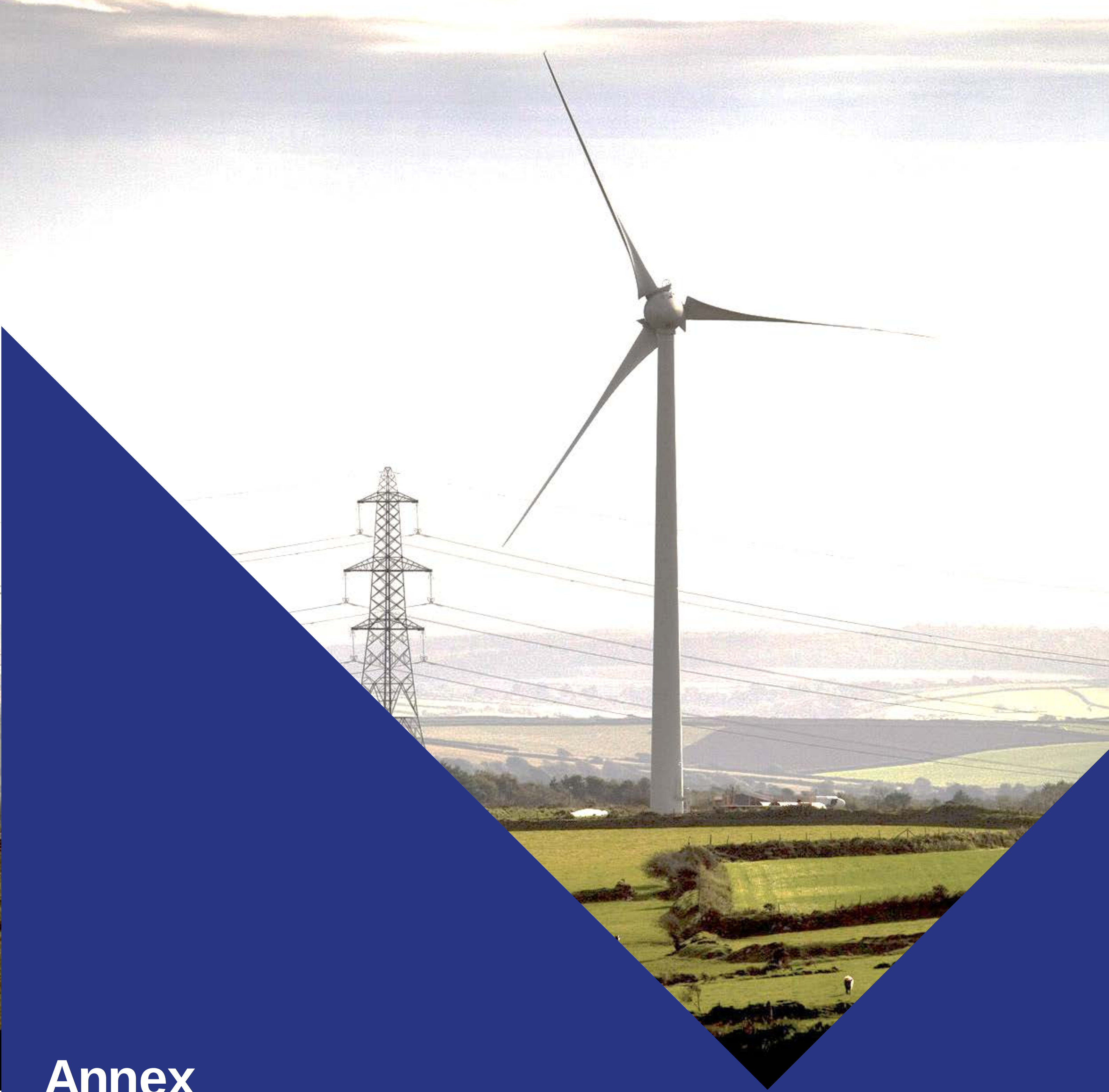


Annex

NGET_A15.01 – Finance Annex

December 2019

As a part of the NGET Business Plan Submission

nationalgrid

nationalgrid

RIIO-T2

nationalgrid
Electricity Transmission

NGET_A15.01 – Finance Annex

How our plan should be financed
(December 2019)

Submission annex 2019

Executive summary

We have based our business plan and financial framework on the application of core RIIO principles, principles which have provided a strong platform to incentivise companies to innovate, think large scale and discover what is possible. We set out the principles we have adopted in Section 3 which maintain those strong foundations whilst addressing the areas that we recognise require improvement.

In developing our proposals, we have reviewed evidence from a range of stakeholders including equity investors and analysts, credit rating agencies and a range of non-investor stakeholders including our customers and Citizens Advice, details of which are included in Section 4. We have reflected our stakeholders' views in the development of our plan and our approach to assessing financeability requirements, as set out in Section 5. As well as targeting appropriate credit metric ratings to ensure credit worthiness in an uncertain period we have given equal weight to equity financeability to ensure adequate levels of investment can be secured.

During the next price control, we are proposing a major programme of infrastructure investment. Our draft plan indicates the scale of investment in RIIO-2 has annual baseline totex ranges from of £1.3bn to £1.6bn, totalling £7.3bn including real price effects, across the 5-year price control, as explained in Section 6. We expect that funding for new expenditure will come primarily from revenues, new debt and re-invested equity dividends.

The objective of the financial package is to ensure that this investment can be financed, by a combination of debt and equity, as efficiently as possible by meeting investor expectations. Section 7 combines our principles and stakeholder engagement outcomes with empirical evidence to explain our proposals to achieve this objective. Key to this are our working assumptions of 6.5% (real relative to CPI) for allowed equity return and a 15-year tracker to set allowed debt funding.

Use of an appropriate return is important to the resilience of the energy sector as a whole, but nowhere is it more pronounced than in transmission where the uncertainty and complexity of investment required, and the scale and pace of market disruption is markedly higher than in other sectors. We have also seen growth in the cyber threat to our assets and the risk of political intervention in our operations over the last few years in particular. These are risks which as a network we are best placed to manage because our customers and consumers do not have the ability to mitigate. Our proposal provides a fair, equitable return which is lower than RIIO-1 but reflects the nature of risk we manage.

We have tested Ofgem's framework including sensitivity scenarios against our definition of financeability and to ensure an appropriate balance is achieved between investors, consumers and customers. Section 8 outlines the results of our preliminary financeability assessment. We test the actions required to resolve financeability issues under Ofgem's package and assess the sustainability of these actions. We also test our proposed package against the same financeability definition.

Equally important to the investor proposition is the impact for those that pay energy bills, as outlined in Section 9. Our plan results in a broadly flat revenue profile and customer tariff before inflation compared to RIIO-1 and a declining consumer bill profile.

1. Purpose of the Finance Annex

This annex is for stakeholders who require a more detailed understanding of how our business plan will be financed. The purpose of the annex is to:

- consider the overall financeability of the plan using Ofgem's working assumptions;
- explain how we arrive at our proposed financial package and how it alleviates financeability concerns; and
- set out the energy bill impact under Ofgem's working assumptions and our proposed framework.

Within this annex, our analysis is based on our final business plan submission.

2. Introduction

We have worked with our stakeholders to build a business plan that reflects their expectations and delivers the services they want. Our expertise in delivering a safe, reliable network will be key in this period of energy transition where we will need to be proactive and responsive to changes in the way the network is used. We are making new and different decisions so that our networks enable the move towards a Net Zero economy and do not become an obstacle to delivery.

To manage this, we are proposing a major programme of infrastructure investment which needs to be funded through a combination of debt and equity investment, at the most efficient proportions. The financial package must provide the funding and incentives required to compensate investors and deliver the investments required. At the same time, we ensure our allowed revenues and return are appropriately balanced for both the investor and consumer propositions.

In evaluating the T2 financial package:

- we consider the RIIO principles which we regard as key to delivering a plan that meets investor and consumer requirements over the long-term;
- we take into account stakeholder views on how our plans should be financed and how they will assess the value of their investment, taking into account the implications for customer and consumer bills;
- we use our principle-based approach, initial stakeholder feedback and empirical evidence to inform our basis of assessment;
- we assess the financeability of our business plan under Ofgem's working assumptions and our proposed financial package; and
- we test the impact of our plan on the average household bill against our objective of achieving a sustainably low bill level and the tariffs which are charged to our customers to ensure transparency and predictability.

3. Regulatory context

The price control framework is set on a notional basis for a notional standalone network. An appropriately balanced financial framework is key to current and future consumers being fairly charged for the network they use and the services they receive. Careful assessment and calibration of the framework enables a balance to be struck between consumers benefitting from sustainably low bills and incentivising continued investment in long-term assets which will provide benefits over many years.

The T1 framework provided a strong platform and has worked well in driving a range of network behaviours which have benefitted both current and future consumers by incentivising companies to innovate, think large scale and discover what is possible. The RIIO framework has adapted well to protect consumers as the energy system has changed. For example, volume driver uncertainty mechanisms have worked well to automatically adjust our allowances as customer driven connection and reinforcement work have changed from the baseline envisaged. In addition, a range of re-openers have adjusted our allowances for specific categories of uncertain costs, which overall has led to a significant reduction in baseline allowances set at the start of the T1 price control and contributed towards a lower bill for consumers. The T1 framework has also provided strong incentives for us to manage risks effectively and to deliver improved service levels. Over the T1 period, these improvements are expected to deliver a £800m[1] saving to consumers, savings which will also be embedded into future price controls so reducing costs for consumers in the long term. Our shareholders have also benefitted through the same mechanisms by additional return on their investment.

The fundamental financial principles of RIIO-1 which contributed to driving the consumer benefits and network behaviours should be retained within the RIIO-2 framework. However, we acknowledge there are gaps and imperfections in the current framework which have led to the perception of windfall gains and losses which has led to concerns over the legitimacy of the level of returns reported by networks under RIIO-1. It is appropriate for the framework to evolve to address these concerns through improvements in the design of the next price control, whilst maintaining core RIIO principles which focus on incentivisation, innovation and outputs.

In developing our financial proposal, we have adopted the following principles which are a combination of those which worked well in the first RIIO price control and address the areas which require improvement:

Balances risk and reward: *risks best managed by networks are not passed to consumers*

The financial framework needs to balance risk and reward fairly between consumers and network companies with risks remaining with networks where they are best placed to manage that risk.

Identifying the key risks borne by networks and potential outcomes at the start of the price control will be a significant step to improving transparency of returns reported in the T2 period. Establishing and appropriately allocating the significant risks is also of direct benefit to consumers. Reducing risks for networks can reduce the cost of capital, and therefore short-term consumer bills. However, limited risk for networks or inappropriate transfer of risk to consumers creates little incentive or financial capacity to control costs because of the limited opportunity to retain benefits from efficiencies and innovation. This will ultimately drive higher long-term consumer bills. To avoid this, the framework needs to allow a return which reflects market conditions and the risk landscape. This will provide the financial

[1] Based on RRP18

capacity needed for the networks to be incentivised to take the additional risks required to facilitate energy transition.

Regulatory commitment and stable regime: *to keep financing costs low for consumers*

It is reasonable for equity investors to expect returns which are broadly stable over time so that returns which were considered appropriate at the time of investment would still be considered appropriate now and in the future. Unpredictability increases risk perception, placing upward pressure on the cost of capital. This does not mean that financial parameters should remain unchanged from the previous control. The financial framework should be set using transparent and replicable methodologies which are also considered for their ongoing application in future controls.

Takes a long-term sustainable approach: *to ensure investment is recovered fairly from both current and future consumers*

Financeability is not just a consideration of short-term liquidity ratios but considers the long-term sustainability of the company's financial position which is important in safeguarding future investment. We consider trends across several price controls. This helps us to avoid short-term fixes to address immediate cashflow issues that might create financeability problems in the future.

Strong incentives: *so the networks demonstrably strive to deliver benefits for consumers*

The T1 price control introduced an incentive-based framework which supports and encourages longer term decision making best aligned to the changing nature of network services and facilitates responses to asks which as yet cannot yet be defined. An effective incentive framework ensures delivery of services at the price and levels consumers are willing to pay by aligning their interests with those of investors. Networks are encouraged to seek out lower costs, through the potential to share benefits, whilst still being held to account for delivering the outcomes they have committed to with clear consequences of non-delivery.

These principles underpin the decisions and judgements we make when assessing the financial package.

As the framework develops further, we also focus on transparency of performance and bringing clarity as to how networks have delivered for the consumer.

Continuing to define outcome and outputs against which we are expected to deliver maintains the principle of network accountability. Clarity over outcomes and targets at the start of the price control allows transparent monitoring of performance maintaining consumer confidence that we have delivered value for money.

4. Stakeholder evidence

We have engaged with equity investors through individual meetings and our annual investor survey. Coupled with analyst commentary the emerging themes at this stage in the T2 process are:

- stability of dividends is of fundamental importance to equity investors
- it is recognised that the significantly lower allowed return proposed by Ofgem could decrease the ability to attract equity finance
- political and regulatory risk is seen as increasing compared with the lead up to the T1 period.

The three main credit rating agencies have published a number of documents commenting on the progress of the RIIO-2 framework.

All agencies raise concerns over the pressure on credit metrics caused by Ofgem's proposed decrease in returns, with Moody's implementing downgrades as a result in specific cases.

We have also engaged broader stakeholders on elements of the T2 financial package but given the complex nature of this topic, our engagement was very targeted.

Our approach to financeability assessment has been developed and will continue to be informed by the evidence we gather from our stakeholders.

4.1 Introduction

The financial parameters which make up our financial package proposal are initially derived from principle-based arguments and supported by empirical evidence. We have then taken real world considerations into account when sense checking the package.

Our stakeholder engagement to date has focussed on our three key groups; equity investors who receive a return through dividends and the capital growth of the business as reflected in the share price, debt investors who receive interest on and ultimately a repayment of their investment and consumers. We have used the evidence obtained through this process to establish proposals that align with consumer and investor expectations, the objective being to ensure our network remains a fair and attractive investment proposition for the level of risk borne by investors and that key elements of our proposals are supported by consumers. This allows major capital programmes to be financed by a combination of equity and debt as efficiently as possible.

As well as informing our financial proposals, we also take equity and debt investor feedback into account in developing a methodology to assess the financeability of the network.

4.2 Equity investors

Equity investors earn their return from both the dividend paid to them and the capital growth of the business as reflected in the share price. As a publicly listed company, we are in a position where we have a good understanding of our investor profile and what they consider to be a fair return. The investor base is broad and encompasses a wide range of ownership categories, from those who are considering long-term investments spanning multiple price controls to those shorter-term investors who are likely to sell down their stakes within three to five years.

As part of our ongoing investor engagement activities we regularly meet with investors to discuss the key strategic issues facing the business and have conducted c500 meetings in the past year. We have collated the views expressed by our investors with the feedback received from the seminar on our UK and US business in September 2018 and 2019, respectively, and during several site visits in both the UK and US to understand what it is our shareholders look for in return for investing in National Grid.

We also obtain feedback from the annual survey we conduct to get a further insight into equity investors thinking and expectations. Our August 2019 survey was conducted by Teneo who were selected based on their expertise in such activity. The survey comprised detailed interviews on a range of topics, including those related to the RIIO framework. Teneo interviewed representatives from 18 leading institutions with over £8.0 trillion of global equity assets under management. The institutions represented just over 16% of National Grid's share register at the time and so comprised a significant proportion of our investor base.

The purpose of the survey was to understand investors views with regard to:

- the political and regulatory environment
- the financial position of the utilities and how they make their assessment
- the application of resources, in particular their views on dividend policy

Quotations from the survey that are presented in this annex came directly from equity investors and do not represent Teneo's opinion. We have cross referenced the views received from investors with commentary from analyst reports and market reaction to regulatory announcements. The key themes arising from our equity investor engagement to date are:

- most investors consider the dividend fundamental to their assessment of National Grid with several stressing the importance of a sustainable growing dividend
- some investors specifically highlighted their concern that the lower returns proposed by Ofgem could weaken their investment, a position supported by analyst commentary which focusses on Ofgem's proposed returns being below expectations
- the political and regulatory environment emerged as a key concern in contrast to the lead up to RIIO-1 where the UK regime was considered "gold standard".

4.2.1 Dividend policy

For most investors, the dividend is fundamental to their assessment of National Grid. Utilities are seen as income stocks. Therefore, our ability to continue to pay and grow the dividend, and the potential rate of growth are priority considerations in investors' valuation of the stock, with some investors highlighting their use of a dividend discount model and the direct implications for them of changes in level of the dividend on the valuation. Several investors stressed the importance of a sustainable growing dividend to their investment case, and one interviewee stated that even a halt in dividend growth (as opposed to a cut) would make them question their holding. Others highlighted the importance of maintaining the dividend through regulatory cycles.

"What we are effectively looking for from Grid and a few others is to form a bit of a yield base for the portfolio and keep that yield ticking over. If we thought dividend growth was going to grind to a halt then that would have a material impact on the income of our portfolio and would be quite negative for our holding in Grid."

Source: 2019 investor survey conducted by Teneo

"Their dividend policy is fine. That focus on maintaining the dividend is good. I'd like to emphasise that dividend continuity through various rate cycles is key to shareholders like us."

Source: 2019 investor survey conducted by Teneo

"The dividend is very important to us. We look at stocks on a dividend discount model. It is our primary valuation tool, so dividend is absolutely critical."

Source: 2019 investor survey conducted by Teneo

"The dividend is the most important part of the investment thesis at National Grid, and a clear dividend growth policy is really critical."

Source: 2019 investor survey conducted by Teneo

As well as referencing the prominence of the role of the dividend within their own funds investors also highlighted the importance of the dividend as a discipline on management

"The dividend of course plays an essential role for those running income funds. Then there is also the signalling aspect of it. If you have to cut your dividend it suggests that things aren't completely OK with the business."

Source: 2019 investor survey conducted by Teneo

"Dividends are key for us and also represent a good discipline. If you feel you have to pay dividends because of the commitment to shareholders, you are less likely to do anything stupid with any spare capital you may generate."

Source: 2019 investor survey conducted by Teneo

Many also see it as a demonstration of regulatory commitment to provide a return to shareholders. In the context of a regulated utility, a dividend is not just a return to current shareholders but it is a visible and credible demonstration to investors that the regulatory regime is stable and will provide a return to investors. Investors are therefore trying to assess the implications of lower returns on our dividend policy.

"There have been some concerns as to whether the dividend policy is going to be sustainable after implementation of RIIO-2. I wonder how the company will be able to sustain the policy with RIIO-2 coming into force. This is the main question."

Source: 2019 investor survey conducted by Teneo

In total all respondents to our investor survey stated that the dividend was an important part of their investment decision.

4.2.2 Financial position

Many equity investors use credit metrics as a key part of their assessment of financial position, with measures of return, cash flows and dividend cover also used widely.

The majority of the sample still viewed the current level of regulatory gearing as appropriate and saw the balance sheet position as sound.

“It's pretty close to optimal in terms of gearing. I don't have any issues.”

Source: 2019 investor survey conducted by Teneo

“They have a strong balance sheet. That is key. They have a capital allocation policy that is very well thought out, and it is something that we like.”

Source: 2019 investor survey conducted by Teneo

However, RIIO-2 uncertainty was mentioned by interviewees, with some believing that the balance sheet and credit rating could come under pressure based on the current RIIO-2 proposals.

“It is time to hunker down and prepare their balance sheet for the eventual hit from RIIO-2.”

Source: 2019 investor survey conducted by Teneo

“Things are going to get tougher under RIIO-2, and that will put us in uncharted waters. We will have to wait and see what they can do. They may need to take actions to support the balance sheet.”

Source: 2019 investor survey conducted by Teneo

4.2.3 Political and regulatory environment

There was an almost unanimous view that the current political and regulatory environment remained highly uncertain. The most commonly cited themes included decreasing allowed returns and overall ambiguity about the outcomes of RIIO-2.

“We are of the hope that regulators and policymakers come to the realisation that they need to incentivise investment in UK electricity and gas infrastructure. Obviously, that is highly relevant to National Grid. The reason I mention that is that the regulatory environment here in the UK does not in our mind properly incentivise publicly owned utilities - putting aside completely any discussion about a Labour government and the prospect of nationalisation.”

Source: 2019 investor survey conducted by Teneo

A shift in return expectations alone would likely impact investor appetite but when combined with the heightened political risk there is a perception that since the RIIO-1 price controls were determined in 2012-14, National Grid and other regulated utilities have operated in an increasingly uncertain environment. The focus on political risk has changed over time, with investors identifying political tensions over the UK’s withdrawal from the EU (Brexit) and the Labour Party’s proposals to renationalise regulated utilities as key risk factors for National Grid’s valuation in recent periods.

A common view was that politics and regulation were no longer as independent as in the past and any change in the political landscape would eventually have an impact on the regulatory regime. While regulators are established by statute to further their duties independently of political intervention, they do not operate in isolation from the wider political context. Therefore, it is possible and even likely that the regulatory uncertainty is influenced by the political environment. This was also reflected in the answers of respondents, who spoke about nationalisation as an outcome of a Labour Government.

"As a utility or infrastructure investor, or for someone who is managing a diversified portfolio, and seeking something more defensive, National Grid ticks the boxes. The problem now is that the driver of that consistency has been regulation and politics, and the stable political backdrop. There is nothing fundamentally wrong with what National Grid is doing in terms of strategy or capital allocation, but the political and regulatory environment in which they are operating is making National Grid fundamentally more volatile than they were under RIIO-1 or prior to Brexit."

Source: 2019 investor survey conducted by Teneo

"The company's biggest challenge in my mind is an exogenous one. It is the quite difficult regulatory environment that it's faced with in the UK."

Source: 2019 investor survey conducted by Teneo

"The negatives are that there are a lot of factors that the company cannot control in the political and to some extent regulatory environment. There are discrete points of risk with - in the case of nationalisation - potentially binary outcomes."

Source: 2019 investor survey conducted by Teneo

"At this point, the main concern is in the UK. I am comfortable with the regulatory environment in the US. In the UK, there are two fronts. One is on the political side. Brexit is a factor, but the risk of nationalisation is something we look at closely. The other one, of course, is the regulatory environment, particularly the RIIO-2 framework parameters and the pending company responses. Those are the ones we spend a lot of time thinking about."

Source: 2019 investor survey conducted by Teneo

Investors also expressed the view that investment decisions are global with investors weighing up the relative merits of the UK political and regulatory environment against other jurisdictions globally.

"The important thing for regulators to understand - and the company knows this - investment decisions are increasingly global, and that when it comes to regulated businesses we have the option of investing in various jurisdictions with various regulatory environments attached to them, many of which are far superior to what we have here in the UK."

Source: 2019 investor survey conducted by Teneo

"They have UK assets, and the UK regulatory environment has historically been a very constructive place, and we are still trying to maintain that. I think that Ofgem is independent. I am starting to have doubts, but I do not yet consider the UK market to be one which I need to avoid from a regulatory standpoint."

Source: 2019 investor survey conducted by Teneo

These views can be contrasted against earlier investors surveys where the UK regulatory regime was considered to be 'gold standard'. For example, our 2012 investor survey, ahead of the T1 business plan submission, noted that "investors value the UK regulatory regime and rank it highly relative to other countries. They feel there is a lot of transparency and a track record of regulatory consistency."

4.2.4 Earnings profile

Complexity and transparency of reporting and performance was also raised by some investors.

With the introduction of RIIO, performance reporting has become ever more complex. Growing focus on annual RRP statements, interim and half year announcements, RNS statements and MOD adjustment announcements all appear at different times of the year from either ourselves or Ofgem with subtly different perspectives.

To maintain investor confidence in T1, we placed less external emphasis on earnings and instead focussed investors on our economic performance through the introduction of a new Return On Equity (ROE) performance metric. ROE is more stable than earnings under RIIO and ensures a closer link to underlying performance of the business, something which has become disconnected from our IFRS earnings position. However, investor feedback suggests there is still more to be done to simplify and improve the consistency of publications.

"Many of the companies that we focus on give better guidance on the trajectory of earnings, rather than just the asset growth."

Source: 2019 investor survey conducted by Teneo

There has also been an increasing focus on cost of active managers and a rise in metric driven lower cost "quant" funds. Many of these funds will apply earnings based screening tests. There will, therefore, be a focus on earnings trend during the regulatory period as well as the change in earnings between the T1 and T2 periods.

4.3 Analyst commentary on the RIIO-2 regulatory process

There has been considerable City reaction throughout the consultation process with much focus on the sector specific consultation and decision publications. The quotations below are taken from analyst coverage and highlight concerns over regulatory uncertainty, in particular, the sharp decline in allowed return. The analysis commentary draws out recent share price movements as indicative of reduced investor confidence in the stability and predictability of the regulatory regime. The small uplift in returns set out in the May decision documents has not alleviated these concerns.

We include comments to illustrate general sentiment and include a wider range of analyst commentary at Appendix A1.

4.3.1 Response to sector specific consultation document

The 9.2% decline in share price on the 18th December 2018 when the sector specific consultation was published was the largest decline on a single day in recent history, indicating the scale of surprise in the market. Analyst coverage at the time commented on this decline in reference to expected increase in volatility and risk to National Grid's stock.

"The stock was down 9% on today's Ofgem methodology update. We see this regulatory uncertainty discounted in the shares here (we don't expect more details from Ofgem for 6 months); on a 1.5x US rate base for National Grid's US business (broadly in line with US peers), its UK RAB is trading at a c.15% discount to RAB."

Ofgem's conference call reiterated that investors need to prepare for lower returns, and that customers are at the heart of RIIO-2. However, the National Grid stock price reaction suggests increased risk to the sector (and ultimately cost to consumers) at a time of macro and policy uncertainty in the UK."

Source: Morgan Stanley – Nick Ashworth, December 2018

4.3.2 Response to sector specific decision document

Analyst coverage since the publication of Ofgem's sector specific decision document in May 2019 has focussed on returns and can be summarised as a step in the right direction but still lower than market expectations.

"*Bottom line—some positives, but base equity return allowances still very weak: OFGEM this morning published their RIIO-2 sector methodology for the transmission (gas and electricity) and gas distribution price controls, covering April 2021-March 2026. The document is a step in the right direction for investors, but headline returns on equity still appear low. We think that Labour's nationalisation policy has indirectly put the industry and regulator's focus upon returns*."

Source: Credit Suisse – Mark Freshney, May 2019

4.4 Debt investors

Debt investors are primarily interested in credit ratings as they provide a view of the credit risk of the networks and their ability to meet loan principal and interest repayments, as an indication of the probability that a company may default on its loan obligations.

The credit rating is also of importance to consumers and equity investors. An investment grade credit rating indicates a low risk of a default, reducing the cost of borrowing to the network and ultimately the cost to the consumer. The ability to service debt is also indicative of the risk borne by equity investors. Since equity financing is a greater risk to the investor than debt financing is to the lender, there can be increased cost of equity pressures if the risk of default is considered to be higher.

We have considered the view of the three main credit rating agencies (Moody's, Standard and Poor's (S&P) and Fitch) as set out in their responses to the RIIO-2 consultation and published notes:

- a note prepared by Moody's, '"Credit quality likely to weaken in RIIO-GD2 regulatory period",14 February 2019
- a note prepared by S&P, Ofgem's Proposed RIIO-2 Regulatory Framework Will Test U.K. Energy Networks', 20 February 2019
- a note prepared by Fitch, 'Ofgem's Credit-Enhancing Mechanisms Unlikely to Benefit Ratings', 28th February 2019

Common themes which have emerged to date are:

- all agencies consider Ofgem's proposed allowed returns to place considerable pressure on credit ratings with Moody's issuing some downgrades as a direct consequence
- there is concern that the focus on short-term debt financeability is at the expense of longer-term financeability and the equity investor offering
- many of Ofgem's proposed measures to improve financeability are unlikely to have the desired impact.

4.4.1 Credit ratings impact

While Moody's note considered the impact of Ofgem's proposals on Gas Distribution companies specifically, it has a clear read across to the other Gas and Electricity networks which are subject to the same regulatory regime. Moody's compared the total returns and cash returns proposed for RIIO-2 against RIIO-1, and noted that

"the RIIO-2 proposed returns are well below the total return (including indexation of the regulatory asset base) proposed for UK water companies in the price review process currently underway"

As a direct consequence, Moody's downgraded their rating of Wales & West Utilities Finance's Class A notes to Baa2 with a negative outlook and assigned a negative outlook to the Baa1 ratings of Scotland Gas Networks and Southern Gas Networks indicating their financeability concerns as a result of Ofgem's proposed returns assumptions. In a short note, published as a response to Ofgem's methodology decision[2], Moody's recognised the modest increase in Ofgem's working assumptions but again re-iterated the unfavourable comparison to proposed returns in the water sector for the 2020-2025 price control.

Unlike Moody's, S&P felt it was too early to assess credit impact on individual companies but also highlighted their concerns regarding the proposed decrease in returns;

"Overall, S&P Global Ratings expects U.K. regulated gas and electricity networks to find aspects of the new methodology challenging, particularly the reduction in the allowed cost of capital. The resulting reduction in revenues could erode the limited headroom on the networks' credit ratios and put the ratings on some networks under pressure"

S&P also made an observation regarding the impact of the proposals of the sector's overall attractiveness to investors which aligns with the evidence we have collated.

"Another key question is whether the proposed allowed rates will allow the sector to remain as attractive for investors as it is today. For instance, water companies are likely to operate with a WACC of 2.4%-2.6% in real RPI terms for the next regulatory period from April 2020 to April 2025, whereas other similarly strong regulatory frameworks in Europe may allow higher returns".

Fitch, like the other agencies, also focused on the impact of the proposed sharp cut in allowed returns

"In our view, the proposed reduction in allowed and expected returns would result in credit rating pressure for most of the issuers, since it has a direct negative impact on EBITDA and free cash flows."

[2] "Regulator signals smaller cut to allowed return, but many uncertainties remain", Moody's Investor Services, 30 May 2019

4.4.2 Short-term vs long-term financeability

Moody's clearly point out that, at the proposed levels of allowed returns, financeability of the networks relies solely on the CPIH transition. They clearly articulated that any improvement of short-term debt financeability through CPIH can only be achieved at the expense of equity financeability, as well as creating long-term financeability issues for both debt and equity

"…. pressure on near-term cash flows is largely offset, for the notional company, by the adoption of CPIH indexation, which increases cash (real) returns on RAV by 1 percentage point (an increase of 55-60%) and the notional company's AICR by more than 0.5x. Although this is a pure "speed of money" adjustment that will reduce future cash flow by an equivalent amount, we regard the change as credit positive as long as companies reduce distributions to maintain a stable path of net debt/RAV."

This view is supported by Fitch who point out that CPIH transition is favourable in the short term but negative in the long term;

"An immediate shift towards a lower inflation measure would boost real return, especially in light of the significantly reduced cost of equity allowance. This would aid financeability by up fronting cash flows, but could negatively affect longer-term credit strength"

This can be summarised as the CPIH transition being a short-term fix. The transition improves short-term debt financeability at the expense of equity financeability and potentially creates longer term financeability issues for both equity and debt.

4.4.3 Impact of Ofgem's proposed measures to improve financeability

Fitch commented on the measures Ofgem's have proposed that companies should take to improve financeability. These include lower dividends, equity injections, re-financing of expensive debt and the use of alternative capitalisation or depreciation rates.

"We view that the use of alternative capitalisation or depreciation rates would not help PMICRs and, therefore, financeability (please see "The Importance of Post-Maintenance Interest Coverage Ratios for Credit Analysis of UK Regulated Networks" published in January 2019).

We also believe that if the refinancing of expensive debt was economically advantageous, the companies would have already acted on it.

Finally, lower dividends and equity injections could leave companies facing a difficult choice between keeping current ratings or cash dividend distributions."

In summary, Fitch are identifying a concern that the majority of Ofgem's proposed company measures are either unlikely to improve financeability at all or may provide some support to debt but only at the expense of equity.

4.4.4 Stability of regime

Moody's comment specifically on Ofgem's use of the outperformance wedge, noting that

'the proposal to reduce allowed returns further [below the cost of capital] on the assumption that companies will outperform is a break with regulatory precedent' and *'we would regard it, if reflected in final determinations, as a credit negative divergence from established regulatory practice"*.

Although it is difficult to predict the outcome, this will be an input into Moody's assessment of the qualitative factors feeding into their ratings analysis, in particularly the 'stability and predictability of regulatory regime'. This component of the rating assessment is currently regarded as a Aaa rating because the regulatory framework is

"… well established (>15 years of being predictable and stable) and transparent (well established regulatory principles clearly define risk allocation between companies and consumers and are consistently applied, with public or shared financial model)."

If Moody's were to lower their rating for this sub-category, it would require networks to meet higher financial ratio thresholds to achieve a given rating. A recent example of this is Moody's response to Ofwat's April 2018 PR19 consultation, where the 'stability and predictability of the regulatory regime' category was downgraded from Aaa to Aa because the framework was considered to be a response to public and political pressures which undermined the track record of stable and predictable regulation[3]. In conjunction with this downgrade, the thresholds were raised for the company to achieve a particular rating for the core metric financial ratios.

