equity	2.76%	3.93%	3.79%	4.98%	5.91%	7.12%	D	$D = C + A*(B-C)$

3.115 Using the approach presented at Paragraph 3.46 and the information in Table 8 regarding forward risk-free rates, we can present for illustrative purposes the RPI and CPIH CAPM-implied cost of equity for each year of RIIO-GD2 and T2 as per Table 14 below.

<sup>33</sup> We present the notional equity beta to three decimal places solely to allow the CAPM-implied cost of equity calculation to be displayed to two decimal places.

<sup>34</sup> The low RPI TMR is derived from the CPIH range as follows:  $(1+6.25\%) / (1+1.009\%) - 1$ . Similarly, the high uses 6.75% instead of 6.25%. The Low Nominal TMR is derived from the CPIH range as follows:  $(1+6.25\%) * (1+2.04\%) - 1$ . Similarly, the high uses 6.75 instead of 6.25%. We present the RPI TMR range to three decimal places solely to allow the subsequent calculation to be displayed to two decimal places.

<sup>35</sup> The low CPIH RFR is derived from the RPI RFR as follows:  $(1-1.68\%) * (1+1.009\%) - 1$ . Similarly, the Low Nominal RFR is derived from the RPI RFR low as follows:  $(1-1.68\%) * (1+3.07\%) - 1$ .

**Table 14: CAPM-implied cost of equity for each year of RIIO-GD2 and T2, in RPI and CPIH terms**

Price base	Component	Year-end 31st March					Ref	Source	
		2022	2023	2024	2025	2026			
RPI	Notional equity beta	Low	0.646					A	Table 12
		High	0.762					B	Table 12
	Total Market Return	Low	5.189%					C	$C = (1+I) / (1+1.009\%)^{-1}$
		High	5.684%					D	$D = (1+J) / (1+1.009\%)^{-1}$
	Risk-free rate	Forward: real increase	0.09%	0.13%	0.16%	0.18%	0.20%	E	Table 8
		Spot: 26th Oct 2018	-1.68%					F	Bank of England
	Cost of equity	Low	2.79%	2.80%	2.81%	2.82%	2.83%	G	$G = (E+F) + A * (C - (E+F))$
		High	3.95%	3.96%	3.97%	3.97%	3.98%	H	$H = (E+F) + B * (D - (E+F))$
CPIH	Total Market Return	Low	6.25%					I	Table 11
		High	6.75%					J	Table 11
	Risk-free rate	Spot + forward	-0.60%	-0.56%	-0.53%	-0.51%	-0.49%	K	$K = (1 + (E+F)) * (1 + 1.009\%)^{-1}$
	Cost of equity	Low	3.83%	3.84%	3.85%	3.86%	3.86%	L	$L = K + A * (I-K)$
		High	5.00%	5.01%	5.02%	5.02%	5.03%	M	$M = K + B * (J-K)$

## Step 2 - Cross-checking the CAPM-implied cost of equity

### Background

3.116 Step 2 in our proposed cost of equity methodology is to estimate equity investor expectations based on a number of cross-checks. These cross-checks include:

- Market-to-Asset Ratios
- professional forecasts from investment managers and advisors
- bids for offshore electricity transmission assets (“OFTOs”)
- infrastructure fund discount rates.

3.117 In the sections below we explain and demonstrate how this information can be interpreted in the context of cross-checking the CAPM estimate.

### Market-to-Asset Ratios

3.118 Network assets can be sold from one equity investor to another in either a public or private market. We would expect the price paid by equity investors during such transactions to reflect the underlying asset being traded: the regulated asset value (the RAV). The ratio of the market price to the RAV is referred to as the market-to-asset ratio.

3.119 A ratio greater than 1 implies that investors are paying a premium to own network assets. An investor would do this on the expectation that the return from network ownership is greater than the investor’s cost of equity. Similarly, a market-to-asset ratio less than 1 would imply that investors do not expect to earn a regulatory return greater than their cost of equity.

3.120 One of the benefits of market-to-asset ratios, relative to the other cross-checks we describe below, is that these transactions do not necessarily need to be adjusted for gearing or risk. The underlying assets, regulatory framework, and tax treatment, are constant.

3.121 Market-to-asset ratios can be observed in two main ways:

- For publically listed shares – the Enterprise Value can be compared to the regulatory asset value (RAV) to derive a market-to-asset ratio.
- For privately held shares – the transaction price paid to obtain full or partial ownership of a network business can be compared (after accounting for the proportion of ownership obtained) to the RAV to derive a market-to-asset ratio.

3.122 Figure 11 below presents the market-to-asset ratios for three publically listed network companies:

**Figure 11: Market-to-asset ratios of three publically listed companies**

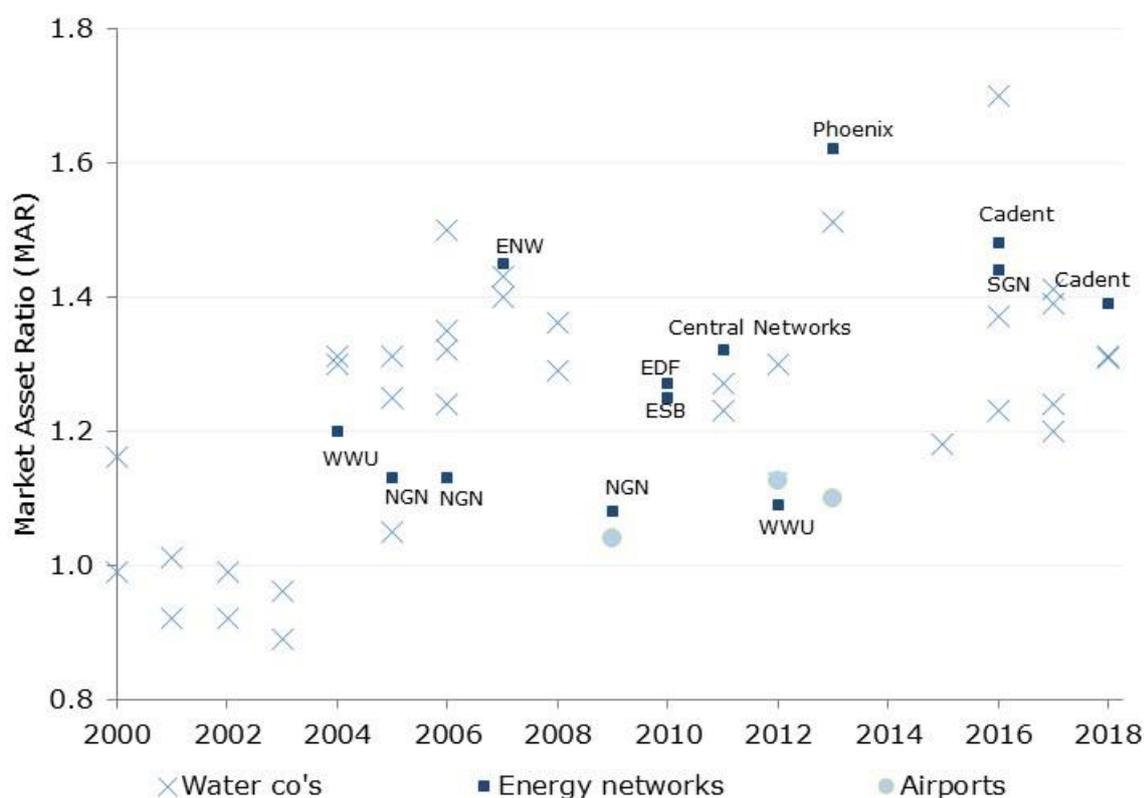


Source: CEPA analysis

3.123 We can see that these listed companies have been trading at a premium for the majority of the previous 9 years. This implies that investors may expect the return on the RAV to be greater than their costs of capital.

3.124 Similarly, Figure 12 below presents the market-to-asset ratios for a selection of network company corporate transactions.

Figure 12: Market-to-asset ratios for a selection of corporation transactions



Source: CEPA analysis

3.125 This information implies that investors have, for the majority of the previous 18 years, been prepared to pay significantly more than the underlying RAV value in order to acquire ownership of network assets. This information suggests that investors expect to earn a return from network ownership over-and-above their costs of capital.

3.126 We have sought to understand whether the scale of these premia can be explained by RIIO-1 assumptions only. We find, however, that the payback that investors must be assuming, in order to match the premia paid, must extend well beyond the end of the RIIO-1 period. In other words, investors appear to expect to outperform regulatory settlements that have not yet been determined.

3.127 We do exercise some caution when considering market-to-asset ratios. Firstly, there may be limited information in listed share prices as these stocks could, particularly in the short-run, be influenced heavily by wider market “noise”. Second, as noted in the UKRN Study by Burns, any premium on corporate transactions could, at least in part, reflect (i) a control premium; or (ii) a winner’s curse.<sup>36</sup>

3.128 However, on the evidence available, these premia suggest that investors are expecting to earn returns well in excess of their costs of capital.

Professional forecasts from investment managers and advisors

3.129 The market-to-asset ratios described in the previous section can only be observed in arrears. The network companies, and some of the other parties involved in the

<sup>36</sup> See UKRN Study here: <https://www.ukrn.org.uk/wp-content/uploads/2018/06/2018-CoE-Study.pdf> p.67

corporate transactions, have argued that the existence of such premia does not necessarily imply that we should reduce the allowance for the cost of equity.

3.130 A forward-looking measure of investor expectations would avoid any overreliance on outturn market-to-asset ratios. Forward-looking measures can be obtained from investment managers and advisors. A summary of the publically available forecasts can be found above, at Table 10.

3.131 We present Table 10 in the TMR section because these forecasts are most relevant to our TMR estimation. However, the values from Table 10 support our CAPM cross-check in two ways:

- If we substitute the CAPM implied TMR value of 5.25% RPI real (using the low end of our methodology) with the average of the values from Table 10 (3.59%, after deducting 3% for RPI), then the implied value for the cost of equity is 2.3%, which falls below the CAPM implied range presented in Table 13 (retaining the risk-free rate assumption of -1.68% and the high equity beta assumption of 0.76, as displayed).
- Alternatively, if we substitute the CAPM implied equity beta of 0.76 (using the high end of our equity beta methodology) with an equity beta assumption of 1.0, while also substituting the TMR range implied by Table 10 (3.59%, after deducting 3% for RPI), we find that the cost of equity would be around 3.6%, inside the high end of the CAPM-implied range presented in Table 13 (retaining the risk-free rate assumption of -1.68%, as displayed).

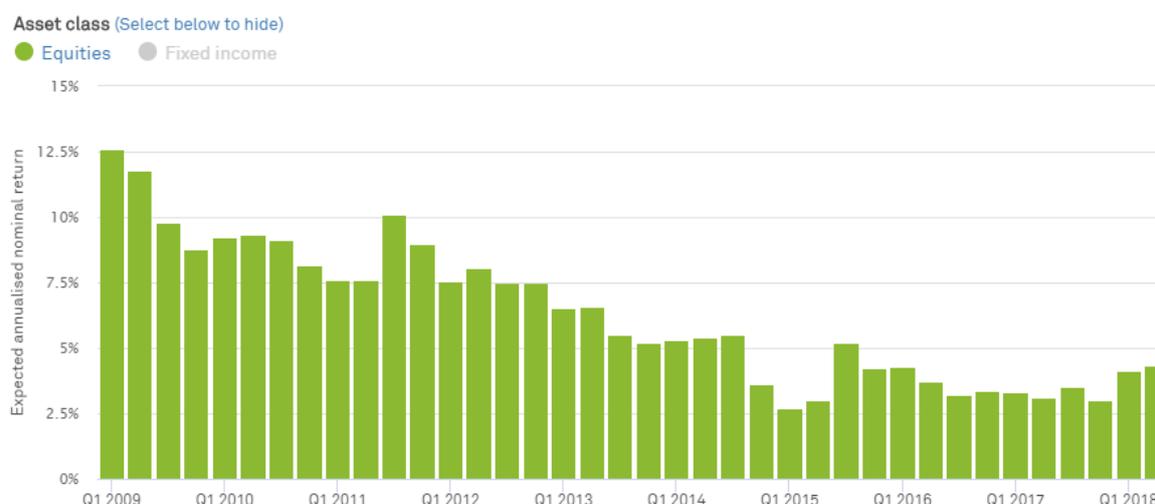
3.132 Therefore, if the values presented in Table 10 are reliable sources of investor expectations, then the high-point of the CAPM-implied range in Table 13, is potentially too high, even with an equity beta assumption of 1.0.

3.133 In addition to the current level of expected returns, we note the downward movement in expected returns over the last few years. For example, the BlackRock Investment Institute UK (BII)<sup>37</sup> return forecasts have fallen by more than 7.5% in the period 2009 to 2018, as per Figure 13 below. We note that BII shows returns on a geometric basis, for a short investment horizon of 5 years, but we interpret the direction as indicative.

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<sup>37</sup> BII refers to its mission as “to help our portfolio managers become even better investors and to produce thought-provoking investment insights for clients and policymakers.” <https://www.blackrock.com/corporate/insights/blackrock-investment-institute/what-we-do> Although this diagram was available on the Blackrock website as of October 24<sup>th</sup> 2018, it appears that they no longer publish it.

**Figure 13: BII historical forecast 5-year equity returns (as of August 2018)**



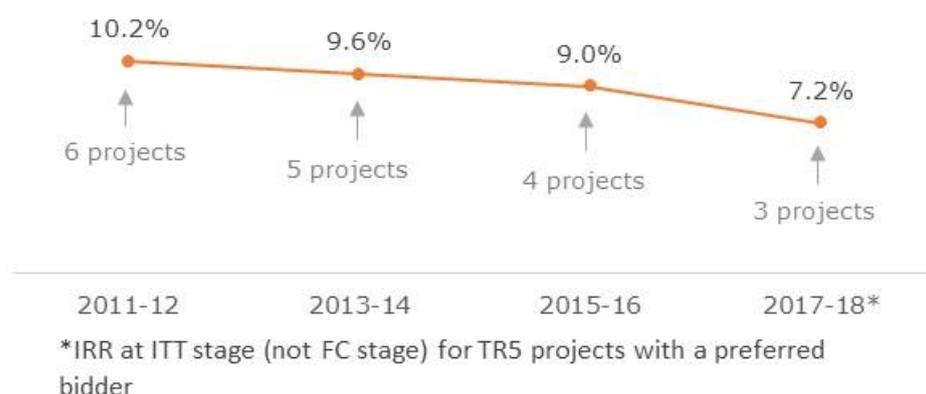
Source: BlackRock Investment Institute, August 2018. Data as of 30 June 2018 Notes: The charts show how our five-year return assumptions have changed since 2009 from a UK currency perspective. The figures are shown in geometric terms. Equities are represented by the MSCI World ex UK Index, and fixed income by the FTA Over 15-Year Gilt Index. We do not have historical assumptions for MSCI World equities and long-dated European and US government bonds, but would expect a similar pattern. Expected return estimates are subject to uncertainty and error. Expected returns for each asset class can be conditional on economic scenarios; in the event a particular scenario comes to pass, actual returns could be significantly higher or lower than forecasted.

**Bids for offshore electricity transmission assets**

3.134 Ofgem has recently begun its sixth round of tenders for offshore transmission assets.<sup>38</sup> These tender rounds could arguably provide additional information that supports the market-to-asset ratios.

3.135 Figure 14 below displays the weighted average nominal post-tax equity Internal Rate of Return (IRR) for multiple winning bidders. Given the similarity between these assets, the multiple bidders and the number of transactions, we are less concerned about the impact of any one winning bid (thereby mitigating possible winner’s curse bias).

**Figure 14: Average nominal post-tax equity IRR by financial close year range (weighted by project transfer value)**



3.136 Figure 14 shows a 3 percentage point decline in the cost of equity from 2011 to 2018, broadly in line with the difference between the RIIO-1 allowance and the CAPM-implied range for RIIO-2 as displayed at Table 13.

<sup>38</sup> <https://www.ofgem.gov.uk/publications-and-updates/ofgem-s-information-event-of-to-tender-round-6>

- 3.137 Offshore Transmission Owners (OFTOs) are highly leveraged (at around 90% at financial close), which would imply a higher level of financial risk than we are assuming for RIIO-2 (given a working assumption of 60% gearing). We acknowledge differing OFTO/network risk profiles but also note that networks offer greater outperformance potential under the RIIO price control framework.
- 3.138 We conclude from this cross-check that the OFTO data supports a cost of equity of around 7% nominal (equivalent to 4% real RPI), in line with the nominal value implied by the CAPM of 6-7%.

#### Infrastructure fund discount rates

- 3.139 The six London listed closed end funds in Table 15 below invest in private finance initiatives, infrastructure and also in private utility assets, such as OFTOs. In their Report and Accounts, the funds disclose an average nominal discount rate (cost of equity) used to value their equity investments in these portfolio companies. These rates reflect the funds' and their auditors' judgement of the risk of each of those investments. Three of the funds also disclose their RPI inflation assumption.
- 3.140 All of the funds except 3i Infrastructure use discount rates between 7.2% and 7.9% nominal (average of 3.7% real RPI where disclosed). The mix of assets in these funds includes those with higher expected risks than energy networks, for example overseas investments or those including greater volume or revenue risk. 3i Infrastructure uses a 10.2% nominal rate (7.7% real RPI) but provides limited information regarding the basis for this.<sup>39</sup> We observe that the 3i Infrastructure portfolio is more concentrated than the others and appears to have companies that are more like the operating companies typical in Private Equity Leveraged Buy-Out transactions (LBOs) so includes assets with higher risk than regulated networks, which may contribute to the higher discount rate.
- 3.141 Table 15 below lists the discount rates for each of the six infrastructure funds.

**Table 15: Listed infrastructure funds: discount rates and premia to Net Asset Value**

Fund	Discount rate (nominal)	Premium to NAV <sup>40</sup>
BBGI SICAV	7.2%	15.5%
John Laing Infrastructure <sup>41</sup>	7.3%	9.7%
HICL Infrastructure	7.2%	3.5%
GCP Infrastructure	7.8%	12.1%
International Public Partnerships	7.9%	8.7%
3i Infrastructure	10.2%	12.3%

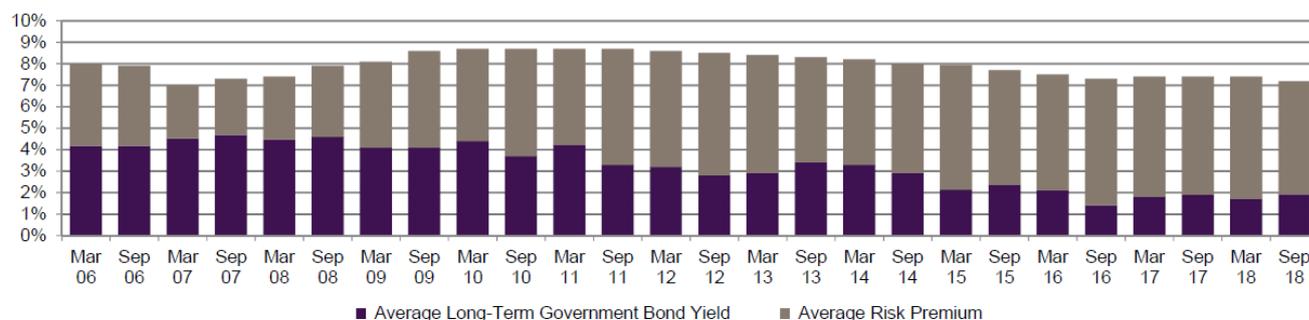
<sup>39</sup> Results to 30<sup>th</sup> September 2018.

<sup>40</sup> Premium calculated using share price at close of 27<sup>th</sup> November 2018 and NAV taken from last published results or the Financial Times of 26<sup>th</sup> November 2018.

<sup>41</sup> John Laing Infrastructure was taken over in August 2018 at a share price of 142.5 pence in cash with a NAV at last results of 130.0 pence.

3.142 Figure 15 below demonstrates how the discount rate applied by HICL Infrastructure<sup>42</sup> has changed over time. We note<sup>43</sup> that discount rates for investment range between 6.4% and 9.6% and that two most recent weighted average discount rates are 7.4% and 7.2% nominal and that this has decreased from approximately 9% since 2011.

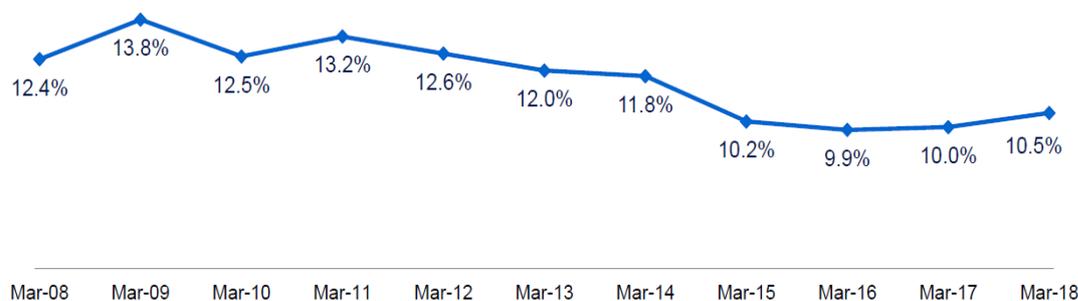
**Figure 15: HICL Infrastructure weighted average discount rates**



3.143 Figure 16 below demonstrates that the discount rate applied by 3i Infrastructure has decreased by over 3% since 2009 (from a value of 13.8% nominal to a value of 10.5% at the last annual results; it was then lowered to 10.2% at the last interim results).

**Figure 16: 3i Infrastructure: discount rate trend over time**

Portfolio weighted average discount rate (%)



3.144 The listed infrastructure fund data suggests discount rates of 7.2% to 7.9% nominal, which is equal to 4% to 4.7% when using our RPI assumption of 3.07% and deflating using the Fisher equation. We conclude that these discount rates and implied returns are broadly supportive of the CAPM-implied cost of equity, particularly taking into account the relative risks of constituent investments and the prevailing net asset value (NAV) premia. We also take comfort from reduction in discount rates seen in recent years.

<sup>42</sup> HICL Infrastructure Company Limited (HICL) is a long-term equity investor in infrastructure, working with public sector clients to deliver high-quality projects which support the community and provide essential public services. <https://www.hicl.com/#>

<sup>43</sup> See page 13 here: [https://www.hicl.com/sites/default/files/Sept%202018%20Interims%2018%20Results%20vWebsite\\_0.pdf](https://www.hicl.com/sites/default/files/Sept%202018%20Interims%2018%20Results%20vWebsite_0.pdf)

Summary of our interpretation of these cross-checks

- 3.145 There is no perfect cross-check to the CAPM, and we reiterate that the CAPM remains a primary tool for estimating the cost of equity. The cross-checks listed above each have benefits and drawbacks. For example, some of these cross-checks will involve assets that are exposed to different risk profiles or gearing levels.
- 3.146 However, when taken in the round, we find general support for the CAPM implied cost of equity.
- 3.147 On the basis of these cross-checks, we consider that the conclusion of step 2 is to narrow the CPIH CAPM implied range, from the values presented in Table 13 (3.87-5.08%), to 4.0-5.0% in CPIH terms. We give weight to the forward-looking UK equity market returns when increasing the lower end to 4% real CPIH, and to the infrastructure fund and OFTO data for the 5% real CPIH upper end.
- 3.148 We propose that these steps will be repeated at the initial and final determination stages based on prevailing market conditions and evidence of investor return expectations.

**For completeness, we present a re-estimated cost of equity range in**

3.149 Table 16 below in both RPI and nominal terms.

**Table 16: Re-estimated cost of equity range after Step 2 in RPI, CPIH and Nominal terms**

	RPI <sup>44</sup>		CPIH		Nominal <sup>45</sup>	
	Low	High	Low	High	Low	High
Cost of equity range after Step 2	2.96%	3.95%	4.00%	5.00%	6.12%	7.14%

3.150 For completeness, we also present the re-estimated cost of equity range after Step 2, for each year of RIIO-GD2 and RIIO-T2 in Table 17 below. Given our proposed approach to the risk-free rate, and the fact that forward curves presented at Table 8 are relatively shallow, we do not include an explicit uplift within our working assumption. The CPIH range presented, however, is within the range for all years as presented at Table 14.

<sup>44</sup> The low RPI is derived from the CPIH range as follows:  $(1+4.00\%) / (1+1.009\%) - 1$ . The high RPI value is derived using the same method, using CPIH of 5.00% instead of 4.00%.

<sup>45</sup> The low Nominal is derived from the CPIH range as follows:  $(1+4.00\%) * (1+2.04\%) - 1$ . The high Nominal value is derived using the same method, using CPIH of 5.00% instead of 4.00%.

**Table 17: Re-estimated cost of equity range after Step 2, for each year of RIIO-GD2 and T2, in RPI, CPIH and Nominal terms**

Price base	Component	Year-end 31st March					Ref	Source
		2022	2023	2024	2025	2026		
RPI	Cost of equity range after Step 2	Low	2.96%				A	$A = (1+C)/(1+1.009\%)-1$
		High	3.95%				B	$B = (1+D)/(1+1.009\%)-1$
CPIH		Low	4.00%				C	Judgement based on Step 1 and Step 2
		High	5.00%				D	Judgement based on Step 1 and Step 2
Nominal		Low	6.12%				E	$E = (1+C)*(1+2.04\%)-1$
		High	7.14%				F	$F = (1+D)*(1+2.04\%)-1$

Cross-checking the CAPM-implied cost of equity questions

- FQ16. Do you agree with our proposal to cross-check CAPM in this way?
- FQ17. Do you agree that the cross-checks support the CAPM-implied range and lend support that the range can be narrowed to 4-5% on a CPIH basis?
- FQ18. Are there other cross-checks that we should consider? If so, do you have a proposed approach?

### Step 3 - Expected versus Allowed returns

#### Background

- 3.151 The WACC is an expected return by definition, as pointed out by the UKRN report. In finance theory, the WACC provides the benchmark against which the (risk-adjusted) expected return on any investment is judged. If the risk-adjusted expected return is not at least equal to the WACC, then the investment should not take place; if it exceeds the WACC, then the investment is expected to yield above-market returns.
- 3.152 The UKRN Report highlighted that (ex ante) expected equity returns (ER) can be different from baseline allowed returns (AR) insofar as investors expect (ex ante) companies to be affected by other financial incentives (positive or negative).
- 3.153 The UKRN Report argues<sup>46</sup> that the AR should be set by taking into account the degree of financial incentive (positive or negative) that investors might expect, in order to be consistent with the principle that the cost of equity, is, by definition, an expectation. The UKRN Report also recommended that the regulator collect data on outperformance and explicitly forecast a value for the wedge.
- 3.154 We have assessed the issues raised in the UKRN Study against our experience of setting, and reviewing, price controls. We find that the distinction is important and we are persuaded to act upon the UKRN Study advice. We therefore propose that

<sup>46</sup> See page 14 and section 5 (page 64 onwards) of the UKRN Study: <https://www.ukrn.org.uk/wp-content/uploads/2018/06/2018-CoE-Study.pdf>

it would be beneficial to make a distinction between AR and ER as part of our cost of equity methodology. Two advantages are as follows:

- Distinguishing between AR and ER allows us to adjust for both positive or negative expectations, as part of RIIO-2. Ultimately, we may estimate an expectation of zero, but a formal approach that distinguishes between AR and ER allows us to maintain consistency.
- Distinguishing between AR and ER allows us to reflect investor expectations as the RIIO-2 (or subsequent) price control review progresses – we can therefore recognise that investor expectations can change to reflect the interpretation of the price control settlement, as illustrated in consultations with stakeholders.

3.155 There are potentially two options for implementing a consistent distinction between AR and ER.

- a) Set the AR by explicitly forecasting the (out- or under-) performance that investors might expect, for example based on the degree of (out- or under-) performance that has materialised historically (on the basis that this will set investor expectations) and/or that is expected in RIIO-2 based on the final framework set at determination.
- b) Set the AR by applying regulatory discretion, taking into account the relative likelihood of out- or under-performance, within the bounds of the cost of equity generally, as modified in Step 2 (as a result of cross-checks of the CAPM-implied range as per Step 1).

3.156 The first option, a), is a strict application of the consistency we are seeking to establish - it therefore ignores whether the adjustment results in an AR that is outside the ER range.

3.157 The second option, b), is a less prescriptive application, recognising that expectations, or future outcomes, may not be easy to estimate, and may not reflect the outturns that have materialised in previous periods.

### **Stakeholder views**

3.158 We shared our thinking with the ENA and other stakeholders.

3.159 We noted concerns raised by Oxera and by one of the UKRN Study authors (Burns), as follows:

- There will be implementation issues with making a distinction between AR and ER. Companies argued that the issue should be tackled at the source – cost allowances and associated incentives should be set on the expectation of zero outperformance.
- That the future may not reflect the past, and that there are many features of the price control settlement in RIIO-2 that are not comparable to other price controls – expectations for RIIO-2 may not therefore be able to be based on the outcomes of other price controls.

### **Evidence that the outperformance expectations are positive**

3.160 In line with the UKRN Study recommendations, we have gathered evidence on outperformance in previous price controls, both within and outside the energy sector. At Appendix 4 we present evidence from the following sources:

- NERA

- National Audit Office
- Ofwat
- Citizens Advice
- Ofgem's RIIO annual reports.

3.161 We also found evidence from published equity research analysis that supports estimations that outperformance can be realised in future price controls.<sup>47</sup>

### **Our proposed approach to applying a distinction between AR and ER for RIIO-2**

3.162 On the available evidence of past performance and notwithstanding the point raised in 3.159 (second bullet point) above, inherent information asymmetries and the current RIIO-2 proposals, we find that investors will likely have positive expectations of companies' performance during the RIIO-2 period. We propose to set the AR, in line with option b), by remaining within the bounds of the cost of equity evidence generally, as modified in step 2. This approach would avoid placing too much weight on historical data and would reflect the difficulties in precisely estimating expected outperformance in the light of ongoing changes to the RIIO-2 incentives framework.

3.163 However, we are confident that, on the balance of probabilities, investor expectations will be, at the very least, marginally positive, and that company capabilities are suitably adequate to fulfil such expectations.

3.164 We have considered stakeholder views that a similar effect could be achieved by recalibrating incentives, such as by setting appropriate cost or performance targets. However, this would assume that information asymmetries inherent in price control regulation will not exist for RIIO-2. We consider this unlikely, and as a result, investors could still have positive expectations on average, for the likelihood of outperformance against cost and performance targets.

3.165 In the absence of making a distinction between AR and ER, we could select a point estimate by taking the mid-point of the range after applying Step 2 (say 4.5% on a CPIH basis). However, given that we believe investor expectations are positive, the logical consequence would be to select a point estimate in the lower half of this range, ie 4.0-4.5% on a CPIH basis. This would imply outperformance up to 50bps of additional equity return.

3.166 As a working assumption at this point in the price control review, we assume an AR of 4% CPIH real, the bottom end of the cost of equity range from Step 2. Thus, in making the distinction between AR and ER the impact on the AR would be a reduction of 50bps from the mid-point of the range. We note this is a relatively small reduction compared to historical outperformances of 200-300bps. This will be re-assessed at initial and final determinations in light of consultation responses, additional evidence and an assessment of the final overall RIIO-2 proposals.<sup>48</sup>

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<sup>47</sup> We reviewed equity broker research from 2018 regarding expected performance of SSE and National Grid, which was used to justify premiums to RAV for UK energy network businesses in Sum-Of-The-Parts (SOTP) valuations. Generally, these were estimated at around 10-15% either of 2019 RAV or RAV at the end of RIIO-1. Where outperformance was quantified it was estimated at 1.5-2.0% p.a. with one example providing detail on the expectation of 1.0% Totex outperformance and 0.5% ODI/ IQI, including the RIIO-2 period.

<sup>48</sup> Note our current assumption, as noted at Paragraph 10.57 of the Core Document, is that variances of 300bps from allowed returns are less likely in RIIO-2

3.167 Using this methodology, even if we are wrong to assume that investor expectations are positive, or if outturn outperformance does not materialise, the allowed returns would still be within the expected return range as supported by the CAPM in step 1 and reinforced by the cross-checks in step 2.

3.168 We will, however, as the RIIO-2 price control review progresses, continue to evaluate:

- Additional information on company outperformance (some of which we have recently received via the RFPR process).
- Investor expectations, as estimated by equity analysts and investors generally.
- The incentive regime that will apply in RIIO-2 and how this differs from RIIO-1 or other price controls.<sup>49</sup>
- The approach to setting cost and performance baselines in RIIO-2 and how this differs from RIIO-1 or other price controls.

Proposed methodology to implement Step 3

3.169 Based on current evidence available to us, we believe that, on the balance of probabilities, investor expectations will be positive: companies will be expected to outperform regulatory targets during RIIO-2.

3.170 We therefore propose to select a point estimate at the lower end of the cost of equity range, where the range is first estimated by CAPM (Step 1) then modified by cross-checks (Step 2).

Proposed methodology for Steps 1, 2 and 3

3.171 Prior to making any determinations for RIIO-2, we propose to update the underlying analysis within Step 1 and Step 2, and reflect upon any relevant information we receive regarding Step 3.

Current working assumption for allowed equity return using proposed methodology

3.172 For the purposes of informing business plans, the conclusion of these 3 steps, on the basis of current market evidence, would be to assume an allowed return of 4.0% on a CPIH basis.

3.173 Table 18 below displays this assumption in RPI, CPIH and nominal terms.

**Table 18: Working assumption on the baseline allowed cost of equity after Steps 1, 2 and 3**

	<b>RPI</b>	<b>CPIH</b>	<b>Nominal</b>
	Point estimate <sup>50</sup>	Point estimate	Point estimate <sup>51</sup>
Baseline allowed cost of equity	2.96%	4.00%	6.12%

<sup>49</sup> As part of this, we propose to review stakeholder responses to this consultation regarding business plan and asset stranding incentives as referred to in the sector methodology (see managing uncertainty chapter for example).

<sup>50</sup> The RPI point estimate is derived from the CPIH point estimate as follows:  $(1+4\%) / (1+1.009\%) - 1 = 2.96\%$ .

<sup>51</sup> The nominal point estimate is derived from the CPIH point estimate as follows:  $(1+4\%) * (1+2.04\%) - 1 = 6.12\%$ .

3.174 For completeness, Table 19 below presents our working assumption on the baseline allowed cost of equity after Step 3, for each year of RIIO-GD2 and T2.

**Table 19: Working assumption on the baseline allowed cost of equity after Steps 1, 2 and 3, for each year of RIIO-GD2 and T2, in RPI, CPIH and Nominal terms**

Price base	Component	Year-end 31st March					Ref	Source
		2022	2023	2024	2025	2026		
RPI	Working assumption for the baseline allowed cost of equity after Steps 1, 2 and 3.	2.96%					A	$A = (1+B)/(1+1.009\%)-1$
CPIH		4.00%					B	Judgement based on Steps 1, 2 and 3.
Nominal		6.12%					C	$C = (1+B)*(1+2.04\%)-1$

3.175 We present RPI and nominal values for information only, given our decision to move to CPIH.

Expected and allowed return questions

- FQ19. Do you agree with our proposal to distinguish between allowed returns and expected returns as proposed in Step 3?
- FQ20. Does Appendix 4 accurately capture the reported outperformance of price controls?
- FQ21. Is there any other outperformance information that we should consider? We welcome information from stakeholders in light of any gaps or issues with the reported outperformance as per Appendix 4.

## 4. Financeability

In this chapter we summarise the background to financeability for RIIO-2. We recap on the Framework consultation and Framework decision. Then we outline our further thoughts regarding company actions and the cashflow floor concept. We then make proposals and seek stakeholder views.

### Background

- 4.1 Ofgem has a duty to have regard to the need to secure that companies are able to finance the activities which are the subject of obligations imposed by or under the relevant legislation. Most regulated utilities raise debt finance by issuing bonds in the capital markets. In addition, the companies have licence requirements to take all appropriate steps within their power to maintain an investment grade credit rating.
- 4.2 These ratings are issued by firms called rating agencies. An investment grade credit rating signals a strong likelihood that the company will be able to meet its liabilities and keeps the cost of debt low for networks. This keeps network charges low for consumers.
- 4.3 Rating agencies use different methodologies for how they determine credit ratings. Among other things (including the stability and predictability of the regulatory regime), rating agencies use certain financial ratios (or credit metrics) to rate companies. One type of credit metric for instance is the interest cover ratio, which measures the cashflow available to companies to make interest payments to bondholders. All else being equal, a high interest cover ratio implies a company can comfortably service its debt, and be awarded a strong credit rating.
- 4.4 If the cost of debt and the cost of equity moved in step together, there should, in principle, be little impact on credit metrics across time. But if the cost of debt falls more slowly than the cost of equity (for instance, because of historical contracted liabilities), then the reduction to company cashflows due to a lower cost of equity may affect its ability to make interest payments. In the absence of some offsetting action from the companies or Ofgem, this could impact company ratings.
- 4.5 A sharp reduction in the cost of equity in RIIO-2 therefore could, in the absence of some offsetting action, make it more challenging for companies to maintain strong credit ratings.

### Summary of Framework consultation and Framework decision

- 4.6 In the Framework consultation, we set out three options for how financeability issues could be addressed:
  - We could stop inflating the RAV. This would increase the cashflow to companies in the short to medium term, giving them a greater ability to pay debt costs (option A)
  - We could put the onus on companies to take appropriate action, for instance by de-gearing (option B)

- We could introduce a cashflow floor to provide assurance to bondholders that debt costs would be met (option C)
- 4.7 Following consultation, we noted there was strong opposition from most stakeholders to moving to a nominal return model, as would need to be the case if we were to stop inflating the RAV (option A).
- 4.8 A key issue for stakeholders in relation to option B was establishing where the responsibility for financeability lay (between Ofgem and the companies). Centrica and Citizens Advice considered that responsibility lay solely with the network companies. The majority of networks considered that the onus should be on Ofgem. All other respondents, including some network companies, believed that the burden should be shared, or lie primarily with network companies.
- 4.9 Some stakeholders (such as Centrica and three network companies) were cautiously supportive of option C (a cashflow floor). They suggested there could be merit in this approach in specific and limited circumstances. Other network companies did not support the idea. National Grid (NG), for example, argued that this approach “*would move the regulatory regime away from an incentive-based approach towards a pass-through fixed return approach, at least in part*”. They also highlighted that Moody’s believed that while such a mechanism could support operating companies’ credit quality, it could be credit negative for holding companies due to potential reductions in distributions.
- 4.10 However, nearly all respondents felt that there was insufficient detail on how a cashflow floor would operate to be able to assess the option properly at that stage. They requested further clarity from Ofgem.
- 4.11 In our Framework decision, we decided to rule out option A. We noted we would carry out further work to develop the two remaining options: B, which puts the onus on companies to address any financeability issues and C, which establishes the concept of a cashflow floor.