Below is an exhibit from Moody's report, summarising Moody's previous guidance for the UK water companies at a given rating level, as well as the updated guidance given their revised view of the sector's business risk.

Figure A15.1: Moody's core ratio thresholds for water utilities

Exhibit 5

Moody's ratio guidance for the UK water utilities

Issuer Rating	Maximum RCV gearing (previous)	Maximum RCV gearing (new)	Minimum AICR (previous)	Minimum AICR (new)
A2	≤ 60%	≤ 55%	≥ 1.8x	≥ 2.0x
A3	≤ 68%	≤ 65%	≥ 1.6x	≥ 1.7x
Baa1	≤ 75%	≤ 72%	≥ 1.4x	≥ 1.5x
Baa2	≤ 85%	≤ 80%	≥ 1.2x	≥ 1.3x

4.5 Other stakeholders

We have also undertaken initial engagement with a wider non-investor stakeholder base including customers such as Centrica and Citizens Advice. Themes coming out of this engagement activity include the importance of predictability and transparency of charges, limiting volatility of charges as well as the absolute level.

4.5.1 Other stakeholder engagement on the financial package

We engaged stakeholders on elements of the RIIO-2 financial package (including the cost of capital and rates of return), but given the complex nature of this topic, our engagement was very targeted. Because of its technical nature we did not consider it appropriate to engage members of the public on this topic and have instead chosen to engage with Citizens Advice in their role as consumer representatives. This approach was agreed with the Independent Stakeholder Group and used inputs from consumer engagement experts. In addition, we engaged our customers including Centrica, NPower and EdF (amongst others) on elements of our financial framework.

At the time of writing, our engagement with Citizens Advice included topics such as CAPM, the performance wedge, consumer bills and transparency of reporting. For example, Citizens Advice reviewed the material we published on consumer bills before we released it onto our website and their views influenced how we considered the cost of debt funding proposals. Over the next few months, we will engage further with stakeholders such as Citizens Advice and Centrica on the financeability analysis contained in this plan.

[3] https://www.moodys.com/researchdocumentcontentpage.aspx?docid=PBC_1124483 "Regulator's proposals undermine the stability and predictability of the regime" 22 May 2018

Also relevant here, is that we have engaged consumers on the acceptability of our plan, including the overall bill impacts which incorporate our proposed financial package. The results of this were that (for our draft business plan) 87% of consumers (household and business combined) found our plan and bill impact to be acceptable.

5. Assessing our business plan

We have taken the views and commentary of both equity and debt investors into account when developing our approach for assessing financeability.

Our initial assessment for equity investors focusses on yield and sustainability of the dividend. We reflect investors' expectations by giving evidence for:

- a dividend yield of 5% based on comparisons with regulatory and market comparators
- dividend cover of at least 1.5 in order to sustain a stable dividend.

In line with application in practice, we assess financeability using Moody's Regulated Electric and Gas Networks Rating Grid Methodology, and Moody's and Standard and Poor's core metrics. These form our primary tools to assess the credit rating of the notional and actual network and so, the debt investor proposition.

We have taken the views and commentary of both equity and debt investors into account when developing our approach for assessing financeability which we set out in this section. Ofgem's and networks' financeability duty and our initial analysis are covered in Section 8, Financeability assessment.

5.1 Equity financeability

Our investors have highlighted our ability to continue to pay and grow the dividend and the importance of a sustainable dividend as a priority. Ultimately, if return levels are not high enough there is a risk that investors will cease to hold National Grid stock as they see dividends placed at risk through lower revenues and structures which have little capacity to absorb any underperformance or financial shocks. Investors may then take the option to invest in other defensive stocks such as other utilities or tobacco who can pay a similar dividend and eventually give a better return. They may also follow other equity in moving away from the UK and into other regions.

The absence of a dividend increases the risk that investors will not receive a return commensurate with the risk of their investment. To continue to attract investment and reflect the delay in realisation of returns, the cost of equity would need to be higher which would increase the cost to consumers. To retain and attract investment we need to be able to pay a dividend yield which is comparable to equivalent investment opportunities and demonstrates stability in line with investor expectations.

On this basis, we regard dividend yield as an input assumption which has a direct impact on the equity investors' required return. We reference both the dividend yield assumption used in the T1 framework and market information and so consider a nominal dividend yield of 5% appropriate.

We also review the earnings-based equity metrics set out in Ofgem's Financeability Assessment Guidance; regulated equity/EBITDA and regulated equity/earnings. These ratios are similar to a price/earnings ratio which can be used as an indicator of the earnings per share profile. However, they are more difficult to use as a performance benchmark as they are less comparable than dividend yield and dividend cover and do not have an independent methodology or recognised thresholds.

5.2 Dividend payout

As outlined above the level of dividend pay-out is closely monitored by our shareholders and the wider investment community to assess its sustainability and relative attractiveness within our peer group and relative to the wider equity market. Measures that are used to assess the relative attractiveness of a company's dividend policy include the dividend yield and dividend cover.

5.2.1 Historic dividend yields

Within our peer group over the last 10 years, yields have varied due to changes in market values as well as changes in dividend policies. However, there are some important observations that can be made:

- the average yield in the utility sector has been higher than for that of the FTSE100, 5.3% and 4.2% respectively;
- the lowest dividend yield across the peer group analysed was 3.3% for Severn Trent; and
- the range of the second and third quartiles across the peer group was reasonably narrow at between 4.0% to 6.7%.

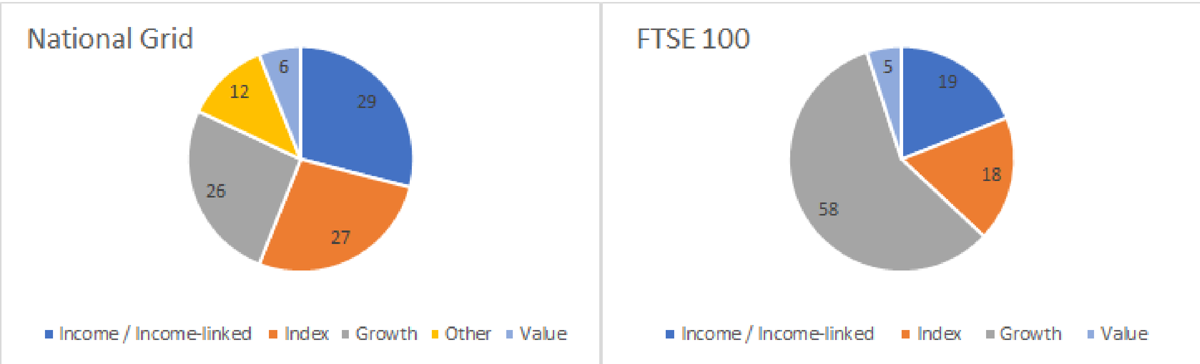
Figure A15.2: UK regulated utility and FTSE100 dividend yields since January 2009

We have considered a number of factors in confirming that a peer group analysis is a reasonable approach to determining an appropriate dividend yield.

Firstly, we disaggregate our shareholder base by geography and investment style to confirm that our shareholder base is representative of the wider market. If this is the case, then we can conclude that there is not another pool of investors willing to take a lower dividend yield (for the same lower growth) in the market who are not currently investing in National Grid.

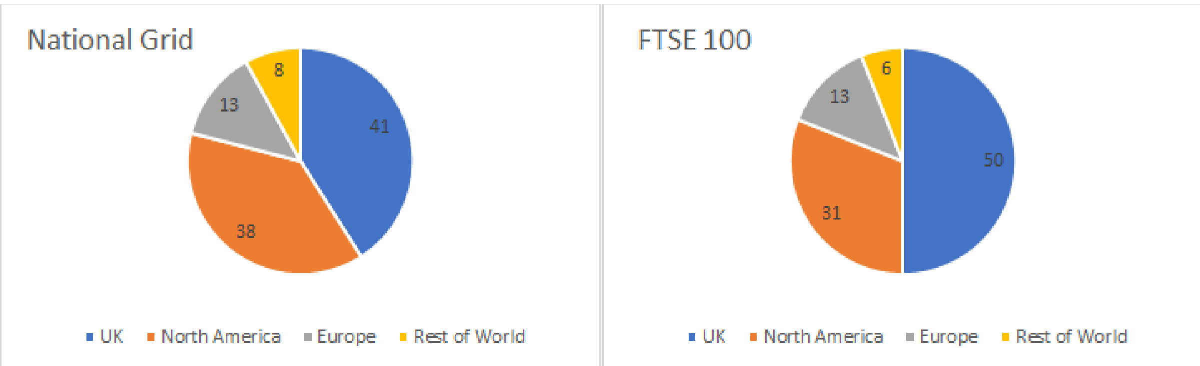
The charts below show a consistency with the FTSE100. The larger proportion of income and income-linked investors in National Grid's share register shows a preference for dividend income over asset growth, consistent with the lower growth that is available to utility investors relative to the wider FTSE100. The move to a CPIH indexed price control will further reduce the level of asset growth within the sector, bringing even greater prominence to the dividend within the investor proposition.

Figure A15.3: National Grid and FTSE100 investors by investment style



Note that 'other' within our shareholder base includes retail investors

Figure A15.4: National Grid and FTSE100 investors by geographic location



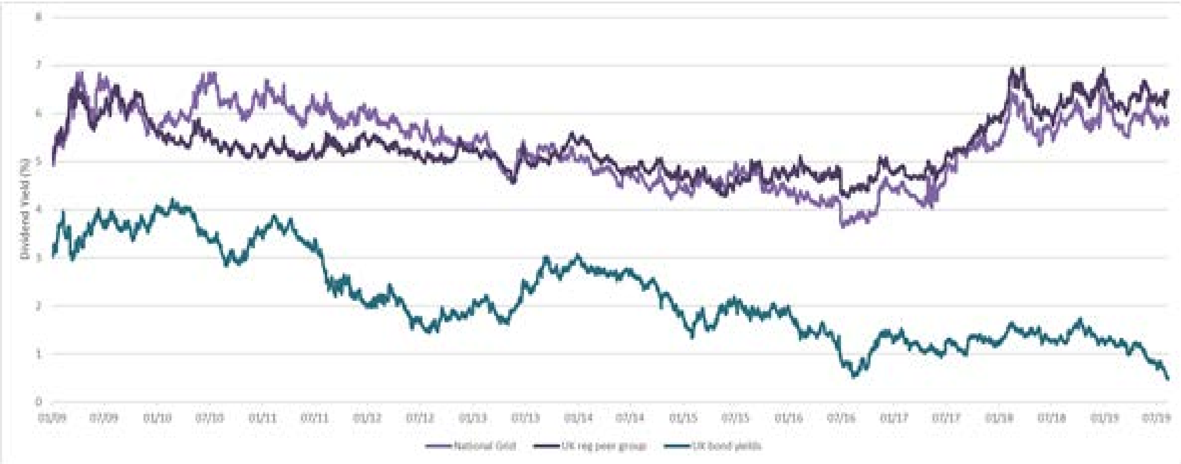
Secondly, we calculate a pay-out ratio adjusted dividend yield. The pay-out ratio represents the proportion of earnings received in cash through the dividend, with the remaining earnings retained to fund asset growth. The FTSE100 pay-out ratio of 51% implies that FTSE100 investors receive a greater proportion of their return through asset growth, relative to utility companies whose pay-out ratio is 75%. Adjusting for this difference in the investor proposition the FTSE100, dividend yield would be 6%, greater than that of the utility sector, reflecting the higher total return that is available in the FTSE100 relative to the utility sector.

The different mix between asset growth and dividend yield within the FTSE100 compared to the utility sector can be further illustrated by reviewing the constituents of the FTSE100. There are companies within the FTSE100 that do not pay a dividend (examples include Ocado and Just Eat) or those that have made very significant cuts to their dividend during times of financial distress such as Royal Bank of Scotland, after the 2008 financial crisis. In fact, there are currently 24 companies in the index with a dividend yield below 2%, indicating that their investor proposition is more focussed on growth rather than yield, relative to the rest of the FTSE100 constituents.

Finally, there are characteristics of a regulated utility that make the dividend a more important feature of their investors proposition even compared to yield stocks within the FTSE100. These relate to the long asset lives relative to other UK listed businesses and the regulatory price controls that set their revenues. A consistent dividend policy, both in terms of yield and cover, therefore, provides confidence to investors of the regulatory commitment to allow equity investors to recover their initial investment and earn a stable return over the long term. This is further supported by utility peers in other jurisdictions, for example European utilities average dividend yield was 5.7% over the last decade.

Yields across the UK utility sector have remained above 5% despite significant reductions in bond yields over the last decade, with National Grid's yield moving in line with the rest of the sector.

Figure A15.5: Average UK utility dividend yields vs bond yields since January 2009



5.2.2 Expected dividend yields

Sell-side analyst forecasts indicate that yields within the regulated utility sectors are expected to remain at levels in excess of 5% over the next four years, with JP Morgan expecting yields above 6% for the next two years.

Table A15.1: Sell-side dividend yield expectations

Bank	2019	2020	2021	2022
Credit Suisse[1]	5.4%	5.6%	5.2%	5.3%
JP Morgan[2]	6.1%	6.7%	-	-
Morgan Stanley[3]	5.5%	5.4%	5.6%	-

1. Credit Suisse estimates are an average for European regulated utilities within their coverage: Italgas, National Grid, Pennon, Severn Trent, Snam, Terna and United Utilities.
2. JP Morgan estimates are an average of UK regulated utilities within their coverage: National Grid, Centrica, SSE, Drax, United Utilities, Severn Trent and Pennon.
3. Morgan Stanley estimates are an average of UK infrastructure companies within their coverage: National Grid, Pennon, Severn Trent and United Utilities.

A forecast of dividend yield is also used as a valuation metric through the equation; dividend per share / dividend yield = share price. It also serves as an illustration of the importance of the dividend yield to equity investors, showing the direct interaction between the dividend yield and equity valuations. Table A15.2 summarises the sell-side analysts yield assumptions that are used in their published sum of the parts (SOP) calculation.

Table A15.2: Sell-side dividend yield expectations used in sum of the parts calculation

Bank	Dividend Yield Assumption	Weighting in SOP valuation	Date of note	Forecast year
HSBC	5.0%	50%	21/06/2019	2020
Goldman Sachs	5.9%	20%	19/09/2019	2020

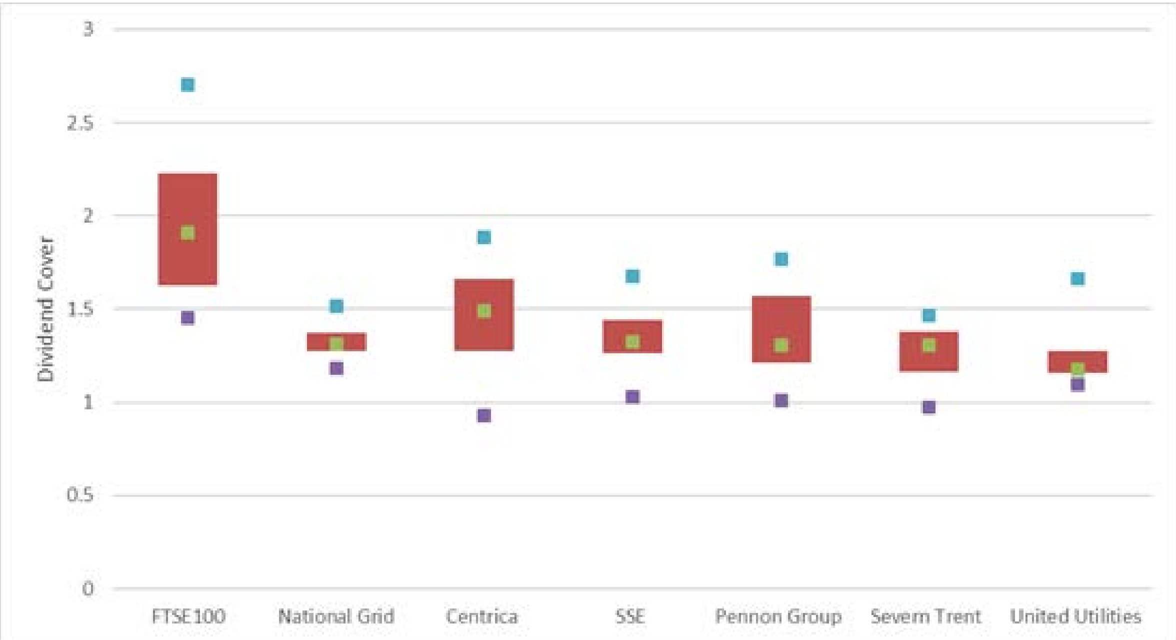
Investors will also make an assessment of how changes to the regulatory model will impact the dividend capacity in the next regulatory review. The changes to the regulatory model which accelerate cashflows, for example the move from RPI to CPI inflation will cause investors to expect a higher dividend yield in the next regulatory review and a relatively stable pay-out ratio.

5.2.3 Historic dividend cover

Dividend cover is also monitored by investors to assess the sustainability of the dividend over the longer term. In our view, the assessment of the financeability of the package as a whole is best made through an analysis of the credit metrics alongside the primary equity financeability ratio of dividend yield. The dividend cover ratio can also be used as a sense check to these outputs to ensure they are not significantly different to market expectations.

Dividend cover for the UK utility sector has averaged 1.33 times over the last decade and FTSE100 cover is 1.91 times over the same period. The greater level of pay-out delivered by UK regulated peers relative to the FTSE100 is consistent with the differences in dividend yields observed above. This is consistent with our European utility peer group which averaged dividend cover of 1.5 times.

Figure A15.6: Average UK regulated utility and FTSE100 dividend cover since January 2009



5.2.4 Expected dividend cover

Sell-side analyst forecasts indicate an expectation that dividend cover within the regulated utility sectors is expected to range between 1.1 and 1.4 times.

Table A15.3: Sell-side dividend yield expectations

Bank	2019	2020	2021	2022
Credit Suisse[1]	1.3x	1.2x	1.3x	1.4x
Morgan Stanley[2]	1.3x	1.1x	1.1x	-

1. Credit Suisse estimates are an average for European regulated utilities within their coverage: Italgas, National Grid, Pennon, Severn Trent, Snam, Terna and United Utilities.
2. Morgan Stanley estimates are an average of UK infrastructure companies within their coverage: National Grid, Pennon, Severn Trent and United Utilities.

5.2.5 Business planning assumptions

As explained previously, investors view dividends as ‘absolutely critical’ or ‘essential’. The existence and value, of a dividend makes a difference both to the willingness of investors to provide capital, and to the return required on their investment. In this regard, we need to ensure that dividend yield is an input to financeability modelling rather than an output.

Research has supported the popular perception of short-termism in equity markets. For example, the evidence provided in a Bank of England paper on Andrew Haldane and Richard Davies’ speech ‘The Short Long’ which provided statistically significant empirical evidence to support short-termism in equity markets across all sectors and, specifically, within the ‘Energy and Utilities’ sector in the UK and US.

Based on the arguments and evidence considered it is appropriate for the dividend to be set at a pragmatic rate; a rate that balances the need to provide a current reward to shareholders with a need to retain capital in the business. We see the dividend as an input that recognises interdependencies within the financial package, rather than solely as an output.

We therefore believe a stable notional dividend policy of 5% of the equity proportion of the RAV and 1.5x dividend cover is appropriate. This is consistent with our UK and European peer group over the last 10 years and with assumptions in the previous price control. A stable dividend policy sends a strong signal of confidence to investors. Linking the dividend to the equity proportion of the RAV is appropriate as it provides a consistent return on the equity that investors notionally retain in the regulated business.

5.3 Debt financeability

Our assessment is informed by the methodologies adopted by the credit ratings agencies. This aligns the regulatory assessment with the agency treatment and measurement of the various risk factors that debt investors consider when evaluating an investment. Our approach:

- **Focusses first on the assessment on the notional company**

  The onus for ensuring financeability of the actual companies lies with networks. However, the regulator has a duty to have regard to the need to secure that the price control is set at a level which would allow an efficient notional company to finance its licenced activities. The methodology which is adopted therefore needs to be robust, replicable and relevant for both views.

Whilst the parameters and particulars of actual companies may be of interest to the extent that they inform estimates for a ‘notional efficient company’, the financial parameters (such as cost of debt, gearing, cost of equity, and financial metrics) should be estimated for the notional efficient company. The financeability of the actual company can only be assured on a sustainable basis if supported by a package which delivers a financeable notional company.

- **Targets a strong credit rating consistently across the financial package**

Standard Special Condition B10 of the National Grid Electricity Transmission plc licence in force as at August 2019 states that

“*The licensee shall use all reasonable endeavours to ensure that the licensee maintains at all times an investment grade issuer credit rating.*”

An investment grade is achieved under Moody’s definition with a credit rating of Baa3 and Standard and Poor’s (S&P) with a BBB- rating. However, just achieving investment grade for the base allowed return does not provide any financial capacity to absorb macroeconomic shocks or outturn of company specific risks. It would also attract more interest cost than a higher investment grade level. From a debt funding perspective, we aim to retain an A- credit rating for NGET (for the actual company) as this ensures access to a wide range of debt instruments and capital markets at an efficient interest rate. This rating is supported through targeting a Baa1/BBB+ credit rating for the notional company.

Maintaining an appropriate financial capacity in the credit ratings will be imperative in RIIO-2, particularly given the heightened political backdrop in the UK (Brexit, nationalisation) coupled with increasing uncertainty in network requirements over this period of energy transition. For example, during the 2008 global financial crisis, due to NGET’s strong credit ratings, the company was able to maintain debt market access. Following the Lehmann Brothers collapse in September 2008, NGET was still able issue a new syndicated €600m five-year bond on 1 December 2008.

We currently support the higher actual company rating through working hard across the capital markets to raise debt at as efficiently as possible and through delivering stakeholder outputs at lower totex levels to allowances. These outcomes are incentivised by the regulatory framework because the resulting lower interest rates and totex levels feed into future revenue allowances for ourselves and other networks. With interest rates predicted to increase and lower incentivisation in the T2 framework, we recognise there is greater risk around achieving A- under this approach in the future, but we believe maintaining a target of Baa1/BBB+ for the notional company to be appropriate.

The purpose of targeting a Baa1/BBB+ credit rating for the notional company is both to enable access to an efficient cost of debt and ensure that we are appropriately resilient to future financial shocks, which is important given our role as owners and operators of critical national infrastructure. For example, at a Baa2/BBB rating (one notch below our target rating), a change in RPI to CPI wedge to 50bps would reduce our adjusted interest cover ratio to below investment grade severely restricting the ability of the notional company to efficiently raise further debt funding.

A Baa1/BBB+ credit rating is also consistent with recognised regulatory practice, consistent with the cost of debt allowance (which is an average of A and BBB corporate bonds) and consistent with the vast majority of our peers (currently there is only one entity in the UK rated BBB or lower).

A notional efficient network will need to achieve the same credit rating in the financeability assessment in order to access this debt rating. That is, the benchmark rating for the financeability assessment and the cost of debt rating must be consistent.

Setting debt funding at Baa2/BBB level would add ~30bps to debt funding costs equivalent to an equity return increase of ~45bps.

The financial capacity enables us to deal with downside risks associated with the pursuit of innovation and incentivisation strategies. Using Ofgem's suggested totex performance scenario of 10% as a quantification of our downside risk, would equate to c£150m additional spend each year based on the current totex plan. Outturn of this level of risk would have a significant impact on key financial ratios. To ensure financial resilience we need to be able to maintain investment grade if such a scenario were to outturn. This requires a strong credit rating against the baseline totex plan which provides the financial capacity to absorb reasonable downside impacts. Reducing credit ratings for the energy network would also add additional risk at a time when networks are being asked to invest to meet the governments Net Zero targets.

We have therefore assessed our credit rating against a target rating of Baa1/BBB+.

- **Considers financeability over future price control periods to ensure the long-term sustainability of the company's financial position**

  Financeability is not just a consideration of short-term liquidity ratios but takes into account the long-term sustainability of the company's financial position which is important in safeguarding future investment.

  Consideration of a time-frame beyond the RIIO-2 period has the benefit of distinguishing between short-term liquidity and longer-term financeability issues. Extension of the assessment period to at least RIIO-3 will determine whether the financial framework is sustainable beyond the immediate price control and that the ability of the network licensee to maintain investment grade is not solely reliant on actions taken to improve liquidity in the RIIO-2 period.

  Assessment of the current and subsequent price control periods enables customer impact to be evaluated against the principle of matching cost to usage of the assets and identifying any intergenerational movement of customer charges.

- **Considers a range of financial ratios for debt investors, covering Moody's methodology and scorecard approach and Standard and Poor's core ratio**

  It is appropriate to apply a similar approach to those used by the ratings agencies to assess our financeability under the T2 deal. This ensures that the financeability of the notional company is not decoupled with that of the actual network.

  Each of Moody's, Standard and Poor's (S&P) and Fitch take account of qualitative and quantitative risk factors in their assessment of credit ratings. The qualitative risk factors include both industry risks, such as the stability of the regulatory regime and company specific risks, such as the nature of the investment programme and management approach to financing activities. The quantitative elements are based on the outcome of financial ratios which demonstrate a company's ability to service debt and investment requirements from its cashflow.

  We use the scorecard methodology adopted by Moody's (Moody's "Grid") and the FFO/net debt metric used by S&P as a basis for our primary tools to measure financeability from a debt investor's perspective.

  The credit rating assessment processes used by Fitch also includes qualitative and quantitative aspects. However, the methodology supporting the Fitch rating is not publicly available to the same extent as Moody's. All three agencies are important to bond investors and an acceptable outcome needs to be achieved across all. Therefore, the financial ratios which are considered by Fitch but are not covered in our primary assessment are also calculated to supplement and cross-check the results.

5.3.1 Moody's Grid methodology

Moody's methodology is clearly documented in their Rating Methodology for Regulated Gas and Electric Networks, last published in 2017[4], and so has the benefit of being transparent and replicable. Moody's themselves note that the published methodology is a guide to the most important factors to be considered in assigning ratings but that other considerations may form part of their judgement. We use the Grid approach as documented and do not include further subjective judgements to maintain our principle of transparency.

Moody's Grid methodology has the additional benefit of being the primary assessment tool for notional networks operating under the RIIO-1 framework. A consistent approach provides the ability to directly compare price control frameworks and ensure that trends in credit ratings which are indicative of the stability of the regulatory regime are not obscured by changing metrics and methodologies. Continued application of this methodology across price control periods is also consistent with the principles under which our financial package is developed.

Moody's Rating methodology for Regulated Gas and Electric Networks sets out clear guidance and thresholds for approximating the credit risk for regulated gas and electric networks. The methodology attributes 60% to qualitative risk elements and 40% to the quantitative financial metrics.[5]

Figure A15.7: Grid factors and weighting applied in Moody's Rating methodology

EXHIBIT 1

Regulated Electric and Gas Networks

Broad Grid Factors	Factor Weighting	Sub-Factors	Sub-Factor Weighting
Regulatory Environment and Asset Ownership Model	40%	Stability and Predictability of Regulatory Regime	15%
		Asset Ownership Model	5%
		Cost and Investment Recovery (Ability and Timeliness)	15%
		Revenue Risk	5%
Scale and Complexity of Capital Program	10%	Scale and Complexity of Capital Program	10%
Financial Policy	10%	Financial Policy	10%
Leverage and Coverage	40%	(FFO + Interest Expense - Non-Cash Accretion - Capital Charges) / (Interest Expense - Non-Cash Accretion) OR (FFO + Interest Expense) / Interest Expense	10%
		Net Debt / RAB OR Net Debt / Fixed Assets	12.5%
		FFO / Net Debt	12.5%
		RCF / Net Debt	5%
Total	100%		100%

The quantitative metrics measure both how easily a company can repay its debt and its ability to service the debt prior to repayment.

The adjusted interest coverage ratio (AICR) is Moody's preferred metric for networks whose allowed revenues are determined using a 'building block approach' as adopted for RIIO price controls. It is used as an indicator of the networks ability to cover the cost of its debt.

[4] "Rating Methodology - Regulated Electric and Gas Networks", Moody's Investor Service, 16 March 2017

[5] "Rating Methodology - Regulated Electric and Gas Networks", Moody's Investor Service, 16 March 2017, page 8

Adjustments are made for unconventional debt funding (e.g. capital accretion, index-linked bonds or swaps arrangements) to improve consistency and comparability to the peer portfolio.

The Regulated Asset Base (RAB) is equivalent to the Regulatory Asset Value (RAV) and serves as a proxy for the long-term average enterprise value of a regulated business. The net debt/RAB ratio therefore demonstrates the degree to which a company's operations are funded by equity versus debt financing and is used to assess the company's leverage and financial stability.

Funding from operations (FFO)/net debt measures cashflow compared to a company's indebtedness and their ability to generate sufficient cashflow to cover future debt payments. A higher level is usually indicative of greater financial strength. The final metric, retained cashflow (RCF)/net debt is similar but considers the networks cash position after the dividend payments have been made. The higher the level of RCF relative to the debt position the more cash the network has to support its capital expenditure programme.

The 60% weighting attributed to the qualitative factors mean that these elements can dominate the Grid rating. Moody's set out the characteristics expected for a qualitative sub-factor to achieve a particular rating although these are, by their nature, typically more subjective. To limit the subjectivity associated with their assessment we therefore take as our starting point the latest qualitative factors Moody's assign to NGET[6]. These are set out in Table A15.4 along with the weighting each factor is given:

Table A15.4: Weighing and rating applied to qualitative factors in our financeability assessment

Sub Factor	Weighting	Latest Rating
Stability and predictability of regulatory regime	15%	Aaa
Asset Ownership Model	5%	Aa
Cost and Investment Recovery	15%	A
Revenue Risk	5%	Aa
Scale / complexity of capital programme	10%	Ba
Financial Policy	10%	Baa

Taking each factor in turn, the stability and predictability of the regulatory regime considers the characteristics of the regulatory environment in which a network operates. A network operating in a stable, reliable and highly predictable regulatory environment will be scored highly. Where changes do occur, networks can still have a high score if there is sufficient consultation during the process and the changes are supportive of networks credit quality. We have already noted that the stability of the regime has been a key concern for both credit rating agencies and our equity investor population during the RIIO-2 consultation process.

The asset ownership model considers the risk that the operating license, or concession may be terminated where assets are not owned outright by the rated entity. The cost and investment recovery focuses on the risk allocation between networks and its customers and the extent to which the network is able to pass through incurred costs. A network that benefits from a fair and timely cost and investment recovery but is subject to efficiency targets scores in the middle of the grid.

[6] "National Grid Electricity Transmission plc – Update to credit analysis", Moody's Investor Service, 23 July 2019"

Revenue risk considers the ability of a network to generate the revenue allowed to it by the regulator and its exposure to volume risk.

The scale and complexity of the capital programme considers a network's investment plan and the associated execution risk. Moody's makes its assessment based on size and scope, complexity, management's ability to deliver the plan without material cost over-runs and whether the program will introduce financing challenges. This is an area where transmission networks have been considered higher risk than both the distribution and water sectors hence the Ba rating.

The final factor considers the company's approach to financing its activities and its tolerance for financial risk. In this factor, Moody's assess the likelihood that financial policy decisions could add uncertainty to future cash flow levels and divert resources away from creditors.

Over the T1 period, we have seen the qualitative factors remaining broadly unchanged. However, we now find ourselves in an evolving political and regulatory landscape, which may affect the outcome of Moody's Grid more than a shift in quantitative metrics.

In their recent Rating Action publication[7], Moody's specifically highlighted the stability and predictability of NGET's regulatory framework and the potential impact of increased political intervention on National Grid's credit rating.

"The rating could also be downgraded if the risk of adverse political interventions increased, particularly in the United Kingdom. Guidance for National Grid Plc's current rating may be revised as Ofgem's price review progresses and the group's business mix evolves. Any revision will take into account factors including any changes in Moody's assessment of the stability and predictability of the group's regulatory frameworks and the incremental basis risk resulting from the change in indexation of NGET and NGG's revenues as compared to their RPI-linked liabilities."

We address the potential dominance of qualitative metrics on the Grid by separate assessment of the financial metrics, to ensure companies' cash flow metrics accurately reflect its assigned rating.

Separate assessment of financial ratios has precedent with Moody's calculation of the rating outcome. The Moody's Grid is an input to the Moody's Committee rating discussion and is supplemented by an assessment of the core metrics (AICR and net debt/RAV), to ensure companies' cash flow metrics accurately reflect its assigned rating, which due to the supportive qualitative factors in the Grid can be overlooked. The core metrics, like the Grid, have their own associated indicative rating, which can be more punitive than the Grid outcome, due to the requirement for strong quantitative factors and can ultimately result in a lower overall rating determined by the Committee.

Moody's published the core ratio guidance in their sector report[8], as described in Table A15.5. These thresholds need to be met to achieve the corresponding credit rating, even if the Grid indicates a higher outcome.