### **Developing the financeability assessment approach**

- 4.12 In our Framework decision, we proposed to consider the financeability of notional companies in-the-round considering all price control assumptions.<sup>52</sup> As a proxy for the financeability of the actual companies, we stated that we would stress test the notional company base case.
- 4.13 We propose to continue to focus on the notional company in assessing financeability, assuming in the first instance that companies meeting their operating targets are not exposed to material risk of financial distress. We will also monitor company projections and will consider downside scenarios.
- 4.14 Despite our focus on financeability of the notional company for setting allowances we believe it is important for companies to assess the financeability of their RIIO-2 business plans, on both a notional and actual capital structure basis, and would propose that companies include this assessment in their business plan submission for Ofgem review. At the beginning of 2019, we intend to provide more guidance to companies with regards to how they should assess financeability, including a draft financial model for RIIO-2. We expect a financeability assessment will include a suite of financial metrics commonly used in financial markets, including

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<sup>52</sup> Paragraph 6.64 [https://www.ofgem.gov.uk/system/files/docs/2018/07/riio-2\\_july\\_decision\\_document\\_final\\_300718.pdf](https://www.ofgem.gov.uk/system/files/docs/2018/07/riio-2_july_decision_document_final_300718.pdf)

those identified in our March 2018 Framework Consultation<sup>53</sup> and those used by rating agencies. However, we do not propose to follow any one metric used by any particular rating agency and instead propose to assess the resulting quantitative metrics and qualitative factors as a whole. We do not expect to provide targets for any particular metrics and would expect companies to assess financeability as a whole, including potential company actions.

- 4.15 In the event of material underperformance, we propose looking to company actions or the operation of the cashflow floor to address any associated financeability issues, rather than relying solely on headroom in base case credit metrics.

### **Onus on companies**

- 4.16 We consider that companies can address any financeability concerns in a number of ways:

- Dividend policies can be adjusted to retain cash within the ring-fence during the RIIO-1 or RIIO-2 period
- Equity injections can be used to reduce gearing
- Expensive debt or other financial commitments could be re-financed
- Companies can propose alternative capitalisation rates and/or depreciation rates, if appropriate.

- 4.17 Against a background of adequate allowed returns on a notional company basis, we consider these options can be effective in addressing any financeability concerns.

### **Cashflow floor concept**

- 4.18 Given limited ability to compel timely company action in addressing any financeability issues, we propose to develop the cashflow floor as an important additional measure to address potential downside financeability concerns.
- 4.19 Although we expect network companies are likely to be able to comfortably repay debt in the base case we recognise that with a lower cost of equity they may have less headroom to deal with downside scenarios (however unlikely these might be). Two possible ways to deal with this are increasing the headroom over the cost of debt by increasing the cost of equity for all licensees (which would have a significant cost to consumers)<sup>54</sup>, or strengthening the ring-fence so bondholders are better protected on the downside (and therefore require less headroom on base case cashflows). The latter may thus allow us to consider a less constrained cost of equity allowance. It is with this in mind that we have continued work on a potential cashflow floor.
- 4.20 In our Framework Consultation, we outlined the concept of a revenue or cashflow floor and stated that "[t]he floor could be set at a level that would allow a notionally geared company to more easily service interest payments equal to the cost of debt allowance".<sup>55</sup> We identified two possible variants of a cashflow floor:

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<sup>53</sup> Paragraphs 7.69 to 7.72

[https://www.ofgem.gov.uk/system/files/docs/2018/03/riio2\\_march\\_consultation\\_document\\_final\\_v1.pdf](https://www.ofgem.gov.uk/system/files/docs/2018/03/riio2_march_consultation_document_final_v1.pdf)

<sup>54</sup> The financial impact of changes to the cost of equity is discussed in Chapter 3 of this annex - Cost of equity.

<sup>55</sup> Paragraph 7.82

[https://www.ofgem.gov.uk/system/files/docs/2018/03/riio2\\_march\\_consultation\\_document\\_final\\_v1.pdf](https://www.ofgem.gov.uk/system/files/docs/2018/03/riio2_march_consultation_document_final_v1.pdf)

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- Variant 1: Maximum penalties
  - Variant 2: Minimum coverage ratios
- 4.21 In our Framework decision, we said that we do not intend to replicate individual company financial structures in detail, as this would imply, retrospectively, that consumers are exposed to actual company financing choices.
- 4.22 Since our Framework decision we have reflected on the arguments for not incorporating actual financial structures or costs, and consider them to be more nuanced. Whilst we continue to focus on the notional concept, with measures calibrated to notional gearing, we now believe that in order for the cashflow floor to provide confidence of contingent credit support, it should be designed to work in practice while still protecting consumers. Applying a notional capital structure without adjusting for current levels of gearing, or otherwise distinguishing between supported and unsupported debt, would likely not result in the required level of confidence.
- 4.23 Since our Framework decision, we have identified three main objectives for a cashflow floor. These are that a cashflow floor should:
- (i) Strengthen the ring-fence and support the creditworthiness of actual Licensees in the current low cost equity environment.
  - (ii) Protect consumers and debtholders from downside scenarios while leaving shareholders fully exposed to incentives on cost and quality of service.
  - (iii) Preserve incentive on Licensees to manage their financial structures in a reasonable and prudent manner
- 4.24 In terms of benefits to consumers, we believe the inclusion of a cashflow floor would avoid arbitrarily increasing the cost of equity to address any potential financeability concerns.
- 4.25 We have developed a third variant of a cashflow floor which, while based on notional gearing, assesses actual company cashflow versus actual levels of company debt service (including any principal payments due and not already pre-financed). We characterise this as Variant 3, "Liquidity based cashflow floor", and believe it has the following benefits:
- As it is adjusted to reflect actual company cashflow and actual company debt service, we believe it provides stronger credit support than the other variants as it should protect against payment default.
  - It can be clearly defined and would not be exposed to any changes in rating agency ratio definitions or metrics.
  - It has less risk of being triggered before it is really required.
  - It is therefore more likely to be considered proportional and should not place unnecessary risk on consumers.
- 4.26 We believe the inclusion of a cashflow floor would have the added benefit of strengthening the ring-fence, if appropriately structured. For example, we would envisage more regular reporting of liquidity positions as a matter of course and greater regulatory oversight if a company ever requires financial support from the cashflow floor.

- 4.27 In assessing consumers' interests, the provision of contingent support of this nature would require justification that alternative measures to address financeability concerns would not be expected to have a lower cost, eg arbitrarily setting higher allowed returns purely to address potential company downside performance concerns.
- 4.28 It is anticipated that cashflow floor support would only be required in the event of material company underperformance against baseline allowed returns.
- 4.29 We agreed in our Framework decision that more work needed to be done on how a cashflow floor could operate (and the benefits and risks of this for consumers). Based on the work undertaken, we outline several elements of a cashflow floor mechanism that we believe meet the objectives outlined above.
- 4.30 To facilitate development of a cashflow floor that meets the main objectives set out in Paragraph 4.23 we have identified the following design principles for the cashflow floor:
- a) It should provide support for debt payments but not equity payments - this supports objectives (i), (ii) and (iii).
  - b) It should be targeted, only applying to those companies in circumstances that require it - this supports objectives (ii) and (iii).
  - c) It should be proportional; it should not place any unnecessary burden on particular consumer groups - this supports objective (ii).
  - d) Compared to the alternatives (including not having a cashflow floor), it should be beneficial to consumers - this supports objective (ii).
  - e) It should allow the removal of constraints on cost of equity judgements that might otherwise apply - this supports objectives (ii) and (iii).
  - f) It should not offer companies an easy alternative to managing their own finances appropriately; it should be structured as a safety net but not be open to manipulation - this supports objectives (ii) and (iii).
- 4.31 With the main objectives and design principles in mind we have developed the following draft cashflow floor process based on Variant 3 for consultation:
- a) The licence condition<sup>56</sup> that compels companies to confirm they have adequate financial resources could be amended to include a requirement to provide Ofgem with quarterly liquidity forecasts for the subsequent 12-month period.
  - b) These forecasts would compare Expected Cash Available before debt service ("ECA") to Debt Service Requirements ("DSR"), where:
    - ECA equals forecast funds from operations plus forecasted working capital inflows/outflows plus cash and liquid investments plus undrawn available portions of committed credit facilities with maturity dates longer than 12 months minus total expected operating and capital spending (including any cash-based pension top-up needs) minus contracted acquisitions.

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<sup>56</sup> Standard Condition 44 in Gas Transporters Licence; Standard Condition B7 of the Electricity Transmission Licence. Links below: [https://epr.ofgem.gov.uk//Content/Documents/Gas\\_transporter\\_SLCs\\_consolidated%20-%20Current%20Version.pdf](https://epr.ofgem.gov.uk//Content/Documents/Gas_transporter_SLCs_consolidated%20-%20Current%20Version.pdf)  
<https://epr.ofgem.gov.uk//Content/Documents/Electricity%20transmission%20full%20set%20of%20consolidated%20standard%20licence%20conditions%20-%20Current%20Version.pdf>

- DSR equals all debt interest (excluding any deferrable shareholder debt payments), all debt maturity or principal payments, all payments under derivatives (net of receipts) including principal accretion if payable on inflation-linked swaps, taking into consideration any credit puts that cause debt acceleration or new collateral posting requirements in the event of a downgrade of up to 3 notches (if applicable).
- c) If any such liquidity forecast (or any voluntary liquidity forecast between test periods) identifies a shortfall the company would, subject to a short cure period, be placed in Cashflow Supported Status ("CSS"). This would result in:
- An increase in tariffs across the sector (gas or electricity) by an amount equal to the identified shortfall (Cash Top Up or "CTU"), potentially collected by the System Operator<sup>57</sup> and payment made to the CSS company that enables it to meet debt service requirements
  - Ring-fence provisions triggered, including:
    - Dividend lockup
    - Restriction on asset disposals
    - Restriction on new liens or loans
    - Restriction on payments to related parties
  - Increased regulatory oversight, including:
    - Repayment plan to be provided to Ofgem
    - Monthly financial and operational reporting to Ofgem
    - Ofgem discretion to appoint an Ofgem representative to the board
    - Ofgem discretion to require an additional independent director to be appointed to the board.
- d) Following the triggering of CSS and payment of CTU, the company would collect full charges in accordance with their normal allowances but would pay 75%<sup>58</sup> of operating surpluses to the System Operator to allow a reduction of charges to all consumers (spreading the consumer rebate across the sector) and the 'repayment' of the CTU. The CTU would:
- Escalate at WACC until repaid.
  - Only be available a limited number of times.
  - Need to be fully repaid for the company to exit CSS and be released from the relevant restrictions and from the additional oversight measures.
- e) If the company fails to repay 100% of the required CTU repayment after 10 years, a RAV amount equal to the CTU amount still owed would be partitioned ("CFF Partitioned RAV") and an amount equal to the WACC and depreciation associated with the CFF partitioned RAV will be payable to the System

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<sup>57</sup> For all references to System Operator in relation to the cashflow floor, please read System Operator for the electricity sector and System Operator or Transmission Owner for the gas sector.

<sup>58</sup> Percentage to be confirmed; 75% provided as an assumption at this stage. Less than 100% of operating surpluses being used to repay the CTU allows cash to build up within the ring-fence, for the benefit of all creditors.

Operator, which would use these funds to reduce charges to all consumers in proportion to their original contribution.

- 4.32 A schematic depicting this draft process has been included as Appendix 5 to this annex.
- 4.33 We would seek to avoid company manipulation of the use of the cashflow floor and would therefore consider the following as potential protection against this:
- That the cashflow floor is subject to a gearing cap<sup>59</sup> (to be determined based on notional gearing levels but to include some headroom compared to each licensee's gearing levels as at 31 March 2018, adjusting downwards for any future de-gearing until gearing reaches the notional level), or
  - A gearing penalty such that any CTU would escalate at WACC if the company is within 5% of notional gearing or at a higher amount for greater gearing levels, for example WACC plus an additional 1% for each additional 5% gearing.
- 4.34 On the basis that the cashflow floor would provide comfort to debt providers that additional funding will be available in the event of material underperformance, company business plans can be prepared on the basis of ensuring base case cashflows will be adequate to meet debt funding costs.
- 4.35 During consultation, views of stakeholders, including debt providers, will be considered in assessing what level of headroom is considered appropriate for base case business plans in light of anticipated operating cashflow stability and details of the cashflow floor.
- 4.36 Our comprehensive review of company financial arrangements including debt and tax (called the ring-fence review) is ongoing. We are establishing whether our findings have any implications for the prices that consumers pay for network services, and the resilience of network companies against financial failure. Any action that we take to amend or reform the ring-fence conditions for RIIO-2 will be informed by the results of our work in establishing the cashflow floor mechanism. In terms of RIIO-1 actions, we are planning changes to the regulatory reporting process from next year. We propose that licensees should disclose more information on debt and tax, including returns to HMRC and appropriate reconciliations. We also plan to integrate greater transparency by expecting the licensees to publish their dividend policies and disclose more information on executive pay.

### **Proposal**

- 4.37 We do not propose to rule out either Option B (onus on companies) or Option C (cashflow floor) at this stage. We would welcome views from stakeholders on the draft cashflow floor mechanism outlined herein as part of this consultation.
- 4.38 Further work on the detail of the proposed cashflow floor mechanism will continue and it is envisaged that a more detailed mechanism will be consulted on in 2019, ahead of the final determinations in 2020. This would allow detailed consideration of the proposed cashflow floor by companies, investors, consumer groups and other stakeholders.

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<sup>59</sup> Above which the cashflow floor would no longer be available, for any of the licensee's debt.

Financeability questions

4.39 We welcome stakeholder views on our proposals in respect of financeability, including the following questions:

FQ22. What is your view on our proposed approach to assessing financeability? How should Ofgem approach quantitative and qualitative aspects of the financeability assessment? In your view, what are the relevant quantitative and qualitative aspects?

FQ23. Do you agree with the possible measures companies could take for addressing financeability? Are there any additional measures we should consider?

FQ24. Do you agree with the objectives and principles set out for the design of a cashflow floor?

FQ25. Do you support our inclusion of and focus on Variant 3 of the cashflow floor as most likely to meet the main objectives?

## 5. Corporation tax

In this chapter we summarise the background to corporation tax allowances. We recap on the Framework consultation and Framework decision in March and July 2018 respectively. We then outline updated proposals for RIIO-2 and seek stakeholder views on those proposals.

### Introduction

- 5.1 In RIIO-1, a financial model is used to calculate a tax allowance on a notional basis, as a proxy for efficient corporation tax costs, for each of the relevant licensees.
- 5.2 The RIIO-1 allowance is supplemented by two specific uncertainty mechanisms:
  - a) A tax trigger mechanism that reflects changes in tax rates, legislation and accounting standards; and
  - b) A tax clawback mechanism that claws back the tax benefit a licensee obtains as a result of gearing levels that are larger than assumed.
- 5.3 We are considering if these arrangements need amending to remain suitable for RIIO-2.

### Summary of Framework consultation

- 5.4 We proposed to review whether the RIIO-1 arrangements were working well and also the causes of any variances between tax allowances and taxes actually paid to HMRC. In addition, we also suggested there were three options that we might consider, in terms of implementing a new tax policy for RIIO-2, as follows:
  - Option A – Notional allowance with added protections
  - Option B – Pass-through for payments to HMRC
  - Option C – The "double-lock": the lower of notional (Option A) and actual (Option B)

### Framework decision

- 5.5 In our Framework decision, after reviewing responses from stakeholders, we decided to retain all three options and to assess them further prior to making any firm decision for RIIO-2. In part, this decision reflected the lack of sufficient information for the purposes of ruling out any of the options. We also noted that we would focus on identifying any material defects with the current approach. We stated that we were conducting a ring-fence review, and noted that we would consult on any proposals arising from this work.
- 5.6 We also noted that one company (SSE), had achieved a "Fair Tax Mark"<sup>60</sup> recognition.

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<sup>60</sup> The Fair Tax Mark is awarded and published by Fair Tax Mark Ltd, a not-for-profit Community Benefit Society registered under the Industrial and Provident Societies Act (registration 32308R).

### **Update on our further work**

- 5.7 Since our Framework decision, we have met with and discussed approaches to corporation tax with network companies and other stakeholders.
- 5.8 Some companies re-iterated their concerns regarding Option C, the double-lock. For example, WWU stated that, because it had higher than average debt costs, Option C (the double-lock) would unfairly capture its associated lower tax costs. WWU felt this could be inconsistent because the tax allowance could be based on a different debt cost than was provided through the price control.
- 5.9 In our discussions with companies through the Energy Networks Association ('ENA'), we referred to concerns that tax allowances could materially deviate from tax costs. We challenged the companies to prove whether this was or was not the case.
- 5.10 We have reviewed the tax trigger mechanism that is currently in place in RIIO-1, to check if it was reflecting changes in tax rates, legislation and accounting standards. We find that this mechanism is working relatively well: it will adjust tax allowances downwards by approximately £70m as part of the Annual Iteration Process, primarily as a result of tax rates being lower than expected.
- 5.11 We have also reviewed the tax clawback mechanism that is currently in place in RIIO-1, to check if it was reflecting the degree to which tax allowances should be adjusted to reflect high gearing. At least two companies will be affected during RIIO-1 under this mechanism, with tax allowances adjusted downwards by approximately £30m to reflect the benefits of high gearing. We find that this mechanism is rarely triggered in practice as it depends heavily on how 'high gearing' is defined.

### **Proposals for RIIO-2**

- 5.12 We propose that, wherever possible, all companies should seek to obtain the "Fair Tax Mark" certification. The Fair Tax Mark is awarded and published by Fair Tax Mark Ltd, a not-for-profit Community Benefit Society registered under the Industrial and Provident Societies Act (registration 32308R). The Fair Tax Mark encourages and recognises organisations that pay the right amount of corporation tax, at the right time, and in the right place. We recognise that at present the "Fair Tax Mark" is not available to companies owned outside the UK, however we understand that Fair Tax Mark Ltd intends to issue (within the next two years) accreditation to companies that are non-UK owned, and therefore, we expect network companies to work with Fair Tax Mark Ltd towards obtaining accreditation.
- 5.13 We also note the existing requirements on companies as per the Finance Acts (2009 and 2016). Schedule 19 to the Finance Act 2016 requires the companies to annually review and publish their tax strategies. Schedule 46 to the Finance Act 2009 requires companies to appoint a Senior Accounting Officer to ensure that appropriate tax accounting arrangements are established and maintained. We propose to consider how these duties are reflected in the implementation and operation of RIIO-2.
- 5.14 At this stage, we also propose to retain all three options open for further consideration and we expect companies to provide substantial evidence that there are not material differences between allowances received under the price control compared to payments made to HMRC. The added protection we propose for Option A is for us to revisit the notional allowances, during the RIIO-2 period or at

its close-out, should we find that allowances are materially greater than payments to HMRC.

- 5.15 We also propose to continue working closely with the companies, through a specific working group which will discuss tax issues, and through gathering information via our reporting templates. We are not at this stage proposing to consult on any changes as a result of the ring-fence review.

#### Corporation tax questions

- 5.16 We welcome stakeholder views on our corporation tax proposals, particularly the following questions:

- FQ26. Do you support our proposal that companies should seek to obtain the "Fair Tax Mark" certification?
- FQ27. Is there another method to secure tax legitimacy other than the "Fair Tax Mark" certification? Could we build upon the Finance Acts (2016 and 2009) with regards to the requirement for companies to publish a tax strategy and appoint a Senior Accounting Officer?
- FQ28. For Option A, how should a tax re-opener mechanism be triggered? Is there a materiality threshold that we should use when considering the difference between allowances and taxes actually paid to HMRC? If so – what might this be?

## 6. Indexation of RAV and calculation of allowed return

In this chapter we summarise the background to inflation issues and the relationship between inflation, RAV indexation and the calculation of the allowed return. We recap on the Framework consultation and Framework decision in March and July 2018 respectively. We then outline updated thoughts and set out proposals for RIIO-2, before seeking stakeholder views on those proposals.

### Introduction

- 6.1 For previous price controls, including RIIO-1, we decided to use the Retail Price Index (RPI) to index the RAV and to allow returns in real terms.
- 6.2 However, RPI is no longer seen as a credible measure of inflation. The Office for National Statistics (ONS) has now adopted CPIH as the lead measure of inflation for household costs. ONS prefers CPIH as a measure of consumer prices because it is more comprehensive than CPI. CPIH includes owner occupiers' housing costs and council tax, and therefore, their inclusion captures a major component of household spend.
- 6.3 Other regulators are using RPI less heavily within their respective price control frameworks. In 2014, Ofcom concluded that CPI was preferable to RPI. In 2015, the Water Industry Commission for Scotland (WICS) started to use CPI. More recently, Ofwat determined in December 2017 that it would use CPIH. In March 2018, ORR proposed to use CPI instead of RPI.

### Summary of Framework consultation and Framework decision

- 6.4 In the Framework consultation, we proposed to move away from RPI to either CPI or CPIH and we noted that we were not convinced a phased transition was necessary (one of the other regulators, Ofwat, is phasing its transition away from RPI by using a blend of RPI and CPIH to set the price control for the sector).
- 6.5 In the Framework decision, we stated our intention to use CPIH. We noted the consequences in terms of the immediate impact on consumers and we stated that we would carry out further work on whether a phased transition was necessary. We also stated that we would make our final decision when we set the methodology for each sector.

### Update on our further work

- 6.6 Since our Framework decision, we have focused on whether there should be an immediate switch, or a phased transition, to CPIH. We favour an immediate switch for a number of reasons
  - a) A step reduction in the allowance for equity costs would dramatically reduce the cashflow available for companies to service debt interest costs. An immediate switch is better than a phased transition in terms of off-setting this reduction.
  - b) We have considered the impact on consumer charges and believe that the impact on charges does not justify a phased transition. We accept that in isolation the switch puts upward pressure on charges.<sup>61</sup> However, we expect

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<sup>61</sup> We note that on behalf of WPD, NERA estimated the change would increase charges by 6% at the start of RIIO-2. This is similar to Ofgem's estimation in July 2018 (5%). NERA also noted that the impact would decline over time.

overall charges to be lower in RIIO-2 due to decreasing allowances for the cost of capital. We approximated these two impacts for household consumers relative to RIIO-1 as follows:

- A £30 reduction due to lower allowances for cost of capital
- A £15 increase due to an immediate switch to CPIH<sup>62</sup>

- 6.7 Cadent and WWU argue that a liquid bond and gilt market, in CPIH terms, is a pre-requisite for moving away from RPI. However, we disagree. While we accept that many financial products are linked to RPI, we see net benefits to consumers, in terms of the financeability of the sector of moving away from RPI. We recognise that WWU has a material exposure to RPI but we note WWU will benefit from the move to CPIH, in terms of the cashflow available to pay debt costs.
- 6.8 We have also considered whether the volume of RPI debt that the companies actually have, on average across all the sectors, justifies a phased transition away from RPI. We estimate that less than 30% of the total network company debt in the energy sector is linked to RPI – we note that Moody’s estimated a similar value (approximately 25%). Notably, this is much less than the proportion of index-linkage in the water sector. We note that one of the consultancy companies, NERA, in its advice to WPD, estimated that the proportion of index-linked debt in the water sector is much higher, at around 50%.
- 6.9 In addition, we are not convinced that there will be a material impact on the ability for companies to hedge cashflow volatility, if allowances are based on CPIH rather than RPI.
- 6.10 Since our Framework decision, we have also engaged with stakeholders on whether there should be an immediate switch. We have not received convincing evidence from stakeholders that we should phase the transition away from RPI. Citizens Advice, British Gas, and the Energy Users Group, continued to support a move away from RPI, although Citizens Advice sought more clarity on the cost of moving to CPIH.
- 6.11 Stakeholders also sought clarification from us with regards to how we would secure that the change from RPI to CPIH would be net-present-value (NPV) neutral. Some stakeholders suggested that we implement a ‘true-up’ for the outturn difference between RPI and CPIH.
- 6.12 We also note that we could apply real-RPI-WACC to a proportion of the RAV and real-CPIH-WACC to the remaining proportion of the RAV. If we were to estimate a WACC in nominal terms, we could monitor outturn RPI and outturn CPIH to ensure that both the real-CPIH-WACC and the real-RPI-WACC were reflective of our ex ante nominal WACC after accounting for outturn RPI and CPIH inflation. This true-up could also be further modified by adjusting the proportion of RAV we consider to be CPIH based, perhaps to reflect RAV additions from RIIO-2 onwards. However, these true-up approaches could indirectly result in continued RPI indexation.
- 6.13 Therefore, our current view is that NPV-neutrality is best secured, in terms of RAV and allowed returns, by a one-off, point-in-time switch from RPI to CPIH, reflecting the expected difference at that time, rather than monitoring the

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<sup>62</sup> We also note that over the longer term the switch to CPIH will be value neutral for consumers, reversing the £15 shorter-term RIIO-2 impact. See main consultation document appendix (eg consumer bill impact) for more information.

difference over time or truing up for any outturn RPI or wedge values. This is because of complexity and definitional issues that would arise if we attempt to secure unconditional NPV neutrality over time, relative to multiple measures of inflation. Note that, in general, our methodologies for the cost of equity and the cost of debt emphasise expectations, not outturns; a true-up would be inconsistent with this. For cost of equity, we are proposing an uplift in the allowed return to reflect the expected RPI/CPIH wedge. For the cost of debt, the RIIO-1 iBoxx benchmark is in nominal terms, and we propose new mechanisms to convert to CPIH that are not seen as disadvantageous to companies.

- 6.14 Note that we address RAV and allowed returns in this section. We recognise that inflation issues will also arise in other areas of the price control, in particular for cost assessment. We therefore refer stakeholders to other areas of this consultation for further information regarding how inflation issues are being addressed.

### Proposals

- 6.15 We propose to use CPIH from RIIO-2 onwards (1<sup>st</sup> April 2021 for GT, ET and GD) for the purposes of calculating RAV indexation and allowed returns. We do not propose to phase the move away from RPI.
- 6.16 Prior to implementing our decisions for RIIO-2, we propose to consider again, as stated in the Framework decision, a number of factors relating to CPIH:
- Whether or not CPIH remains the ONS lead measure of inflation
  - Whether a suitable historical dataset on CPIH emerges to enable its use in price controls
  - The prospects for the emergence of CPIH-linked financial assets.

### Next steps

- 6.17 As a working assumption at this stage, for RIIO-2 forecasting and business plan purposes, we propose to assume that CPIH will be equivalent to the forecast for CPI (as per the Office for Budget Responsibility). We will provide an update on the issue of forecasting CPIH at a later stage in the process.
- 6.18 We are mindful of the impact that a CPIH assumption will have on reporting and business plan templates. We are also mindful that inflation assumptions are important for cost assessment and for how companies present Real Price Effect information. We aim to provide more clarity on these issues early in 2019 to avoid any unnecessary complications later in the process.

### RAV indexation (CPIH) questions

- 6.19 We welcome stakeholder views on our proposals in respect of RAV indexation and the calculation of the allowed return, in particular the following questions:

FQ29. What is your view on our proposal for an immediate switch to CPIH from the beginning of RIIO-2 for the purposes of RAV indexation and calculation of allowed return?

FQ30. Is there a better way to secure NPV-neutrality in light of the difficulties we identify with a true-up?

## 7. Other finance issues

In this chapter we address the following financial issues:

- Regulatory depreciation and economic asset lives
- Notional gearing
- Capitalisation rates
- Notional equity issuance costs
- Pension scheme established deficit funding
- Directly Remunerated Services
- Amounts recovered from the disposal of assets

We address each of these issues in turn below, outlining the relevant background, making proposals and seeking stakeholder views on relevant proposals.

### Regulatory depreciation and economic asset lives

#### Introduction

- 7.1 Our existing policy is to depreciate the RAV at a rate that broadly approximates to the useful economic life of the network assets and incentivises investment efficiency.
- 7.2 For depreciating new additions to the RAV, the exact approach differs by sector. For example, ED is currently transitioning from a 20-year straight-line asset life (as at 31 March 2015) to a 45-year straight-line asset life (by 31 March 2023).
- 7.3 The assumed asset life for ET is also increasing (from just above a 20-year life) although the degree of this increase varies by licensee. NGET and SPTL will depreciate new RAV additions using a 45-year straight-line asset life from 2021 onwards, while the transition for SHE-T is over two price control periods (32.5-years from 2021 onwards to 45-years straight-line asset life by the end of RIIO-2).
- 7.4 During RIIO-1, there has been a slower rate of depreciation for NGGT compared to the other sectors - new additions to the RAV are depreciated on a straight-line basis over 45-year asset life. In GD new RAV additions are also being depreciated at 45 years, although a "sum-of-the-digits" assumption means that more of the asset is depreciated in the earlier years.
- 7.5 It is important to understand that, following the introduction of the totex approach in DPCR5/RIIO-1, the RAV no longer precisely corresponds to physical assets. Rather, the RAV represents simply the balance of unrecovered financial investment in the networks and also the licensee's share of incentivised out- or underperformance.
- 7.6 A return is paid on the RAV through the allowed cost of capital, and the RAV is repaid through depreciation allowances.

7.7 Therefore, the rate of depreciation should be set so that different generations of consumers pay network charges broadly in proportion to the value of network services they receive.

### **Proposals**

7.8 In the Framework Decision, we stated our decision to maintain the existing depreciation policy of using economic asset lives as the basis for depreciating the RAV.

7.9 We are open to exploring further changes in the depreciation methodology in line with the economic principle of intergenerational fairness.

7.10 We note that in relation to Gas Distribution and Gas Transmission, in particular, we would look to develop a price control that is flexible to the uncertain pathway towards the decarbonisation of heat to ensure consumers are protected from unnecessary or stranded costs. Part of this assessment will be careful consideration of the useful economic lives of network assets and therefore appropriate regulatory depreciation rates.

7.11 We do not currently have any sector-specific proposals but would welcome views from respondents on sector-specific arguments relating to the useful economic lives of their assets.

7.12 At a sector level, we will assess compelling evidence about the appropriate depreciation charges in line with economic principles submitted in response to this consultation. For example:

- Understanding of future demand scenarios
- Identification of the whole range of possible uncertainties
- Understanding the possible value of options and stranded assets
- Identifying implications for efficiency and financeability
- Assessing impacts on consumers' bills
- Considering the mix of asset life and depreciation profiles.

### Regulatory depreciation question

7.13 We welcome stakeholder views on the following question:

FQ31. Do you have any specific views or evidence relating to useful economic lives of network assets that may impact the assessment of appropriate depreciation rates?

## **Capitalisation rates**

### **Introduction**

7.14 Capitalisation rate refers to the level of company expenditure paid for by consumers over time, rather than immediately.

## Proposals

7.15 As stated in the July Framework Decision, we intend to review our assumptions for the fast/slow money split in light of operational practice to date and the information in company business plans. In addition, we will consider the impact of the implementation of IFRS16<sup>63</sup>, which effectively brings all leased assets on to company balance sheets, following submission of company business plans.

### Capitalisation rates question

7.16 We welcome stakeholder views on the following question:

FQ32. Do you agree with our proposed approach to consider capitalisation rates following receipt of company business plans?

## Notional gearing

### Introduction

7.17 Notional gearing represents the assumed percentage of net debt to RAV for the notional company. This in turn impacts the percentages of RAV that attract debt and equity allowances.

7.18 Notional gearing was set at 62.5% for gas transmission, 55-60% for electricity transmission and 65% for gas distribution during RIIO-1.

### Proposals

7.19 There are a number of issues that are at play when setting notional gearing, including:

- cashflow volatility (as affected by totex spend and fast/slow money split, incentives and uncertainty mechanisms)
- the companies' business plans (including proposed transitional arrangements and notional equity injections)
- the cost of equity, the overall cost of capital and financeability

7.20 We expect network companies to assess the overall risk of their business plans and make realistic and well-justified proposals for notional gearing.

7.21 We will continue to review notional gearing in light of the riskiness of the overall price control settlement and the ability of the notional efficient company to sustain downsides. We are currently assuming, as a working assumption in advance of receiving business plans, a notional gearing value of 60% for both RIIO-GD2 and T2.

### Notional gearing question

7.22 We welcome stakeholder views on the following question:

FQ33. Do you have any comments on the working assumption for notional gearing of 60%, or on the underlying issues we identify above?

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<sup>63</sup> IFRS 16 provides guidance on accounting for leases. IFRS 16 was issued in January 2016 and will be effective for most companies that report under IFRS in 2019.

## Notional equity issuance costs

### Introduction

7.23 Notional equity issuance costs are transaction costs associated with notional equity issuance during a price control period.

### Background

7.24 In the Framework consultation, we sought stakeholder views on whether they thought existing mechanisms are appropriate in principle and in practice. We noted the RIIO-1 assumption that equity issuance costs should attract an allowance of 5% of the value of any notional equity raised. CEPA recommended<sup>64</sup> that 3% is appropriate: one operator felt this was too low, whereas another thought this was appropriate.

7.25 In our Framework decision, we proposed to maintain the current approach while considering further what the level of funding should be.

### Further work

7.26 We have reviewed the equity RIIO-1 mechanism further. We find the volume of equity issuance, and therefore the allowances for costs, are lower in RIIO-1 than we expected at final determinations.

### Proposals

7.27 We propose to consider further the equity issuance cost assumption in light of RIIO-2 business plans and notional gearing. After receiving this further information, we will consider whether the issuance cost should be lower than the 5% assumed in RIIO-1 and whether the overall modelled volume of equity issuance is reliable, compared to actual company equity issuances.

7.28 In the meantime, we will continue to consider other information, from stakeholders and from our own research, on actual equity issuance costs, that may be useful in proposing an appropriate allowance for this area.

### Notional equity issuance costs question

7.29 We welcome stakeholder views on the following question:

FQ34. Do you agree with our proposed approach to consider notional equity issuance costs in light of RIIO-2 business plans and notional gearing?

## Pension scheme established deficit funding

### Introduction

7.30 We have a long-standing commitment to consumer funding of deficits in defined benefit pension schemes, which were generally in existence before the energy network sector was privatised. To reflect this commitment, our price controls

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<sup>64</sup> Review of cost of capital ranges for new assets for Ofgem's Networks Division, 23 January 2018 [www.ofgem.gov.uk/ofgem-publications/127844](http://www.ofgem.gov.uk/ofgem-publications/127844) Page 47, para 6.4

provide a form of pass-through funding by consumers of 'Pension Scheme Established Deficits' (those attributable to service before certain specified cut-off dates).

7.31 We updated our policy on this in April 2017.<sup>65</sup>

### Proposals

7.32 We review the allowed revenue the network companies can recover on a triennial basis and completed the last review in November 2017.<sup>66</sup> The next triennial review will complete in November 2020 and will set the established deficit pension allowance from 1 April 2021. This review will sit outside the RIIO-2 price control review.

7.33 Part of the current established deficit pension allowances for transmission and gas distribution network companies relates to pension scheme administration (Admin) and pension protection fund levy (PPF) costs. For electricity distribution network companies, Admin and PPF costs form part of totex. We consider it appropriate that for RIIO-2 we align transmission and gas distribution with electricity distribution and would welcome views on this.

7.34 For the business plans, we expect network companies to assume the pension allowances for RIIO-2 will be equal to 2020-21 allowance as set out in our November 2017 decision (adjusted to remove Admin and PPF). Companies should report separately their historical RIIO-1 and forecast RIIO-2 Admin and PPF costs.

### Pension funding question

7.35 We welcome stakeholder views on the following question:

FQ35. Do you agree that for RIIO-2 we align transmission and gas distribution with electricity distribution and treat Admin and PPF costs as part of totex?

## Directly Remunerated Services

### Introduction

7.36 Directly Remunerated Services<sup>67</sup> (DRS) are specific activities of the network companies that are settled outside of the normal regulatory price control. Companies are allowed to charge their customers directly for certain services performed. For instance, a network company may enter into a commercial agreement with a third party such as a telecoms provider to lease out unused space on its grid infrastructure for the placement of satellite dishes or pylons. The Telecoms provider will then pay a rental fee directly to the network company, according to the terms of that agreement. These services are "directly remunerated" by the customer rather than through Ordinary Transportation Charges.

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<sup>65</sup> [Decision on Ofgem's policy for funding Pension Scheme Established Deficits](#)

<sup>66</sup> [Revised pension allowance values and completion of 2017 reasonableness review](#)

<sup>67</sup> These are referred to as "Excluded Services" in Special Condition 8B (Services treated as Excluded Services) of the electricity transmission licence, Special Condition 11C (Services treated as Excluded Services) of the gas transmission licence and in Special Condition 4C (Services treated as Excluded Services) of the gas distribution licence.

## Policy Intent

- 7.37 The policy intent across sectors is to avoid consumers paying for a service that the network companies have already been remunerated for.
- 7.38 Costs associated with these services are paid for directly by the specific party (or parties) requiring the service. As such, these costs should not be factored into the network companies' cost allowances, to avoid double-counting.
- 7.39 Ofgem will forecast the expected revenues and costs from providing these services and reflect these when setting the allowances at the beginning of the price control. Where the actual revenue earned or cost incurred differs from original forecasts, in some cases, it may be appropriate to true-up this difference. The need for a true-up depends on the category of services and whether the costs and revenues are incentivised.

## Categories

- 7.40 Under RIIO-1, there are different categories of DRS in each sector. For RIIO-2, we propose to clarify the treatment of revenues and costs for each category and to harmonise the categories across sectors.
- 7.41 In the sections below we address DRS for the ET, GT and GD sectors.

## Electricity Transmission

### DRS1. Sole-use Connections

- 7.42 Sole-use Connection services for which network companies receive customer contributions are currently treated as DRS. The expenditure (net of customer contributions) for these services is currently reflected in the companies' allowed revenues.
- 7.43 For RIIO-T2 our intention is to align the existing policies for DRS across the sectors, where possible, and on this basis we propose to treat Sole Use Connections in Transmission in the same way as we currently do for Gas and Electricity Distribution.

### DRS2. Diversionary Works

- 7.44 This category consists of the relocating of any electric line or electrical plant under statutory obligations. The expenditure for these services is currently reported to us as part of excluded, consented and de minimis services.

### DRS3. Alterations

- 7.45 This category relates to the moving of any electrical lines or plant to accommodate extensions, redesigns, or redevelopment of any premises that cover the Transmission System. The expenditure for these services is currently reported to us as part of excluded, consented and de minimis services.