Table A15.5: **Ratings thresholds for Moody's core ratios**

Credit rating	Maximum RCV gearing	Minimum AICR
A2	<60%	>1.8x
A3	<68%	>1.6x
Baa1	<75%	>1.4x
Baa2	<85%	>1.2x

[7] "Rating action: Moody's takes action on certain National Grid subsidiaries and affirms other ratings", Moody's Investors Service, 29 March 2019, page 4

[8] "Regulated electric and gas networks – UK Risks are rising, but regulatory fundamentals still intact", Moody's Investor Service, 29 May 2018, page 4

Our assessment considers credit metrics as being achieved when the mid-point of the relevant ranges is met. This in line with credit rating agencies practice, where is it expected that metrics are nearer to the middle of range for the relevant rating to apply. Any company whose metrics only just hit thresholds would likely to be on negative watch for that credit rating rather than definitely achieve it. If we were to achieve only minimum thresholds throughout the period, the potential for downside risks would result in a network with weak financial resilience increasing the likelihood of downgrade.

Moody's have highlighted that guidance can be reassessed. Moody's guidance is based on a level of risk defined by its qualitative features and is reassessed where regulatory changes alter the associated risk profile.

This is evident in Moody's assessment of the water sector. Moody's currently has the majority of UK water companies on negative outlook, reflecting concerns over Ofwat's PR19 determinations. Given the rise in the perception of regulatory intervention through items such as the performance wedge it is increasingly being mentioned by rating agencies that this could be applied to energy networks.

Prior to PR19 the water sector ranges for the core metrics were aligned with the regulated energy networks, but now require improved ratios to support a riskier regulatory regime. For example, Moody's have increased the AICR ratio headroom required by the water sector by 10bps. We have assumed that the thresholds applied to energy networks do not change from where they are today but partially reflect this risk in targeting the mid-point of the range for key ratios.

5.3.2 Standard and Poor's rating methodology

The credit rating assessment processes used by Standard and Poor's (S&P) also includes qualitative and quantitative aspects. The application of the methodology supporting the S&P ratings is less mechanistic with the methodology not publicly available to the same extent as Moody's.

The rating methodology does set out the importance S&P place on FFO/net debt as a core metric in their assessment. We have engaged with S&P on interpretation and application of their rating methodology, in particular the thresholds likely to apply to regulated utilities. The result of this engagement and consideration of peers' ratings leads to the interpretation of 9%-11% as the BBB+ range.

As for the Moody's ratios, we target the mid-point of the range in assessing the financeability of the notional and actual companies.

By permission from S&P, we include their ratings methodologies at Appendix A2 to this annex.

6. Financing requirements

Based on our business plan submission, around 20% of our annual totex will be funded by customers via in-year revenues and 80% is funded by the company, to be recovered from future customers. This transfers risk from customers to the company, spreading the cost of the long-term investments we make over multiple generations, fairly matching the cost with those that use the network over time.

To optimise the efficiency of raising debt finance, the company funds around 40% of its share of totex from equity investors and 60% from debt investors. This is consistent with management's view of the optimal capital structure to minimise the weighted average cost of capital. It is also consistent with Ofgem's T2 working assumptions.

Funding sources include:

- reinvestment of profits attributable to equity investors;
- reinvestment of scrip dividends; last year just under 40% of NG plc's shareholders elected to reinvest dividends totalling around £600m into the business;
- issuance of new equity, e.g. our £3.2bn rights issue in May 2010; and
- raising financing efficiently from debt investors.

Both debt and equity investors provide funding in anticipation of earning a return that is commensurate with the risk they are taking.

Risk arises due to the uncertainty as to whether the future cashflows generated by the company will fully refund the investment and return expected by investors. Whilst our regulatory agreements reduce this risk, its five-year timeframe is much shorter than the regulatory asset life which is 45 years and the holding period of many of our investors. Therefore, investors assessment of the attractiveness of investing in UK regulated energy networks will include a judgement about the long-term quality and stability of the UK regulatory regime and the certainty of recovery of the RAV which represents money due to investors.

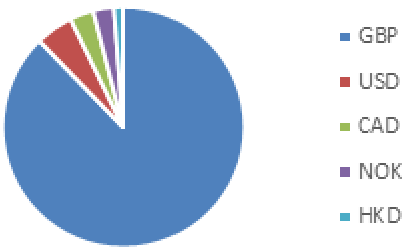
If investors perceive the risk is too high compared to the return, they will move their money elsewhere, making raising new equity and debt more costly so increasing costs to consumers.

6.1 We add value to consumers by accessing efficient sources of debt financing to fund large scale investment over the long-term

Our business plan assumes that NGET expects to issue ~£3bn of long-term debt over the next price control, both to fund capital expenditure and to refinance maturing debt.

Our scale enables access to the debt capital markets which tend to provide the most efficient source of debt financing. The vast majority of our debt is raised in this way and we work hard to ensure debt is issued as efficiently as possible in line with the incentives available to us under the T1 framework. For example, we can issue debt in any one of multiple currencies, using derivatives to manage the ultimate liability into sterling ensuring we have access to the best value funding available. We have also used a variety of debt products to find new and innovative ways to issue debt including Retail Price Index (RPI) retail bonds.

Figure A15.8: £7.2bn of debt (pre derivatives) at 31 March 2019, by currency



We are a well-known issuer with a clear and distinctive debt investor proposition, reflecting our world-class safety and reliability performance as well as our strong credit rating and financial ratios. Efficient debt funding is incentivised by the regulatory framework and the resulting lower interest rates feed into future revenue allowances for us and other networks.

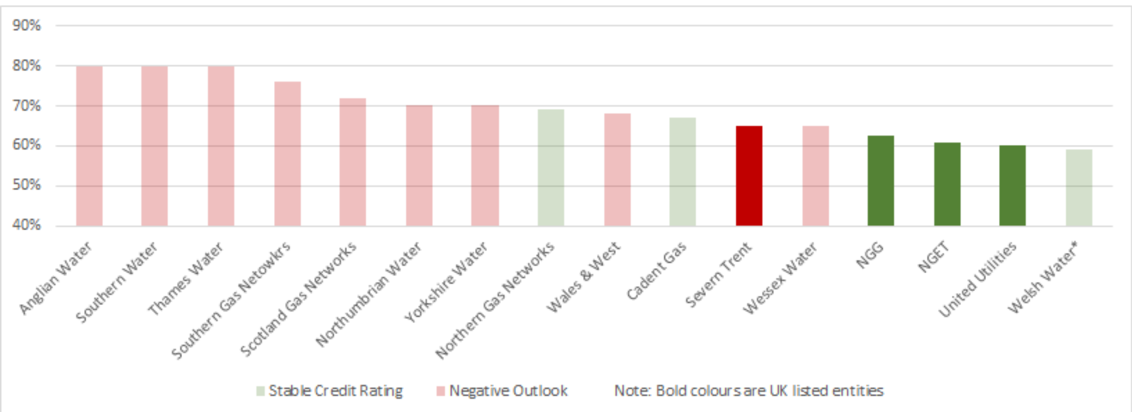
We seek to minimise the total interest rate charges to NGET, whilst managing liquidity risk and maintaining a balanced maturity profile of debt issued that appropriately manages refinancing risk.

6.2 The notional gearing is efficient but lower than the utility peer group

Given yield curves and rating agency views we believe that gearing levels between 60% and 65% are efficient for raising equity and debt. This has proven to be the case over several years and it is of note that the notionally efficient gearing level used by Ofgem and other utility regulators has fallen within this range.

On average, the utility sector as a whole is geared at a higher level (median of ~70%), however this average is increased by companies that are on negative watch, showing a risk of lower financial resilience. When gearing is compared across the gas distribution and water sectors, there is a clear relationship between lower geared entities and ratings stability. In total 10 of the 12 peers across the water and gas sectors that have a gearing of 65% or higher are currently on negative outlook (Figure A15.9).

Figure A15.9: regulatory gearing and credit rating outlook across the gas distribution and water sectors



*Not for profit
Note: Gas Distribution and Water sector gearing taken from Moody's sector reports, NGG and NGET gearing taken from March 2019 stats, adjusted for dividend payments made in July 2019.

It is also of note that the UK listed entities, who will be subject to higher market scrutiny, are geared at lower levels on average.

6.3 The lowest cost of funding investment for consumers includes an equity investors proposition that appropriately reflects the risks of investing in National Grid

Equity investors earn a return on their investment through a combination of asset growth and dividend yield. Investors assess how the return supports their requirements, including:

- the risk reward balance in light of a lower risk-free rate but higher political and regulatory risks when compared with the T1 period;
- the relative attractiveness of the risk reward balance compared to similar regimes in other jurisdictions (e.g. USA, EU and Australia);
- the ability of the company to maintain an efficient capital structure over the long-term, without the use of short-term financing levers; and
- the ability for the company to maintain its financeability in a range of macroeconomic and operational scenarios.

6.4 Allowed revenue breakdown and summary financial statements under Ofgem's business planning assumptions

Table A15.6 summarises the allowed revenue breakdown and financial statements under Ofgem's financial package. We base the cashflow and income statements and balance sheet position on maintaining a gearing ratio of 60% as the most efficient capital structure for the notional company and in practice. Key ratios based upon these financial metrics are analysed further in Section 8, Financeability assessment and show that without the implausible incentive performance adjustment, credit metrics are not consistent with a Baa1 investment grade, reducing the financial capacity to carry the risk of capex uncertainty and bringing a more risk averse approach to investment and innovation.

Table A15.6: Financial statements based on Ofgem's proposed financial package

Allowed revenue breakdown (£m nominal)	2021/22	2022/23	2023/24	2024/25	2025/26
Fast Pot Expenditure	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
RAV Depreciation	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Return	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Incentives	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Non-Controllable Opex	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Other	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Total	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

Income Statement (£m nominal)	2021/22	2022/23	2023/24	2024/25	2025/26
Operating revenue	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Opex	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Non-controllable opex	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Established pension deficit repair	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
EBITDA	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Statutory depreciation	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Operating profit	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Net interest expense (interest coupon)	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Net interest expense (inflation coupon)	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
PBT	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Tax expense	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
PAT	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

Balance Sheet (£m nominal)	2021/22	2022/23	2023/24	2024/25	2025/26
Plant, Property & Equipment	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Total Assets	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Debt	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Total Liabilities	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Net Asset	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Total Equity	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

Cashflow (£m nominal)	2021/22	2022/23	2023/24	2024/25	2025/26
Operating revenue	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Opex (including non-controllable)	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Pension costs	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Net cash flow from operations	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Net interest expense (interest coupon)	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Tax expense	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Funds from operations (FFO)	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Capex	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Dividends paid	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
(Issue) / repayment of debt	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

6.5 Allowed revenue breakdown and summary financial statements under National Grid's business planning assumptions

Table A15.7 summarises the allowed revenue breakdown and financial statements under our financial package. Key ratios based upon these financial metrics are analysed further in Section 8, Financeability assessment and show that under this financial package both debt and investor expectations are met and the consumer bill is reduced, whilst sufficient financial resilience is maintained to make anticipatory investments to help the UK meet net zero emissions by 2050.

Table A15.7: Financial statements based on our proposed financial package

Allowed revenue breakdown (£m nominal)	**2021/22**	**2022/23**	**2023/24**	**2024/25**	**2025/26**
Fast Pot Expenditure	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
RAV Depreciation	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Return	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Non-Controllable Opex	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Other	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Total	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

Income Statement (£m nominal)	**2021/22**	**2022/23**	**2023/24**	**2024/25**	**2025/26**
Operating revenue	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Opex	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Non-controllable opex	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Established pension deficit repair	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
EBITDA	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Statutory depreciation	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Operating profit	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Net interest expense (interest coupon)	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Net interest expense (inflation coupon)	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
PBT	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Tax expense	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
PAT	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

Balance Sheet (£m nominal)	**2021/22**	**2022/23**	**2023/24**	**2024/25**	**2025/26**
Plant, Property & Equipment	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Total Assets	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Debt	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Total Liabilities	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Net Asset	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Total Equity	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

Cashflow (£m nominal)	**2021/22**	**2022/23**	**2023/24**	**2024/25**	**2025/26**
Operating revenue	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Opex (including non-controllable)	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Pension costs	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Net cash flow from operations	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Net interest expense (interest coupon)	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Tax expense	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Funds from operations (FFO)	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Capex	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Dividends paid	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
(Issue) / repayment of debt	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

7. Our financial package

We derive the parameters which underpin our financial proposal using a principle-based approach and empirical evidence.

The key aspects of our proposed financial package can be summarised as: -

- A real post tax cost of equity of 6.5% CPI-stripped
- Notional gearing of 60%
- Cost of debt allowances set using full indexation approach based on a 15-year trailing average
- Immediate transition to CPIH index linked price control
- A single totex capitalisation rate set at 'natural' rate
- Asset lives maintained at 45 years and depreciated on a straight-line basis

We have justified this package on the basis of a wide range of evidence and a financeability assessment that provides the financial capacity to absorb downside risks.

There has been extensive consideration of the methodology for setting allowed return and the wider financial package in Ofgem's RIIO-2 framework and sector specific consultations, and we have set out our views in response to those consultations. Our views on the financial framework, as described in this section, is in most respects consistent with Ofgem's RIIO-2 policies but in some cases we take a different view of the available evidence and the parameter values this implies. We will not re-visit those arguments in full here but do make clear where we have differing assumptions.

7.1 Allowed equity return

The cost of equity is an estimate of the return that equity investors expect. In the context of a network price control, the allowed equity return is the cost of equity that investors would require if the company was a standalone network. This network would only carry out the activities which are within the scope of the price control and have a finance structure which matched the assumed notional gearing.

Setting the right allowed return is critical to achieving a balance between current and future customer charges and investor returns. It ensures networks can fund their operations and future investments and have adequate financial capacity to manage uncertainty around the energy transition, whilst at the same time consumers pay no more than is necessary for the services and activities they receive and from which they benefit. This is important for the resilience of the energy sector as a whole and especially in transmission where the uncertainty and complexity of the investment that is required, and the scale and pace of market disruption, are markedly higher than in other sectors. The required financial capacity is dependent on networks receiving a fair return for the risks they hold, and on investors having confidence in the stability of the regulatory regime.

The cost of equity cannot be directly observed and will always be an estimation, which makes it important that all available evidence is taken into account to ensure the estimation is suitably robust. This is also the case when setting the cost of equity in a price control, for a notional standalone company.

The most commonly used framework to estimate cost of equity is the Capital Asset Pricing Model (CAPM). The equity beta within CAPM captures all the risks that cannot be eliminated through diversification of an investment portfolio, for which investors require compensation. However, in reality very few of the risks that we face as a business can be clearly classified as either diversifiable or non-diversifiable and in practice, the performance of the CAPM tends to under-predict equity returns for assets whose equity betas are less than 1. There is a large body of research suggesting that factors other than the market equity beta explain equity returns.

We do not draw attention to the shortcomings of the CAPM with a view to challenging its use. On the contrary whilst there are a number of different approaches for estimating cost of equity, CAPM remains the best model as it has the strongest theoretical underpinnings. We raise it to underline the importance of sense-checking the results using alternative approaches and information.

In the following sections, we set out our estimates for the cost of equity and the parameters and cross-checks on which these are based to ensure the estimates represent a fair outcome for both investors and consumers. In doing so, we continue to follow the principles originally established by Ofgem for RIIO price controls in 2010[9], and in particular to:

- adopt a real, weighted average cost of capital (WACC) based approach to setting the allowed return; and
- set the cost of equity based on a CAPM approach but also consider evidence from other models.

The CAPM requires inputs for the following three parameters:

- the total market return (TMR)[10]
- risk free rate (RFR)
- equity beta (β)

These parameters are combined in the following way to estimate the cost of equity (CoE):

$$CoE = RFR + \beta \cdot (TMR - RFR)$$

To apply this model, we assume that

- estimates of TMR are based on long run historical averages as the best and most objective measure of investors' expectations of the future return on equity for the whole market, with the resulting estimate cross-checked against forward-looking evidence from independent, published Dividend Growth Model (DGM) results.
- risk-free rate is estimated by using current yields on long run nominal gilts with adjustments within the price control period to reflect movements in market rates (i.e. indexation of the risk-free rate).

[9] 'RIIO: A new way to regulate energy networks', Ofgem, October 2010, Chapter 7 Box 2

[10] The cost of equity can alternatively be calculated using the CAPM from β, the Risk Free Rate and the Equity Risk Premium (ERP = TMR – RFR), where the ERP is estimated directly instead of the TMR. However, most GB regulators, as well as the Competition and Markets Authority (CMA) prefer to use the formulation which uses TMR rather than ERP because it gives more stable estimates, and this is the approach which Ofgem have proposed for RIIO-2. We agree that this approach is more reliable, and so have adopted this approach in applying the CAPM for this plan.

- beta is estimated using the available information from relevant companies and comparators, adjusted for differences between actual and notional gearing to derive a range based on rolling sampling window of different lengths, with a focus on high frequency (daily) sampling, and adopting ordinary least squares (OLS) estimation techniques.
- CAPM results are sense checked against other models and regulatory precedents. Whilst we support the use of the CAPM approach as the primary methodology for estimating a cost of equity range, we recognise that no single approach provides a definitive estimate, and therefore cross check the CAPM result against a range of other evidence from appropriate comparators.

In estimating cost of equity, and in selecting a reasonable point value from within the possible ranges, we will not only consider cross-checks but also take into account financeability considerations; feedback (from both investors and consumers); the levels of network risk and how network risk has changed since the T1 price control was set; and the need to attract and retain finance.

In summary, the proposed cost of equity in this business plan is based on the following values, which are shown alongside Ofgem's working assumption:

Table A15.8: Ofgem's working assumptions and our proposals for the financial framework

CPI stripped	Ofgem			National Grid		
	Low	High	BP assumption	Low	High	BP assumption
Total Market Return (TMR)	6.25%	6.75%		7.30%	8.30%	
Risk Free Rate	-0.75%	-0.75%		-0.75%	-0.75%	
Equity Beta	0.66	0.85		0.90	0.95	
Cross Checks	0.13%	-0.03%				
Cost of Equity	4.00%	5.60%	4.80%	6.50%	7.85%	6.50%
Outperformance Wedge			-0.5%			0%
Cost of Equity			4.30%			6.50%

The following sections outline in further detail our proposed approach and estimates at this stage.

7.1.1 Total Market Return (TMR)

Consistent with Ofgem's proposed approach for RIIO-2, and with the method which has most frequently been used by both sector regulators and the CMA to estimate TMR in previous price controls, we have based our estimate of TMR primarily on the long-term historical average realised (ex-post) market return. If based on an average across a sufficiently long time-frame, this average realised return is widely considered the best and most objective estimate of investors' expectations of the future level of market return. It assumes that the use of realised average returns from historic data provides an unbiased estimate of the expected market return over long time periods.

Whilst we agree with Ofgem that interpretation of long-run average returns should form a key part of the proposed methodology for setting TMR, applying this approach requires a series of decisions and will be dependent on:

- the timeframe across which the average returns are calculated, and in particular the start date of the period considered;
- the inflation measure used to deflate the actual return in each past year, which is on a nominal basis, to give the 'real' return in that year;
- whether the implied TMR value is based on the historic average return on a geometric or arithmetic basis; and if based on the geometric return, what 'uplift' should be applied.

For each of these, Ofgem's approach seems to adopt an option which leads to a lower estimate of TMR, which does not result in a balanced estimate. We have evaluated the options in each area and come to a view based on the approaches we consider to be best justified.

In terms of timeframe, estimates of returns have often been based in the past directly on averages since 1900. However, there is nothing special about 1900 as a start for the averaging period and no reason to assume that data prior to this point is any less relevant. Ofgem themselves have previously recognised this[11]. Conversely, if data prior to 1900 is to be disregarded as being less relevant, the data in the first decades of the 20th century might equally be excluded in working out the average returns.

Using 1900 as a starting point gives values which are, or very close to, the lowest average return, whereas averaging over longer or shorter periods gives higher values. We find a similar pattern when looking at total equity market returns from the USA over longer or shorter averages than from 1900. We have taken these alternatives into account to ensure a balanced view is taken when deriving our TMR range.

A second reason why long-run average return since 1900 based on the usual source (DMS) is likely to underestimate the average realised total return on the equity market is that for the first 54 years of the series, DMS only include the 100 largest companies in the UK in working out returns. It is well-known that the average total return on companies with smaller market capitalisation is generally somewhat higher on average than on larger shares[12].

Although Ofgem have decided to transition to a CPIH indexed price control, it is still necessary to decide what long-term historic inflation series back to 1900 or longer should be used to deflate the historic series of nominal equity market total returns. This should be the most accurate and reliable inflation series over this long timeframe. We and economic consultants (Oxera, Nera and Frontier) have considered whether CPI inflation should be used as a basis of setting real returns with reference to data published by the Bank of

[11] For example, Ofgem said on 17th February 2014 in the "*Decision on our methodology for assessing the equity market return for the purpose of setting RIIO-ED1 price controls*" that "*the most objective evidence for prospective market returns is the level of returns achieved by investors in equity markets over the longer term, going back as far as the start of the 20th century or even earlier in the 19th century*."

[12] DMS themselves have provided evidence for this, for example in the 2002 publication "Triumph of the Optimists", and in the 2013 Sourcebook. The top 100 companies appear to represent c.50% to 60% of UK equities from 1900 to 1954, this proportion then increasing from 66% to 80% from 1985 to 2014; and DMS (2013) show that the return on the smallest equities making up 10% of the market from 1955 to 2012 was c.2.9% higher than for the rest of the market, so that including just these shares would reduce the calculated average market return by c.0.32% p.a. If the premium was similar in the first half of the 20th Century, the overall impact could be up to 1.2%p.a., but as the premium outside of the top 100 companies may fall with company size a narrower range than 0.32% to 1.2% seems reasonable, leading to our suggested range from 0.5% to 1%. This seems broadly consistent with the figures in Table 1 of Campbell et al (2019), which shows an average return from 1900 to 1929 for the top 30 UK companies of 4.5%, c.f. 5.3% for the wider set of UK companies they considered (albeit this is still not the full set of all companies), i.e. a difference of 0.8%.

England (BoE) in the Millennium dataset. However, the conclusions of these reviews have been that the RPI series is more reliable than the available CPI series.

The reasons for this are set out in detail in the relevant economic studies with a summary being that reservations were expressed by the authors within the CPI dataset itself, meaning that reliable CPI values only exist for the period since 1989. The underlying data that would be needed to calculate reliable values of CPI for earlier timeframes has not been retained by the ONS. In addition, personal consumption expenditure (PCE) deflators derived from National Accounts between 1956 and 2009 (when the basis of these accounts was changed) are found to give a good and (on average) consistent approximation to RPI throughout this period of greater than 50 years, but these deflators are materially higher (on average) than CPI during the years for which reliable CPI values are available. As similarly calculated PCE deflators for the years up to 1956 are also available, these can be combined with the RPI series from 1956 onwards, but not the indicative modelled estimates of CPI, to give a complete and reliable inflation dataset across the whole of the required timeframe[13].

Historical RPI inflation therefore represents the most reliable and consistent source of estimating UK inflation for longer periods, and on this basis, we support setting historical real TMR, relative to RPI, using RPI inflation. An estimate of the real TMR relative to CPI can then be derived from this by adding the expected forward-looking difference between RPI and CPI.

Finally, the issue of whether TMR should be based on a geometric or arithmetic average return, and if geometric the uplift which should be applied, has received widespread academic attention over many years. Without a clear case to justify moving from regulatory precedent we find the balance of evidence supports the use of geometric averages with an adjustment within the top end of the 1 to 2% range.

Ofgem have estimated a TMR range from 6.25% to 6.75% real relative to CPIH, equivalent to 5.15% to 5.65% relative to RPI, whereas our estimate of TMR, using the same approach, is at least from 7.3% to 8.3%, relative to CPIH, equivalent to 6.2% to 7.2% relative to RPI.

Our estimate is higher than Ofgem's for the following reasons:

- use of the more reliable historic RPI dataset rather than CPI to deflate the historic nominal return series, and then adding the forward-looking 1% RPI-CPI wedge, which adds c.0.8% to the calculated average returns when expressed relative to CPI;
- considering average returns over shorter or longer timeframes as well as the average from 1900 only would separately be sufficient to justify a TMR range that is at least 0.3% to 0.5% higher than Ofgem's range;
- recognising higher historic returns on the full UK equity market as opposed to the largest 100 companies only; and
- use of a better justified geometric to arithmetic uplift in line with regulatory precedent.

There is evidence that would credibly increase the range further. On this basis, the range we have used in this plan is the lowest range consistent with a broader view of historic returns data.

[13] This is broadly the approach used for the long-run historic RPI dataset that is published by the ONS and included in the Bank of England's Millennium dataset, the only difference being during the years from 1948 to 1956 when the ONS and BoE use values for a provisional "Index of retail prices' which was still in development rather than PCE deflators, where the latter now appear more reliable across these few years than the provisional index.

7.1.2 TMR cross-checks

There is merit in cross-checking the resulting TMR value against estimates from other methods. In particular, we consider that forward looking evidence from Dividend Growth Models (DGM) has a role to play as a crosscheck. This is the main alternative to the CAPM for calculating the cost of equity and is widely used in US regulatory proceedings.

The DGM derives the cost of equity by computing the discount rate that equates a stock's current market price with the present value of all future expected dividends and applying a similar approach to the dividends across the equity market as a whole gives a value for the TMR.

Given the need to estimate the values of input parameters, especially the expected growth rate of future dividends, and recognising the sensitivity of the output to the choice of those assumptions, it would seem to be preferable to source estimates for use as a cross-check of TMR from reputable and independent organisations who have published DGM results for wider usage, rather than commissioning and using a bespoke modelling result to inform a price control. Using the published results of models from Bloomberg and the Bank of England, Oxera in a report for the ENA[14] and NERA[15] concluded that the TMR range derived using the DGM approach was in the range of 7% to 8% relative to RPI. More recent values from Bloomberg showed that DGM estimates of TMR had increased, by c1.5% or more, with the daily values during 2018 generally lying in the range from 12% to 14%, nominal. Oxera have now updated their DGM model, which gives results that agree well with those from the Bank of England[16], and find that (as at the end of August 2019) both the spot value and 10-year trailing average of the equity market discount rate estimate implied by DDM is 9.5% relative to CPI[17].

Ofgem also refers to DGM estimates as a cross-check of the TMR estimate based on long-run average returns but uses the results from a study it commissioned from CEPA rather than independent model results. The CEPA model gives somewhat lower estimates of TMR (c.8% nominal, so c. 6% real relative to CPI and c.5% real relative to RPI), because it uses lower estimates of dividend growth rates in both the short-run and long-run. The failings of the estimates used in CEPA's model, especially in relation to the long-term forecast, are not addressed in the Sector Specific Methodology Decision, and so its results are underestimated.

It therefore follows that DGM estimates, placing weight on the published results from independent models rather than bespoke models which incorporate downward bias in the estimates of the model's input parameters, would support use of a TMR value that is near the top of our range for historic average returns (7.3% to 8.3% relative to CPI).

7.1.3 Risk free rate (RfR)

The RfR is the theoretical rate of return of an investment with no risk and represents the interest that an investor would expect from an absolute risk-free investment over a specified period of time. It is common UK regulatory practice to assume that the yield on UK government bonds (or 'gilts') is a suitable guide to the RfR, given their liquidity and negligible default risk.

In evaluating our approach to estimating the RfR we consider the wide range of available information on the yields on both index-linked and nominal gilts, bearing in mind both past and current values. However, whereas in previous price controls we would also need to

[14] "The cost of equity for RIIO-2, A review of the Evidence, Prepared for Energy Network Association", Oxera, 28 February 2018, page 27 and 29

[15] "Total Market Return for Determining the Cost of Equity at RIIO-2", NERA, 3 November 2017, Page 5

[16] See for example Figure A21.5 in Ofcom's November 2018 Business Connectivity Market Report.

[17] "The cost of equity for RIIO-2 Q4 2019 update, prepared for Energy Networks Association", Oxera, 29 November 2019, page 20

adjust the currently observed yield for future rates implied in recent forward curves, this is no longer a requirement as cost of equity will be indexed by adjusting the risk-free rate each year to reflect more recent market rates. We see merit in indexing RfR in this way to help ensure legitimacy around cost of equity as well as introducing greater consistency with the way in which cost of debt allowances are already updated in response to market movements.

In a report commissioned by the ENA, 'Cost of Equity Indexation using RfR'[18], NERA have set out recommendations for three key design aspects of such a tracker: the appropriate tenor of RfR index; the appropriate averaging period; and the appropriate inflation adjustment to derive a CPIH real RfR. We support use of the yields on long (20-year) nominal gilts consistent with other UK and European regulators; averaging these over the 12-month period leading up to each annual RfR reset; and to derive a real (relative to CPIH) value by subtracting the Bank of England's 2% CPI target from the 12-month trailing average nominal 20-year gilt yield. However, as the future values of gilt yields are not yet known, for this plan we have, in the interests of simplicity, used Ofgem's working assumption for RfR values in RIIO-2, as shown in the Table below:

Table A15.9: Ofgem's working assumption for Risk Free rate

RFR	2021/22	2022/23	2023/24	2024/25	2025/26	RIIO-2 average
CPI Real (%)	-0.85%	-0.79%	-0.74%	-0.70%	-0.66%	-0.75%
RPI Real (%)	-1.88%	-1.82%	-1.77%	-1.73%	-1.69%	-1.78%

7.1.4 Beta

Beta relates to undiversifiable risk for which investors expect additional return over expectations for the market as a whole. The CAPM states that equity investors in firms with a lower level of exposure to market-wide risks are more protected from these risks, and so require a lower return on equity. The table below summarises the range we have considered for this plan submission:

Table A15.10: National Grid's proposed equity beta range

	Low	High	Source
Debt beta	0.1	0.1	There is evidence for debt beta between 0 and 0.1. We use 0.1 here to be more comparable to Ofgem proposals but set out in the following sections why 0.05 could be more appropriate
Asset beta	0.42	0.44	This is equivalent to top end of Ofgem's range if adjustments for market value of debt and equity are not made[19]
Notional Gearing	60%	60%	As per Ofgem's working assumption
Equity Beta	**0.90**	**0.95**	

[18] "Cost of Equity Indexation using RFR, A report for the ENA", NERA, March 2019

[19] See RIIO-2 Sector Specific Methodology Decision – Finance, Ofgem, 24 May 2019, if the values in Table 8 were re-calculated with MVF = 1 and EV/RAV = 1

The values in Table A15.10 are also broadly consistent with the estimates in Oxera's latest report, which gives an asset beta range from 0.38 to 0.41 for a debt beta of 0.05[20] (which gives a similar equity beta range, from 0.88 to 0.95).

Whilst beta estimation is an area requiring judgement, there is a history of precedent showing how regulators and the CMA have approached this in the past. We propose estimating forward-looking asset betas by looking at the historic correlations between the share prices of regulated utilities and the stock market index. Adjustments should then be made to take account of differences in risk between different sectors (e.g. energy is generally considered to be higher risk and thus have higher beta values than water). Before setting out the empirical evidence on this basis, we summarise our choices about the estimation method, the estimation window, data frequency, the choice of comparators and beta disaggregation, the approach to adjusting for gearing (un-levering and re-levering), as well as the debt beta assumption.

Methodology

- **Raw beta estimation**

  Consistent with regulatory precedent, our overall approach is to estimate raw beta values using ordinary least squares statistical techniques, with a preference to draw mainly on high frequency (i.e. daily) data, and to consider a range of estimation periods.

  We consider the estimation period and frequency of data together to ensure sufficient observations in the regression lead to more reliable estimates with relatively low standard errors.

  We do not base our derivation of raw beta estimates on low frequency data (monthly or even weekly) across a short timeframe (less than 5 years) as the number of data observations used becomes too low. Monthly and weekly beta values are also found to vary significantly depending on which day of the week or day in each month the data points are taken from, which incorporates additional subjectivity into the estimation method, especially if the range of different values for each start day are not all taken into account.

- **Adjusting raw beta values for leverage (gearing)**

  When comparing the betas of different companies, we need to take into account the different gearing levels that are chosen, since all else being equal a company with higher gearing will exhibit a higher equity beta. Observed raw beta values therefore need to be de-levered and then re-levered to give a suitable notional equity beta value. There is established precedent for making these adjustments from past price control decisions across many sectors, by both sector regulators and the CMA.

  The gearing value used to de-lever raw betas can be calculated using net debt on a market or book value basis. Regulatory precedent uses a view based on book value and in practice we find there is little effect on the final estimated notional equity beta if an adjustment is applied consistently to align to a market value basis for both the 'de-gearing' and 're-gearing' stages. There is limited benefit therefore from changing approach and we choose to align to the approach based on regulatory precedent.

  In addition, we have not adopted Ofgem's proposed adjustment for an estimate of past MAR values in the de-gearing calculation (conversion of observed equity beta to asset beta). This adjustment is flawed, contrary to finance text-book theory and inconsistent

[20] "The cost of equity for RIIO-2 Q4 2019 update, prepared for Energy Networks Association", Oxera, 29 November 2019, pages 49 and 50

with best practice. Even if it were defendable, the method double counts the performance wedge adjustment.

- **Debt beta**

  The debt beta captures the degree of correlation between the returns to debt-holders and the broader economy, analogous to the equity beta which captures correlated risk for equity holders. NERA have reviewed evidence on debt betas and recommend a range of 0 to 0.1 based on regulatory determinations and more recent estimates[21]. This range is further supported by evidence from Oxera[22] suggesting that a figure of 0.05 is more appropriate – but may still be too high - based on regulatory precedent and empirical analysis on utility debt.

  Provided the actual company gearing and assumed future notional gearing are relatively close, the debt beta that is assumed in the de-gearing and re-gearing calculations has relatively limited impact on the final notional equity beta, CAPM cost of equity, and overall allowed cost of capital, and so we have conservatively assumed a debt beta of 0.1 even though lower values could be justified.

- **Choice of comparators and beta disaggregation**

  When calculating the empirical values of observed equity betas, a key question concerns the choice of comparator companies whose equity beta values are to be measured. None of the UK utility listed companies commonly used have a range of business activities that perfectly match those of a standalone energy transmission network that will be subject to the RIIO-2 price control, which is the basis of the beta value that should be used for the forthcoming price control. Adjustments must be therefore made for differences in risk between observed company data and our network.

  National Grid's asset beta values are generally higher than those of the water companies, consistent with transmission networks having higher beta risk as we continue to invest in more complex, bespoke projects, remain exposed to more uncertainty due to the impact of decarbonisation and are subject to greater risk through greater reliance on digital assets. This supports an asset beta at the top end of the empirical range, in excess of 0.4 (using a debt beta of 0.1).

  In addition to this, the observed value for National Grid needs to be adjusted for variations in risk between its UK and US businesses. Ofgem suggested that it might be appropriate to exclude SSE from the sample because SSE it appears to be an outlier, as a result of its business mix and/or distinctly different gearing. However, an alternative way of improving the estimates is to consider National Grid's and SSE's beta values, and to disaggregate this into separate beta values for National Grid's UK and US activities and SSE's networks and retail businesses. The merits of this approach were recognised by Indepen in their report for Ofgem, and it is an approach which Ofcom adopt in relation to BT when setting price controls.

  The calculation can be undertaken using the observed betas of good comparators to National Grid's US business and SSE's retail business. US comparators have lower asset betas than National Grid Group, and thus the asset beta for National Grid's UK networks is correspondingly higher than the overall group beta. Previous work by NERA has shown the impact of this disaggregation on the estimate of UK asset beta to be significant. It is also possible to disaggregate SSE's group beta into its UK regulated

[21] "Review of Indepen report recommendations on beta estimation", NERA, 13 March 2019, page 22
[22] "Review of RIIO-2 finances: The estimation of beta and gearing", Oxera, March 2019 and "The cost of equity for RIIO-2 Q4 2019 update, prepared for Energy Networks Association", Oxera, 29 November 2019, page 39

and non-regulated activities, using the beta of Centrica as an estimate of the non-regulated element.

Using this approach, the resulting pure energy beta is higher than that estimated by Ofgem, at least backing up the use of the top end of the beta range if not going higher than the range used by Ofgem.

Empirical evidence

The empirical evidence from a range of studies and Ofgem's own analysis is generally consistent and suggests that an asset beta range of 0.41 to 0.44 (for a debt beta of 0.1)[23] would be a conservative asset beta range for a UK regulated energy network. Attaching more weight to the results that are derived from disaggregating group beta values would lead to higher values. Furthermore, there is a perception that since RIIO-1 utilities have operated in an increasingly uncertain political and regulatory environment with a potential for there to be more direct political intervention in the operation of the sector, the most extreme example being Labour's manifesto commitment to re-nationalisation. Whilst Ofgem is independent from political intervention, it is possible and even likely that regulatory uncertainty is influenced by the political environment. There is strong evidence that the increased risk is being considered by investors and is having an adverse impact on their valuation assessments. Given that the CAPM market beta is not sufficient to capture all of the risk premium, relying solely on the CAPM is likely to understate required returns for companies with significant exposure to such risks. In the absence of a benchmark that includes a factor for this uncertainty, a pragmatic adjustment is to select a beta point estimate towards the top end of the derived range.

Both Oxera and NERA have published reports which estimate an asset beta range for the regulated energy networks using asset betas for National Grid plc, SSE plc and three listed UK water companies – United Utilities, Severn Trent and Pennon, as well as extending this to a comparison of EU network data.

Taking account of the differences between the sectors, Oxera's most recent report suggests a range for asset beta for a UK regulated network (for a debt beta of 0.05) from 0.36 to 0.41, but then recommends use of a value in the top half of this range (i.e. 0.38 to 0.41) to recognise, amongst other things, that the CAPM market beta does not necessarily capture all of the systematic risk faced by energy networks. This is equivalent to 0.41 to 0.44 using a debt beta of 0.1.

NERA's April 2018 report[24] recognised that asset betas for UK network companies had ranged from 0.3 to 0.4 (for zero debt beta), but with National Grid's group beta in the upper half of the range and SSE's beta generally above the range. NERA's later report[25] proposed a range for asset beta from 0.40 to 0.45 (for a debt beta of 0) for RIIO-2, recognising information for European companies and the effect of disaggregating National Grid's Group beta.

In addition, the average asset beta values that were included in Ofgem's SSMD, assuming the MAR and fair value of debt adjustments are not used, range between 0.37 and 0.46 for a debt beta of 0.1. The higher observed asset betas for energy networks compared to water companies can also be seen in this sample.

Based on these asset beta figures, our estimate of the notional equity beta that should be assumed at a notional RAV gearing of 60% is 0.90 to 0.95. As a sense-check, these values are broadly consistent with the values that were used for transmission networks in RIIO-T1.

[23] Equivalent to 0.38 to 0.41 for a debt beta of 0.05
[24] "RIIO-T2 Beta and Risk Assessment", NERA, prepared for National Grid, 30 April 2018, Section 2.2
[25] "Review of Indepen report recommendations on beta estimation" prepared for National Grid, page (v), NERA, 13 March 2019

7.1.5 Allowed vs expected returns

We make no further adjustments to the cost of equity calculated from the CAPM, whereas Ofgem propose a downward adjustment of 50 basis points to the allowed equity return to reflect its expectations that companies will outperform the targets that it sets. This adjustment is conceptually and practically flawed.

From a conceptual perspective, the justification confuses windfall gain from poor price control setting and outperformance from incentives. If the wedge is meant to apply to windfall gain, then this suggests lack of confidence in proper calibration of the price control even before it has been attempted. This cannot be the case. Ofgem has adequate tools and data to be able to achieve this and is also proposing to introduce Return Adjusting Mechanisms to deal with any significant windfall gains or losses if they were to arise.

If instead, the wedge is being introduced in relation to outperformance from incentives, then the approach does not recognise and appreciate the consumer benefit of incentives-based regulation, the widely-accepted solution to the existence of monopoly. In this model, expected return will differ from allowed return to the benefit of consumers. To converge the two would result in a reversion to rate of return regulation and undermine the behaviours that drive dynamic efficiency which has driven huge benefit to consumers over the last 25 years.

Practically, little evidence is offered for the existence or quantum of the outperformance wedge. To further this point, the proposed 50 basis points wedge can be directly translated into an additional annual totex efficiency of between 5% and 14% for each network, with companies being impacted in a non-uniform way. For example, the figure for our electricity transmission business would be 7%. This differential would appear unjustified and more fundamentally, any such totex adjustment would need to be justified with evidence before being applied. This is the same for the outperformance wedge. No such justification has been provided for the outperformance wedge and it will have serious negative consequences for sector confidence and incentives on management if applied. The proposed outperformance wedge has not been included in our proposed cost of equity range.

7.1.6 Cross checking the CAPM estimate of the cost of equity

The primary method used to estimate the cost of equity should remain the CAPM, because it has the strongest theoretical basis. Other methods, though may be worth considering as cross-checks of the CAPM result, given the degree of subjectivity involved in estimating the input parameters of the CAPM model. However, the differences in the risk environment would still need to be considered in setting an appropriate range. It should also be noted that some comparisons might provide an absolute floor to the return but do not actually inform the realistic range for the cost of equity.

The following cross checks are informative, and as explained below these provide support for the cost of equity that adopted in this plan, if not higher values:

- the Dividend Growth Model estimates of the cost of equity for individual listed network companies;
- an assessment of the risk differential between the asset risk premium and debt risk premium; and
- regulatory precedent.

DGM estimates for individual listed utilities

As previously shown by Oxera[26], the raw estimated cost of equity values from applying DGM models on a single company basis to National Grid and the listed UK water companies have generally been above 8% nominal even before adjusting for differences between actual gearing and assumed notional gearing and differences between National Grid's UK and US businesses. Oxera's latest report for the ENA includes more up to date estimates as shown in the table below in the August 2019 column.

Table A15.11: DGM estimates for listed utilities

Nominal values	November 2017	August 2019
National Grid	8.9	9.3
Pennon	8.4	9.2
United Utilities	8.7	8.9
Severn Trent	7.7	8.3
Average	8.4	8.9

Given that energy networks would be expected to have higher risk and thus need higher returns than water companies, these DGM values suggest that the allowed equity return for energy networks in RIIO-2 needs to be some way above 8.9% nominal (equivalent to 6.8% real assuming 2% CPI).

Asset Risk Premium to Debt Risk Premium differential

A cross-check can be applied to the cost of equity that draws on evidence from debt markets to ensure that the allowed returns set by the regulator for equity are commensurate with the risk associated with operating and owning the associated assets.

This test is related to the required differential between the asset risk premium and debt risk premium[27]. On this basis, Oxera's analysis indicated that the cost of equity should be at least 2% higher than Ofgem's working assumption in the December 2018 consultation before, i.e. at least 6.5% real relative to CPI. Oxera have revisited their approach in their updated (November 2019) report and show that their estimated cost of equity range (5.98% to 7.09%) implies a differential between the asset and debt risk premium that falls across the middle of the empirically observed distribution of the ARP–DRP differential observed for the bonds issued by UK utilities. This suggests that the cost of equity range should be at least consistent with Oxera's range, if not higher.

Regulatory precedent

Last but by no means least, Ofgem's cost of equity working assumption of 4.3% seems inconsistent with past regulatory precedent, both Ofgem's own, with the CMA, and even with Ofwat's PR19 (even though a relative risk assessment would show that energy networks would be expected to have higher risk and so higher allowed return than water networks). The most recent precedents from other regulators should not, though, be seen as

[26] "The cost of equity for RIIO-2: A review of the evidence", Prepared for Energy Networks Association, Oxera, 28 February 2018, Section 5.2

[27] The asset risk premium is the additional compensation over the RFR that investors require to invest in a company as a whole. This is the premium for equity risk assuming zero gearing and should be higher than the risk premium on debt given the lower priority of equity relative to debt in terms of claims on cash flows.

independent cross-checks that can give meaningful support to Ofgem's estimates, as they have been influenced by common references (such as the UKRN cost of capital report) and advice from a small group of advisors, leaving them exposed to the risks of 'groupthink'. It does not seem credible that a reduction in allowed return between RIIO-1 and RIIO-2 from 8% (CPI stripped for comparison, equivalent to 7% relative to RPI) to 4.3% can properly reflect any changes in the underlying network risks or market environment. This reduction is a consequence of significant changes in Ofgem's approach to estimating certain parameters. These not only break with precedent but undermine the commitments to regulatory certainty which were made by Ofgem when RIIO was first introduced, in recognition of the benefits that this certainty ultimately brings for consumers.

7.2 Cost of debt

The cost of debt allowance in a price control is set to remunerate companies for the cost of debt that would be expected to be incurred by a notional efficient network company[28]. The best estimate of this efficient cost of debt is likely to be based on a trailing average of market rates. By updating this trailing average each year, the resulting cost of debt estimate is an average that applies both to existing debt and new debt that is raised during the price control. This 'full indexation' approach was used during RIIO-1.

Given the similarities across the four energy network sectors (gas and electricity, transmission and distribution), the efficient cost of debt would be expected to be same across the sectors, so the same trailing average should be used. The length of this trailing average should be broadly consistent with how long ago the debt of these networks was issued. In RIIO-1, a 10-year trailing average was used, but the companies across the energy sectors have actually issued debt with broadly the same average tenor of around 20 years. This would suggest that the cost of debt in RIIO-2 should be based on a 20-year trailing average of market rates.

However, Ofgem have said (in the SSMD) that the specific cost of debt indexation to be used in RIIO-2, specifically the length of trailing average, will be calibrated to ensure it provides a good estimate of efficient sector debt costs. Given that the number of companies in the ET sector is small, a calibration against the transmission sector alone would involve a comparison against just two other networks which are somewhat atypical, effectively collapsing to a company-specific or pass-through mechanism which Ofgem has already rejected for good reason. Any meaningful calibration would instead need to be made using a much wider sample of energy networks, and so should be carried out by comparing different lengths of trailing average of the chosen market index (iBoxx) with the anticipated average cost of debt in the relevant years across all network sectors together (ET, GT, ED and GD). Several studies have made this comparison and taken together they suggest that for RIIO-2 a 15-year trailing average might be justified. This is the approach that we propose and have adopted in this plan.

The market indices from iBoxx which are used in this trailing average index mechanism are nominal yields, and so must be adjusted for inflation in order to give values that can be used in a real CPIH-linked price control. We consider that the Bank of England's 2% CPI inflation target, this target having applied since 2003, should be used to deflate the iBoxx index values in this way.

The future cost of debt allowances under a trailing average index mechanism cannot be known in advance, as they depend on the outturn values of the index in the coming years. However, based on currently available information, we have estimated the future level of cost of debt allowances for the years of RIIO-T2 under our proposed approach. This gives

[28] Consistent with this, in the Sector Methodology Decision, Ofgem affirmed that the cost of debt allowance should be an estimate of the 'return debt investors expect from an efficiently run company, including both embedded debt raised prior to the price control period and new debt raised during the price control period.'

the values that are shown in Table A15.12, which also shows Ofgem's current working assumption.

Table A15.12: Current estimates for allowed cost of debt in RIIO-2

	2022	2023	2024	2025	2026	RIIO-2 average
Ofgem working assumption (CPI -stripped)	2.03%	1.96%	1.91%	1.88%	1.86%	1.93%
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

The National Grid values are calculated based on the indices as at 29th March 2019 and exclude transaction and liquidity costs.

In their SSMD Ofgem stated that they "invite networks to submit evidence of transaction and liquidity costs", recognising that in their view the evidence points to a reduction in the benefit network companies enjoy in issuing debt relative to the iBoxx (the "halo effect"). Work performed by NERA on behalf of the ENA[29] identified additional borrowing costs related to the premium to issue new debt, transaction costs or costs associated with maintaining sufficiency of financial resources and the costs on networks of managing the CPI to RPI basis points risk. In total, NERA's analysis produced a range between 53bps and 82bps, with a mid-point of 68bps.

In calibrating the appropriate level of additional borrowing costs that should be recovered we have noted that Ofgem's proposed calibration cross check methodology already includes the benefit of any halo effect, should it exist, and therefore cannot offset additional borrowing costs incurred by networks which are not captured in the iBoxx indices. We therefore propose that the 68bps midpoint is used to fund networks for additional borrowing costs, representing the additional borrowing costs expected to be borne by a notional efficient network company.

7.2.1 Principles and rationale

The allowed cost of capital in a price control depends not just on the allowed cost of equity but is also reliant on setting a cost of debt value that is appropriate for a notional, efficient company. In relation to allowances for financing costs, this creates the reasonable expectation that networks will, on average, be able to recover their efficiently incurred financing costs.

The cost of debt allowance should therefore be set to reflect the cost of debt that would be expected for an efficient, notionally geared network company that follows a typical, prudent and efficient debt financing strategy. Such a strategy would involve the notional network borrowing gradually over time, issuing long-term bonds as it goes along. Thus, in any given year its balance sheet will contain debt issued over many previous years, in addition to the new debt it might issue to finance that year's activities and re-finance past debt that is maturing.[30] For such a notional company the best approximation for the efficient cost of debt is likely to be a trailing average of market index rates.

[29] "Halo Effect and Additional Cost of Borrowing at RIIO-2, A Report for ENA", NERA, 26 September 2019

[30] The profile of borrowings that would result from this strategy is not expected to be a perfect representation of actual company debt strategies, and the actual profile of borrowings for individual companies will inevitably depart from this idealised profile for a number of reasons. For example, companies might choose to raise debt less frequently to reduce issuance costs. However, the resulting differences in timings would not be expected systematically or on average to increase or reduce borrowing costs relative to the theoretical /conceptual profile described, so it is not clear why consumers should be exposed to these differences or the risks related to individual companies' decisions.

We support the policy objectives which have been set out by Ofgem for RIIO-2, namely that:

- consumers should pay no more than an efficient cost of debt
- the cost of debt allowance should be a fair and reasonable estimate of the actual cost of debt likely to be incurred by a notionally geared, efficient company
- companies should be incentivised to obtain lowest cost financing without incurring undue risk and
- the calculation of the allowance should be simple and transparent while providing adequate protection for consumers.

A full indexation mechanism that is based on a suitable trailing average of market rates, as introduced for RIIO-1, is the right approach to deliver these objectives. It means that companies are responsible for any costs which arise from differences between their own borrowing profile and capital structure and the assumed typical profile and structure, and so protects consumers from the individual financing decisions that companies have taken. It also ensures customers do not pay more than necessary if the costs of debt that are typically observed in the financial markets fall during the price control period as they have during the RIIO-1 period, whilst supporting the financeability of network companies if the cost of debt rises.

In determining our approach for RIIO-2, we have considered how the existing RIIO-1 indexation mechanism should be modified to ensure it reflects the cost of debt that would be expected for a notional, efficient company. In this draft plan, we have proposed a full indexation mechanism which meets the policy objectives, could be applied consistently across the energy industry networks (electricity and gas, transmission and distribution) and is based on an independent benchmark.

The sections below set out in more detail the basis on which we propose that cost of debt allowances should be set for RIIO-2, which include some refinements to the existing indexation mechanism that was used in RIIO-1.

Proposed full indexation mechanism, including length of the trailing average period and the preferred reference benchmark

We support the continued use of the 'A' and 'BBB' iBoxx 10+ non-financials indices, as used in RIIO-1. These indices have the benefit of being based on a large number of bonds from different companies and so are more reliable than other indices which are based on a smaller number of bonds[31]. There is no additional evidence or a better alternative index to suggest that a move away from the iBoxx non-financials 10+ indices would better represent the debt costs of an efficient notional energy network company.

In estimating the future cost of debt allowance in RIIO-2, we have used the average of the iBoxx A and BBB 10+ non-financials indices, consistent with the approach in RIIO-1. This is a reasonable credit rating for Ofgem to target when setting the price control, as it implies that the notional network would have some financial capacity to withstand risks which might materialise whilst still maintaining an investment grade rating consistent with network companies' licence obligations and is also consistent with recent regulatory precedent set by Ofwat and with the current rating of the vast majority of our peers. Reducing credit ratings for the energy network would also add additional risk at a time when networks are being asked to invest to meet the governments net zero targets and when much of the industry is on negative outlook.

[31] Ofgem and Ofwat have previously considered different reference indices including those published by Bloomberg and concluded that the iBoxx indices provide a suitable benchmark that is representative of the networks, whereas the other indices have drawbacks. See for example "Decision on strategy for the next transmission and gas distribution price controls - RIIO-T1 and GD1 Financial issues", Ofgem, 31 March 2011, paras 3.30 to 3.37

Given that companies across all the energy network sectors (gas distribution, gas transmission, electricity distribution and electricity transmission) have issued debt with broadly the same average tenor and all are investing in similarly long-life assets under the same regulatory framework, there is no good reason why debt costs or cost of debt allowances should differ across the sectors for the notional companies[32]:

- the conceptual basis for using a trailing average index applies equally across all sectors. The rationale is that it allows the cost of appropriately rated long-term debt, if raised in equal amounts each year, to be recovered through allowed revenues
- this profile of debt raising is not intended to be a precise model of the actual debt that has been raised for any individual company, but a plausible model of efficient funding for a typical network operator, consistent with Ofgem's stated objective of setting a cost of debt allowance that is a fair and reasonable estimate of the actual cost of debt likely to be incurred by a notionally geared, efficient, energy network company
- there are also no fundamental differences between the sectors that would justify the cost of debt allowances being different. Networks share the same industry, regulatory frameworks, political risks, financial market, and target credit rating for the notional network company.

These observations are also supported by analysis of the debt instruments that have been issued by different networks. After adjusting for credit ratings, which will reflect corporate capital structure choices, and the tenor of individual debt issuances, the cost of new debt is generally very similar for all network companies. Therefore, after adjusting for these factors, the apparent variations in debt costs between networks and sectors is largely down to when they chose to issue debt.

This reasoning, which supports use of the same cost of debt index across all four energy network sectors (as well as supporting, for the proposed calibration cross-check, a comparison of expected debt costs under the proposed mechanism with the average debt costs across the networks in all four sectors), was not properly addressed in Ofgem's SSMD. Ofgem's first objection to this approach was that Ofgem were unable to include ED in the cross-check because business plans for the ED sector would not be available. However, a plausible rate of change of RAV for ED can be proposed, and the amount of existing debt in the ED sector that will mature during these years is known to Ofgem, so the overall average borrowing costs across all four sectors from 2021 to 2026 will be relatively insensitive to the rate of change of the ED RAV that is assumed in these years. Any uncertainty that this could cause would be expected to be small in proportion to the benefit, in terms of much more robust and defensible estimates, from including a much larger number of companies in the industry average costs used for the calibration check.

Ofgem also suggested, at paragraph 2.23 in the SSMD, that "*The approach of setting sector wide cost of debt allowances (except for specific exceptional circumstances) pre-dates RIIO* ...". However, the references quoted by Ofgem do not really support the propositions made, and in any case the approach to setting cost of debt in price controls prior to RIIO actually supports the use of the same trailing average mechanism in all four energy network sectors. This is because, whilst the allowed cost of debt interest rate in these early price controls might have been different for different sectors, these differences principally reflected the different timing of the price controls in different sectors. The approach to setting cost of debt allowances that was used was, though, in each case substantively the same, being based on "*the principles for setting the cost of debt and the evidence available at the time*"[33] and the need, for example, to "*balance the spot rates for the cost of debt, the ten year trailing*

[32] Assuming the price controls across the different sectors are being set on a broadly similar basis, with similar notional gearing assumption, and targeting a similar credit rating on a notional basis for each.
[33] "RIIO-2 Sector Specific Methodology Decision – Finance", 24 May 2019, Ofgem, paragraph 2.25

average, and the long-term averages"[34]. Since RIIO now adopts a trailing average index for setting the cost of debt, the cost of debt allowance varies each year, and if the index mechanism is designed properly it should in each year just reflect a fair and reasonable estimate of the actual cost of debt likely to be incurred by a notionally geared, efficient company, rather than depending on the date at the last price control was actually set.[35] The cost of debt index mechanism and cost of debt allowance should therefore be the same in each sector in each year.

In the SSMD (Para 2.26) Ofgem rejected a company-specific approach to cost of debt allowances on the grounds that "*consumers in different locations should not be exposed to paying different charges due to different financing risk strategies of management and/or shareholders*." It is obvious that the same reasoning applies when considering different network sectors, i.e. the customers of the different energy network sectors should not be exposed to "*different financing risk strategies of management and/or shareholders*". A reasonable estimate of the efficiently-incurred costs for a notional efficient network company should therefore be the same in all sectors. In contrast, a cost of debt allowance that was based (either directly or indirectly via the proposed 'calibration' check) on a sector specific average cost could lead to substantially different allowances across the sectors with customers and consumers bearing very different financing costs for use of similar assets and services. This would not be consistent with the principle that the cost of debt allowance should be a fair and reasonable estimate of the actual cost of debt likely to be incurred by a notionally geared, efficient company, nor with the principle that consumers should pay no more than an efficient cost of debt. Therefore, the same trailing average index mechanism should apply to the networks in all the ET, GT, ED and GD sectors, and any calibration of the proposed index should be made against the average debt costs across all 4 sectors.

Companies across all the energy sectors (gas distribution, gas transmission, electricity distribution and electricity transmission) have issued bonds with broadly the same average tenor of around 20 years[36]. The following table shows the projected average age and remaining length of existing energy network bonds as at 31st March 2021.

[34] "Gas Distribution Price Control Review Final Proposals", Ofgem, 3 December 2007, Para 9.11
[35] Note that if the same index mechanism, i.e. same length of trailing average, is applied in all 4 sectors, the eventual outturn average cost of debt across RIIO-ED2 will still be different from that in RIIO-T2 and RIIO-GD2, because it will involve averaging across different years, i.e. 2023-2028 instead of 2021-2026. The differences in allowed cost of debt between sectors in the price controls prior to RIIO which Ofgem point towards are much more comparable to these 'timing effect' differences, than to the impacts of setting cost of debt allowances in a different way in different sectors, as Ofgem claim.
[36] See for example "Consultation on strategy for the next transmission and gas distribution price controls - RIIO-T1 and GD1: Financial issues", Ofgem, December 2010, Figure 3.5; "RIIO-ED1: Draft determinations for the slow-track electricity distribution companies Financial Issues", Ofgem, July 2014, para 2.36; Figure 15 in the CMA's Final Determination of the Appeal by British Gas Trading of RIIO-ED1; and Figure 1 in "RIIO-2 Sector Specific Methodology Decision – Finance" published by Ofgem in May 2019.

Table A15.13: Average age and remaining length of existing energy network bonds

	Avg remaining life at 31/3/2021	Avg age at 31/3/2021	Avg maturity at issuance
NGET	13	10	23
NGG	15	16	31
NGG + NGET	14	12	26
GD (excl Cadent)	10	11	21
DNO	11	11	22
Industry	12	10	22

This table shows that the average age for the existing network bonds is broadly consistent at around 10 years with an average remaining life of around 10 years[37] (albeit the average age and remaining life in the transmission sector is actually slightly higher than in distribution, which would if anything support a longer trailing average for transmission if it was considered separately.) This provides a strong conceptual basis for the future use of a 20-year trailing average index in RIIO-2 for each of the energy network sectors, and this would allow the cost of appropriately rated 20-year debt, if raised in equal amounts each year, to be recovered through allowed revenues. It is also worth noting that 20 years is not only broadly consistent with the average length of energy network debt, but also with the average duration of debt that is included in the iBoxx non-financials 10+ index at around 20 years.

Therefore, the starting point for setting an appropriate cost of debt allowance is to base this on a 20-year trailing average of the iBoxx A and BBB non-financials indices.

The next stage of the process which Ofgem intend to follow is to calibrate the proposed index to ensure it provides a good estimate of the efficiently-incurred debt costs for an energy network, by comparing estimates of the cost of debt allowance for the proposed index during the forthcoming price control to estimates of the cost of debt of the network companies during those years. As explained above, this cross-check should be made to the average cost of debt across the networks in all four energy network sectors (ET, GT, ED and GD).

Ofgem's SSMD has highlighted that in carrying out this cross-check several issues need to be considered:

- treatment of Cadent debt – Ofgem accept that including Cadent's debt costs within the cross-check would distort the results, unless a suitable adjustment is made, although a simpler alternative might be to exclude Cadent's debt costs for the purpose of the calibration (SSMD paragraphs 2.51 and 2.52),
- treatment of past debt refinancing costs – past refinancing costs need to be taken into account, as otherwise consumers would benefit from the reduced interest rate achieved through re-financing without incurring any of the associated refinancing costs. Such an outcome would clearly be unjustified, and it could also have unintended effects, such as

[37] This would be consistent with equal amounts of debt having been issued each year, i.e. 20 years ago, 19 years ago, 18 years ago, ..., 3 years ago, 2 years ago, and last year.

discouraging networks from some future decisions which might have reduced financing costs and thus benefitted consumers.

- whether debt costs should be considered on a pre- or post-derivatives basis
- the need to include some floating rate and shorter dated debt, as well as the industry's bond debt which has an average tenor of c.20 years.
- the need to provide a separate allowance for other borrowing costs (such as transaction and liquidity costs) which are not included in the iBoxx indices.

Derivatives and swaps should not be included in this assessment as they were taken out by companies in the expectation that they, rather than consumers, would be exposed to the risks and impacts of these. Consistent with Ofgem's discussion of debt sharing in the SSMD, it would be wrong to start to take account of derivatives and swaps now as this risks "*retrospective capture of decisions or risks taken in previous price controls ..., and that in turn could call into question regulatory stability.*" Ofwat have also considered this issue[38] and explain why they think swaps should be excluded: "*their bespoke nature makes it difficult to make comparisons and assess if they have been efficiently incurred. We maintain our 'early view' position that shareholders – not customers – should bear the risks and rewards of swaps*." In any case, there would appear to be little if any overall benefit to consumers if derivatives across all the energy network sectors were included, and it would clearly be unjustified and unacceptable to include a subset of derivatives (e.g. in some sectors) which benefit consumers but not those which would increase costs to consumers.

Several studies by consultants[39] have sought to show the results of this calibration cross-check, and the results are summarised in Tables A15.14 and A15.15, which show the implied length of trailing average of iBoxx A and BBB non-financial 10+ indices which would give the closest match to the projected future debt costs in RIIO-2:

Table A15.14: Results of industry wide calibration cross checks performed by Centrus on behalf of National Grid

	NGET	NGG	NGET + NGG	GDN	DNO	Industry
Centrus (excluding debt buybacks)	10yrs	15yrs	11yrs	13yrs (excl Cadent)	20yrs	13yrs
Centrus (including all debt buybacks)	13yrs	>20yrs	20yrs	13yrs (excl Cadent)	20yrs	15yrs

Note: Data in this table excludes the impact of additional borrowing costs such as transaction and liquidity costs

[38] "PR19 Draft Determination Cost of Capital Finance Annex", , Ofwat, July 2019, Table 4.4
[39] "Cost of debt in RIIO GD2: A report prepared for NGN", Frontier Economics, March 2019; and "Cost of debt at RIIO-2: A Report for ENA", NERA, 14 March 2019.

Table A15.15: Additional results of calibration cross checks

	NGET+NGG	GDN	DNO
Frontier – excluding derivatives & excluding Cadent		13 years (or 11-15 year trombone)	
Frontier – including derivatives & excluding Cadent		15 years (or 13-17 year trombone)	
NERA – excluding derivatives	c. 15 years	14yrs (incl Cadent 'cost of refinancing'	≥20 yrs
NERA – including derivatives		16yrs (incl Cadent 'cost of refinancing'	≥20 yrs

Notes:

1) Data in this table excludes the impact of additional borrowing costs such as transaction and liquidity costs
2) NERA's estimates of under/out performance relative to the current index mechanism are converted to a required length of trailing average using the sensitivity of the average during RIIO-2 to different lengths of trailing average as calculated by Centrus and Frontier.

These tables show that these previous studies have all shown that if the 10-year trailing average that is used in RIIO-T1/GD1 was used again in these sectors for RIIO-2, it would fail to fund the actual debt costs that the companies would be expected to incur. The calibration suggests that, once buy-backs are taken into account, a 15 year trailing average would better match the expected future debt costs, whether considering transmission only, transmission plus gas distribution, or all four sectors together. In conclusion whilst the analysis of the length of bonds issued by networks would suggest the trailing average should be 20 years in length, this calibration (which also takes other forms of debt into account) suggests the length of the trailing average might be reduced towards 15 years. This is the length of trailing average that we propose for RIIO-2 and have used in this plan.

The need to adjust the chosen index to reflect the impact of the halo effect, debt issuance costs and company specific circumstances

The iBoxx indices are based on observed yields for the debt which makes up the indices, and so they do not include all the costs that are incurred in raising debt and financing networks, such as the premium to issue new debt, transaction costs or costs associated with maintaining sufficiency of financial resources. Ofgem has in the past suggested that these costs do not need to be separately funded because they are offset by the 'halo effect'. This is a term which refers to the ability of energy networks, in the opinion of Ofgem, to raise debt more cheaply than the market index that forms the basis of the cost of debt allowance. More recent evidence suggests that this 'halo effect', if it exists at all, is now small, and so in RIIO-2 the trailing average index will need to be adjusted to take account of liquidity and transaction costs. In their SSMD Ofgem stated that they "invite networks to submit evidence of transaction and liquidity costs"

In any case, if the length of the trailing average is set using the proposed calibration cross-check described above (rather than simply using a ≥20-year trailing average to be consistent with the observed average age and tenor of debt issued in each network sector), any halo effect is already taken into account automatically in deciding on the appropriate length of the trailing average, and so the additional transaction and liquidity-related costs (which are not included in the iBoxx index) are not offset at all by any halo effect and instead need to be separately provided for in full.

Work performed by NERA in their paper "Halo effect and additional costs of borrowing at RIIO-2: A report for the ENA", identified additional borrowing costs associated with transaction costs, liquidity costs, costs of carry, new issue premium and CPI costs that are incurred by network companies but that are not included in the iBoxx index values used in the calibration cross-check. In total the report identified that these costs ranged from between 53bps to 82bps. To reflect the additional borrowing costs that a notional efficiency network company would incur, we have included additional borrowing costs of 68bps, the midpoint of the range identified by NERA, in our proposed cost of debt allowance.