### DRS4. Telecommunications

- 7.46 In RIIO-T1 we put a mechanism in place relating to the treatment of rental incomes earned by NGET for providing space on its towers for telecoms equipment  
68. 50 per cent of the profits earned from this rental agreement (the net of the

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<sup>68</sup> See s.3.25 of the following document: <https://www.ofgem.gov.uk/sites/default/files/docs/2000/11/energy-networks-providing-telecommunications-services-30-11.pdf>

revenues and associated costs) are kept by NGET and the remaining 50 per cent is shared with the consumers.

- 7.47 No directly remunerated revenues or costs have been reported in respect of Telecommunications services by any other network company, during RIIO-T1. Revenues for services falling under this category are not capped as these services are the result of a commercial contract.

#### DRS5. Outage Changes

- 7.48 This category relates to the net costs reasonably incurred by the licensee as a result of any outage change. Where a change in a planned outage results in additional project costs for a network company, the additional costs reasonably incurred can be recovered from the System Operator and is recorded against the project in question.

- 7.49 These costs are a pass-through and are recovered from the System Operator, as such no profit is made on costs associated with this category.

#### DRS6. Emergency Services (Not applicable to Electricity Transmission)

#### DRS7. User Pays Agency (Not applicable to Electricity Transmission)

#### DRS8. PARCA Activities (Not applicable to Electricity Transmission)

#### DRS9. Independent System Operation (Not applicable to Electricity Transmission)

#### DRS10. Network Innovation Competition (NIC) Payments

- 7.50 This category relates to NIC payments made by the System Operator in respect of NIC funding. We provide another mechanism under Special Condition 3I (the Network Innovation Competition) for the recovery (and return, including royalties) of NIC Funding and therefore we propose to remove this category from Directly Remunerated Services, for RIIO-T2 reporting.

#### DRS11. Miscellaneous

- 7.51 This category is for the provision of any other DRS that does not come under one of the above categories. The expenditure for miscellaneous services is reported to us separately from total allowed expenditure and is not, therefore, reflected in allowed revenues.

### **Gas Transmission**

#### DRS1. Sole-use Connections

- 7.52 Sole-use Connection services for which network companies receive customer contributions are currently treated as DRS. The expenditure (net of customer contributions) for these services is currently reflected in NGGT's allowed revenues.
- 7.53 For RIIO-T2, our intention is to align the existing policies for DRS across the sectors, where possible, and on this basis we propose to treat Sole Use Connections in Transmission in the same way as we currently do for Gas and Electricity Distribution.

#### DRS2. Diversionsary Works

- 7.54 This category consists of the relocating of any electric line or electrical plant under statutory obligations. The expenditure for these services is currently reported to us as part of excluded, consented and de minimis services.

### DRS3. Alterations

7.55 This category relates to the moving of any electrical lines or plant to accommodate extensions, redesigns, or redevelopment of any premises that cover the Transmission System. The expenditure for these services is currently reported to us as part of excluded, consented and de minimis services.

### DRS4. Telecommunications

7.56 This category consists of allowing the use of any assets forming part of the Transportation System to carry, either directly or indirectly, electronic information and data. No costs have been reported against this category for NGGT under RIIO-T1.

### DRS5. Outage Changes (Not Applicable to Gas Transmission)

### DRS6. Emergency Services

7.57 This category relates to the provision of emergency services by one licensee to or on behalf of another, under the provisions of Standard Special Condition (SSC) A41. For any services falling under this category, revenues are to be set at a level that will allow the licensee to recover reasonable costs, a reasonable commercial margin and appropriate indemnities against third party claims.

### DRS7. User Pays Agency Services

7.58 This category was linked to Xoserve services delivered to shippers, based on the arrangements in place under SSC A15A. As of 1 April 2017, SSC A15 is no longer in force and has been replaced with new funding and governance arrangements for Xoserve under SSC A15A.1.<sup>69</sup> As part of the new arrangements, all users pay Xoserve directly, so this category will no longer be in use. As such, we propose to remove this DRS category for reporting purposes.

7.59 The funding arrangements for the Gas Transporter's share of Xoserve costs are being considered for RIIO-GT2 in the GT Sector annex of this consultation.

7.60 Note that Must Reads services shall continue to be treated as DRS, following the decision made to treat these as such, as of 1 April 2017.<sup>70</sup> We propose that costs associated with Must Reads should be reported to us through the "Miscellaneous" category.

### DRS8. PARCA Activities

7.61 This category is for the provision of works relating to phase 1 of the Planning and Advanced Reservation of Capacity Agreements (PARCA) process. This includes the initial investigations and assessment of technical options for the provision of Entry or Exit Capacity as carried out by the licensee. The phase one PARCA fee is paid directly by the PARCA applicant to the licensee and is therefore not reflected in allowed revenues.

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<sup>69</sup> <https://www.ofgem.gov.uk/publications-and-updates/completion-xoserve-funding-governance-and-ownership-fgo-implementation-phase>

<sup>70</sup> <https://www.ofgem.gov.uk/publications-and-updates/direction-treat-certain-services-relation-central-data-service-provider-excluded-services-1-april-2017>

DRS9. Independent System Operation (Not applicable to Gas Transmission)

DRS10. NIC Payments (Not applicable to Gas Transmission)

DRS11. Miscellaneous

7.62 This category is for the provision of any other DRS that does not come under one of the above categories. The expenditure for miscellaneous services is reported to us separately from total allowed expenditure and is not, therefore, reflected in allowed revenues.

**Gas Distribution**

DRS1. Sole-use Connections

7.63 Sole-use Connection services for which network companies receive customer contributions are currently treated as DRS, with the exception of any connection services provided under the 10 metre rule.<sup>71</sup> The expenditure (net of customer contributions) for these services is currently reflected in the companies' allowed revenues.

7.64 Where connections are contestable, revenues are to be set at a level that will allow the network company to recover reasonable costs incurred, a reasonable profit margin and any other costs incurred in accordance with the Connections Charging Methodology subject to the requirements of Standard Condition 4B(1) of the Gas Transporter Licence.

7.65 For RIIO-RIIO-GD2, our intention is to align the existing policies for DRS across the sectors, where possible, and on this basis we propose to treat Sole Use Connections in Transmission in the same way as we currently do for Gas and Electricity Distribution.

DRS2. Diversions Works

7.66 This category consists of the relocating of any electric line or electrical plant under statutory obligations. The expenditure (net of customer contributions) and Replacement expenditure for these services is reflected in the network companies' allowed revenues.

DRS3. Alterations

7.67 This category relates to the moving of any gas pipes or plant to accommodate extensions, redesigns, or redevelopment of any premises that cover the gas network. The expenditure (net of customer contributions) for these services is reflected in the network companies' allowed revenues.

DRS4. Telecommunications (Not applicable to Gas Distribution)

DRS5. Outage Changes (Not Applicable to Gas Distribution)

DRS6. Emergency Services

7.68 This category relates to the provision of emergency services under the provisions of Standard Special Condition A41. For any services falling under this category, revenues are to be set at a level that will allow the network company to recover reasonable costs, a reasonable commercial margin and appropriate indemnities against third party claims.

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<sup>71</sup> Up to the first 10 metres of a connection in a public highway are provided free to the customer requiring the connection where the connection is within 23 metres of a relevant gas main. These costs are included within Totex and recovered from all customers through the RAV.

#### DRS7. User Pays Agency Services

- 7.69 This category was linked to Xoserve services delivered to shippers, based on the arrangements in place under SSC A15A. As of 1 April 2017, SSC A15 is no longer in force and has been replaced with new funding and governance arrangements for Xoserve under SSC A15A.1.<sup>72</sup> As part of the new arrangements, all users pay Xoserve directly, so this category will no longer be in use. As such, we propose to remove this DRS category for reporting purposes.
- 7.70 The funding arrangements for the Gas Transporter's share of Xoserve costs are being considered for RIIO-GD2 in the GD Sector annex of this consultation.
- 7.71 Note that Must Reads services shall continue to be treated as DRS, following the decision made to treat these as such, as of 1 April 2017.<sup>73</sup> We propose that costs associated with Must Reads should be reported to us through the "Miscellaneous" category.

#### DRS8. PARCA Activities (Not applicable to Gas Distribution)

#### DRS9. Independent System Operation

- 7.72 This category relates to the operation of Independent Gas systems in remote areas of the UK. Where network companies operate and maintain an Independent System,<sup>74</sup> the costs of doing so are recharged to the National Transmission System in order to socialise the cost across all GB consumers. This current cross-subsidy arrangement will remain in force until 2021 and is subject to change as this is a policy area that is being considered for RIIO-GD2 (see GD Sector annex of this consultation).

#### DRS10. NIC Payments

- 7.73 This category relates to NIC payments made by the System Operator in respect of NIC funding. We provide another mechanism under Special Condition 1I (the Network Innovation Competition) for the recovery (and return, including royalties) of NIC Funding and therefore we propose to remove this category from Directly Remunerated Services, for RIIO-RIIO-GD2 reporting.

#### Miscellaneous

- 7.74 This category is for the provision of any other DRS that does not come under one of the above categories. The expenditure for miscellaneous services is reported to us separately from total allowed expenditure and is not, therefore, reflected in allowed revenues.

#### Directly Remunerated Services question

- 7.75 We welcome stakeholder views on the following question:

FQ36. Do you have any views on the categories of Directly Remunerated Services and their proposed treatment for RIIO-2?

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<sup>72</sup> <https://www.ofgem.gov.uk/publications-and-updates/completion-xoserve-funding-governance-and-ownership-fgo-implementation-phase>

<sup>73</sup> <https://www.ofgem.gov.uk/publications-and-updates/direction-treat-certain-services-relation-central-data-service-provider-excluded-services-1-april-2017>

<sup>74</sup> These systems and their charging arrangements are outlined in Special Condition 4I.

## Amounts recovered from the disposal of assets

### Introduction

7.76 Where network assets are no longer required, network operators may dispose of or relinquish operational control, subject to consent. They may also recover from third parties, any costs in respect of damage to their network. Some of these transactions can include the disposal of land.

### Background

7.77 The financial impact of disposing of assets include the following:

- cash proceeds of sale at an arm's length transaction to a third party external to the licensee group
- transfer at an arm's length fair market value of assets within the licensee group
- cash proceeds of sale of assets as scrap
- amounts recovered from third parties, including insurance companies, in respect of damage to the network.

7.78 Under RIIO-1 the current policy on the treatment of financial proceeds is different between sectors as follows:

- RIIO-GD1 – cash proceeds are netted off calculated additions to RAV, subject to a five-year delay from the year in which the proceeds occur
- RIIO-T1 - cash proceeds are netted off calculated additions to RAV from the year in which the proceeds occur
- RIIO-ED1 – cash proceeds are netted off against totex from the year in which the proceeds occur

### Further work

7.79 We will consider whether it is in the consumer interest to ensure there are incentives on the financial proceeds from disposals together and, if so, how the fair value is established and how the incentive is set.

### Proposals

7.80 We propose the licensees include a strategy as part of their Business Plans on how they treat the disposal of assets. As part of their submission, they should demonstrate how consumers would benefit from that strategy.

### Disposal of assets question

7.81 We welcome stakeholder views on the following question:

FQ37. Do you have any views on the potential treatment of financial proceeds or fair value transfers of asset (including land) disposals for RIIO-2?

## Appendices

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## Appendix 1 – Finance questions for consultation

### Cost of debt questions

- FQ1. Do you support our proposal to retain full indexation as the methodology for setting cost of debt allowances?
- FQ2. Do you agree with our proposal to not share debt out-or-under performance within each year?
- FQ3. Do you have any views on the next steps outlined in Paragraphs 2.22 to 2.25 for assessing the appropriateness of expected cost of debt allowances for full indexation?
- FQ4. Do you have a preference, or any relevant evidence, regarding the options for deflating the nominal iBoxx as discussed at Paragraph 2.14? Are there other options that you think we should consider?

### Risk-free rate questions

- FQ5. Do you agree with our proposal to index the cost of equity to the risk-free rate only (the first option presented in the March consultation)?
- FQ6. Do you agree with using the 20-year real zero coupon gilt rate (Bank of England database series IUDLRZC) for the risk-free rate?
- FQ7. Do you agree with using the October month average of the Bank of England database series IUDLRZC to set the risk-free rate ahead of each financial year?
- FQ8. Do you agree with our proposal to derive CPIH real from RPI-linked gilts by adding an expected RPI-CPIH wedge?

### TMR questions

- FQ9. Do you have any views on our assessment of the issues stakeholders raised with us regarding outturn inflation, expected inflation, and the calculation of arithmetic uplift (from geometric returns)?
- FQ10. Do you have any views on our interpretation of the UKRN Study regarding the TMR of 6-7% in CPI terms and our 6.25% to 6.75% CPIH real working assumption range based on the range of evidence?
- FQ11. Do you have any views on our reconciliation of the UKRN Study to previous advice received on TMR as outlined at Appendix 2?

### Equity beta questions

- FQ12. Do you have any views on our assessment of the issues that stakeholders raised regarding beta estimation, including the consideration of: all UK outturn data, different data frequencies, long-run sample periods, advanced econometric techniques, de-gearing and re-gearing, and the focus on UK companies?
- FQ13. What is your view on Dr Robertson's report?
- FQ14. What is your view on Indepen's report?
- FQ15. What is your view of the proposed Ofgem approach with respect to beta?

### Cross-checking the CAPM-implied cost of equity questions

- FQ16. Do you agree with our proposal to cross-check CAPM in this way?

FQ17. Do you agree that the cross-checks support the CAPM-implied range and lend support that the range can be narrowed to 4-5% on a CPIH basis?

FQ18. Are there other cross-checks that we should consider? If so, do you have a proposed approach?

### **Expected and allowed return questions**

FQ19. Do you agree with our proposal to distinguish between allowed returns and expected returns as proposed in Step 3?

FQ20. Does Appendix 4 accurately capture the reported outperformance of price controls?

FQ21. Is there any other outperformance information that we should consider? We welcome information from stakeholders in light of any gaps or issues with the reported outperformance as per Appendix 4.

### **Financeability questions**

FQ22. What is your view on our proposed approach to assessing financeability? How should Ofgem approach quantitative and qualitative aspects of the financeability assessment? In your view, what are the relevant quantitative and qualitative aspects?

FQ23. Do you agree with the possible measures companies could take for addressing financeability? Are there any additional measures we should consider?

FQ24. Do you agree with the objectives and principles set out for the design of a cashflow floor?

FQ25. Do you support our inclusion of and focus on Variant 3 of the cashflow floor as most likely to meet the main objectives?

### **Corporation tax questions**

FQ26. Do you support our proposal that companies should seek to obtain the "Fair Tax Mark" certification?

FQ27. Is there another method to secure tax legitimacy other than the "Fair Tax Mark" certification? Could we build upon the Finance Acts (2016 and 2009) with regards to the requirement for companies to publish a tax strategy and appoint a Senior Accounting Officer?

FQ28. For Option A, how should a tax re-opener mechanism be triggered? Is there a materiality threshold that we should use when considering the difference between allowances and taxes actually paid to HMRC? If so – what might this be?

### **RAV indexation (CPIH) questions**

FQ29. What is your view on our proposal for an immediate switch to CPIH from the beginning of RIIO-2 for the purposes of RAV indexation and calculation of allowed return?

FQ30. Is there a better way to secure NPV-neutrality in light of the difficulties we identify with a true-up?

### **Regulatory depreciation question**

FQ31. Do you have any specific views or evidence relating to useful economic lives of network assets that may impact the assessment of appropriate depreciation rates?

**Capitalisation rates question**

FQ32. Do you agree with our proposed approach to consider capitalisation rates following receipt of company business plans?

**Notional gearing question**

FQ33. Do you have any comments on the working assumption for notional gearing of 60%, or on the underlying issues we identify above?

**Notional equity issuance costs question**

FQ34. Do you agree with our proposed approach to consider notional equity issuance costs in light of RIIO-2 business plans and notional gearing?

**Pension funding question**

FQ35. Do you agree that for RIIO-2 we align transmission and gas distribution with electricity distribution and treat Admin and PPF costs as part of totex?

**Directly Remunerated Services question**

FQ36. Do you have any views on the categories of Directly Remunerated Services and their proposed treatment for RIIO-2?

**Disposal of assets question**

FQ37. Do you have any views on the potential treatment of financial proceeds or fair value transfers of asset (including land) disposals for RIIO-2?

## Appendix 2 – Total Market Returns: reconciling the 2018 UKRN Study with previous advice on TMR

### Introduction

In March 2018, Ofgem (and other regulators) received advice<sup>75</sup> from academics and practitioners on cost of capital issues (the "2018 UKRN Study") including Total Market Returns ("TMR")<sup>76</sup>. This advice updates previous advice that Ofgem received in 2014<sup>77</sup> and 2006<sup>78</sup> (the "2006 Advice"), and advice that Ofgem (and other regulators) received in 2003<sup>79</sup> (the "2003 Advice").

This appendix provides a reconciliation of the difference between: the UKRN Study (2018), the 2006 Advice, and the 2003 Advice.

### A recap of the advice received in 2003 and 2006 on the TMR

The 2003 Advice states<sup>80</sup>:

*"Our central estimate of the cost of equity capital, derived from a wide range of markets, is around 5.5% (geometric average), and thus 6.5% to 7.5% (arithmetic average)."*<sup>81</sup>

The 2006 Advice states<sup>82</sup>:

*"We have not altered our estimate of the real market return on equities (6.5% to 7.5%)".*

Therefore, the 2006 Advice is consistent with the 2003 Advice: both recommend a real TMR of 6.5% to 7.5%.

Using the 2017 Dimson Marsh Staunton ("DMS") dataset, the low end of the TMR (6.5%) can be replicated as follows:

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<sup>75</sup> See 2018 UKRN Study here: <https://www.ukrn.org.uk/wp-content/uploads/2018/06/2018-CoE-Study.pdf>

<sup>76</sup> See 2018 [UKRN Study](#) page E-125.

<sup>77</sup> See 2014 Advice here:

[https://www.ofgem.gov.uk/sites/default/files/docs/2014/02/wright\\_smithers\\_equity\\_market\\_return.pdf](https://www.ofgem.gov.uk/sites/default/files/docs/2014/02/wright_smithers_equity_market_return.pdf)

<sup>78</sup> See 2006 Advice here: <https://www.ofgem.gov.uk/ofgem-publications/56022/15576-smithersco.pdf>

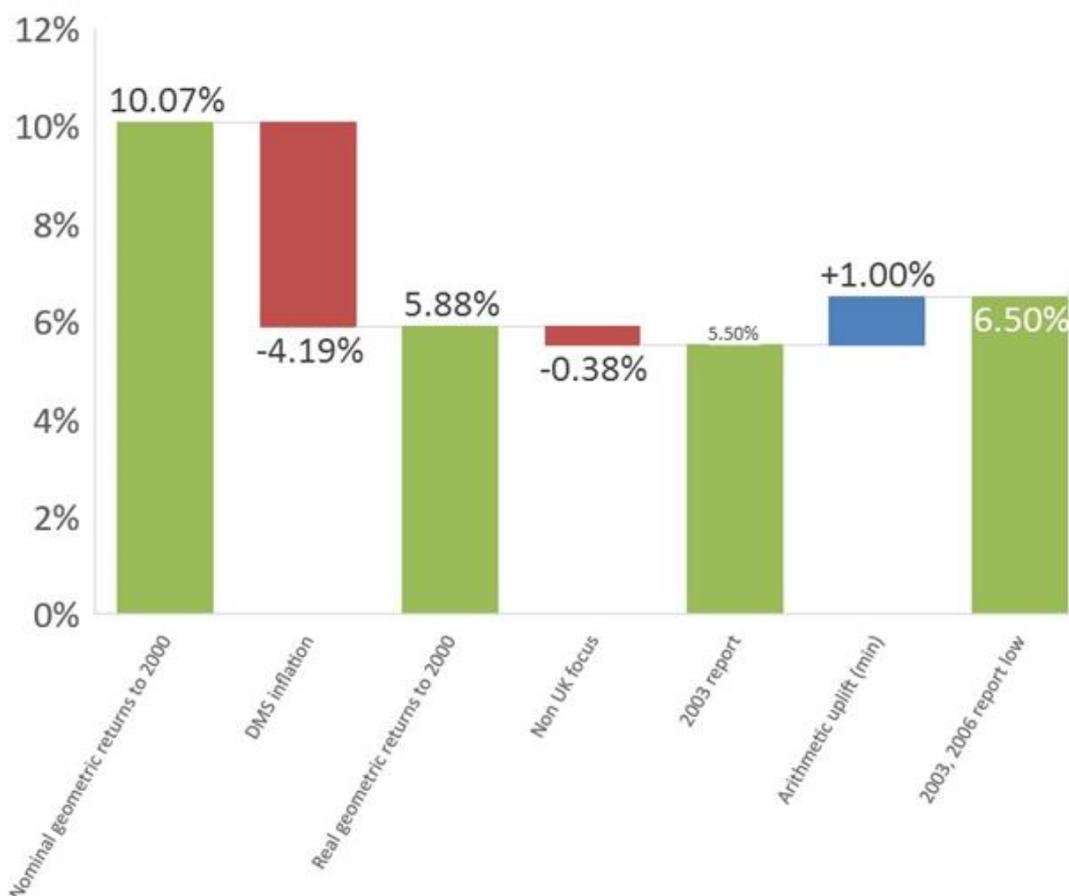
<sup>79</sup> See 2003 Advice here: <https://www.ofgem.gov.uk/ofgem-publications/50794/2198-jointregscoc.pdf>

<sup>80</sup> See page 4 of the 2003 Advice.

<sup>81</sup> Note that "the cost of equity capital" refers to the "average" firm (a firm with a beta of 1) as per page 13 of the [2003 Advice](#). Therefore, this "cost of equity capital" is equivalent to TMR.

<sup>82</sup> See page 37 of the [2006 Advice](#).

**Figure 17: Outturn Total Market Returns for the period 1899 to 2000, and the low end for TMR of 6.5% as recommend in 2003 and 2006**



The first two bars are based on 100 years of outturn data from 1899 to 2000<sup>83</sup> and the third bar combines the first two. The fourth bar (Non-UK focus) reflects the following advice:

- "International evidence suggests that the US experience was somewhat better than the world geometric average of around 5.5%, which was also close to the UK experience. Although we believe all such estimates should be derived in a world context, there may nonetheless be both empirical and theoretical grounds for regarding the UK's historic cost of equity capital as more typical of the prospective world return."<sup>84</sup>
- "This ...[6.5% to 7.5%] was derived from Dimson et al's (2001) estimates of the compound average real return of 5.5% from the major world equity markets over the course of the twentieth century, a figure which is also very close to the historic real return on the UK market."<sup>85</sup>

<sup>83</sup> We note that DMS publish updated datasets annually. Each annual publication can add data for the additional year and can change data for historical years. We note that the [2014 Advice](#) refers on page 7 to a geometric return of 5.78% for the period 1899-2000, whereas the DMS data from 2017 results in a geometric return of 5.88% for this same period. In any case however, the point we raise is that the advice places explicit weight on international evidence.

<sup>84</sup> See page 48 of the [2003 Advice](#).

<sup>85</sup> See page 38 of the [2006 Advice](#).

Therefore, to arrive at 5.5%, there is a downwards adjustment of 38bps<sup>86</sup> in recognition of international evidence on returns.

The sixth bar (+100bps) reflects the minimum recommended uplift from geometric returns to arithmetic returns, as per the following advice:

- *"The arithmetic mean return may exceed the geometric mean return by as much as 2 percentage points in annual terms (given historical estimates of stock return volatility and an assumption of unpredictable returns). However, if cost of capital assumptions are being made over longer horizons, this may be an over-estimate (possibly by as much as a full percentage point), if either a) returns are predictable; or b) (more dubiously) stock returns in future are likely to be less volatile."*<sup>87</sup>
- *"To this compound average return estimate we add an adjustment to derive the arithmetic average return, which we took to be in the range of one to two percentage points..."*<sup>88</sup>

### **Updated evidence: a recap of the advice received in the 2018 UKRN Study**

In 2018, the UKRN Study recommends:

*"...we suggest a modest downward adjustment of the original range proposed by MMW, to a range of 6-7%."*

The lower bound of this range can be presented as follows:

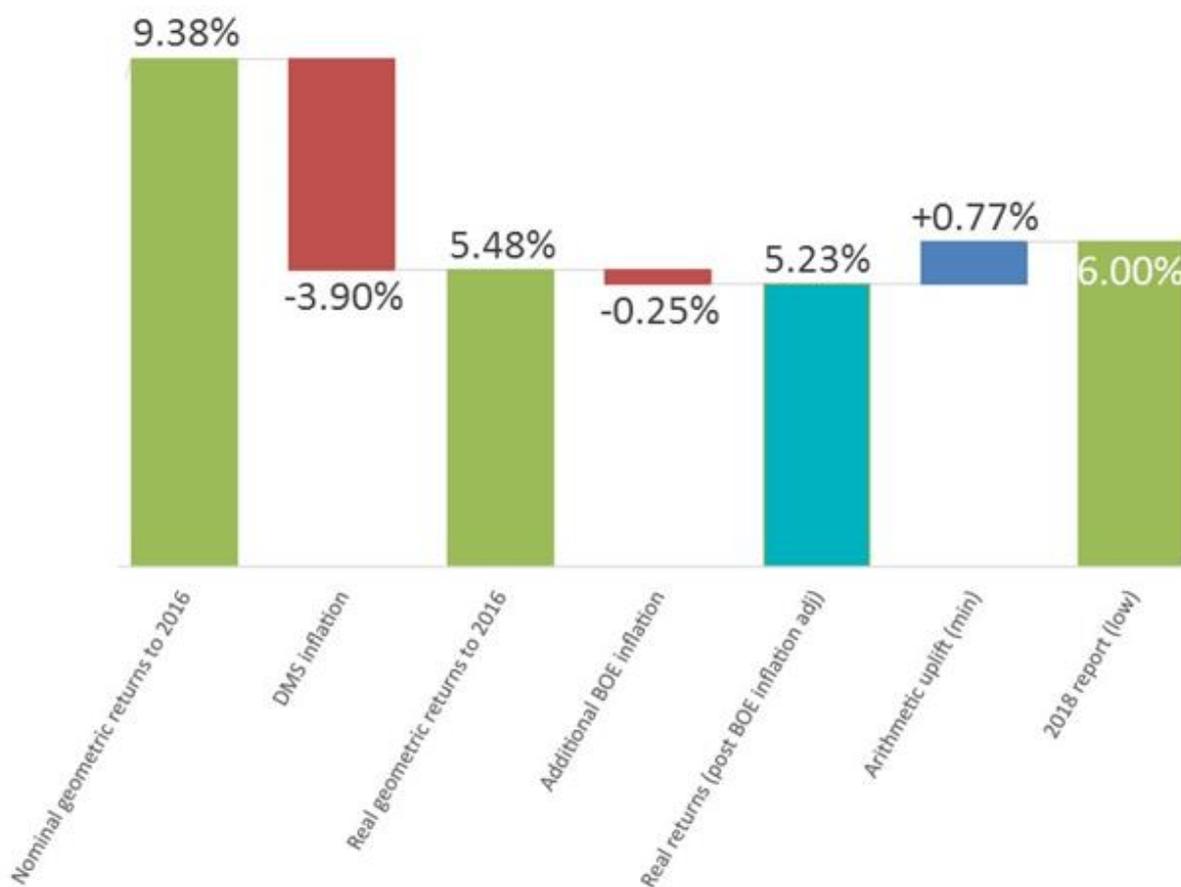
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<sup>86</sup> We note that the [2014 Advice](#) refers on page 7 to a geometric return of 5.78% for the period 1899-2000, using a prior version of the DMS data, which would imply a smaller downward adjustment of 28bps rather than the 38bps we present here. We use the 2017 DMS data to allow us to provide a like-for-like reconciliation while noting that the 2018 [UKRN Study](#) states 5.88% (page E-125, Table 1) for UK returns, using DMS data, for the period 1899-2000.

<sup>87</sup> See page 49 of the [2003 Advice](#).

<sup>88</sup> See page 38 of the [2006 Advice](#).

**Figure 18: Outturn Total Market Returns for the period 1899 to 2016, and the low end for TMR of 6.0% as recommend in 2018**



The first two bars are based on 116 years of outturn data from 1899 to 2016 and the third bar combines the first two. The fourth bar demonstrates the impact of using Bank of England (BoE) inflation data, rather than DMS inflation data. The fifth bar combines the third bar and the fourth bar.<sup>89</sup>

The sixth bar demonstrates the uplift from geometric to arithmetic as implied in the following two extracts from 2018 UKRN Study:

"We would, however, argue that the case for an adjustment to arithmetic averages as large as 2 percentage points (which was implied by the upper end of MMW's range) is distinctly weakened if regulators wish to set returns on a consistent basis at a relatively long (eg, 10-year) horizon, given that (as noted in MMW) long-horizon returns have distinctly lower volatility than would be the case in a random walk stock market."

"Thus, in light of both these issues, we suggest a modest downward adjustment of the original range proposed by MMW, to a range of 6-

<sup>89</sup> 5.48% and 5.23% are also reported in the 2018 [UKRN Study](#) (page E-125, Table 1) as "UK, £ (DMS)" and "UK, £ (CPI)".

7%, primarily reflecting a smaller adjustment from geometric to arithmetic returns."<sup>90</sup>

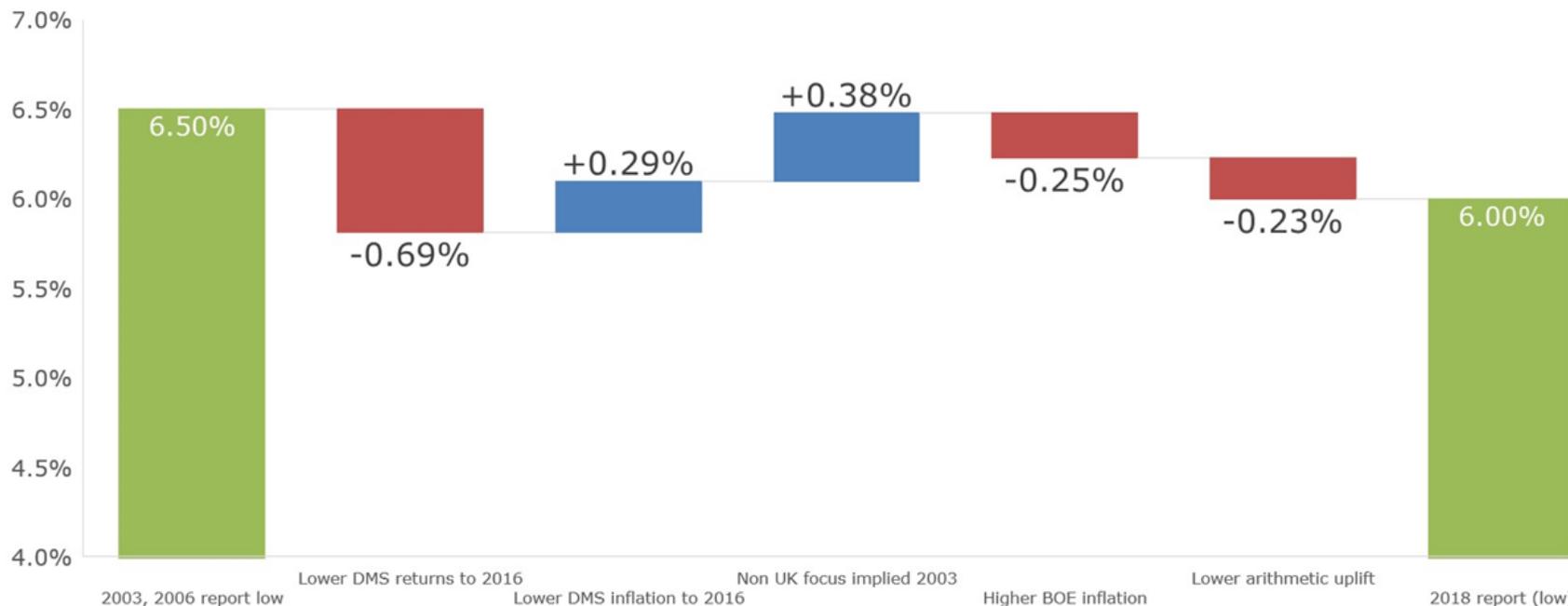
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<sup>90</sup> The reference to "both these issues" is explained in the following page.

**Reconciling 6.5% with 6%**

The difference between the TMR of 6.5% (low end in the 2003 and 2006 Advice) and the TMR of 6% (low end in the 2018 UKRN Study), can now be presented as follows<sup>91</sup>:

**Figure 19: Reconciliation of TMR advice**



<sup>91</sup> Page E-125 of the 2018 [UKRN Study](#) refers to "both these issues" (international evidence and arithmetic uplift) and therefore Figure 19 could be presented in an alternative way, where the quantum of the fourth bar (non-UK focus) is offset by the quantum of the sixth bar (arithmetic uplift), insofar as the combined effect is +15bps. Given the data on international returns, the non-UK focus bar could be less positive (eg +0.28%) and the lower arithmetic bar could be less negative (eg -0.13%)

The second bar recognises that returns over the 116 years to 2016 are 69bps lower than returns over the 100 years to 2000. The third bar highlights that inflation, as reported by DMS, over the 116-year period is also lower, by 29bps, and therefore this is a positive variance when updating the data. The second and third bars are fully driven by the underlying UK outturn returns data from DMS.

The fourth, fifth and sixth bars highlight changes in approach between the 2018 UKRN Study and the 2003 and 2006 Advice. The fourth bar demonstrates that the 2018 UKRN Study does not make a non-UK focus adjustment in the same way that was implied in 2003 and 2006. The fifth bar recognises that the 2018 UKRN Study focuses on inflation data from BoE, which is 25bps larger than inflation outturn reported by DMS. Lastly, the sixth bar highlights that the uplift from geometric to arithmetic is not as large in the 2018 UKRN Study, as it was in the 2003 and 2006 Advice - an impact that can be represented as 23bps (but note the interaction with this and the non-UK focus as illustrated in footnote 92).

### **Expected real returns and expected inflation**

In addition to the 50bps reconciliation we demonstrate above, the 2018 UKRN Study differs from the 2006 Advice and the 2003 Advice in another critical way - the UKRN Study is in CPI terms. The 2018 UKRN Study addresses the appropriate price index for constructing real returns as follows<sup>92</sup>:

*"Regulators have historically chosen (we believe correctly) to focus on real returns to capital, and to index firms' allowed expenditure to inflation (which may include allowance for 'Real Price Effects' for inputs that are subject to different inflation influences). A direct implication is that both historical and forward-looking analysis of the CAPM components should be carried out in real terms. However, we would argue that the price index originally used as the basis for regulation, the RPI, has a number of defects that detract from its value as the basis for estimating the CAPM-WACC in real terms. "*

The 2018 UKRN Study then identifies a number of issues with RPI as follows<sup>93</sup>:

*"The RPI has become in has become increasingly divorced from the choice of price index in monetary stabilisation, with the Bank of England focussing on the CPI."*

*"The methodology for constructing the RPI is in a number of respects inconsistent with standard practice in constructing measures of consumer price inflation in most countries, whereas the CPI follows standard practice. The resulting differences between inflation as measured by the RPI and the CPI have been quite large, and quite volatile, and are expected to continue so in the future."*

*"The historical time series for the RPI has been subject to significant changes in its data construction over time (most notably in its treatment of housing costs) which make it hard to use the RPI to derive consistent historic estimates of real returns. In contrast, the ONS and*

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<sup>92</sup> See the 2018 [UKRN Study](#) page 30.

<sup>93</sup> Ibid

*the Bank of England have published consistent historical estimates of the CPI."*

In this light, the 2018 UKRN Study made a specific recommendation that<sup>94</sup>:

*"There is a strong case for regulators choosing a measure of inflation for estimating the CAPM-WACC that is consistent with that chosen by HM Treasury and implemented by the Bank of England for inflation targeting."*

We sought clarification from Professor Stephen Wright, one of the UKRN Study authors, whether page 30 and page E-125, when taken together, mean that the recommendation on page E-125, of a TMR in 6-7%, is in CPI terms rather than RPI terms.

Professor Wright confirmed that the recommendation on page E-125 of the 2018 UKRN Study, for a TMR of 6-7%, is in CPI terms, and therefore can be interpreted as 5-6% in RPI terms given the recent expected difference between RPI and CPI inflation of 1% (ignoring the Fisher equation for simplicity).

As a result, the recommendation in the 2018 UKRN Study on page E-125 for a TMR of 6-7%, after re-stating as 5-6% in RPI terms, can be interpreted as being 150bps lower, than the TMR recommendation in the 2003 and 2006 Advice (of 6.5%-7.5% in RPI terms).

100bps of the 150bps represents the difference between expected RPI inflation and expected CPI inflation, given the current expectations for RPI and CPI inflation of approximately 3% and 2% respectively.

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<sup>94</sup> *Ibid.*

## Appendix 3 - Dividend Discount Model

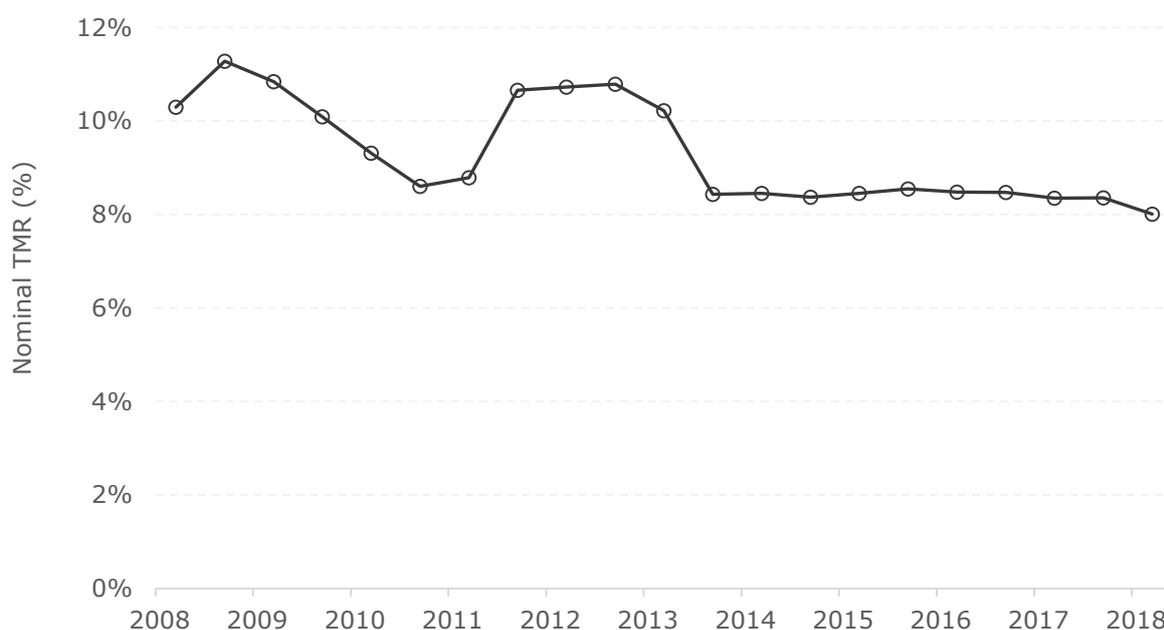
### Introduction

A Dividend Discount Model ("DDM") can be used to estimate expected returns. In particular, where we use a stock market index, DDM analysis can be used to estimate the TMR.