Proposed mechanism for deflating the nominal iBoxx indices

The nominal iBoxx indices provide a measure of the yields on nominal bonds of a given rating, and so need to be deflated by a suitable inflation measure in order to give a cost of debt that can be applied in a price control which is set in terms where the effect of inflation is stripped out. If future price controls starting with RIIO-2 are to be linked to CPIH, as Ofgem have proposed, the nominal iBoxx indices will need to be deflated by an estimate of expected future CPIH inflation.

As there are no widely accepted reputable values of expected future CPIH, the nominal iBoxx index values will need to be deflated using values that are based on the expected level of future CPI, although the CPI values used should be adjusted to take account of the anticipated difference between CPI and CPIH. These CPI values should be based on independent published values and can use either the CPI values for the furthest ahead horizon in the OBR's Economic and Fiscal Outlook publication which had been published most recently prior to each relevant day, or on the long-term CPI forecast which has in recent years been published in the OBR's Fiscal Stability Report. However, given that both these values have in most cases matched the Bank of England's CPI inflation target of 2%, it would be simpler to use the 2% target itself, adjusted to reflect the CPI-CPIH wedge as appropriate, to deflate daily nominal iBoxx values to calculate the daily cost of debt values on a 'real' basis.

Using this 2% inflation target, the 20-year trailing average of the relevant iBoxx index/indices can be deflated from nominal to real (relative to CPI), to give values for the cost of debt allowances that are updated annually. This is the approach that has been assumed in this plan.

7.3 Overall weighted average cost of capital (WACC) and gearing

The overall WACC that is set for a price control is an estimate of the cost of capital for the notional network, and so is a weighted average of the allowed cost of debt and cost of equity for the notional network company, where these are weighted using the notional gearing which was assumed in estimating the cost of equity and cost of debt. Using the values for cost of equity, cost of debt and notional gearing in this plan, the overall WACC is 4.4% real relative to CPI.

Table A15.16: Ofgem working assumptions and National Grid Business Plan Values for WACC in RIIO-2

Real, relative to CPI	Ofgem Working Assumption	National Grid's Business Plan Assumption
Assumed notional gearing	60%	60%
CAPM Cost of Equity	4.8%	6.5%
Expected – Allowed 'wedge'	-0.5%	N/A
Allowed cost of equity	4.3%	6.5%
Assumed Cost of Debt	1.93% (T2 average)	[redacted]
Vanilla WACC	2.88%	4.36%

The cost of equity increases as gearing increases as does cost of debt, albeit for relatively small changes in gearing the cost of debt can be assumed to be fairly steady. As a result, provided the appropriate changes are made to allowed cost of equity for changes in the assumed notional gearing, the calculated allowed WACC is found to change little with changes in gearing, except where gearing changes significantly. This result is consistent with accepted finance theory[40] and has been recognised by both Ofgem and the CMA in earlier price controls.

In this plan, we have assumed a notional gearing of 60%, consistent with Ofgem's working assumption for RIIO-2. The choice of notional gearing is informed by the discussion of financeability in Section 8, Financeability assessment, and needs to achieve balance and consistency between the riskiness of the cashflows, notional gearing and equity beta. Whilst the overall Vanilla WACC is relatively insensitive to the assumed notional gearing, use of the same notional gearing in the above table simplifies the comparison of the values shown.

7.4 Other finance issues

There are a number of other financial issues outside of the cost of capital calculation which need to be addressed:

- regulatory depreciation and economic asset lives;
- capitalisation rates;
- fair returns;
- taxation; and
- pension scheme established deficit funding.

7.4.1 Regulatory depreciation and asset lives

Regulatory depreciation of the RAV does not correspond to a physical asset base but rather to the network's unrecovered financial investment and retained performance. Whilst, not directly linked to physical assets, the technical and economic lives of the current asset base provide a useful reference against which to review the regulatory depreciation profile which

[40] This result is often attributed to Modigliani and Miller

directly impacts the depreciation charge. The charge should reflect the benefit consumers derive from the network services they receive and have regard to intergenerational fairness of the associated charge.

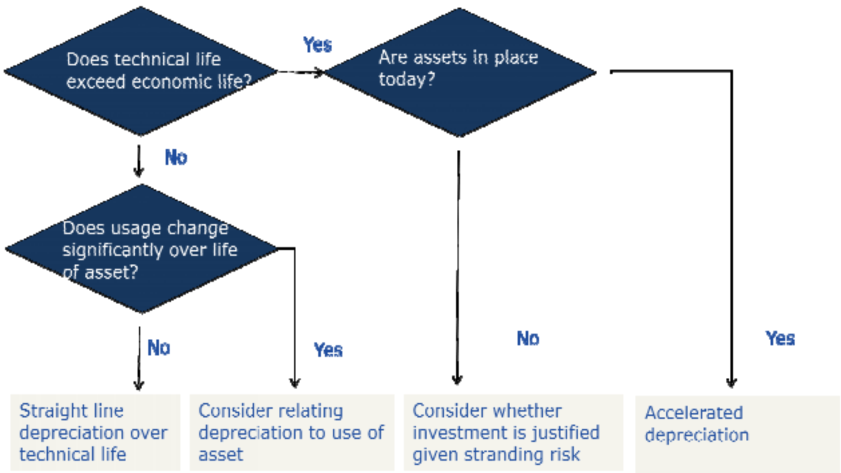
There are two aspects which determine the regulatory depreciation profile:

- the length of time over which the investment is to be recovered (the regulatory asset life); and
- the rate at which depreciation is charged; that is the phasing of the costs charged to customers over the asset life.

Methodology to assess regulatory depreciation profile

Our procedure to assess the regulatory depreciation profile is to:

- understand future demand scenarios to inform potential economic life of the physical assets;
- review the technical and accounting asset lives and depreciation profiles of the current asset base;
- reference to the methodology below which was used prior to the implementation of RIIO-1 as an initial tool to identify alternative regulatory depreciation profiles of the RAV;



- test the correlation of the alternative depreciation scenarios against the technical and accounting financial asset lives;
- assess the consumer bill impact under the range of depreciation and demand scenarios; and
- review the appropriate timescale for implementation.

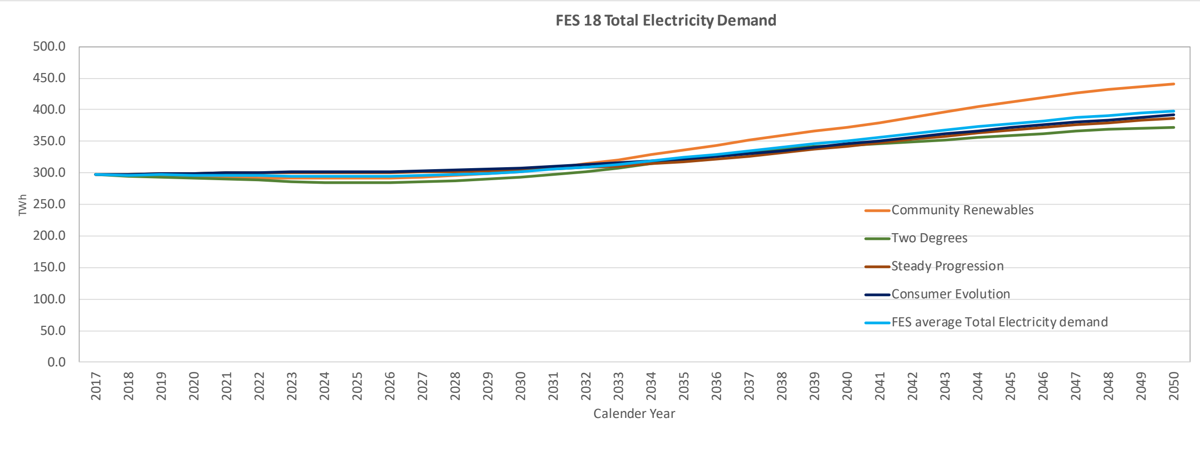
Assessment of T2 depreciation profile

The current T1 regulatory depreciation profile is based on a 45-year regulatory asset life and a straight-line depreciation profile.

- <u>Understand the future demand scenarios to inform potential economic life</u>

  The Future Energy Scenarios 2018 (FES18) demand scenarios indicate continuity in the total electricity demand over the immediate future with all showing an increase in the medium- to long-term.

Figure A15.10 : Electricity demand under the four FES18 scenarios



- Review of the technical and accounting asset lives to identify alternative regulatory asset lives

  Investment in the electricity network is forecast to continue at absolute and work mix levels which we consider will not significantly change the technical or accounting lives of the overall asset base.

Our conclusion is that there is no clear evidence that technical life will exceed the economic life of NGET's physical assets. There is also no anticipated change in the use of the assets for at least the next six price control periods. Our view, therefore, is that continuation of the regulatory asset life and depreciation profile adopted in T1, being straight-line depreciation over 45 years, remains appropriate.

7.4.2 Capitalisation rates

Currently, the T1 framework uses a single capitalisation rate for expenditure on outputs captured in the baseline plan whether non-variant or within the uncertainty mechanism framework. We have carried out a review to understand whether a benefit would arise as a result of applying a split capitalisation rate to address concerns arising due to uncertainty of investment programmes whilst also taking into account investor feedback regarding preference for a transparent price control framework which does not introduce unnecessary volatility.

Our view is that a single capitalisation rate is favourable due to the simplicity of application and explanation. Use of a split rate does not necessarily introduce greater accuracy and adds additional complexity to the framework without significantly reducing earnings volatility.

The capitalisation rate is calculated based on the baseline plan which includes non-variant totex spend, non-zero elements of variant spend plus associated real price effects. The calculation excludes pre-construction spend. Pre-construction spend is categorised as load-related capex in our business plan submission. This is in line with the investment being treated as capital expenditure from an accounting perspective. However, we consider at this stage that accounting standards require that should the construction not go ahead, for example, in accordance with changes in the Network Options Assessment, or be completed by an alternative provider as part of the competition framework, the pre-construction spend remaining on the balance sheet will be expensed to the income statement. Given the current uncertainty around the competition framework, we therefore remove the pre-construction spend of £181m from the capitalisation rate calculation.

Based on our business plan submission, this results in 79.55% being treated as slow money and 20.45% as fast for the electricity transmission owner totex. The exclusion of pre-construction spend from the calculation decreases the proportion of slow money by 0.5%.

7.4.3 Fair returns

In Section 8, Financeability assessment, we will include our assessment of the equity investor proposition to include the likely RoRE ranges based on a range of plausible outcomes.

To be considered a 'fair deal', there is an expectation that networks have a roughly equal chance of out and underperforming. The framework, as currently proposed by Ofgem, is unlikely to deliver a fair deal on the basis that the RoRE range is likely to be skewed to the downside since the financial rewards that may be assumed may not be achievable. This is because:

- Penalties are likely to exceed rewards for non totex incentives through the potential application of dynamic targets within the price control period, as well as the potential for more downside only incentives.
- More stretching price control deliverables are being proposed with asymmetrical treatment of under / over delivery. Combined with a proposal to not fund work which delivers outputs in future price controls, the downside risks borne by networks will be significantly higher than any potential upside.
- If a distinction is made between expected and baseline allowed returns as proposed, a 50bps outperformance wedge would imply savings against allowances in the order of 7%. This is akin to setting a stretch efficiency target which in itself is extremely challenging to achieve, it is unlikely therefore that the scope would exist to create further totex outperformance opportunities.

To allow a fair deal to be calibrated we follow a clear and transparent process in the assessment of risk and its allocation to the appropriate party. Companies should be remunerated for the risks allocated to them and incentivised to manage the probability of their occurrence. In developing the complete regulatory framework, Ofgem have a range of regulatory tools which can be used to ensure challenging price control allowances are set to capture frontier efficiency levels in the sector and incentives are set to improve customer outcomes beyond levels which are currently considered possible.

Despite this we are pragmatic in acknowledging the benefit a Returns Adjustment Mechanism could provide but it should not be used as a way of clawing back genuine, network driven performance. Instead its remit should be limited to the protection of both consumers and investors from unforeseen circumstances which neither we nor Ofgem could anticipate at the time of setting the price control, creating the potential for much higher or lower than acceptable rates of return. Once the framework is more fully developed, the appropriate levels thresholds can be assessed.

A robust analysis of the landscape will ensure that the right balance between allowing companies to outperform and setting thresholds which ensure fair levels of return is achieved. As part of the process we test both the symmetry and range of the implied Return on Regulated Equity and have set out the framework in Appendix A3 and results in Section 8, Financeability assessment.

7.4.4 Tax

Allowances to pay corporation tax are calculated on a notional basis as a proxy for efficient costs. It is expected that these allowances will be broadly equal over time to payments made to HMRC.

The T1 notional allowance approach has been an effective mechanism and we propose its continuation for funding in the T2 period. We adopt this assumption in our business plans, but with an adjustment to include incentives so as to allow closer approximation to the actual charge.

To further align with the actual company tax charge we also propose:

- resetting the capital allowance pool balances reset to reflect CT600 corporation tax returns and supporting computations as they relate to licensed regulated activity; and
- adjusting the capital allowance pool allocations from the various totex categories to reflect expectations for RIIO-2.

The functionality of Ofgem's Financial Model and accompanying instructions do not support resetting of the brought forward capital allowance pools. However, this has formed the basis of our assumptions in our own financial models.

The T1 framework includes a tax trigger adjustment mechanism effectively enabling adjustments to the tax allowance to reflect changes in the tax regime, such as changes in corporation tax rate. We propose that this mechanism is retained and that the tax rates used as the base assumption to calculate the tax allowance are reviewed prior to finalisation of the framework.

7.4.5 Pensions

National Grid, like other companies, incurs costs relating to the provision of pensions for its employees. These costs fall into several categories, including ongoing service costs on both its Defined Benefit (DB) and Defined Contribution (DC) schemes, and in relation to DB schemes additional costs associated with Pension Protection Fund (PPF) levies, Scheme Administration Costs and Deficit Repair Costs.

In the Sector Specific Methodology Decision, Ofgem confirmed that in future price controls starting with RIIO-2 the PPF and Admin costs will, like ongoing pension contribution costs, be included in Totex. Although we do not agree that this treatment creates the optimum incentives for companies to best manage these costs, our estimates of PPF levy and Scheme Admin costs are included in the totex numbers in our business plan.

In addition, Ofgem have a long-standing commitment to the consumer funding of deficits in defined benefit pension schemes[41]. RIIO price controls therefore provide funding allowances for network companies' 'Pension Scheme Established Deficits' (PSEDs), where these allowances are set in accordance with Ofgem's established policy, which was last revised in April 2017[42]. This policy involves a triennial reset of PSED allowances, which is carried out at the same time for all the network sectors that Ofgem regulates (ED, GD, ET and GT). These resets are made outside the main price controls. The next review is due during 2020 and will result in new PSED allowances from April 2021. It will be carried out in parallel with the RIIO-T2 review and will be based on the results of the most recent triennial actuarial valuations of the various networks' pension schemes.

For National Grid's schemes these valuations are underway and will continue into 2020 and will result in valuations of the schemes as at 31 March 2019. The results are therefore not yet available, and so in accordance with Ofgem's Business Plan Guidance, for this

[41] See for example paragraphs 7.45 and 7.62 in "RIIO-2 Sector Specific Methodology Decision – Finance", Ofgem, May 2019.
[42] "Decision on Ofgem's policy for funding Pension Scheme Established Deficits", Ofgem, 7 April 2017

business plan we have assumed that the pensions scheme deficit costs and corresponding PSED allowances will continue at broadly the level that was set during Ofgem's most recent review, in November 2017. However, for the purposes of financeability modelling we assume the allowances for the T2 period continue at values forecast for 2020/21, as required by the Regulatory Instructions and Guidance. The forecast numbers will be updated prior to the RIIO-T2 Final Proposals, following the conclusion of Ofgem's next triennial PSED review, expected during 2020.

8. Financeability assessment

Analysis of Ofgem's assumptions shows the Grid and core AICR metric falling below a Baa1 rating for a 4.3% baseline allowed return excluding incentives performance.

Limiting financial resilience of the network to absorb downside cost shocks from credible scenarios increases the risk of investment and therefore borrowing costs, driving higher bills.

Proposals which accelerate cashflow to mitigate low returns and reduce the value of the investment proposition will provide protection to debt investors, but only by shifting material risk to equity investors.

Ofgem's proposed dividend yield does not align with our investor expectations making it more difficult to deliver required investment.

Our proposed package ensures efficient financing costs are kept as low as possible ensuring sustainably lower bills in the long term.

8.1 Introduction

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 the obligations imposed by or under the relevant legislation. Also, the regulator is required, in accordance with the Electricity Act 1989, to carry out this duty in a manner best calculated to promote efficiency and economy.

This translates to a financial package which supports funding of our business plan through delivery of an attractive investment proposition for both equity and debt investors. In Section 4, Stakeholder evidence, we set out the methodology we follow and criteria we apply to define the financeability of the network.

There is also the question of whether the financeability of the notional or actual company should be assessed. Ofgem's duty is further defined in the RIIO-T1 Final Proposals and supported in the Financeability Assessment Guidance.

"*In setting price controls, we are required to have regard to the ability of efficient network companies to secure financing in a timely way and at a reasonable cost in order to facilitate the delivery of their regulatory obligations. This is also in the interests of consumers...*"[43]

"*…the focus of the financeability assessment as a check to the price control package will focus on the notional company*".

Assessment of the notional company is consistent with the accountability of the regulator to set a price control that ensures the notional network is and will continue to be financeable.

However, networks also have an obligation under their licence to maintain an investment grade credit rating. Networks can only be held accountable for the credit rating of the actual company to the extent this differs from the notional network for reasons within their control. For example, the licensee's actual gearing level and financing costs may differ from the notional assumptions as a result of their capital structures and financing decisions. It is not within the sole control of networks to ensure they continue to have an investment grade credit rating and are financeable if regulatory consistency does not hold and elements of the

[43] RIIO-T2 : Final Proposals for National Grid Electricity Transmission and National Grid Gas, Finance Supporting document", Ofgem, 17 December 2012, para 4.6

financial package are inconsistent with the risk borne by the network. We assess financeability of the actual company but this can only be assured on a sustainable basis if supported by a package which delivers a financeable notional company.

Our approach to assessing financeability is summarised in the table below:

Table A15.17: Our approach to assessing financeability

1	**Focus first on the notional company**	Assess financeability for a notionally efficient company with a capital structure consistent with that used to determine the weighted average cost of capital. This ensures companies and their shareholders bear the risk of their capital structure and financing, not customers.
2	**Target a strong credit rating**	Use a target rating of Baa1/BBB+ to ensure financial resilience and consistency with the index used to set cost of debt allowances
3	**Consider a range of financial ratios for debt and equity investors**	Follow methodologies and focus on key metrics used by credit ratings agencies to aid transparency and consistency. For equity metrics, we target a dividend policy consistent with investor expectations and review trends for dividends and earnings profiles. Table A15.18 summarises the ratios targeted
4	**Assess resilience within and beyond the RIIO-2 period**	Consider trends across several price controls to assess the long-term sustainability of the financial package, stress test financial resilience through the application of a range of sensitivities and alternative scenarios. This helps us to avoid short-term fixes which would increase overall costs.

Table A15.18: Target thresholds for key financial ratios

	Ratio	Threshold	Rationale
Debt	**Adjusted interest cover ratio (AICR)** measures how many times a company can cover its interest payments using available cash	1.5	Based on Moody's methodology. AICR: mid-point of Moody's range Gearing: notional gearing assumption
	Net Debt / RAV ensures we maintain an efficient financing structure	60%	
	FFO / Net Debt measures the ability of a company to pay of its debt using available cash	10%	Based on S&P's methodology. Mid-point of 9-11% range.
Equity	**Dividend yield** enables investors to measure how much they could earn in dividends by investing in stock	5%	Consistent with RIIO-1 and supports a consistent dividend in real terms in line with other UK utilities.

8.2 Process

The licence model owned and developed by Ofgem generates revenues and financial ratios to inform the financeability assessment based on the financial parameters and totex business plan inputs provided by the networks.

We have completed and submitted the financial model as published by Ofgem on the 31st October 2019, which is in accordance with guidance received from Ofgem. Our financeability assessment and assurance is based on this model where the outputs are sufficiently complete to be relied upon, however we supplement this view with our own analysis where there are gaps in the assessment.

For example, our analysis ensures we align assessment to follow methodologies as they may be applied in practice by rating agencies to inform views of a regulated network. Also, Ofgem's proposed assessment period of five years inherently limits focus to the short term which we extend to ensure the financial package is sustainable. We have calculated T3 revenues by assuming proposed parameters are rolled forward against our ten-year business plan. We also used our own models to assess the impact of contestable spend and to generate our consumer bill analysis, neither of which are available in Ofgem's financial model.

For consistency across the T1, T2 and T3 periods, all analysis contained in this annex is sourced from our models. However, we can reconcile all T2 values to Ofgem's model with variances relating primarily to totex inputs. Our financeability assessment is based on a plan inclusive of real price effects (RPEs) which are excluded from data tables and therefore from Ofgem financial model calculations. Baseline totex as defined in our business plan submission for NGET is used to assess financeability while Ofgem's Business Plan Financial Model enforces the use of total totex including uncertainty mechanisms.

We stress test the financeability assessment of the notional and actual company based on Ofgem's proposed scenarios to assess the impact of risk. We also generate our own risk scenarios from our assessment of business and macroeconomic risks (Appendix A3) against which we test financeability.

The detailed data supporting our analysis including all financial ratios and sensitivities, as set out in the RIIO-2 Business Plan Guidance, for both Ofgem's and our proposed financial packages is included at:

- Appendix A4: notional company results based on our financial model;
- Appendix A5: actual company results based on our financial model; and
- Appendix A6: notional and actual company data based on Ofgem's financial model together with commentary on the process used to complete the model.

8.3 Financeability assessment of the notional company

Our baseline plan has annual totex ranges which vary between £1.3bn to £1.6bn, totalling £7.3bn across the 5-year price control, when real price effects are included. However, our plan also shows there are credible scenarios where much higher investment is required. This is particularly the case for facilitating Net Zero by 2050 and if potentially contestable projects are delivered by ourselves under either the T2 framework or the Competition Proxy Model (CPM). Our high scenario forecasts over £10bn of totex in the T2 period.

The T2 framework must enable our plan to be financeable under all credible scenarios. To do otherwise would risk constraining investment and risk delivery of the Net Zero targets. For this reason, whilst we focus our financeability assessment firstly on our baseline plan we also assess higher capital scenarios.

Before setting out the detailed financeability assessment, it is worth outlining why our conclusions from this work are that we do not believe our plan is financeable on a notional basis using Ofgem's working assumptions and a higher equity return is required to keep consumer costs lower over the longer term:

- Cashflows are close to Baa1 adjusted interest cover ratio (AICR) thresholds but only due to the inclusion of highly uncertain incentive performance of c£35m per annum. This revenue would be disregarded by rating agencies and is higher than the likely T2 incentive package so should not be included in any assessment;
- Dividend yield and allowed equity return will not attract required investment, particularly to the levels required to deliver Net Zero targets;
- Without the implausible incentive performance adjustment, credit metrics are not consistent with a Baa1 investment grade, reducing the financial capacity to carry the risk of capex uncertainty and bringing a more risk averse approach to investment and innovation;
- CPIH transition is being used as a way of supporting short term financeability and a reduction in allowed equity returns. This is a short-term fix which will require compensating adjustments to the price control in future periods;
- Economic and totex sensitivities show cashflows reducing to near sub investment grade e.g. if the CPI to RPI wedge was 0.5% rather than 1% and totex was overspent by 10%;
- If we were required to deliver potentially contestable projects, then cashflows would only be consistent with a low Baa2 rating with use of the CPM reducing cashflows to sub investment grade.

These points are explained in more detail through the following sections. We also show the results of analysis using our proposed assumptions.

8.3.1 Financeability assessment against Ofgem's working assumptions

We test the financeability of the notional company in the first instance for our baseline totex plan using the following assumptions set by Ofgem:

Table A15.19: Ofgem's working assumptions including incentives performance

Parameter	Ofgem assumptions
Allowed equity return	4.3% post-application of the 0.5% outperformance wedge
Incentives performance	0.5% equivalent = £35m p.a.
Dividend yield	3%
Gearing	60%, set at beginning of RIIO-2 and maintained throughout the period
Allowed debt funding	Full indexation, 11-15 year trombone
Debt profile	25% inflation linked debt throughout the period with RPI debt switched to CPIH
Inflation indexation	Immediate transition to CPIH, CPIH assumed to be 2% per annum
Depreciation	45 years, straight line
Capitalisation rate	Natural rate

Table A15.20: Key metrics based on Ofgem's package including incentives performance

Quantitative Metrics	T1 Final Proposals	T2 period				
Dividend Yield	5.00%	3.06%	3.10%	3.11%	3.09%	3.08%
Dividend Cover	2.36	2.95	2.86	2.79	2.76	2.59
Indicated rating from Moody's Grid	A3	Baa1	Baa1	Baa1	Baa1	Baa1
Core Metrics						
AICR	1.64	1.46	1.45	1.45	1.46	1.47
Net Debt / RAV	60%	60.7%	61.2%	61.4%	61.2%	61.1%
S&P : FFO / net debt	11.91%	10.99%	10.53%	10.37%	10.30%	10.15%

Consumer implications

This package leads to higher consumer bills by risking equity investment which will ultimately **increase financing costs**

Credit metrics are only close to thresholds due to implausible incentives performance

A rating | Target investment grade | Below target investment grade

These results of key metrics show we are not financeable under Ofgem's package because:

Dividend yield and allowed equity return will not attract required investment

Ofgem's working assumption is a 3% dividend yield but this does not align with our investor expectation of stable dividend growth and is less than the 4% average of the FTSE100 and the 5% of our peers.

It is not appropriate to resolve debt financeability constraints, caused by a base return which is set too low, through assuming lower dividends. Given that energy networks hold greater risk than water companies, investors could see this as an opportunity to invest in an alternative sector where they can earn higher dividends for lower risk. The implication is that Ofgem's package does not balance risk and reward appropriately or adequately reflect the risks inherent in running a transmission network.

We are competing for funds globally which, when combined with the significant level of investment required in UK infrastructure, means returns must be sufficiently attractive to equity investors. A sustainable and predictably growing dividend is key to accessing funds for investment. Ultimately, if it is not high enough, many investors will cease to hold stock as they see dividends placed at risk through lower revenues and structures which have little headroom to absorb any financial shocks. This impacts the ability to attract investment, which has implications for raising further financing efficiently. New equity investment will be more expensive to raise and if equity is replaced with higher levels of debt, the risk to debt investors will increase borrowing costs.

Assumed incentives performance is not credible

An assumed 0.5% incentive performance adds c£35m p.a. to revenues and provides significant support for credit metrics in the T2 period. Without this assumption, AICR falls below Baa1 thresholds during the T2 period.

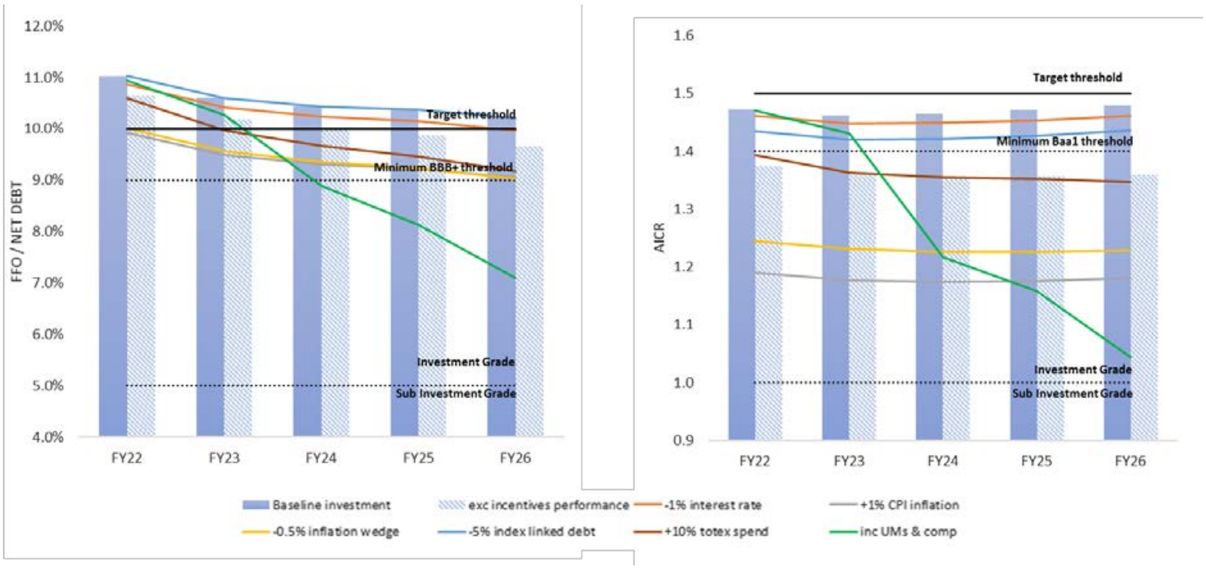
The incentives package has not been finalised, but our current view is that ~£30m per annum is the maximum that could be achieved, lower than the assumed performance. It is also unrealistic to assume we would achieve maximum performance each year of T2 given Ofgem's focus on reducing incentive performance opportunities. Taking our T1 performance where the maximum reward available is currently c£40m, and our achieved performance averages around £10m shows the implausible nature of the assumption.

The notional company should be financeable without the need to rely on assumed outperformance, which is in line with how credit rating agencies will undertake their assessment. Moody's have referred to the scope of outperformance being limited by low-powered incentives in transmission and likely challenging cost allowances, meaning they will not include any outperformance in their modelling until a track record has been established. Financeability therefore needs to be assessed without assuming incentives performance.

Sensitivity analysis highlights limited financial resilience

As illustrated in Figure A15.11, sensitivity analysis shows the financial resilience of the network is much more limited than Ofgem's base case would suggest which also needs to be considered in assessing financeability:

Figure A15.11: Sensitivity analysis of downside risk scenarios for FFO/net debt and AICR using Ofgem's working assumptions including incentive performance



It is therefore more credible to assess financeability without assuming incentives performance, which shows the financial resilience of the network is much more limited than Ofgem's base case would suggest.

Table A15.21: Key metrics based on Ofgem's working assumptions excluding incentive performance

Quantitative Metrics	T1 Final Proposals	T2 period				
Dividend Yield	5.00%	3.07%	3.13%	3.16%	3.16%	3.16%
Dividend Cover	2.36	2.78	2.69	2.61	2.57	2.40
Indicated rating from						
Moody's Grid	A3	Baa1	Baa2	Baa2	Baa2	Baa2
Core Metrics						
AICR	1.64	1.37	1.34	1.34	1.34	1.35
Net Debt / RAV	60%	60.9%	61.7%	62.0%	62.0%	62.1%
S&P : FFO / net debt	11.91%	10.62%	10.12%	9.91%	9.80%	9.61%

Consumer implications

Limiting investment funds now will **risk our ability to support energy transition**

As credit quality deteriorates the **costs of borrowing increase** to reflect increased risk of lending

Capex uncertainty

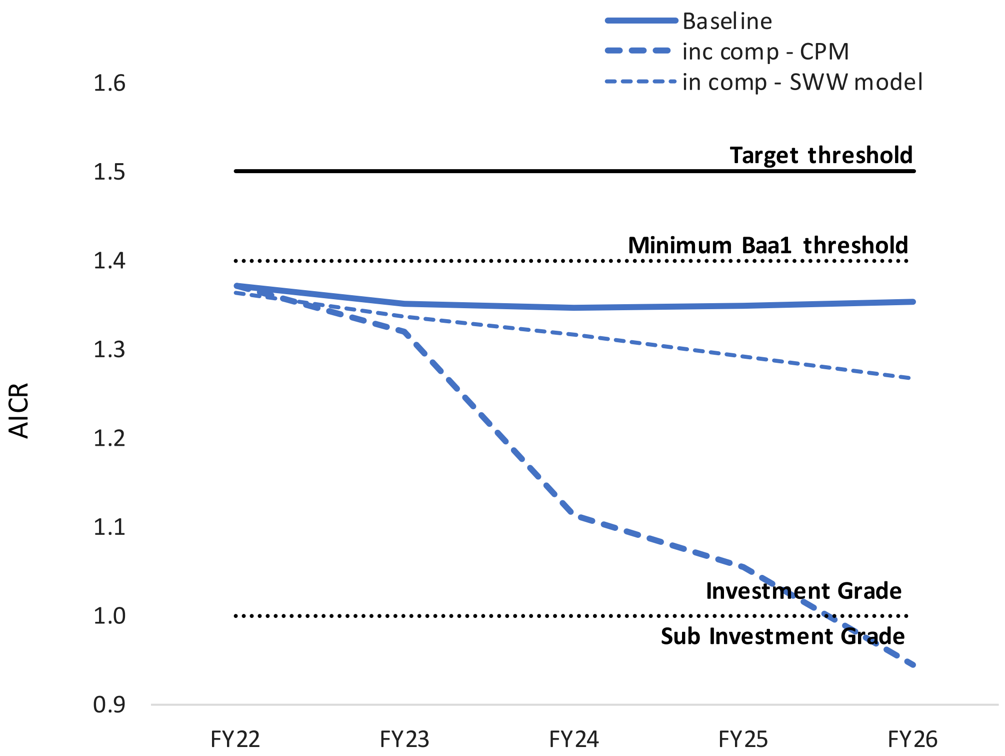
The network has limited financial capacity even before we have considered the potential impacts of alternative funded totex levels. So far, we have assessed the financial package using our baseline totex plan, this reflects the changing external landscape for transmission in the 2020s but there are elements which are subject to major uncertainty. We are operating against a backdrop of increased uncertainty of supply and demand with the requirements to deliver Net Zero by 2050 only partially clear. To remain responsive and proactive to changes in how the network is used we need to ensure financeability in credible scenarios where funded totex outturns higher than the baseline.

We also need to consider the potential impacts of competition. At this stage, the competition framework is not sufficiently developed, creating considerable uncertainty for our business plan as to how costs could be incurred and how they would be funded.

The CPM approach could still be used for the potentially contestable projects which are required in the T2 period so we need to consider the implications. In this scenario, the construction phase of projects would not be funded for the first five years so we are exposed to the full risk of any additional costs without any allowance certainty during the T2 period.

Including the c£1.5bn of contestable projects in the plan means that by the end of the period the network becomes sub investment grade. Even up to this point there is no capacity to absorb any further shocks or cost over-runs without the network becoming sub investment, as can be shown from the AICR trends. This would severely restrict the ability of the company to be raise further funding efficiently.

Figure A15.12: Impact of competable projects on AICR



Also shown in Figure A15.12, is the impact if potentially contestable projects were funded under the SWW model. Although the position would seem like an improvement when compared to a CPM approach, the following table shows metrics are still significantly weakened. However, even this could be considered optmistic as no funding delays have been factored into our analysis.

Table A15.22: Key metrics when including potentially contestable projects funded as SWW

Quantitative Metrics	T1 Final Proposals	T2 period				
Dividend Yield	5.00%	3.09%	3.18%	3.32%	3.45%	3.61%
Dividend Cover	2.36	2.76	2.64	2.47	2.37	2.13
Indicated rating from Moody's Grid	A3	Baa1	Baa2	Baa2	Baa2	Baa2
Core Metrics						
AICR	1.64	1.36	1.34	1.32	1.29	1.27
Net Debt / RAV	60%	61.1%	62.2%	63.8%	65.2%	66.7%
S&P : FFO / net debt	11.91%	10.53%	9.88%	9.18%	8.63%	7.99%

Gearing levels increase above 65% by the end of the period which, according the notional thresholds, indicates equity injection would be required to support investment.

With such a constrained financial position it is likely that we would need to be more cautious on investment, needing funding security before beginning any work leading to risks being passed onto consumers. Such an approach in the T1 period would have impacted millions of pounds of infastructure work where we invested ahead of secured funding in areas of network resilience and renewable generation connections. The impact of these reactions and other unintended consequences would quickly offset any short term bill reductions from the currently proposed levels of return.

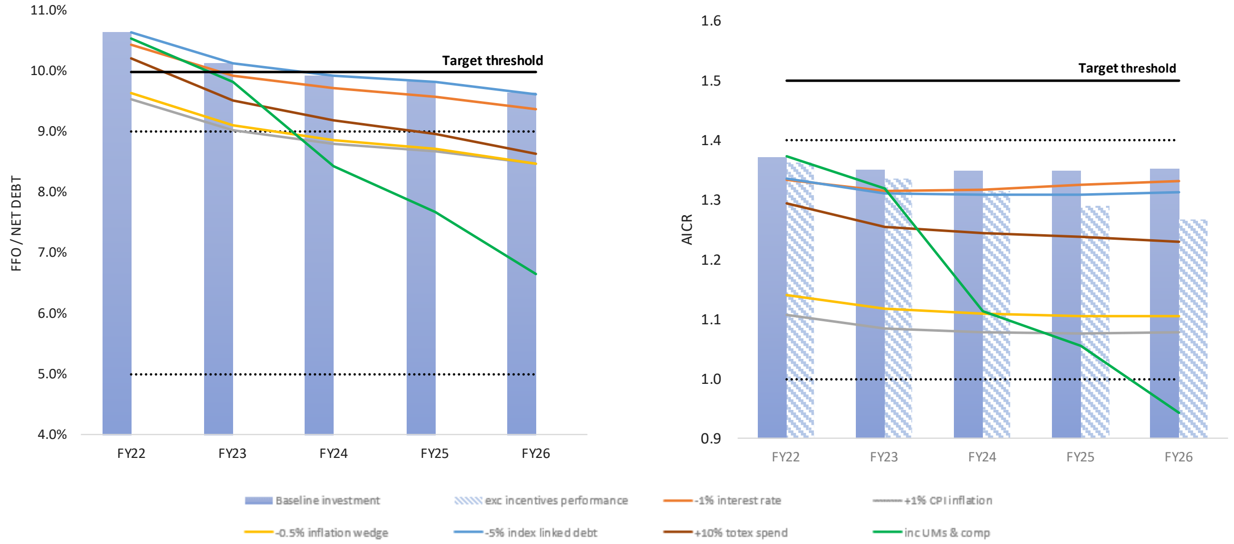
Limited financial resilience of the network

Even without capex uncertainty, Moody's Grid rating falls to Baa2 through the majority of the T2 period when incentive performance is excluded, providing only one notch of headroom above investment grade (Table A15.21).

Again, of particular concern is the AICR trend. This metric measures how many times a company can cover its current interest payment with its available earnings. It is important to have headroom in AICR so that the network is still able to meet its interest payments in the event of macroeconomic shocks and outturn of downside risk.

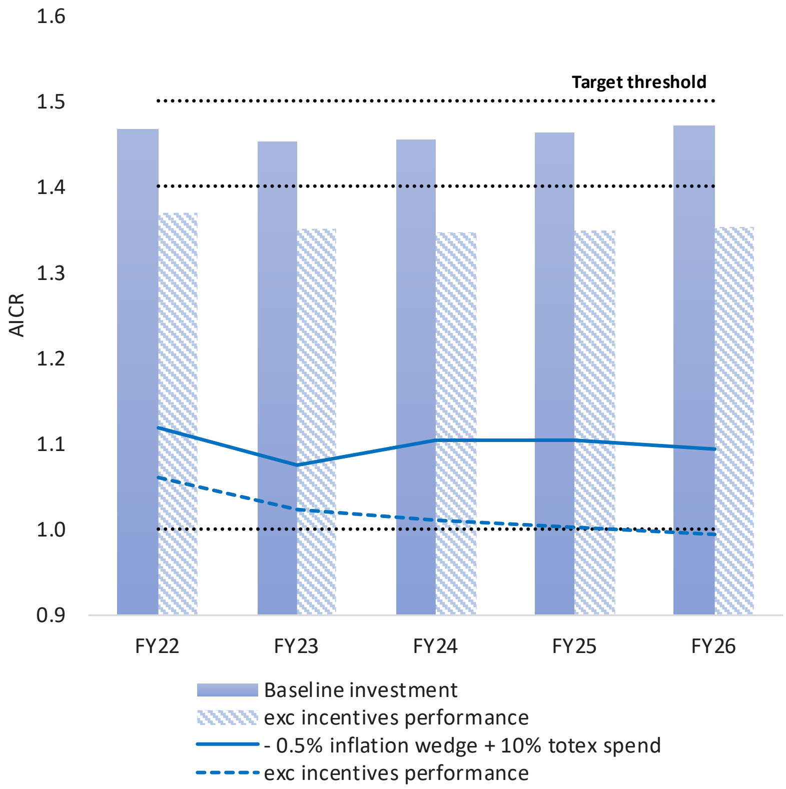
The graphs below show the impacts on key metrics of the downside sensitivities Ofgem have set out to test the resilience of the financial package.

Figure A15.13: Sensitivity analysis for FFO/net debt and AICR using Ofgem's working assumptions excluding incentive performance



The financial package is particularly sensitive to the movement in the macroeconomic environment, where only a 0.5% change in the inflation wedge would mean that AICR deteriorates significantly. Whilst at these levels the network may still be considered investment grade, when combined with a 10% totex overspend we see credit ratings depressed even further and falling below investment grade under credible totex scenarios, indicating significant increase in the risk of lending to the company.

Figure A15.14: Combined totex and macroeconomic sensitivity analysis implications for AICR



Whilst this combination is modelled based on scenarios set out by Ofgem, we have tested their credibility by assessment further scenarios based on the principle risks identified by our own risk management processes (Appendix A3). Through this we have a clear understanding is the events that could impact the delivery of our business plan, with our analysis supporting a change in inflation wedge with a 10% totex overspend as a severe but plausible scenario. The additional scenarios we have considered in addition to those set out by Ofgem are detailed in Appendix A3.

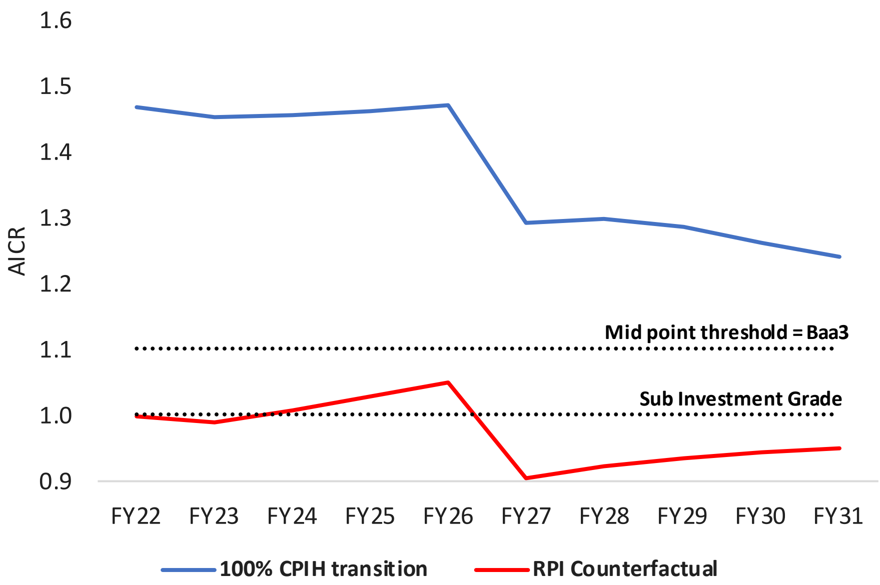
As credit quality deteriorates, a narrowing pool of debt investors combined with increasing costs will ultimately drive higher bills for consumers. Consistent financial ratios are also used by equity investors as a proxy for dividend affordability. Any additional risk faced by the shareholder is likely to place upward pressure on the cost of equity.

CPIH transition is being used to alleviate short term financeability concerns

The transition to CPIH should not be used as a lever to address financeability issues that may be caused by setting returns at a level which is too low. We would therefore expect financeability assessments on both an RPI and CPI basis to be able to test value neutrality.

Figure 15.15 illustrates the impact of changing to CPIH on AICR and shows how key financial ratios are being supported by the one-off cash acceleration created by switching to CPIH indexation. If RPI indexation were retained, AICR falls to sub investment grade meaning that the network is no longer generating sufficient revenue to meet its interest costs.

Figure A15.15: AICR using Ofgem's working assumptions for 100%CPIH transition and RPI counterfactual



Short term cash flow increases, whilst supporting metrics in the T2 and T3 periods, will create financeability issues in the longer term. Ensuring NPV neutrality means that initial positive cashflow impacts from the transition will subsequently become negative. This is likely to be exacerbated by other long-term implications, particularly when future funding will reflect CPIH but a significant proportion of costs are likely to remain nominal or RPI linked creating a mismatch between revenue and costs.

As a result, using CPIH transition to support Ofgem's proposed package will have a detrimental impact on the long-term sustainability of the network, which is key to safeguarding future investment and providing confidence that transition is neutral to investors.

8.3.2 Application of financeability levers

As we have shown the notional company is not financeable using Ofgem's working assumptions, the company has limited financial headroom and limited resilience to cost shocks highlighted by weak financial ratios. The levers which Ofgem have set out to address these issues are:

Table A15.23: Financeability levers proposed by Ofgem

Adjust capitalisation rates	Percentage of totex to be added to the RAV is set to balance costs paid by existing and future consumers, considering the proportion of capex costs expected during the price control period.
	Use as financeability lever: The simplest to understand and arguably most economic lever to use. However, use should be limited to marginal changes otherwise the impact of bringing cash forward is unlikely to be sustainable in the long term, will be disregarded by ratings agencies and will create intergenerational mismatches in bills.
Accelerate regulatory depreciation	Set to balance costs paid by existing and future consumers, taking into account expected economic life of assets and uncertainty in their future use.
	Use as financeability lever: Any adjustment to address short term financeability concerns will reduce the transparency of how cost recovery is set to match the benefits consumers receive.
Reduce notional gearing	Demonstrates the financial risk of the company as it measures the level of net debt in the context of the total value of the RAV.
	Use as financeability lever: Lower gearing levels can enable companies to maintain credit metrics under a wide range of market conditions, but only if set to reflect the cashflow risks from the overall business plan submission. Any further reduction should be supported by our current business plan or framework; as any change, purely to enable cashflows to support short-term credit metrics, risks inconsistency with the underlying risk profile of the business and how the weighted average cost of capital has been calculated.
Reduce dividend yield	Dividend yield should be set to align with equity investor expectations.
	Use as financeability lever: The notional company should be financeable based on an appropriately calibrated package and should not therefore require dividends to be cut.
Risk reward balance	There must be a transparent and fair balance of risk and reward between consumers and networks.
	Use as financeability lever: Allowed return needs to be set at a level high enough to not require the use of short-term levers which bring cash forward but also erode future value.

For the reasons set out in Section 5, Assessing our business plan and Section 6, Financing requirements, changes to notional gearing and dividend yield effectively become constraints leaving only depreciation profiles and capitalisation rates as potential levers to address the limitations of Ofgem's financial package. AICR, as calculated by Moody's is typically our most constrained metric, therefore we focus on how the levers could be used to achieve financeability based on this ratio.

Adjustment of capitalisation rates

We first consider adjusting the capitalisation rate, using this single element would require fixing the rate to 77.6% versus a natural rate of 79.6% to ensure credit metrics achieve target thresholds in the T2 period. A 2% change may seem marginal but as a proportion of totex, the level of cash brought forward is significant, at circa £250m over the T2 period.

We have assessed what the capitalisation rate would need to be without including the cash equivalent of the performance wedge, as we do not consider it appropriate to assume outperformance in our financeability assessment. However, if the wedge were to be applied, the capitalisation rate required to meet target thresholds would be more marginal, c0.5%. equating to c£75m of cash across the T2 period.

The materiality of the cash levels brought forward to correct financial concerns, undermines Ofgem's primary obligation of ensuring fair charges for existing and future consumers for the services they receive. This is also true when considering the acceleration of regulatory depreciation purely to address financeability concerns.

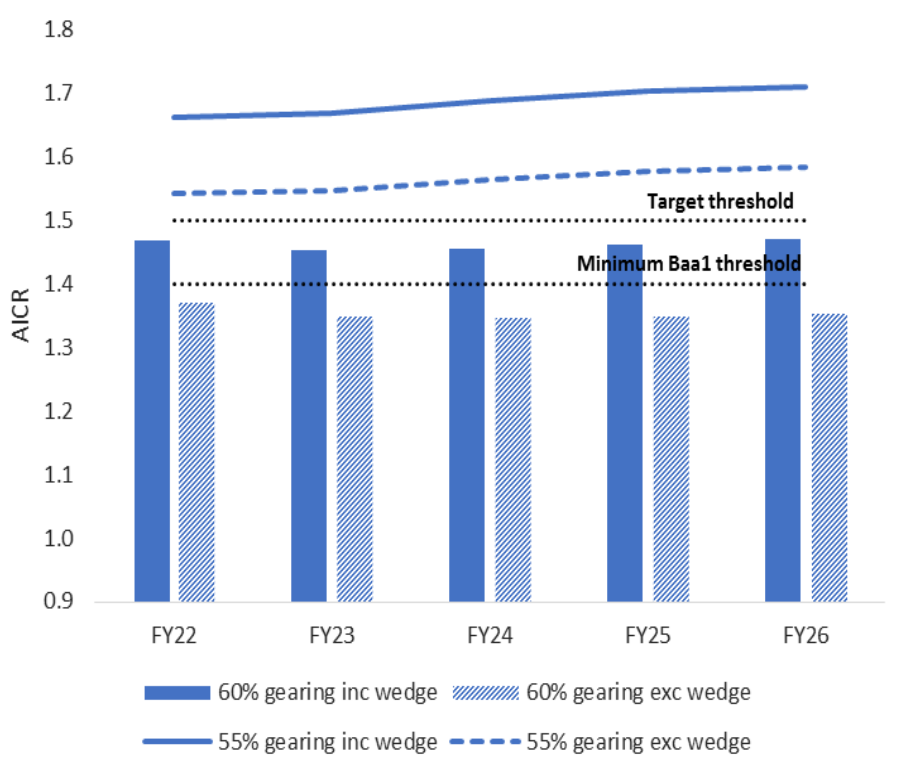
Making companies financeable through levers which bring cash forward and erode future value cannot be sustained in the long term and should not be considered as a substitute for setting allowed equity returns at a high enough level. Particularly, as credit rating agencies disregard changes to capitalisation rate and depreciation profile on the basis that adjustments are NPV neutral.

Reduction in notional gearing

We have also considered the impact of reducing the notional gearing level to 55% as a lever to achieve acceptable debt metrics under Ofgem's proposed package.

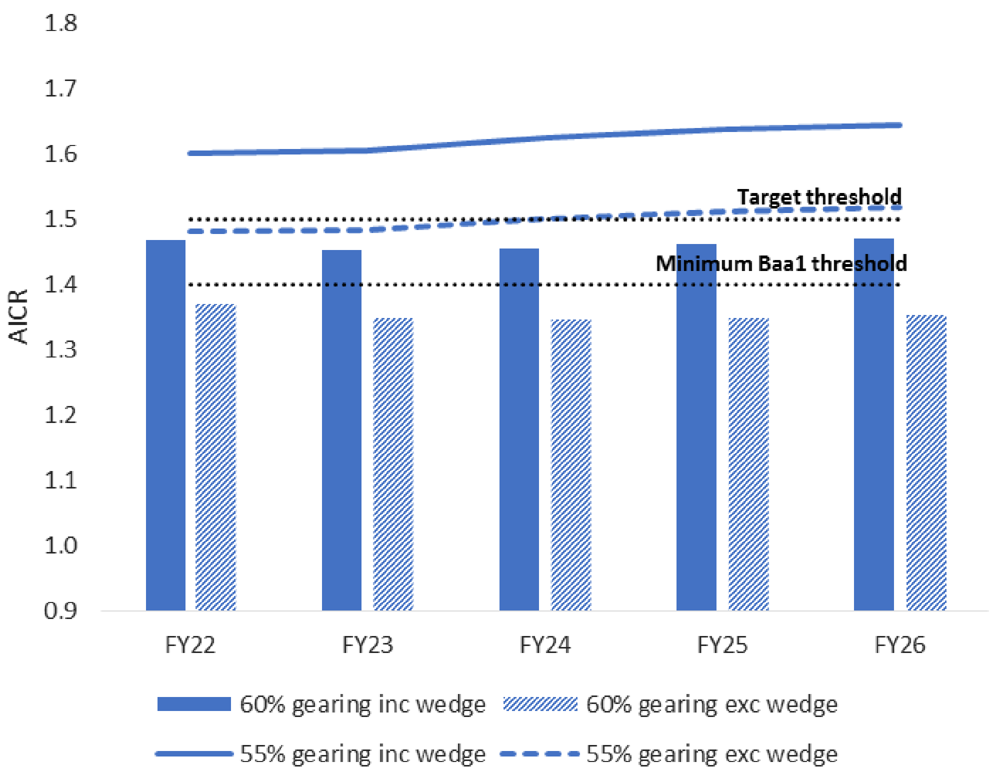
Firstly, we have assumed a view keeping equity return at 4.3% but changing gearing. A change to the notional gearing changes the reference point for equity injections and the absolute level of debt and, therefore, impacts the weighted average cost of capital (WACC) used in revenue calculations. This would imply we are setting an equity return without reference to the change in notional gearing, increasing the WACC.

Figure A15.16: AICR at 60% and 55% notional gearing with allowed returns increasing



The alternative is to reflect the lower gearing levels in the equity return. This would reduce the headline equity return figure which would mean that the allowed WACC has little movement but financeability ratios would still show improvement given the reduction in net debt.

Figure A15.17: AICR at 60% and 55% notional gearing keeping allowed returns aligned



Figures A15.16 and A15.17 show that a reduction in notional gearing to 55% could lead to the network being considered financeable. The concern however, is that at these levels, financial structures are not efficient and sustainable in the long term.

At 60%, gearing remains consistent with the market. Whilst notional levels have been set lower in past price controls, this has only been considered appropriate for companies undergoing significant RAV growth, a position not aligned with our baseline plan. As the risk profile of the network has also not decreased there seems to be limited justification in adjusting notional gearing simply to address financeability concerns.

Using gearing as a lever to support a return which has been set too low, further deteriorates the investor proposition by transferring additional risk to equity and reducing asset growth.

Dividend yield

The focus so far is on achieving credit metric target thresholds in RIIO-2. However, the equity investor proposition is not in line with the feedback from our shareholders or other regulated entities. When we adjust to a 5% dividend yield, Ofgem's proposed financial package AICR falls even more significantly.

Table A15.24 key metrics based on Ofgem's working assumptions with a 5% dividend yield excluding incentive performance

Quantitative Metrics	T1 Final Proposals	T2 period				
Dividend Yield	5.00%	5.23%	5.45%	5.62%	5.76%	5.92%
Dividend Cover	2.36	1.66	1.59	1.53	1.49	1.37
Indicated rating from						
Moody's Grid	A3	Baa2	Baa2	Baa2	Baa2	Baa2
Core Metrics						
AICR	1.64	1.36	1.32	1.30	1.28	1.27
Net Debt / RAV	60%	61.8%	63.3%	64.4%	65.3%	66.2%
S&P : FFO / net debt	11.91%	10.45%	9.78%	9.42%	9.14%	8.80%

Consumer implications

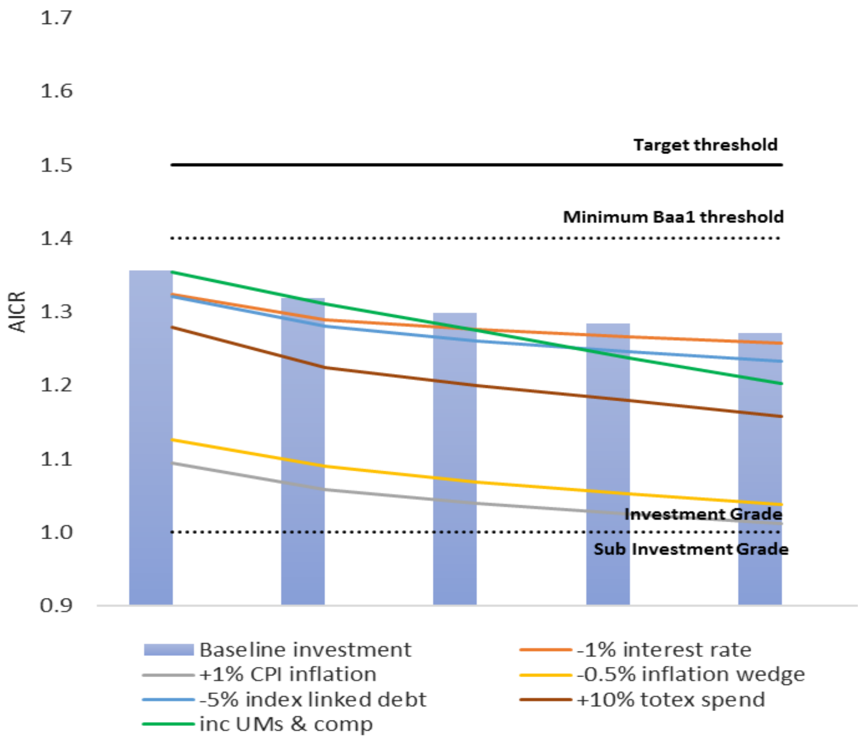
Dividend policy is not sustainable, as gearing increases above threshold by the end of the period.

Limited ability to facilitate changing consumer requirements.

There is also a deterioration in the debt investor proposition as Moody's rating grid falls to Baa2 during the period. Using downward changes to the equity investor proposition to address short term concerns for debt metrics is not a substitute for setting base returns at a high enough level with an appropriately calibrated package.

The AICR metric is also put under further downward pressure, particularly given its sensitivity to small credible changes in the macroeconomic environment as shown in Figure A15.18.

Figure A15.18: Key metrics based on Ofgem's working assumptions with a 5% dividend yield and excluding incentive performance



The 5% dividend yield required by investors cannot be supported with Ofgem's proposed package. There is also a deterioration in the debt investor proposition as Moody's rating grid falls to Baa2 during the period. Using downward changes to the equity investor proposition to address short term concerns for debt metrics is not a substitute for setting base returns at a high enough level with an appropriately calibrated package.

Neither the reduction of the equity investor offering nor the use of short-term cash acceleration levers are aligned with our regulatory principles:

Table A15.25: Assessment of Ofgem's proposed financial package against regulatory principles

Is the regulatory principle met?		Reasoning
Balances risk and reward		Return is insufficient to reflect the risks inherent in running a transmission network and is not aligned with investor expectations or market comparators
Demonstrates regulatory commitment and a stable regime		Ofgem's assumptions are inconsistent with past regulatory precedent, particularly in relation to setting allowed equity returns. Increasing perceptions of regulatory risk impacts investor confidence leading to increased cost of capital, and therefore bills, in the long term.
Takes a long-term sustainable approach		Short term fixes are required to make Ofgem's package debt financeable, these can address immediate cashflow problems but only by deferring underlying issues into the next price control and creating an unfair balance of charges between current and future consumers.
Provides strong incentives		There is no financial capacity to compensate networks for assuming more risk for developing new, innovative ways of working which drive lower consumer bills in the long term.

Investors continually trade off risk and return when they evaluate investment opportunities and they need to be rewarded for the risk they take for investing in National Grid. This requires an allowed equity return which is comparable and allows the company to maintain financeability.

8.3.3 Financeability assessment against our proposed financial package

In Section 7, Our financial package. we set out in detail our principle-based approach to determining our financial package. The package we propose can both maintain credit ratings and offer an equity investor package which can attract and retain investment to keep financing costs efficient and as low as possible.

It also provides the capacity to compensate networks for assuming more risk, enabling delivery of the stretching outcomes stakeholders are telling us are important to them.

We also consider that the weighted average cost of capital and its constituents of our proposed financial package aligns with the regulatory principles. We show below that the financeability issues arising under Ofgem's package are addressed in a way we consider to be sustainable which is in customer's long-term interest.

Table A15.26: Our proposed financial package

Parameter	Our proposed assumption
Allowed equity return	6.5%
Incentives performance	-
Dividend yield	5%
Gearing	60%, set at beginning of the T2 period and maintained throughout the price control
Allowed debt funding	Full indexation, 15 year index plus 68 basis points additional borrowing costs
Debt profile	25% inflation linked debt throughout the period with RPI debt switched to CPIH
Inflation indexation	Immediate transition to CPIH, CPIH assumed to be 2% per annum
Depreciation	45 years, straight line
Capitalisation rate	Natural rate

Table A15.27: Key metrics based on National Grid's proposed financial package with a 6.5% cost of equity (CPI-stripped) and a 5% dividend yield

Quantitative Metrics	T1 Final Proposals	T2 period				
Dividend Yield	5.00%	5.12%	5.21%	5.26%	5.26%	5.27%
Dividend Cover	2.36	2.08	2.01	1.97	1.95	1.85
Indicated rating from						
Moody's Grid	A3	Baa1	Baa1	Baa1	Baa1	Baa1
Core Metrics						
AICR	1.64	1.56	1.54	1.55	1.58	1.62
Net Debt / RAV	60%	60.9%	61.6%	62.0%	62.0%	62.0%
S&P : FFO / net debt	11.91%	11.96%	11.42%	11.21%	11.11%	10.93%

Consumer implications

Dividend policy is sustainable, and in line with investor expectations

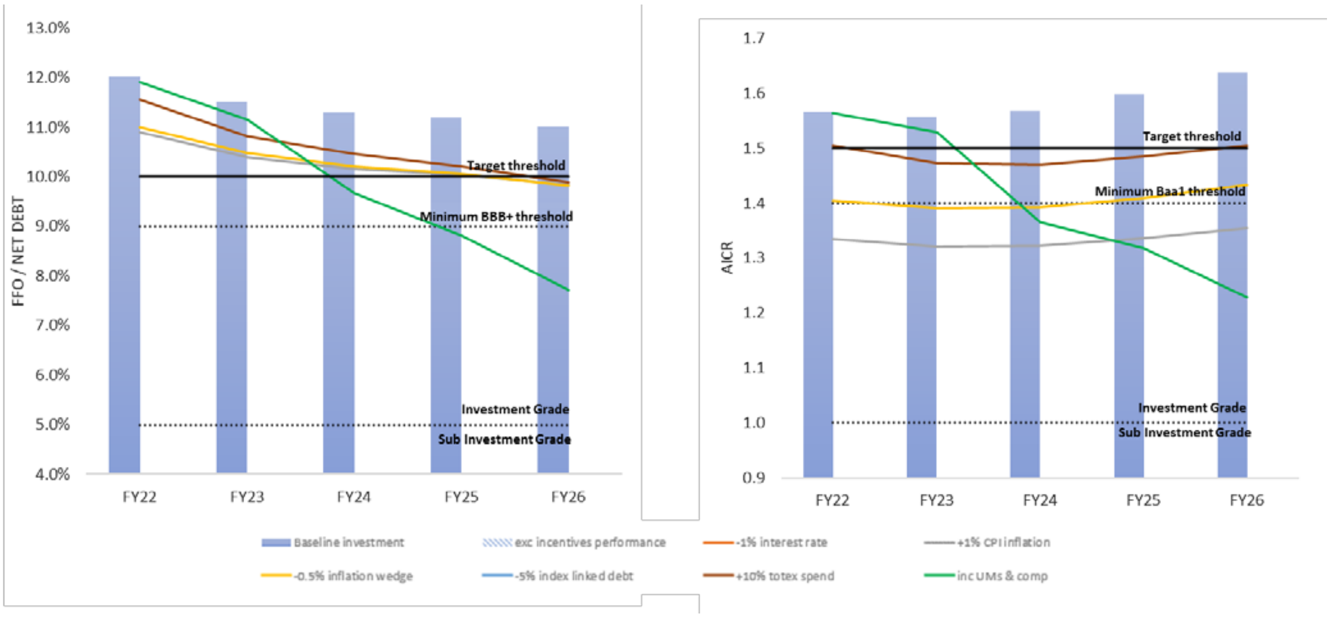
Network is able to borrow more cheaply and can absorb the impact of cost shocks

Network can operate flexibly to facilitate changing consumer requirements

We have tested our package against a range of macroeconomic and operational scenarios to ensure the notional company has sufficient headroom to absorb downside risks.

As the following graphs show, we are able to maintain financeability and remain resilient, a position which is key in safeguarding our future investment ensuring we have the capacity to facilitate change to a low carbon economy and deliver the energy networks of the future.

Figure A22.19: Sensitivity analysis to assess implications for AICR and FFO/net debt using National Grid's proposed financial package



8.4 Financeability assessment of the actual company

Our assessment so far has focussed on the financeability of the notional company, but we also need to assess financeability of the actual company. The onus for ensuring the financeability of the actual companies lies with networks, but this can only be assured on a sustainable basis if supported by a package which delivers a financeable notional company.

For the actual company, notional gearing is adjusted to actual gearing and actual debt and tax costs are included with other financial parameters remaining at notional values. We also include any cashflows which will be recovered/incurred during RIIO-2 but are related to the RIIO-1 price control period. We align our assessment with credit ratings agencies' methodology.

Considering Ofgem's package, including 0.5% of incentive performance, we see an improvement in the results of our financeability assessment when using actual financing. This relates to the debt financing strategy we adopt. We work hard to ensure debt is issued as efficiently as possible to minimise total interest rate charges, but as a consequence tax performance will reduce because of the additional charges incurred.

As already outlined for the notional company, assuming incentive performance at this level is neither a credible assumption nor is it in line with how credit rating agencies will view the network in practice.

Taking out any assumed outperformance shows the significant support the additional revenue provides. We still show an improvement in the credit metric results when compared to the notional focus, but the equity investor proposition remains misaligned with both our peer group and shareholder feedback.