In March 2018, CEPA used DDM analysis to inform its estimate of the TMR for Ofgem. CEPA's preferred specification involved use of a two-period DDM, with UK GDP growth as a proxy for dividend growth and a dividend yield calculation inclusive of share buy-backs. This model generated a spot estimate of 7.9% and a two-year average of 8.5% (figures in nominal terms). While both figures were used in constructing a plausible range for the TMR, CEPA has advised us that more weight should be placed on the two-year average relative to the spot estimates, particularly since there is some evidence of recent volatility in spot estimates. Placing more weight on the two-year average minimises the risk of over-interpreting the most recent reduction.

Now, using updated data for the same specification of the DDM, CEPA estimates a return of 8.0% nominal, as per Figure 20 below which shows a rolling two-year average. We refer to this as CEPA's central DDM specification.

**Figure 20: CEPA DDM analysis**



In the sections below we summarise:

- the details of CEPA's central DDM specification.
- sensitivities to CEPA's central DDM.

### **CEPA's central DDM specification**

CEPA's preferred DDM approach is based on a rolling two-year average of a two period model, in which dividend yields are taken from a broad-based UK index and dividend growth is assumed to follow GDP growth.

The detailed assumptions underlying CEPA's central specification are as follows:

- The current yield is based on dividend and buy-back yields for the FTSE All-Share index based on Bloomberg data.
- Short-term (from years 1-5) GDP growth estimates are based on OBR UK GDP forecasts.
- Long-term (from year 6 to perpetuity) growth is based on outturn UK real GDP growth from 1950 to 2017 plus an assumed CPIH inflation rate of 2%.

### **Sensitivities to CEPA's central DDM**

CEPA has presented different sensitivities to show how the implied TMR changes as the assumed future rates of dividend growth differ. CEPA has considered three different families of DDM based on the long-term growth assumption:

- The central specification is based on UK historic GDP growth (labelled "UK GDP growth" in Figure 21 below). As described above the long-term growth estimate for this specification is 4.5%.
- One alternative specification is based on UK historic dividend growth ("UK dividend growth"). The long-term growth estimate for this specification is 3.1% based on 1.1% real dividend growth since 1950<sup>95</sup> plus an assumed CPIH inflation rate of 2%.
- A further alternative specification is based on international GDP growth ("Int'l GDP growth"). The long-term growth estimate for this specification is 5.3%. This is based on a weighted average of UK and international GDP growth, with the weights of 30% and 70% respectively reflecting the approximate sources of revenue for FTSE All-Share companies. To derive a figure for international GDP growth, CEPA added the difference between the IMF's short-term advanced economies GDP growth forecasts and the OBR's short-term GDP growth forecasts to the long-term UK GDP growth figure of 4.5%.<sup>96</sup>

For each family of models, the current dividend yield is set at 3.5% as described above.

Figure 21 below shows how CEPA's DDM results change for each family of DDM with different assumptions for short-term dividend growth shown on the x-axis. The wide range of short-term growth assumptions shown (from 1% to 6%) reflects the range of outturn and forecast nominal GDP growth rates over short time horizons over the past twenty years. The range shown is therefore illustrative, and neither the upper nor the lower end of this range reflects current short-term forecasts. The highlighted TMR estimate of 8.0% is based the OBR's UK nominal GDP growth forecast of 3.4% in the CEPA central specification.

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<sup>95</sup> As referenced by the Competition Commission in its decision in relation to the NIE price determination reference. See para 13.154 here:

[https://assets.publishing.service.gov.uk/media/535a5768ed915d0fdb000003/NIE\\_Final\\_determination.pdf](https://assets.publishing.service.gov.uk/media/535a5768ed915d0fdb000003/NIE_Final_determination.pdf)

<sup>96</sup> This is arguably a high estimate of international GDP growth relative to UK GDP growth. The IMF's short-term 'advanced economies' forecast is 4.5%, equal to historic UK GDP growth.

**Figure 21: DDM sensitivities**

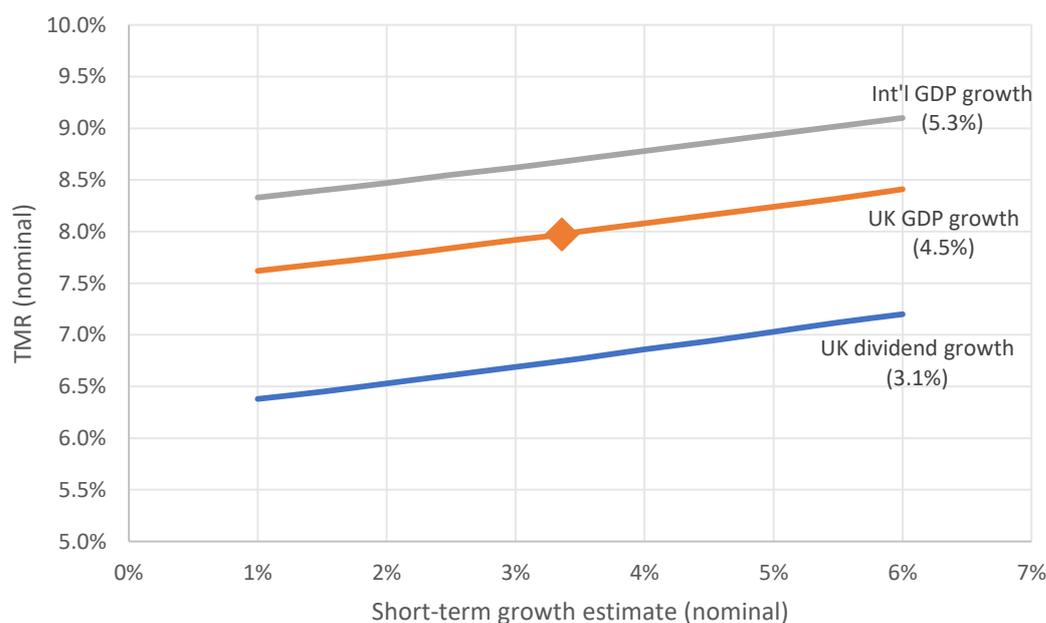


Figure 21 highlights that DDM estimates are more sensitive to long-term growth assumptions than to short-term growth assumptions. It also gives an indication of the range of TMR values that can be supported within CEPA's approach - bearing in mind that credible short-term growth assumptions for all three families of model are currently closer to the middle of the illustrated range than to either end:

- CEPA's central specification falls between models in which long-term growth is based on historic dividend growth and those in which long-term growth is based on an international GDP growth figure.
- The upper end of CEPA's February 2018 DDM-based range of 7.9-8.5% is now less well-supported by models based on UK GDP growth, though it is consistent with placing weight on models incorporating higher forecasts of international GDP growth.
- The lower end of CEPA's February range now corresponds closely to the central specification, and a low end estimate below 7% can be obtained from models based on UK dividend growth. This, however, would require future dividend growth to remain well below outturn GDP growth in perpetuity.
- Overall, a slightly wider range of 7.5-8.5% now appears to best reflect the evidence from the model specifications considered, with the lower part of this range corresponding most closely to UK-specific evidence.

## Appendix 4 – Outperformance of price controls (energy and other sectors)

### Introduction

In this appendix we summarise reported outperformance of price controls.

### Energy sector

In May 2015, Citizens Advice published the following:

**Figure 22: Citizens Advice, distribution of rates of return in regulated energy sectors<sup>97</sup>**

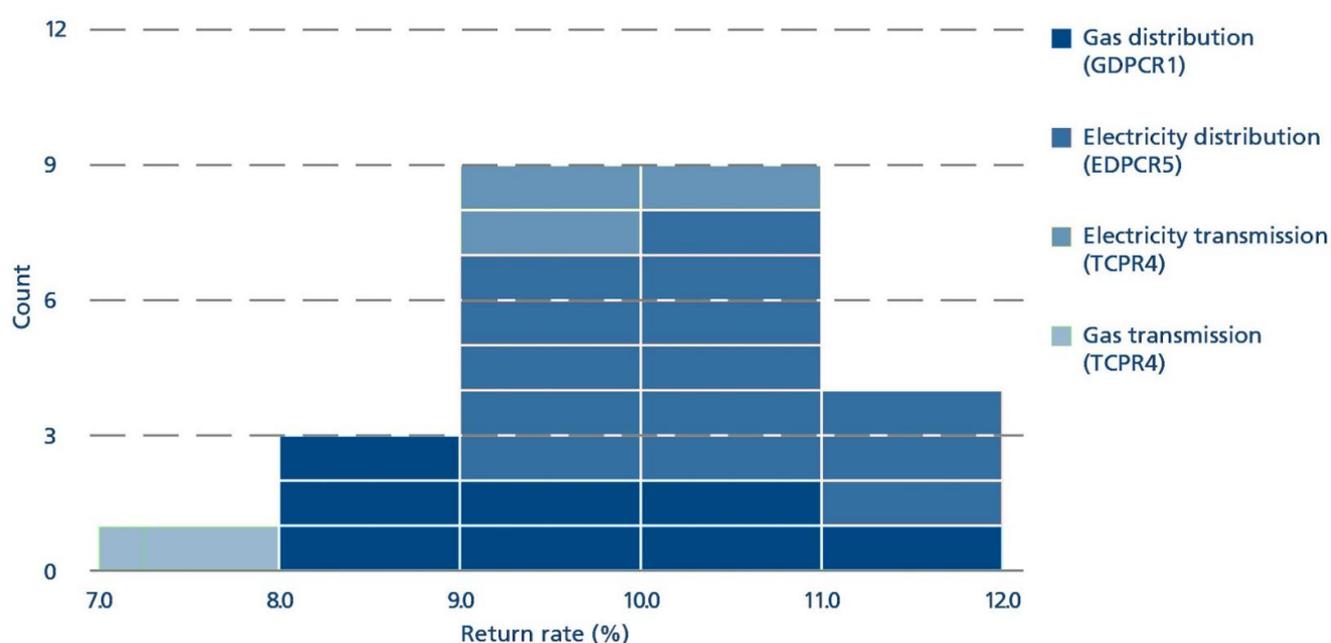


Figure 22 shows that the energy price controls preceding RIIO-1 consistently resulted in outperformance (as all boxes are above 7.0% - the expected return).

In addition, the current RIIO-1 price controls are expected to deliver significant outperformance, as reported in Ofgem’s RIIO Annual Reports, re-presented below from Ofgem publications during 2017.

<sup>97</sup> [https://www.citizensadvice.org.uk/Global/Public/Corporate%20content/Publications/ManyHappyReturns-NewBrandEdition%20\(2\).pdf](https://www.citizensadvice.org.uk/Global/Public/Corporate%20content/Publications/ManyHappyReturns-NewBrandEdition%20(2).pdf)

Figure 23: Forecast eight-year RIIO-ED1 RORE (real, post-tax)<sup>98</sup>

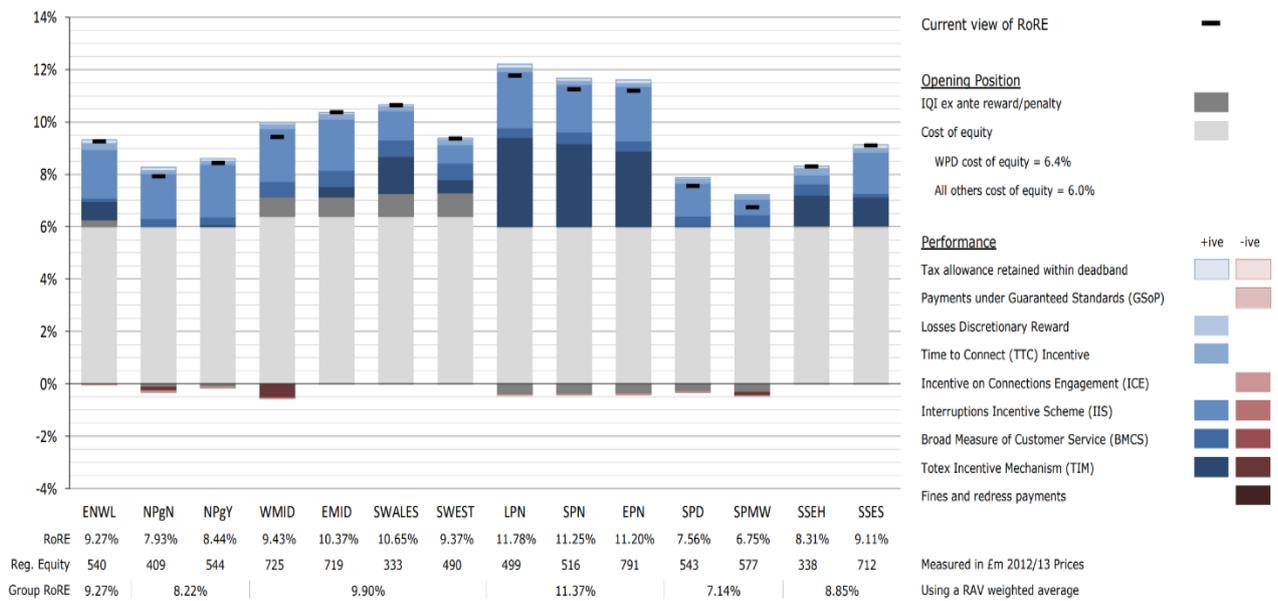
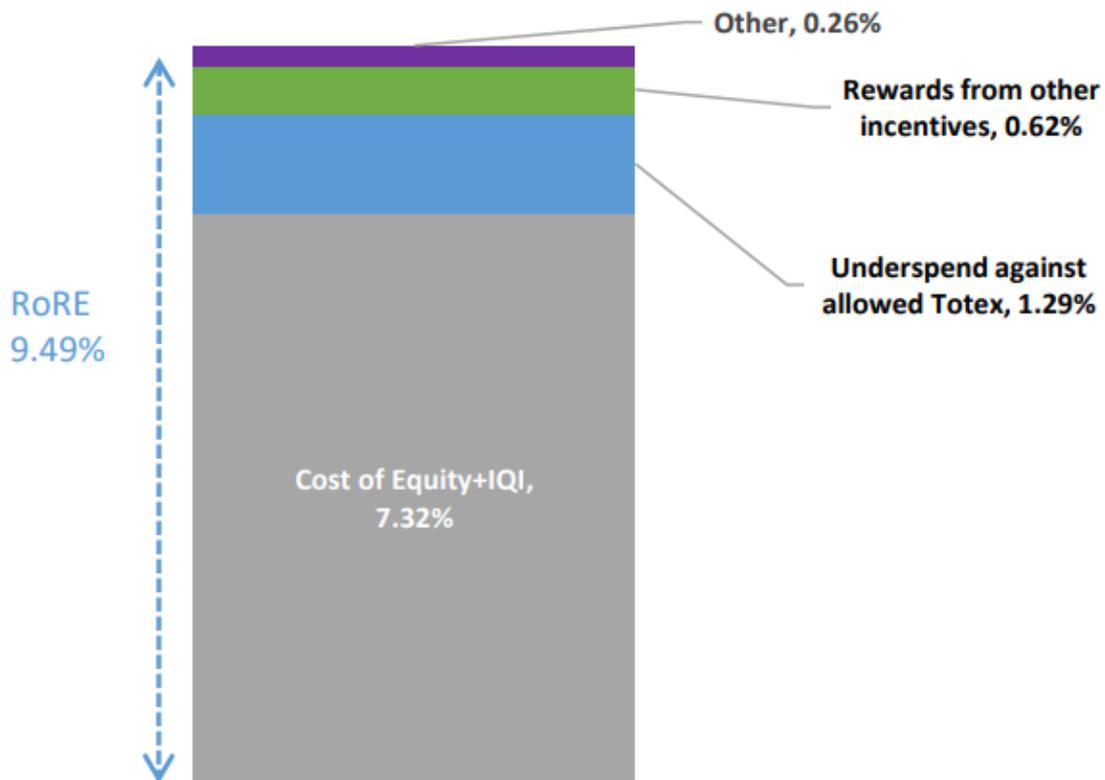


Figure 24: Forecast eight-year RIIO-ET1 RORE (real, post-tax)<sup>99</sup>



<sup>98</sup> [https://www.ofgem.gov.uk/system/files/docs/2017/12/riio-ed1\\_annual\\_report\\_2016-17.pdf](https://www.ofgem.gov.uk/system/files/docs/2017/12/riio-ed1_annual_report_2016-17.pdf)

<sup>99</sup> [https://www.ofgem.gov.uk/system/files/docs/2017/12/riio\\_transmission\\_report\\_2017\\_final\\_1.pdf](https://www.ofgem.gov.uk/system/files/docs/2017/12/riio_transmission_report_2017_final_1.pdf)