Adjusting to a 5% dividend yield, Moody's Grid is below the A- credit rating we aim to support for the actual company for the whole of the T2 period. We target A- because this ensures access to a wide range of debt instruments and capital markets at an efficient interest rate which is key to supporting our debt financing strategy.

Trends also show a gradual increase in gearing levels, by the end of the period we are very close to the threshold (64.9%), suggesting equity issuance will be required to ensure alignment with an efficient capital structure.

It is unlikely that we would be able to attract additional investment when higher returns can be earned in comparable sectors (e.g. water, tobacco). In reality, it is likely that returns would need to be higher to compensate investors for increasing their exposure to a sector which may be perceived as being riskier because of the political and regulatory uncertainty.

In our assessment, the limiting factor is the notional company, yet in this scenario it is debt and tax performance which is ensuring financeability for the actual company. In assessing an overall package, we shouldn't rely on financing performance which may not be achievable in all credible macroeconomic and totex scenarios, particularly given the low interest rate environment we are currently in and the potential for additional capex spend.

The only sustainable way to support both debt and equity financeability is to set an appropriately calibrated package. The package we propose ensures financeability for both the notional and actual company and allows us to continue efficiently financing our activities whilst supporting sustainably lower consumer bills in the long term.

8.5 Financeability assurance statement

Ofgem's Business Plan guidance sets out that our Board needs to assure that the licensee is financeable on a notional and actual basis using Ofgem's working assumptions, with the use of financeability levers where appropriate. As we have set out above, the notional company using Ofgem's assumptions does not meet our definition of financeability, with risks against the equity investor offering, achieving Baa1 credit ratings and balance of risk / reward. However, by reducing the scope of the assurance statement we have been able to assure that there are ways to achieve Baa1 credit ratings in the period using financeability levers. This seems to be the main focus of the assurance requirements.

The Board have therefore agreed to the following assurance statement:

For the purpose of this statement, we define financeable and financeability as applying to the baseline totex forecasts (excluding e.g. contestable projects and totex funded by uncertainty mechanisms) in our 9 December business plan submission only and meaning:

- generating sufficient cash to achieve quantitative Baa1 credit rating thresholds for each year of the RIIO-2 price control period under the March 2017 Moody's Grid Regulated Electric and Gas Networks Rating Methodology and Fitch and Standard & Poor's core metrics; and
- complying with the requirement in the Company's licence to use all reasonable endeavours to maintain an investment grade issuer credit rating based on the actual capital structure of the Company.

In giving this statement the Board does not provide assurance that the investor offering is sufficient to balance risk and reward or that financeability (as defined above) of the Company can continue to be achieved beyond the RIIO-2 price control period using the assumptions set out by Ofgem. The Board is providing this assurance statement as required by Ofgem under paragraph 4.117 of the "RIIO-2 Sector Specific Methodology Decision – Finance", dated 24 May 2019. In providing this assurance statement the Board is not agreeing to the financial framework and the working assumptions proposed by Ofgem and this statement should not be construed as doing so. On this basis, the Board provides the required assurance that, in its opinion, the licensee is financeable on both a notional and actual capital structure basis based on Ofgem's financial framework and the assumptions that are made in the Company's Business Plan prior to the Final Determinations. This statement is based on the prevailing market conditions at November 2019 and internal modelling of credit metrics which has not been tested with rating agencies.

Ofgem's financial framework includes 50bps/£35m p.a. of revenue incentive outperformance, which would be disregarded by rating agencies and is highly uncertain. Therefore, we remove this assumption and this assurance is subject to an increase in revenue of £250m across the period through the application of financeability levers. Many such measures are not in line with published good regulatory principles, are not sustainable in nature and could be disregarded by rating agencies in their assessments. The scale of the adjustment is such that we do not agree with applying the measures. They should therefore not be used ahead of the more sustainable measure of using a higher return assumption. However, such adjustments would provide additional cash in the RIIO-2 period to enable credit metric thresholds to be achieved.

9. Impact on energy bills

We report our consumer bill based on a comparison of T2 average bill to T1 average bill prior to inflationary impacts.

Our business plan delivers a declining consumer bill under our financial package.

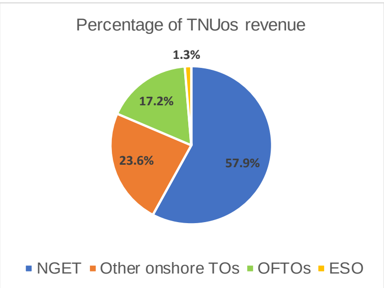
For customer impacts we focus on underlying revenue trends prior to inflationary impacts

Our business plan delivers broadly flat T2 revenues compared to T1 averages under our financial package.

The application of the RIIO-2 regulatory framework to our business plan determines the revenues we are allowed to recover through the price control period. The Electricity System Operator (ESO) recovers revenue from transmission network users by applying the charging methodology in force at the time. The ESO publishes its forecast tariffs, for example through the Forecast of TNUoS tariffs. Our revenues form only part of ESO's published tariffs as the ESO also collects revenues for other onshore and offshore Transmission Owners.

In March 2019 the ESO published the five-year view of TNUoS tariffs for 2020/21 to 2024/25. The published revenues are quoted post-inflation assumptions and are based on the ESO forecasts of the charging base. Our revenues are on average 58% of the total revenues used to forecast these tariffs and our revenues do not increase before inflation.

Figure A15.20: Forecasts and proportions of TNUoS tariffs



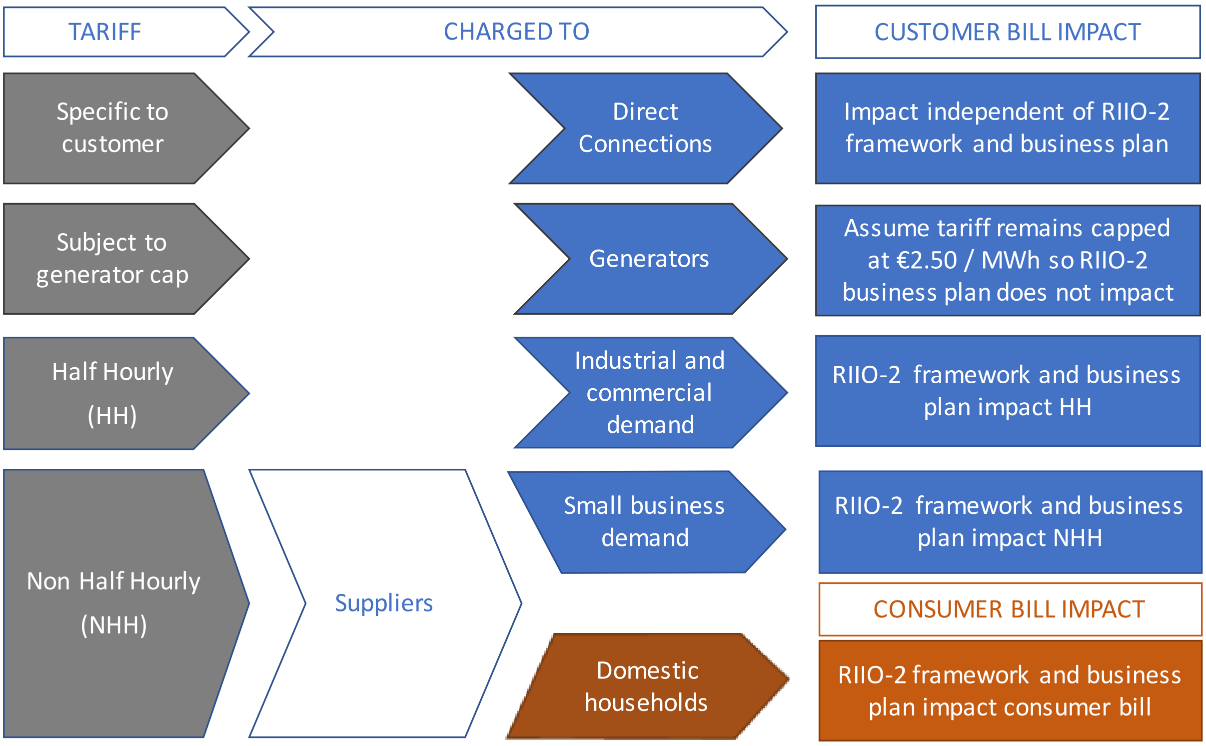
NNH tariffs	Average (p/kWh)
2020/21	6.52
2021/22	6.93
2022/23	7.21
2023/24	7.62
2024/25	8.00

The 23% increase in ESO forecasts tariffs from £6.52 in 2020/21 to £8.00 in 2024/25 are due to increases from other factors, inflation and OFTO revenues in particular.

The process for calculating tariffs is subject to the particular charging methodology in force at the time. Application and engagement on the charging methodology fall within the ESO's activities. We therefore make the simplifying assumption that the charging methodology will not change from its current form allowing us to quantify the specific impact associated with our business plan and to directly compare RIIO-2 charges with those under the previous price control.

Our revenues are paid for by the customers of the ESO. Customers of the ESO are generators and suppliers. Costs charged to suppliers are passed onto commercial and domestic end users. We consider the impact of our plan both on our customers and the end consumer.

Figure A15.21: TNUoS customers and tariffs



The financial model used to support our consumer bill analysis is submitted at Appendix 7.

9.1 Customer bills

We have built this plan with the help of our customers and have incorporated their views in our proposals.

When we have engaged with our customers on how we can help them understand their bill impacts for RIIO-2 they have told us that we should give them visibility of our revenue trends including potential tariff implications. This will allow them to calculate their own specific bill impacts based on their individual circumstances.

We calculate the impact of our business plan on the half hourly and non-half hourly tariff and therefore on our industrial and commercial and small business and domestic users, respectively.

Demand tariff is reflective of revenue. The forecast revenue ranges for our draft business plan submission which are charged to generators and those on HH and NHH tariffs are:

Table A15.28: Revenues charged to generation and demand customers

£m (2018/19 price base)	2021/22	2022/23	2023/24	2024/25	2025/26	RIIO-2 average	RIIO-1 average
NG framework	1847	1929	1801	1747	1704	1806	1769
Ofgem framework	1632	1717	1591	1549	1523	1602	1769

Assuming that forecast demand remains at 2019/20 levels across RIIO-2, results in the following forecast impact of our plan on customer tariffs:

Table A15.29: Customer bill tariffs

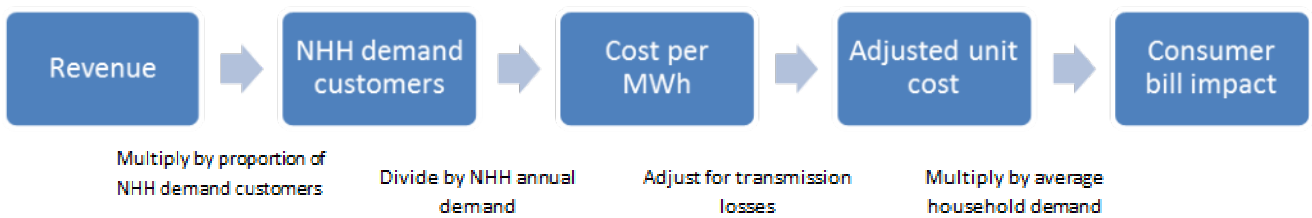
Customer	Impact of our RIIO-2 plan on demand tariff	Average customer case study
Industrial / Commercial (HH)	Increase in bills of c.1% 2019-2020 average of £49.9 / kW RIIO-2 average of £47.2 to £50.6 / KW	Half hourly tariff for a 1MW user Change in annual bill of –£2,800 to +£600
Small businesses (NHH)	Increase in bills of c.1% 2019-2020 average of 6.45p / kWh RIIO-2 average of 6.09p to 6.53p / kWh	Non-half hourly tariff for an average annual usage of 50kMWh Change in annual bill of -£180 to +£40

We have engaged on this approach through our Stakeholder User Group focusing on the impact of our business plan and will continue to engage with individual customers.

9.2 Consumer bills

We calculate our consumer bill impact using a simple top down approach that follows the methodology described by Ofgem. The consumer bill is expressed as National Grid's element of the TNUoS tariff passed on to households by suppliers. We use the following five step process to forecast the RIIO-2 consumer bill:

Figure A15.22: Methodology for calculating electricity bill impacts

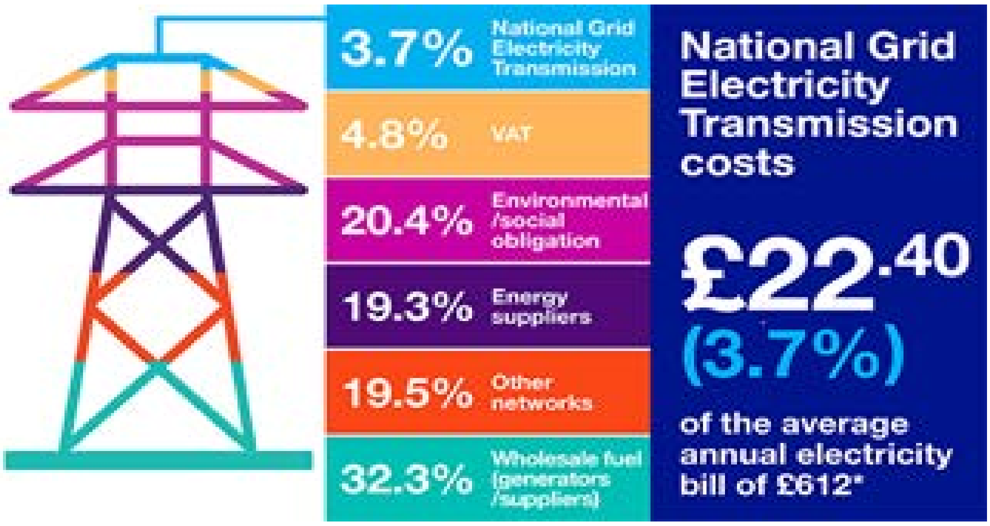


Our approach is based on the charging methodology and inputs from 2019/20, so our forward-looking estimates, such as demand assumptions, do not include potential future changes to these variables.

Using this methodology, on average across the T1 period, National Grid's direct charges to end consumers account for c4% of the average household gas bill, this is around £24 a year.

All values are quoted in the equivalent of 2018/19 prices. This gives transparency to the impacts expected from our business plan by removing the effects of inflation on bills.

Figure A15.23: Illustration of National Grid's electricity transmission charges as a proportion of the total consumer bill, 2018/19



Applying Ofgem's proposed financial package, with the capitalisation rate adjustment to ensure that the company remains able to achieve credit metrics at Baa1 grade for the T2 period (Section 8, Financeability assessment), results in an average T2 consumer bill of £20.95, an average reduction in the annual bill of £3.20 compared with the current price control.

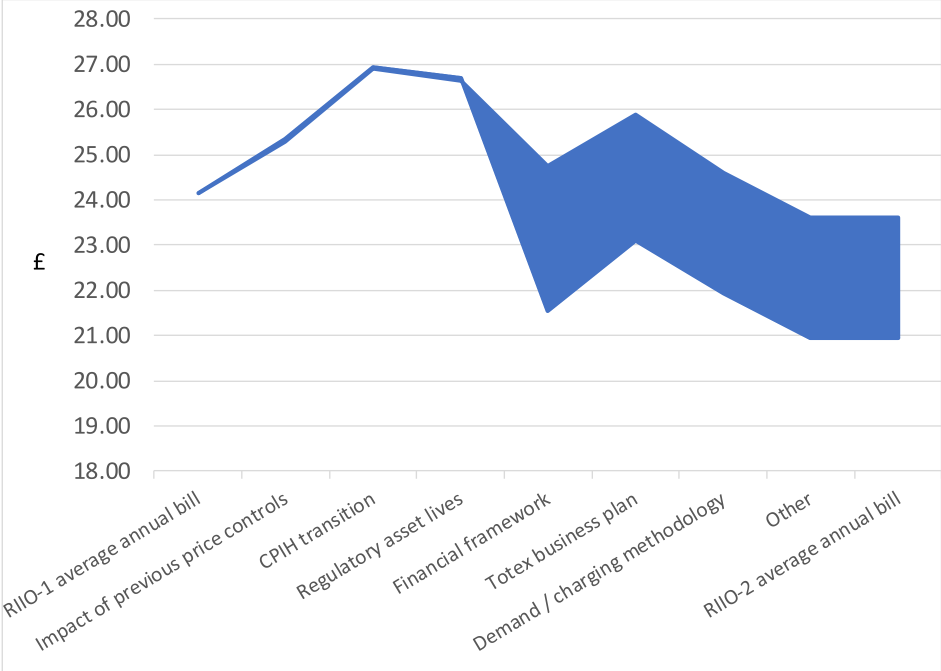
However, by adopting Ofgem's proposed framework we recognise that there are additional risks for consumers:

- The equity investor offering is reduced and is not in line with that of our peers which risks a rise in the cost to invest in the network or limits our ability to make the required investment.
- The short-term fix of amending the capitalisation rate to bring additional revenues into the T2 period from future periods moves away from the principle of matching consumer charges to asset use.

Our proposed financial package mitigates these risks and ensures that charges are set to reflect consumers' use of the electricity transmission network. Under our proposed package, the average T2 consumer bill is £23.60, an average reduction in the annual bill of £0.55 compared with the current price control.

The forecast of average T2 consumer bill ranges can be attributed to several key factors.

Figure A15.24: The impact of individual business plan elements on the consumer bill



The drivers under our proposed package which result in the change in the average consumer bill from T1 to T2 can be allocated into four main categories

- **Previous controls: + £1.15 to +£1.20**

  The level of RAV additions in the T1 period, the inclusion of allowances for the Hinkley Seabank project and legacy adjustments will flow through to the RIIO-2 bill but arise as a result of true-ups required for the previous price control.

- **Framework changes: +£1.35**

  The transition to a CPIH indexed price control accelerates cashflow.

  The continuation of the 45-year regulatory asset life is an increase from the average T1 asset life which delays revenues.

- **Financial package: -£1.90 to -£5.15**

  This category covers changes to financial parameters; allowed equity return, cost of debt allowances and gearing. Under both our and Ofgem's proposed financial package the cost of capital decreases mainly due to lower allowed equity return when compared with T1.

- **Totex plan: +£1.15 to +£1.55**

  Our totex plan is driven by what our stakeholders require from the transmission network and the investment needed to deliver a safe, reliable network which will be key to realising the UK's clean growth ambition. We will continue to communicate and test elements plan with stakeholders, for example, through the Willingness to Pay exercise.

  The upper end of the range representing the impact of Ofgem's package, includes the increased capitalisation rate required to deliver a framework which delivers target credit ratings in T2.

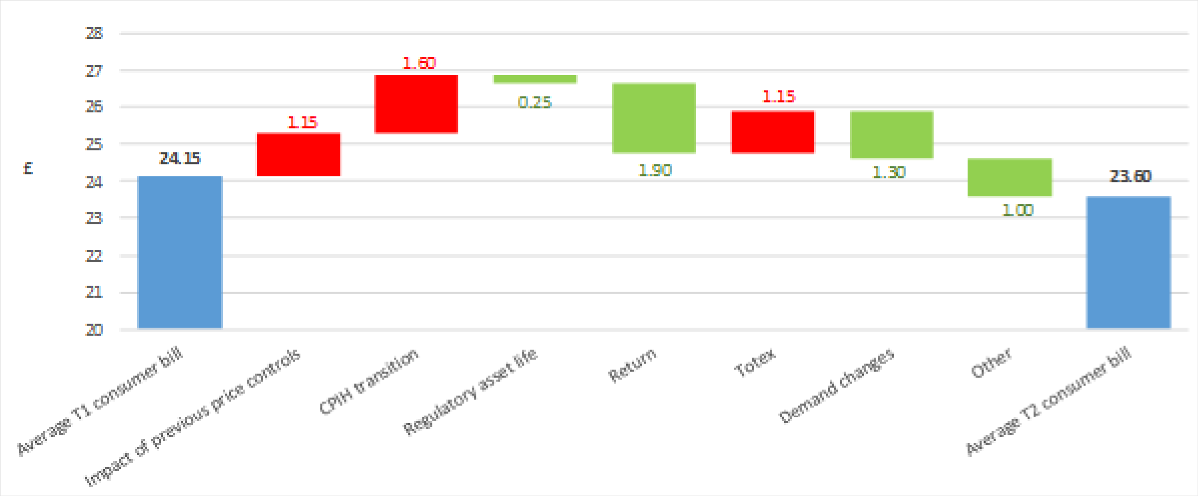
- **Demand projection: -£1.15 to -£1.30**

  We have continued the 2019/20 charging methodology and demand assumptions through the remainder of the current price control and into subsequent periods.

- **Other movements: -£1.00**

  A further reduction is attributable to forecast changes in mainly in pass through costs but also incentive income.

Figure A15.25: Forecast upper range of consumer bill based on National Grid's proposed financial framework



We have engaged with stakeholders on our communications on the consumer bill. In November 2018, we commissioned a study that included awareness of the energy industry amongst the public including the understanding of what makes up the energy bill. Based on the results and feedback we have engaged with stakeholders to explain our portion of the consumer bill and how it is calculated. This information is available at https://www.nationalgridet.com/about-us/breaking-down-your-billl. We have also explained how the bill impacts reflect value for the network they use and the services they receive while being fair to current and future generations. This engagement will continue throughout and contribute to development of our plan.

Appendix A1:Analyst response to sector specific consultation

There has been considerable City reaction throughout the consultation process with much focus on the sector specific consultation and decision publications. In addition to those included in the main body of the narrative, a wider range of analyst commentary is shown below.

A1.1 Response to sector specific consultation document

"National Grid's share price dropped by 9% yesterday leaving the stock trading on only a 3% premium to UK RAB based on our valuation of 18.3x 2019/20 US GAAP P/E for its US business. Every 1% off its UK RAB premium has a 0.8% or 6p impact on its valuation and therefore we would see RAB for the UK business corresponding to 740p. Investors should be prepared for volatility as the UK political situation is currently highly uncertain and we retain a Hold rating on the stock. However, from a fundamental perspective the drop in its shares leaves National Grid discounting a cautious valuation for its UK business."

Source: Deutsche Bank – James Brand, December 2018

"Methodology confirms a tougher regulatory environment into RIIO-2: The UK regulator Ofgem published this morning its consultation document on how it intends to apply the RIIO-2 framework across the sectors that have their next price control starting in 2021 (ET, GT and GD). In our view the highlight goes to the preliminary allowed Cost of Equity (CoE) provided, which came in at the bottom-end of the previous range; and, in our view, below market expectations. Other than that, a few changes to the existing framework have been confirmed: 1) a 5-year price control period; 2) shift to CPIH indexation from RPI, but with no phasing; and 3) introduction of return adjustment mechanisms to prevent extreme returns during the control period."

Source: UBS – Sam Arie, December 2018

A1.2 Response to sector specific decision document

"This morning Ofgem published a greatly anticipated sector specific methodology decision which includes working assumptions for equity returns allowances in the next regulatory period (RIIO-2 commencing Apr-21). At the headline level, the returns allowance has moved higher from 4% to 4.3% (real, CPI) due to an improvement in the beta parameter (midpoint increased from 0.7 to 0.75). The controversial 0.5% outperformance wedge remains, as Ofgem has decided that responses did not provide 'material evidence' to change the regulator's mind, but the door is clearly ajar to a lowering of this parameter as the process unfolds in the coming months (see discussion below). Other positives include the removal of the cashflow floor approach and a preference for sculpting over more severe measures such as anchoring. Our conclusion is that the improvement in returns announced today is a very clear step in the right direction, providing relief from the hard-line stance feared and likely supportive to share prices at current levels. However, a final nominal returns allowance of 6.3% remains materially below water (7.0%) and cross-checks published in the report (7.2% to 7.55%)."

Source: JP Morgan – Chris Laybutt, May 2019

"Impact on companies should not be that dramatic. For National Grid, we estimate that in FY22e, having returns cut from 7% real RPI to 4.3% real CPIH and having the indexation methodology changed from RPI to CPIH would mean a 2.9p underlying EPS cut, i.e. -4.6% vs RIIO-1 methodology in FY22. For SSE, the same exercise leads to a 3.6p adjusted EPS

cut, i.e. -3.4%. We believe that if returns were to be cut this significantly, both National Grid and SSE would shift funds to higher-return projects. We think National Grid would focus on the US network as the investment outlook already points to a significant capex step-up in some areas (namely KEDLY and KEDLI). For SSE, it would predominantly free up more funds for the development of its renewables portfolio, in particular its offshore wind projects (a total pipeline of >7GW)."

Source: Societe Generale – Bartlomiej Kubicki

Appendix A2:Standard and Poor's Credit Rating Methodology

Included by separate attachment:

- Standard and Poor's Ratings' Services Corporate Methodology

Please see file: ***NGET_A15.01A_Appendix A2 Standard and Poor's Ratings' Services Corporate Methodology.pdf***

- S&P Global Ratings, Key Credit Factors For The Regulated Utilities Industry

Please see file: ***NGET_A15.01B_Appendix A2 - S&P Global Ratings, Key Credit Factors For The Regulated Utilities Industry.pdf***

Appendix A3:Risk assessment

A3.1 Introduction

We define a risk as an uncertain event or set of circumstances that should it occur will create a movement away from our baseline plan / forecasts. Risks can have negative effects (threats) or positive effects (opportunities) which can be measured and quantified. Uncertainty, because of its very unpredictability, is a much less tangible concept. However, it may still be possible to assign broad qualitative probabilities even in the case of the most uncertain possibilities.

UK energy networks have traditionally been seen as low risk compared to the broader market. However, it is not the inherent characteristics of the industries that have led to this classification as the underlying risk landscape which networks operate within is significant. These risks can be categorised in many ways, with some specific to transmission, while others are faced by all parts of the economy albeit to a greater or lesser degree. The main categories we consider are:

- **Business risk**

  These are the issues affecting the day to day provision of National Grid's services. In RIIO-2 uncertainty and complexity of investment will drive construction and output delivery risk and, whilst these risks are not new to us, the challenges of moving towards a low carbon economy are. Furthermore, the risks around increasing digitalisation and the associated cyber security risks have risen significantly since the T1 period.

- **Market risk**

  These are the issues affecting the whole economy and industry changes resulting in varying demands for network services. The impact on the economy as a result of Brexit is not yet known but is likely to cause volatility in the markets particularly interest and exchange rates. There is also a risk that the changing nature of the industry and the subsequent impacts for networks (e.g. competition, decarbonisation) will increase asset utilisation and stranding risk.

- **Political risk**

  This is the risk of political intervention or legal changes to the regulation of the sector. The importance of the energy transition and Helm's energy review suggest there is an increased risk of more direct political control in the sector; an extreme example being the threat of nationalisation.

The perceived low risk nature is therefore dependent on the nature of the regulatory frameworks in which networks operate. This low risk status is achieved by a fair sharing of the financial impacts of risk and uncertainty between shareholders and consumers, and how risk is shared is largely dependent on the type of regulatory framework adopted. For example, rate of return regulation (used for example in many US regulated entities) limits risk for networks but also creates little incentive to control costs because of the limited opportunity to benefit from any reductions. This drives behaviours which result in low rates of innovation and productivity improvement which in turn delays when consumer benefits can be delivered. Alternatively, incentives-based regulation aims to mimic the benefits of dynamic competition by creating the potential to earn higher returns if networks deliver services at the price and quality consistent with what consumers want and there is a risk of earning below normal returns where they don't.

RIIO was introduced to make regulated energy networks move away from simply doing what they do as cheaply as possible. Aligning the interests of consumers with those of shareholders are a cornerstone of RIIO and drives progressive behaviours where companies strive to innovate, think large scale and discover what is possible. Whilst these objectives inherently increase the risk placed on network, fair allocation between our shareholders and consumers will ensure networks are provided with the incentive to take on those risks and drive outcomes which deliver long term benefits to consumers.

Managing risk and uncertainty effectively is central to the way we conduct business. Identifying business objectives and understanding the risks to those objectives supports management to make better informed decisions, protect corporate reputation and drive shareholder value whilst delivering consumer outputs. So, while risk and uncertainty are not new to the energy sector, there will be significant new challenges as we move towards a low carbon economy.

National Grid is operating in a complex environment which has seen radical changes over the last decade and one which continues to evolve, the implications of which are difficult to predict. The combination of political, economic and technological factors is dramatically changing the way energy is produced, used and transported. Decarbonisation, decentralisation and digitalisation are transforming the electricity system. In the future, electricity will flow far more dynamically between transmission and distribution-connected parties.

Whilst all businesses have to deal with risk and uncertainty when operating and planning their activities, the significant challenges in the energy sector will require changes in how networks make decisions and the solutions they adopt. In this world, it is vital that network expertise is utilised in driving the right outcomes which means providing scope within the framework to be able to address challenges that come with energy transition as they arise so that networks are proactive and facilitate the move towards a low carbon economy, as opposed to becoming a blocker for delivery.

A key attribute of the framework must be a transparent and fair balance of risk and reward between consumers and networks. Under RIIO principles, risk and uncertainty should be borne by the party best able to manage them, therefore only passed on to the consumer when outside of the networks control and when the potential to significantly impact costs would lead to a higher cost of capital that consumers would need to fund. The residual risk is for the network to manage, with performance and incentivisation creating rewards or penalties for how well the probability of occurrence is managed. This drives innovation, efficiency and performance improvements, benefitting consumers through service improvements and reduced long term costs.

The framework we are adopting allows us to develop an understanding of the changing risk environment and its impact on returns and consumer outcomes. This enables us to engage stakeholders as to where those risks should lie such that it provides a ‘fair deal’ to consumers and investors and will be sustainable and legitimate through RIIO-2.

Within this context, the structure of this annex is set out below:

- risk framework principles
- our approach to risk management
- risk and uncertainty landscape in RIIO-2
- estimation of the impact of each risk and overall impact for combined scenarios.

The key driver to the underlying risk within a price control is understanding the impact of the changes in the framework on the likely range of cash flow volatility, so the outcomes will be key in informing our financeability assessment.

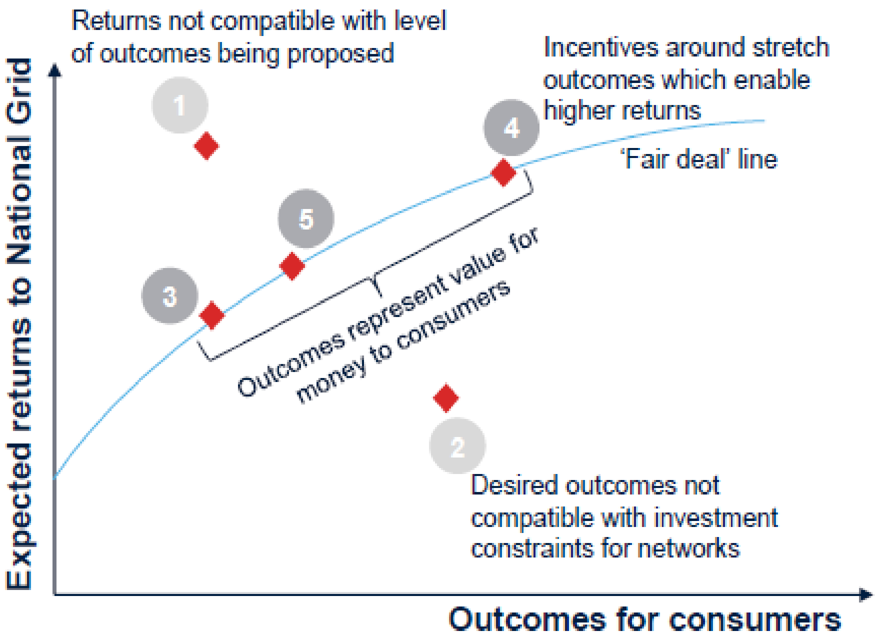
A3.2 Risk framework principles

A key attribute of the framework must be a transparent and fair balance of risk and reward between consumers and networks.

A basic principle of corporate finance is that investments will only be undertaken if investors believe they can earn an acceptable return which is line with the level of risk they are taking on. On this basis, a fair deal for the investor is one which allows them to earn a return equal to the investment's cost of capital. This requires the opportunity to earn returns above the cost of capital to compensate for the additional risks that are faced when the investment is made. For the consumer, a fair deal is one where incremental improvements in service are delivered at a price which they are willing to pay.

Figure A3.1 illustrates the objective of achieving a fair deal. The first element is to ensure that any proposals land on the 'fair deal' line, this is largely driven by the risks we are exposed to from the external environment and is dependent on the agreed allocation of risks between consumers and National Grid. Where on the line, is then dependent on the level of outcomes which consumers are willing to pay for. Stretch outcomes aligned to stakeholder priorities can be realised provided the right incentives are created for the networks to create efficiencies and long-term network benefits.

Figure A3.1: Illustration of the fair deal framework



The absence of a framework to efficiently allocate risks is likely to result in inefficient outcomes, that is not on the fair deal line.