Figure 25: Forecast eight-year RIIO-GT1 RORE (real, post-tax)<sup>100</sup>

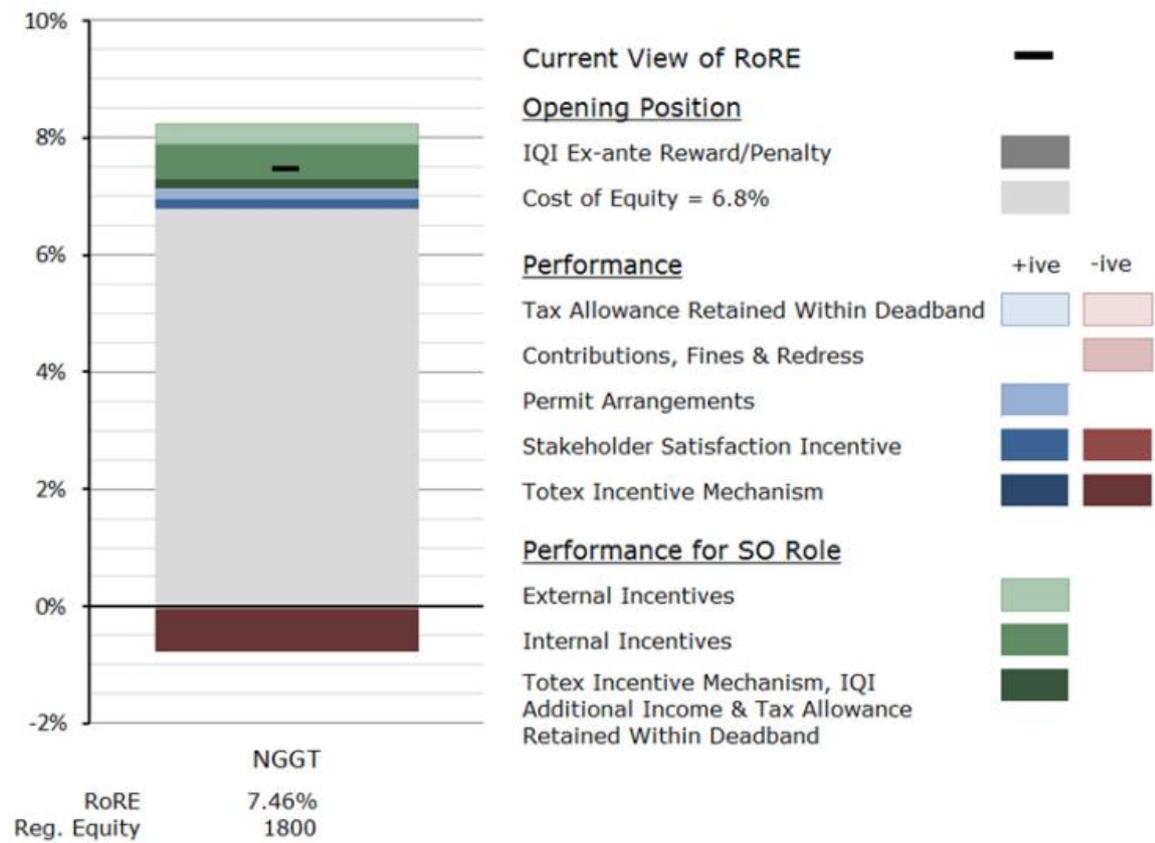
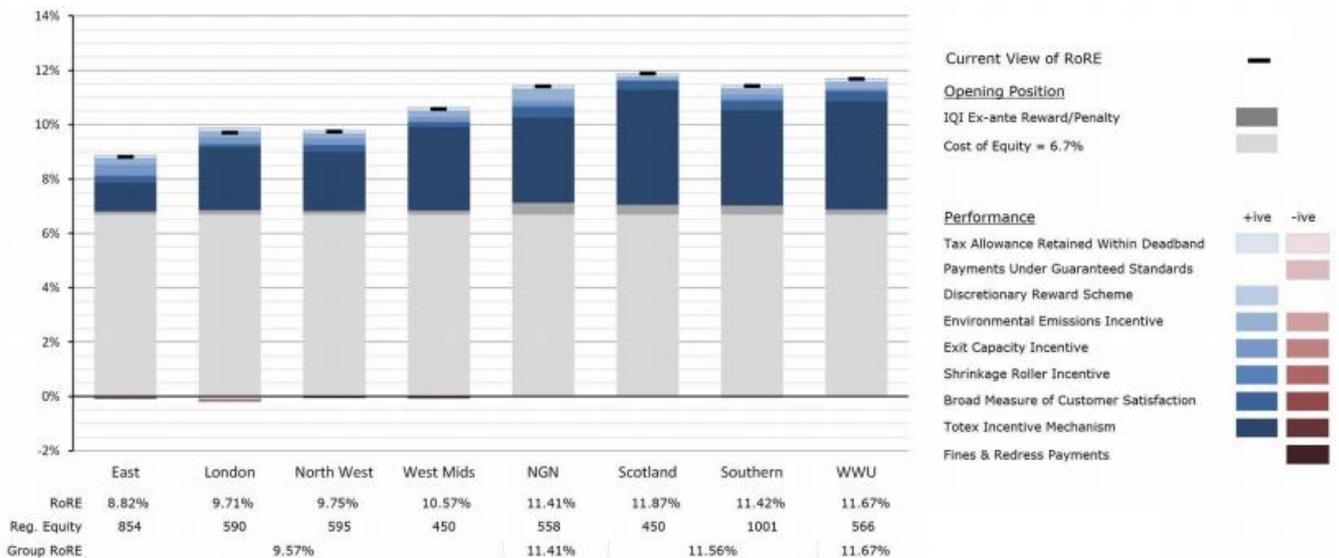


Figure 26: Forecast eight-year RIIO-GD1 RORE (real, post-tax)<sup>101</sup>



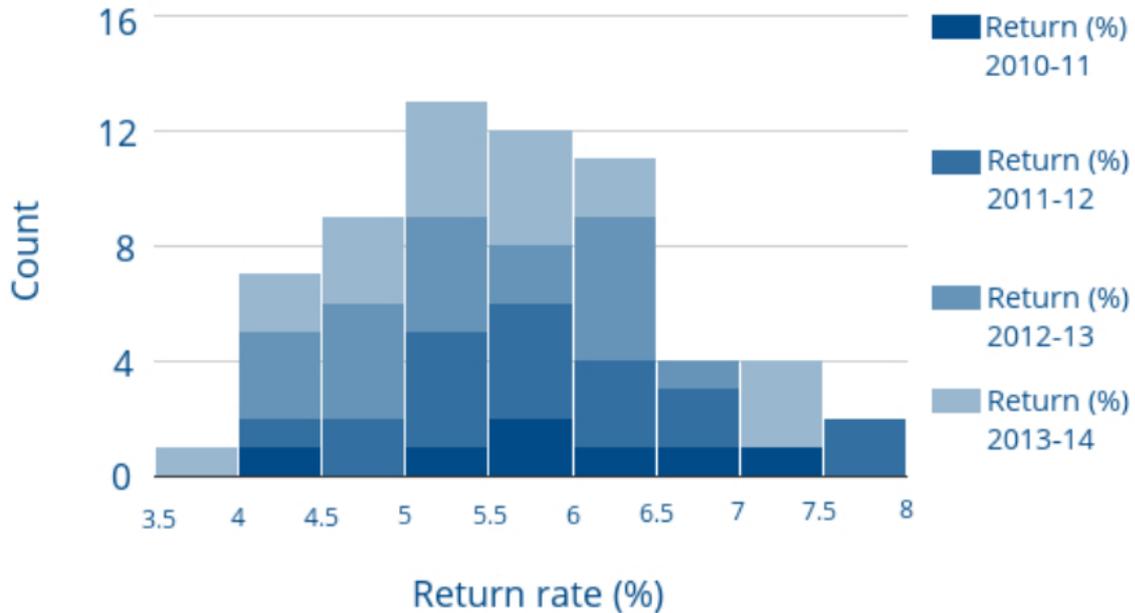
<sup>100</sup> [https://www.ofgem.gov.uk/system/files/docs/2017/12/riio\\_gas\\_transmission\\_annual\\_report\\_2016-17\\_0.pdf](https://www.ofgem.gov.uk/system/files/docs/2017/12/riio_gas_transmission_annual_report_2016-17_0.pdf)

<sup>101</sup> [https://www.ofgem.gov.uk/system/files/docs/2017/12/riio-gd1\\_annual\\_report\\_2016-17.pdf](https://www.ofgem.gov.uk/system/files/docs/2017/12/riio-gd1_annual_report_2016-17.pdf)

**Water sector**

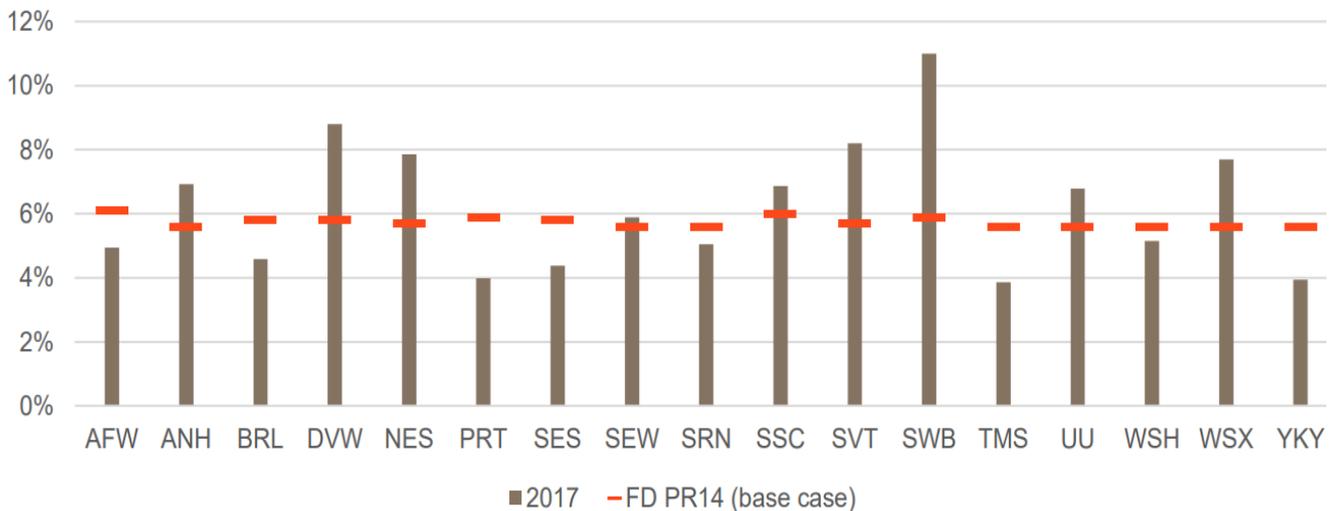
In May 2015, Citizens Advice published the following research on the water sector:

**Figure 27: Citizens Advice, distribution of water company annual returns, 2010-2013<sup>102</sup>**



Ofwat has also published information on outperformance in the water sector:

**Figure 28: Ofwat, average annual RORE<sup>103</sup>**



The Ofwat evidence may indicate that the distribution of returns in the water sector is more balanced than the energy sector.

<sup>102</sup> [https://www.citizensadvice.org.uk/Global/Public/Corporate%20content/Publications/ManyHappyReturns-NewBrandEdition%20\(2\).pdf](https://www.citizensadvice.org.uk/Global/Public/Corporate%20content/Publications/ManyHappyReturns-NewBrandEdition%20(2).pdf)

<sup>103</sup> See page 12 here: <https://www.ofwat.gov.uk/wp-content/uploads/2017/11/Monitoring-financial-resilience-2017-Report.pdf>

The National Audit Office (NAO) also presented outperformance in the water sector per Figure 29 below:

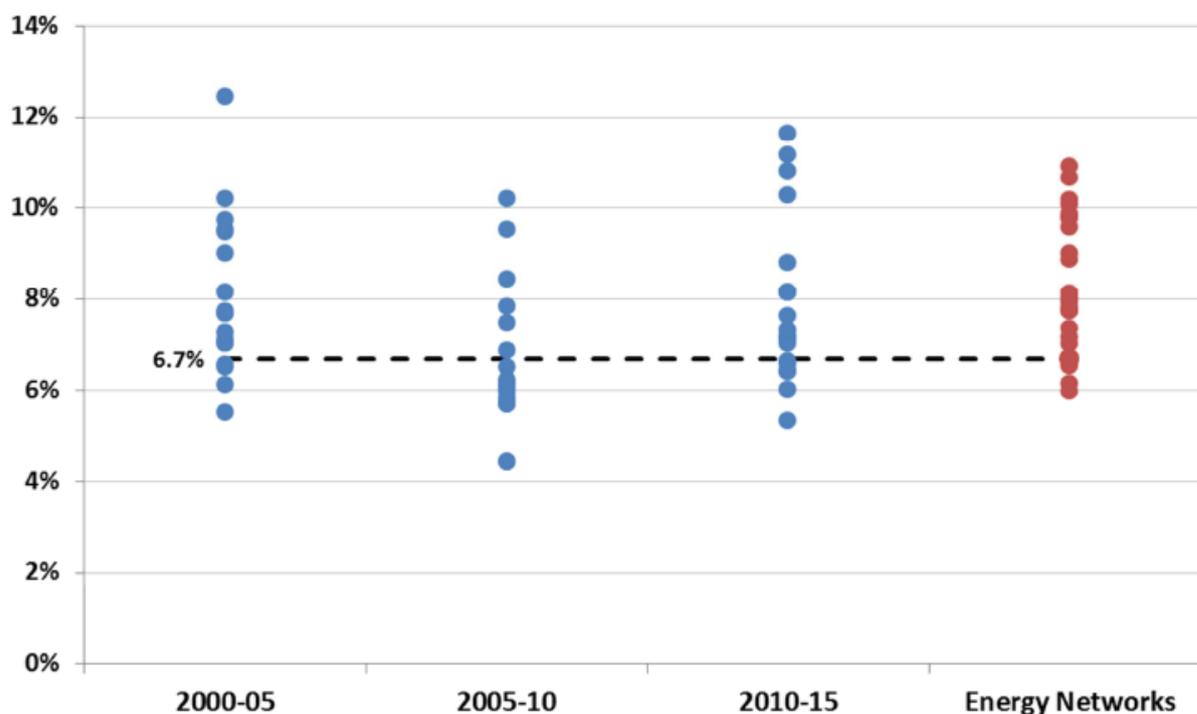
**Figure 29: NAO, comparison of allowed and observed returns<sup>104</sup>**

Company	Water company average return on regulatory capital value <sup>1,2</sup> (%)	Ofwat's allowed return on regulatory capital (%)
Anglian	4.9	5.1
Dŵr Cymru	5.3	5.1
Northumbrian	5.7	5.1
Severn Trent	6.1	5.1
South West	5.3	5.1
Southern	3.7	5.1
Thames	5.2	5.1
United Utilities	5.3	5.1
Wessex	6.4	5.1
Yorkshire	5.0	5.1
Affinity	6.2	5.3
Bournemouth	7.2	5.5
Bristol	4.6	4.9
Dee Valley	6.5	5.5
Portsmouth	4.1	5.5
South East	6.0	5.3
Sutton & East Surrey	6.0	5.5
South Staffs	6.3	5.5
Average return for water and sewerage companies	5.3	5.1
Average return for water-only companies	5.9	5.3
<b>Average return for water sector</b>	<b>5.3</b>	<b>5.1</b>

However, it is worth noting that there is some debate regarding how outperformance should be measured. For example, NERA argue that water sector outperformance reported by Ofwat is flawed. NERA's arguments support Ofgem's current belief that, on the balance of probabilities, investors will expect positive outperformance. NERA estimate the following level of outperformance in the water and energy sectors as follows:

<sup>104</sup> See page 30 here: <https://www.nao.org.uk/wp-content/uploads/2014/07/The-economic-regulation-of-the-water-sector.pdf>

Figure 30: NERA estimates of water and energy company cost performance<sup>105</sup>



NERA note that:

“An alternative source for water companies’ historical RORE performance since PR99 can be found in Ofwat’s PR14 risk and reward guidance document: [https://www.ofwat.gov.uk/wpcontent/uploads/2015/11/gud\\_tec20140127riskreward.pdf](https://www.ofwat.gov.uk/wpcontent/uploads/2015/11/gud_tec20140127riskreward.pdf) (page 42). Ofwat’s analysis shows greater RORE variation than our figures. However, it is not clear to us that Ofwat’s RORE data is valid. It appears that its analysis shows the high/low RORE variation observed in any single year, and therefore the figures are therefore likely to be substantively affected by capex timing as opposed to out or underperformance per se, and are therefore a flawed measure of shareholder return. By contrast, our data takes performance over the whole regulatory period.”

<sup>105</sup> See SGN’s response to March consultation here: [https://www.ofgem.gov.uk/system/files/docs/2018/06/gdns\\_responses\\_riio-2\\_framework\\_consultation.zip](https://www.ofgem.gov.uk/system/files/docs/2018/06/gdns_responses_riio-2_framework_consultation.zip) NERA set out the returns based on an assumed allowed return of 6.7% real return on equity for direct comparison with GDN returns for RIIO-GD1.

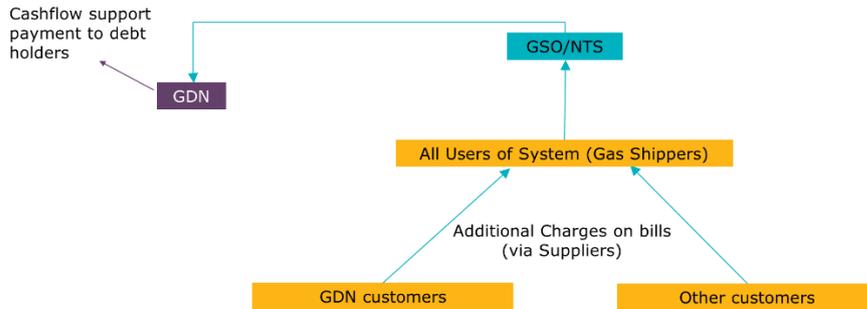
## Appendix 5 - Cashflow floor schematic<sup>106</sup>

This schematic is provided for illustrative purposes only to assist consultees.

### Cashflow Floor Schematic

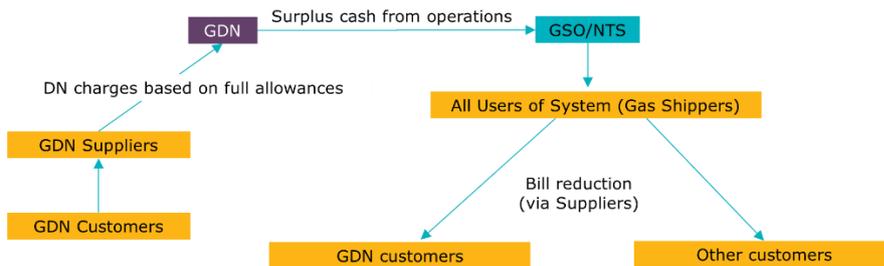
**Step 1**

- Cashflow shortfall identified via cashflow floor ('CFF') process
- Cash Top-Up ('CTU') payment made by all sector customers to GDN via GSO/NTS and Suppliers



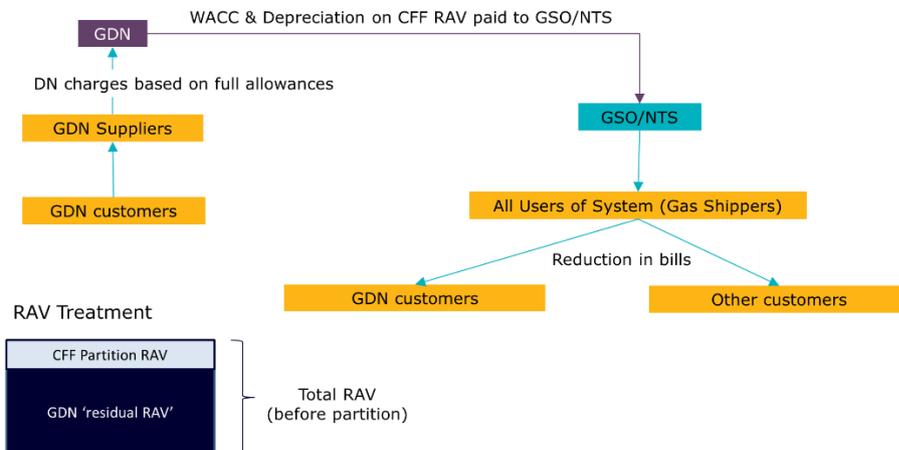
**Step 2**

- GDN starts repayment from surplus cash
- GDN collects full distribution network charges but pays operating surplus to GSO/NTS
- GSO/NTS reduces charges to all customers
- Continues until CTU fully repaid or Step 3



**Step 3**

- Company fails to repay 100% required after [10] years, leading to CFF Partition RAV for amount of CTU still owed by GDN
- GDN charges still based on full RAV but GDN pays GSO an amount equal to WACC + Depreciation on CFF Partition RAV
- Used to reduce ongoing bills of all customers



<sup>106</sup> Schematic provided for Gas sector only.