Points above the line offer a poor deal for consumers as they will overpay relative to the outputs delivered. However, points below the line are equally inefficient as without the financial capacity to undertake higher risk investment, both innovation and future consumer benefits will be delayed leading to higher bills in the long-term

It is important therefore to consider a holistic view of the risk landscape and engage with stakeholders to agree how these risks could be optimally shared between investors and consumers with returns adjusted to match the risk which is being taken on. We have an opportunity to design a framework which would achieve better outcomes for both investors and consumers.

The key attributes of this framework are:

- **An understanding of all material risks taken by the company and those which are inherent in running a transmission network**

  We ran a process with our stakeholder groups to identify risks and uncertainties, both from external and internal influences, allowing us to develop a true picture of the changing risk environment.

  Our assessment indicates there have been key changes in business risks since T1 which need to be considered, for example increases in technological risk, demand / supply-side uncertainty and socio-political developments. Collectively we believe the impact of these developments means we are exposed to new risks which are not balanced by new upside opportunities.

- **A clear articulation of the levels of risk borne by networks**
  Once identified we assess the potential impact of being exposed to a risk and its financial implications to inform mitigation options. We apply the principle that networks are expected to manage the uncertainties they face, with use of regulatory tools limited to instances which deliver value for consumers and investors.

  Stakeholder groups will be engaged to test proposals are aligned with our stakeholder priorities and ensure a transparent allocation of risk.

- **Calibration of the risk reward package**

  The concept of a risk reward trade-off is well accepted in finance theory, i.e. investors require a higher return if they take on more risk and vice versa. Where we land on the fair deal line is dependent on the allocation agreed with our stakeholders, with returns then aligned to the specific risk allocation through cost of capital and incentivisation. The properties of incentive-based regulation need to be preserved when applying the fair deal framework.

  We use Return on Regulated Equity (RoRE), which measures the range of return achievable from the price control, to ensure the package fits together appropriately and the financial implications of our risk exposure.

- **An ability to measure, monitor and adjust actual risk positions against assumed allocation within the RIIO-2 period**

  At the start of the price control, the deal should provide networks a fair deal to perform against but as risks out-turn during the period it is inevitable that expected and allowed returns will begin to deviate as those risks take on either positive or negative values. A clear and transparent process to allocate risk will allow us to monitor and report against the out-turn position facilitating legitimacy of returns in RIIO-2.

Adopting this framework will enable us to create an appropriately calibrated package which provides positive strong incentives to drive improved service levels and reduced long term costs for consumers whilst also providing opportunities to earn returns commensurate with the network's performance.

A3.3 Our approach to risk management

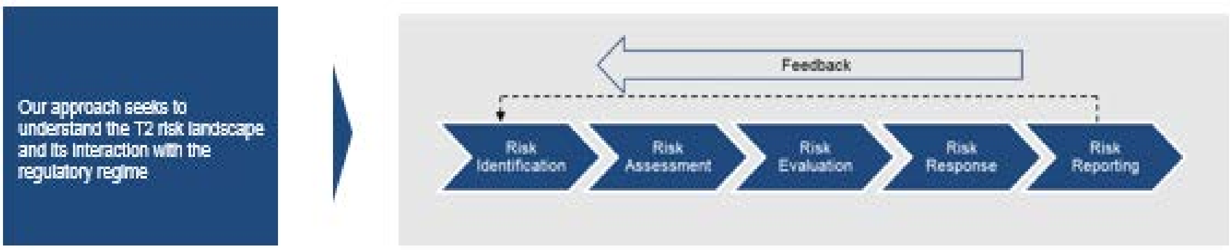
Given its importance, a risk management process is embedded in all elements of our business as part of our on-going assurance activities. Through a ‘top down, bottom up’ approach, all business areas identify the main risks to our business model and to achieving their business objectives. Each risk is assessed by considering the financial and reputational impacts, and how likely the risk is to materialise. The business area then identifies and implements actions to manage and monitor the risks as appropriate. The risks and actions identified are collated in risk registers and reported quarterly. This forms a core part of the assurance process and ensures senior management are aware of the key risk issues and the controls in place to manage them as well as the remediation plans underway to reduce any unacceptable controllable risks down to an acceptable level.

We have built upon our existing approach to risk management and the wide range of analysis conducted across the business, in order to identify and assess the risks, we are facing during the RIIO-2 price control period. Accepting that it is not possible to identify, anticipate or eliminate every risk that may arise, and that risk is an inherent part of doing business, our process aims to provide reasonable assurance that we understand, monitor and manage the main uncertainties that we face in delivering our objectives. This includes considering inherent risks, which exist because of the nature of day-to-day operations in our industry, and financial risks, which exist because of our financing activities

For each area, we have considered carefully how we might manage the risk by considering the mitigating actions which could be taken. In line with our T1 approach, we have only proposed uncertainty mechanisms to manage risks that are outside of our control and could significantly impact costs.

The diagram below represents the process we have followed to understand the RIIO-2 risk landscape and its interaction with the regulatory regime.

A3.2: Process to assess the risk landscape



- **Risk Identification**

  The aim of this part of the process is to agree a complete list of all of the known risks and uncertainties that could arise during the price control. These can be categorised broadly into three categories based on the source of risk and uncertainty:

  - **Timing** and delivery of outputs might differ from that initially envisaged. This manifests itself as performance uncertainty and relates to the ability of the network to deliver the required outputs given the assumed level of inputs. This matching is essentially an inherent risk networks accept when they accept a price control and is incentivised through a range of mechanisms.
  - **Prices** we pay for the inputs we require to deliver our services might change, such as commodity prices, labour costs, the cost of debt.
  - **Volumes** of activity required may be different from forecast creating output uncertainty. This could, for example, be the result of changes in the generation mix requiring connection to the network or legislative changes requiring different or greater actions to be taken than originally planned for.

- **Risk Assessment**

  To enable focus on the factors with the greatest range of uncertainty and risk associated with them we undertake an initial assessment to prioritise the risks we take forward for more detailed analysis. This ensures those with the most significant impacts to consumers and National Grid are addressed first by considering likelihood of occurrence and potential materiality.

- **Risk Evaluation**

  Where we can quantify the risks, values are agreed for the minimum, maximum and likely impacts, relative to the baseline plan. These inputs are used to model and analyse risk exposure using Monte Carlo modelling techniques to provide a range of potential outcomes, we can simulate many possible values from the input variables, weighted so that the 'best guess' value is more likely than the extreme values. To enable this work, we have developed a risk model with which we can assess the impacts for our financial performance and our ability to ensure delivery of consumer outputs.

- **Risk Response**

  This stage identifies the approaches that may be taken to mitigate those risks after allocating each risk to the party best placed to manage them. The types of mitigation are:

  - tolerating or accepting a risk;
  - transferring or sharing a risk;
  - mitigating a risk; or
  - avoiding a risk.

  Post mitigation we re-evaluate the impacts to ensure the financial package allows for an appropriate risk return balance

- **Risk Reporting**

  Following this process, we stress test expected returns under several scenarios. During the price control as risks out-turn we will be able to compare to the scenarios and where risk has been allocated in the deal, providing transparency and legitimacy of our actual performance against the regulatory package which has been agreed.

A3.4 Risk and uncertainty landscape in T2

Under the RIIO-2 framework, the price control settlement will be based on forecasts of output requirements, demand for network services over time, the cost of delivery and financing costs. The nature of the regime whereby many elements are agreed upfront will mean that the uncertainty associated with forecasts and user requirements will reduce over time.

Whilst the majority of forecasts are based on established processes with a good understanding of the costs, uncertainty cannot be removed. The business plan reflects the changing external landscape for transmission in the 2020s and we start to describe below the elements of our business environment that are subject to major uncertainty. It is these fundamental drivers that create uncertainty over the volume of work that we will need to undertake, and/or costs that we will incur, in delivering the outputs to its customers over the T2 period. Our quantitative modelling to understand the risk exposure has been based on historical performance, industry data (e.g. Future Energy Scenarios (FES), Electricity Ten Year Statement (ETYS)) and judgement based on our own experience.

The key risk and uncertainties we have considered are listed below along with details, where appropriate, of how that risk is currently managed. To ensure completeness we have assessed against the corporate risk register to ensure all key risks have been captured which we have also tested with our stakeholder group through an interactive session we ran to ensure key risks had been identified.

A3.4.1 Construction uncertainty

Construction uncertainty refers to all cost uncertainty which is not explained by either a change to the volume required or real price effects. It includes the uncertainty associated with estimating project costs significantly ahead of delivery and project scope changes driven by unanticipated site conditions, and policy changes. Unanticipated site conditions may include weather, outage changes, the condition of closely-associated assets being better or worse than predicted and the knock-on effects of plant failures. This uncertainty is greatest at project inception and reduces as further information is gathered, site surveys are completed and quotations or tenders are received. Uncertainty is also created because of the complexity of investment as transmission networks are more highly meshed and interlinked. Large scale transmission projects compared to investment for smaller scale repeatable activities also increases the chance of variation from forecast

Risk evaluation

To quantify the uncertainty around the smaller scale projects, we have compared cost forecasts and costs at completion for a sample of schemes carried out in RIIO-1 where the functional output was retained. The mean of the initial estimate data was 19%, i.e. on average the cost at completion was 19% higher than the original estimate with a standard deviation of 36%. We have not quantified this risk separately but have incorporated into the evaluation of our capex specific risks, where appropriate, to ensure cost variability is captured.

For larger scale transmission projects in areas such as cable tunnels and undergrounding cables, given their complexity and more bespoke nature we forecast that spend is more likely to be greater rather than lower than the base case. We have therefore assumed a distribution defined by a minimum -5%, maximum +20% and most likely 0% values. These two categories of spend alone highlight a variation of £100m.

How risk is currently managed

The primary mitigations we have in place to ensure projects are completed on time and to budget are the re-sanction process we adopt and the feedback from project completion. Projects are sanctioned with a cost range, which is built up from the known construction risks at the time of sanction. We sanction at P(50) in the range P(20) to P(80). If the forecast cost at completion moves outside this range, then a re-sanction is required. The re-sanction provides an opportunity for a full managerial review of the project. This ensures that the need case for a particular project is not undermined by an increase to the scheme costs, and allows alternative options to be considered

There is also a feedback loop between scheme completion and the initial estimation of project costs process. Unit costs for project estimation are updated based on recent experience on delivered projects and market intelligence. This allows learning points from delivered projects to be considered when compiling future cost estimates. In addition, the process includes the option to apply complexity factors to the future project cost estimation. This allows our experience of the construction risks for different project locations to be applied to future cost estimates.

A drive to innovate and improve efficiency is also key in managing our cost base. Our innovation plan helps to deliver this strategy by developing new, innovative ways of working which will ultimately deliver consumer benefit by challenging how we design, build and manage our assets. As this will require assuming more risk in the short term, we need to ensure that the framework provides the incentivisation or funding required to enable delivery of efficiencies which will ultimately drive consumer benefit in the long term.

Risk allocation in T2

Our mitigating actions show that we do have some control over managing the risks that create the potential for cost over-runs as it is our responsibility to ensure we operate the business efficiently. However, there are also external factors such as unanticipated site conditions which we have limited control over which makes it appropriate to share totex risks in line with the sharing factors. This aligns the interest of both investors and consumers who will benefit from totex savings, but also share the risk of spend levels out-turning higher than expected.

A3.4.2 Major system or asset failure

Our highest priority is to ensure that the risk that an asset or assets fail on the transmission system, leading to a serious loss of supply, is minimised. Implementation of an asset health programme including inspection, maintenance, refurbishment and replacement minimises the potential for interruption and ensures network reliability can be maintained at broadly current levels.

Based on our plans we have identified two principal sources of uncertainty.

The first is uncertainty associated with the forecasting of asset degradation and the risk of our assets deteriorating more quickly or slowly than we forecast. The overall level of network risk could increase or decrease away from the agreed target if actual asset conditions turns out differently to that anticipated. This could lead to an investment scenario which is not in line with funding for or leads to a higher level of defect repairs.

Secondly, there is the uncertainty associated with unexpected type faults. The strategy adopted for asset health expenditure is to avoid costly replacement through maintaining the condition of our assets. This ensures the continued safety and integrity of the network, allowing assets to deliver the outputs they were designed to provide. This whilst sufficient to maintain the level of risk on the system still leaves the potential for unexpected type faults, which cannot be forecast but can have a significant impact on network risk, cause significant costs and lead to disruption of the capital programme.

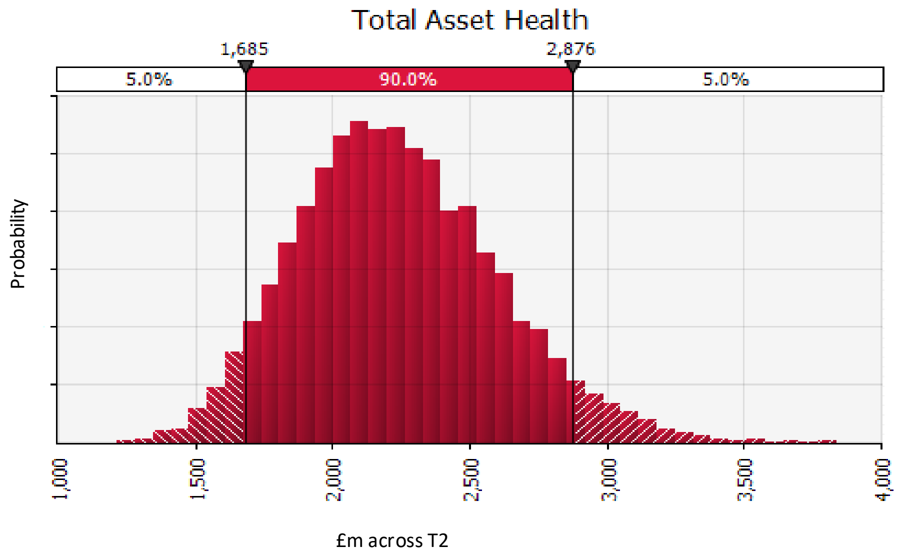
Risk evaluation

To understand the lead assets that should be prioritised for the T2 period, we have adopted an asset risk methodology which calculates the probability of failure and the consequence associated with the failure of assets. Our approach for non-lead assets adopts the same principles and, as a result, the derivation of the deterioration curves used to assess the probability of failure is key in supporting our plans. We have extensive knowledge of how assets are expected to deteriorate through failure investigations, forensic investigations, condition monitoring and assessment and the asset performance data we hold. However, a risk remains that assets may not behave as we anticipate and to assess that risk we have quantified the volume impact of:

- a 10% change in the probability of failure for lead assets; and
- a change in average asset life of +/- five years for non-lead assets

In addition to the asset degradation risk, we also need to factor in the construction risk from the relevant section above to capture the potential variability around unit cost. Based on these parameters, we have performed a Monte Carlo simulation to calculate the overall risk exposure at the end of the T2 period. This highlights a variation of £1.2bn, 90% of the simulations have a total cost between £1.7bn and £2.9bn. Our analysis to understand the implications of financeability is based on a P90 scenario which represents 20% of additional totex, c£500m, compared to the baseline[44]

Figure A3.3: Lead and non lead asset health risk over the T2 period



To assess the risk associated with unexpected type faults we have assumed a 20% probability of an event occurring in any year of the price control period, but only able to occur once. Based on historical experience we have set the range of the cost shock from £0 to £50m which fully feeds into the year in which it is incurred. Scenarios with a one year impact will be assessed in the year with lowest headroom, 2022/23. Based on the P90 outcome the cost is £38m and we assume 20% of any shock will also persist into the following year.

How risk is currently managed

An effective asset management approach which includes a number of preventative and detective controls, ensures the risk is managed to an acceptable level. As a business, we have implemented asset management and data management standards with supporting guidelines to provide clarity around what is expected, with a strong focus on what we need to keep us safe, secure and legally compliant

The key features of our approach include:

- internal and external assurance that we meet our policies, technical documents and procedures;
- development of a capability framework to make sure our people have the appropriate skills and expertise to meet the performance requirements in the standard;
- monitoring key performance indicators to ensure we are meeting our performance expectations;
- plans to ensure we undertake the work we need to address outages, resources, funding; and

[44] Excludes cable tunnels and underground cables due to the highly bespoke nature of each project

- business continuity and emergency plans are in place and practised to ensure we quickly and effectively respond to asset failures. Contingency arrangements for example include site emergency procedures and deploying strategic spares to ensure we can quickly and effectively respond to a variety of incidents.

Risk allocation in T2

As networks influence asset volumes with the policies they apply for maintenance and replacement, it would be inappropriate to pass this on to the consumer when networks do have a degree of control. Where assets do behave differently than anticipated we will adopt Ofgem's framework proposal for managing risk and where costs out-turn from the allowance, the difference will be subject to the totex incentive mechanism and shared with consumers based on the sharing factors.

A3.4.3 The increased uncertainty of supply and demand

The substantial change seen in the last decade is expected to continue at an increasing pace. The uncertainty of future supply and demand due to the rapidly changing energy landscape is being driven primarily by the rate of change of technology costs and the ongoing development of government policy on the approach to decarbonising transport and heat. While this risk was also a factor in T1 the pace at which change is happening is likely to increase significantly over the next price control.

On the supply side, we will face increased uncertainty around the volume, type and location of transmission-connected generation. As the economy continues to decarbonise, we anticipate the phasing out of coal to continue into T2, with 11 GW of coal-fired generation now expected to close over the next decade. Similarly, we expect this generation will continue to be replaced by renewable sources like solar and offshore wind, as the cost of technology will continue to fall. In addition to this, we expect the mix of transmission-connected generation, currently comprising of large-scale generation technologies like nuclear reactors, CCGT, offshore windfarms, to begin to shift towards small-scale generation devices, like battery storage, and potentially towards technologies that provides services other than power generation. This, in turn, will continue to impact on the need for reinforcements of the wider transmission network, particularly when the ability of the network to transfer power across boundaries needs to be increased to avoid costly congestion.

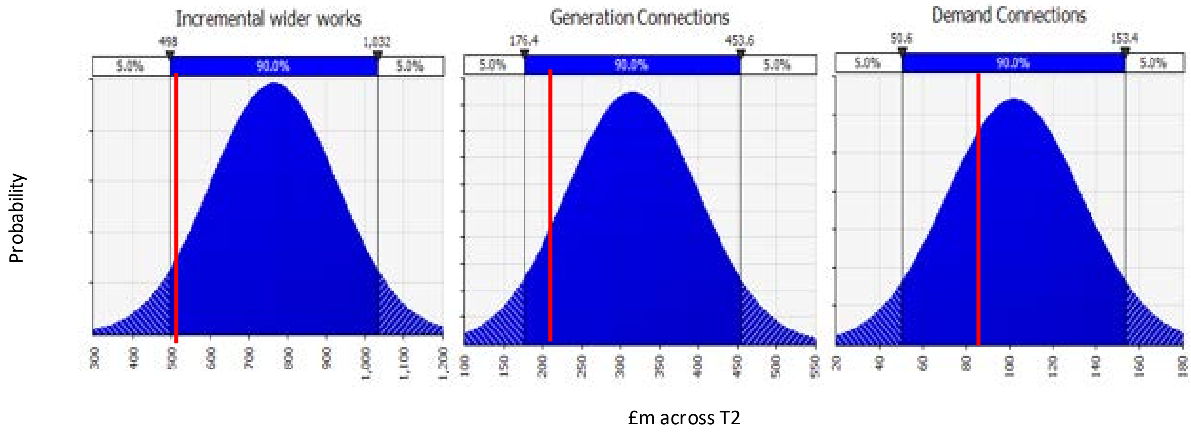
We also anticipate additional network reinforcements will be needed to address problems other than facilitating power flows because of an increase in operability challenges relating to voltage levels, inertia and reduced fault levels and system monitoring as a result of a number of transformations that are taking place in the energy system. However, the scale and exact solutions are uncertain, particularly as the development of whole systems solutions makes it unclear at this stage who may be best placed to deliver to resolve transmission issues.

Similarly, demand is more uncertain than ever before. We expect several opposing trends to impact on the demand for transmission supplied electricity in T2. Factors like modest economic growth, increased energy efficiency and decentralisation, will continue to reduce the requirement for transmission supplied electricity. On the other hand, electrification of transport and heat, along with continued growth in embedded generation - which could cause power flows to reverse - could very easily offset these trends and increase the requirement for transmission supplied electricity. It's currently unclear which one of these trends is going to prevail in T2.

Risk evaluation

Changes to customer connections drive a total uncertainty range between £0.7bn and £2bn, covering incremental wider works, generation connections and demand connections, the detail of which can be found in Annex A7/8.05 Managing Energy Uncertainty

Figure A3.4: Customer connection driven risk over the T2 period



The red line on each graph represents the baseline proposal which has been built from just the projects we anticipate delivering if the Common Energy Scenario was to out-turn. Their position within in the range shows how conservative the baseline proposal is and most likely to out-turn significantly higher, particularly as the scenario is inconsistent with delivering net zero by 2050.

In addition to changing customer requirements, as we transition towards a low carbon future the consideration of whole system solutions across networks is important to minimise costs for consumers, Annex A7/8.06 'Whole Systems' provides deeper coverage of how we have developed a whole system plan and what more we recommend being done through setting the price control. In several areas for investment, such as managing increasing fault levels from embedded generation, system operability, protection and control, and managing harmonics from new offshore wind farms we firmly believe undertaking a whole system review of options prior to investing is in consumer interests. Based on initial estimates it is anticipated that c£400m of additional spend uncertainty will be required to facilitate a whole systems approach.

How risk is currently managed

Whilst the range of uncertainty is not dissimilar to the range associated with the asset health programme, the key difference is that customers drive requirements and, therefore, volumes are largely outside of the networks control. Investment is not discretionary and is driven by licence obligations and it is on this basis that volume risk was not allocated to networks in T1. The uncertainty mechanisms in place have worked well in ensuring allowances adjust for the outputs customers want, thus protecting networks from changes that have occurred during the price control period.

Risk allocation in T2

As the range of uncertainty, we face will undoubtedly be greater in this period than it has been in the past, the energy system is undergoing rapid changes and we expect the scale and pace of these changes to accelerate over the next two years. The existing uncertainty mechanisms for future load requirements will continue into T2, albeit with enhancements based on T1 experience to ensure better cost reflectivity.

In several areas for investment, such as managing increasing fault levels from embedded generation, system operability, protection and control, and managing harmonics from new offshore wind farms we firmly believe undertaking a whole system review of options prior to investing is in consumer interests. The full extent of investment required will only emerge once a whole system review of options have been undertaken. When transmission investments are deemed in consumer interest it will be important that we have uncertainty mechanisms to give us the flexibility to deliver these investments but it is likely to enable transition we need to invest prior to securing funding increasing the cashflow risk for networks.

A3.4.4 The increased risk of cyber attacks

The most critical systems within the UK are energy transmission, a single point of failure for mainland UK with a critical effect on all other sectors, which are now reliant on digital assets to be able to run the networks. Cyber attacks on the Ukraine electrical distribution and transmission networks, attempted attacks on US nuclear power stations and other electrical facilities, as well as an increase in the number of disclosed Operational Technology attacks, signify ever-changing and increasing threats. This has led the head of the UK's National Cyber Security Centre to publicly state that a major cyber-attack impacting critical UK infrastructure is a matter of 'when, not if'.

Consequently, there is an increasing risk that our assets are vulnerable to a cyber security breach of business, operational technology and /or critical national infrastructure (CNI) systems leading to a prolonged loss of supply, significant reputational damage, financial impact and/or safety incidents.

Risk evaluation

To ensure we can deliver the protection needed and that consumers only pay for what is necessary we are proposing the following approach to managing risk and uncertainty in the T2 period:

- We are proposing baseline allowances for resilience projects where we have certainty and can measure the outputs we must deliver.
- We are proposing uncertainty mechanisms so that we can adjust our business plans to respond to new threats and/or requirements. We are currently anticipating c£380m of spend above the baseline.

We are also proposing that given the uncertainty, the cyber resilience plan is reviewed to take account of any changes to plan which, if accepted, limits the funding risk for the network.

Whilst our investments are necessary to protect the network from cyber attack, it is not possible to mitigate against the risk fully and therefore a residual exposure will always remain. To evaluate this component, we have based the likelihood and probability on the corporate risk register which suggests a successful attack has between a 40% and 60% chance of occurring, once in every 10 years. We have set the maximum impact at £100m and have assumed a one year impact which will be assessed in the year with the lowest headroom. Based on the P90 outcome the additional cost is £80m.

How risk is currently managed

We have no control over the nature of external threats, how they change and how quickly they change. We can however manage the risk they pose against our assets and systems by monitoring threats and having flexible business plans that we can adjust or reprioritise.

We continually invest in strategies that are commensurate with the changing nature of the security landscape. This includes collaborative working with the Department for Business, Energy and Industrial Strategy (BEIS) and the Centre for Protection of National Infrastructure (CPNI) on key cyber risks, as well as development of an enhanced security strategy.

Risk allocation in T2

With in period determinations and proposals to review plans and allowances at the end of the price control the funding risk remains allocated to the consumer However, there will always be a residual risk exposure from a successful cyber attack which will remain with the network although we expect the likelihood of this to reduce over the period as we invest in making the network more resilient.

A3.4.5 Adoption of new technology and innovation in our business models

Throughout the T1 period we have adopted innovative engineering solutions and asset management capabilities to deliver the step change in efficiency RIIO was designed to incentivise. Innovating on new technologies and ways of working will be key in allowing us to become more resilient and competitive and our business plan includes the implementation of several such solutions. However, the adoption of new technology also has a number of risks in particular that:

- costs may be higher than expected at the development and/or implementation stages;
- benefits may not be fully realised if solutions do not deliver in line with what was expected or are implemented in a way that does not address the problems we were seeking to resolve; and
- facilitating non-network solutions may not drive the expected behaviours, e.g. demand side response may not lead to the demand reduction expected particularly as there is considerable uncertainty over future opportunities and revenue streams.

There is a risk therefore that we must deploy higher cost solutions than have been assumed in our business plans.

Risk evaluation

To ensure we remain efficient we have committed to achieving future improvements by improving our opex and capitalised labour productivity by 1.1% year on year, an assumption which is three times current UK trends. We do not know explicitly how these efficiencies will be delivered but there is a direct relationship with how successfully we are able to adopt technology and innovation in our business models.

Given the level of ambition and the stretching cost targets we have evaluated the impact of not achieving embedded efficiency improvements, which could credibly result in an additional £100m of totex spend.

How risk is currently managed

We have created a Technology and Innovation team to develop our strategy with regards to new technology, to monitor disruptive technology and business model trends, and to act as a bridge for emerging technology into the core regulated businesses.

Our approach therefore includes:

- monitoring technology trends and maturity of new inventions and prototypes;
- an innovation strategy developing solutions that address the future integrated energy systems;
- developing technologies and solutions in partnership with customers, suppliers and technology companies; and
- increase speed at which we implement technologies onto our network.

Risk allocation in T2

In T1, we had a specific innovation stimulus, to encourage a culture of innovation within the network companies, and support trials that may otherwise not take place within the price control framework. Business as usual activities will deliver our innovation strategy and create consumer benefits within the period and will be funded through our baseline plan. For propositions, which deliver whole system benefits beyond the T2 period we are requesting additional funds via the network innovation allowance. The risk is therefore allocated to consumers through baseline funding and innovation allowances.

A3.4.6 The introduction of competition

As the incumbent Transmission Owner(TO), we may be required to continue to undertake pre-construction activities for contestable projects, potentially including the Development Consent Order (DCO) process where relevant.

Uncertainty on pre-construction activity required normally arises from which projects are needed and how extensive the activity will need to be for each. However, with the introduction of competition and the lack of clarity over which model will be adopted, there is additional uncertainty because we do not know to what extent the responsibility for construction activities for contestable projects will remain with the incumbent transmission owner.

Risk evaluation

We need to consider the potential impacts of competition if we are also required to carry out the construction works. At this stage, the competition framework is not sufficiently developed, creating considerable uncertainty for our business plan as to how costs could be incurred and how they would be funded. The CPM approach could still be used for the potentially contestable projects which are required in the T2 period so we need to consider the implications. In this scenario, the construction phase of projects would not be funded for the first five years so we are exposed to the full risk of any additional costs without any allowance certainty during the T2 period, £1.5bn.

Risk allocation in T2

Without a clear framework, competition creates a significant risk for the networks, investment is likely to be required without secured funding with recovery of costs at Ofgem's discretion. Although it may be reasonable to assume that the recovery of efficiently incurred costs will be allowed.

A3.4.7 Real price effects

Whilst we support proposals to index real price effect allowances for plant and materials as they are less within the networks control and historically show greater volatility, we expect labour funding to remain on an ex-ante basis. Labour is a key input into the business plan and as our single largest category of spend means we will still carry risk in relation to prices out-turning differently to our forecast. This risk could be considered symmetric in that actual costs could be higher or lower than forecast but growing investment levels and scarcity of skills and resources may mean that overall risk for the networks has increased.

This is further exacerbated by the switch to the use of CPI indices in the calculation of allowed revenue. RPI is still in widespread use, particularly in wage negotiations and pensions, and will continue to impact underlying movements in our costs year on year. If it is believed that RPI shows a strong correlation with these movements than it will also be through these areas that value could unintentionally be lost.

Risk evaluation

To understand the exposure related to movements in labour costs we have simulated an RPE distribution based on the historic variance of the difference between the out-turn RPE and the long run business cycle mean. The baseline forecast has been estimated based on its long run mean over the business cycle comprising the period from 1998 to 2014. Short term trends are considered to be less reflective as the economy has struggled to recover from the financial crisis however there is a risk that given the uncertainty in the UK economy, specifically Brexit, short term trends could be more reflective of outturn RPEs during the price control period. This has the potential to add c£80m for both opex and capitalised labour.

Risk allocation in T2

For materials where there can be significant volatility and RPEs can be difficult to forecast, indexation is appropriate to adjust allowances in line with the movements in price. This protects networks from sharp increases in goods which they have little or no impact to mitigate and protects consumers in instances where forecast prices outturn lower than anticipated.

For the specialised labour we employ, there is more that we can do to manage this risk which is inherently more controllable. Similarly, due to the unionised nature of our internal labour, the majority of this is linked to periods of pay deals which renders an element of labour costs relatively fixed.

For the consumer, this means that if a price movement occurs in the labour market, this is unlikely to translate to an impact on totex spend until the next price control period. An ex-ante allowance which recognises the long-term uplift to CPIH seen in specialist labour markets would appropriately fund for the increased price pressure but leaves the risk with us to manage through pay deals and negotiations with contractors.

A3.4.8 Financial Risks

Our activities expose us to a variety of financial risks including:

- Currency risk: because we operate internationally, we are exposed to foreign exchange risk arising from movements due to strengthening or weakening of sterling
- Interest rate risk: arising from our long-term borrowings. Borrowings issued at variable rates expose us to cash flow interest rate risk whereas borrowings issued at fixed rates

expose us to fair value interest risk. This risk is not the same as a changing market cost of debt, against which we may have to raise money. This risk was addressed during RIIO-1 when the use of indexation was introduced as a method of aligning cost of debt allowances to a reasonable estimate of efficiently raised debt, by adjusting for changes in the market. The residual risk incurs because financing costs, as a result of financing and capital structure choices, may be different to allowances.

- Credit risk: we are exposed to the risk of loss resulting from counterparties' default on their commitments including failure to pay or make a delivery on a contract. This risk is inherent in our commercial business activities. We are exposed to credit risk on our cash and cash equivalents, derivative financial instruments, deposits with banks and financial institutions, as well as credit exposures to wholesale and retail customers, including outstanding receivables and committed transactions.

These risks are inherent to our day to day operations and dependent on financial markets. Financial markets can be subject to periods of volatility and shortages of liquidity, for example as a result of unexpected political or economic events such as Brexit. If we were unable to access the capital markets or other sources of finance at commercially acceptable rates for a prolonged period, our cost of financing may increase, the discretionary and uncommitted elements of our proposed capital investment programme may need to be reconsidered and the manner in which we implement our strategy may need to be reassessed.

Risk evaluation

We have not evaluated these risks further as Ofgem's prescribed scenarios allow us to sufficiently asset the impact of plausible macroeconomic shocks.

How risk is currently managed

Changes in foreign currency rates and interest rates could materially impact earnings or our financial condition but we adopt policies to minimise those impacts. Our policy for managing foreign exchange transaction risk is to hedge contractually committed foreign currency cash flows over a prescribed minimum size. Where foreign currency cash flow forecasts are less certain, our policy is to hedge a proportion of such cash flows. Instruments used to manage foreign exchange transaction risk include foreign exchange forward contracts and foreign exchange swaps

Our interest rate risk management policy is to seek to minimise total financing costs (being interest costs and changes in the market value of debt) subject to constraints. We do this by using fixed and floating rate debt and derivative financial instruments including interest rate swaps, swaptions and forward rate agreements. We hold some borrowings on issue that are inflation linked. We believe that these provide a partial economic offset to the inflation risk associated with our UK inflation linked revenues.

Risk allocation in T2

Ofgem propose retaining full indexation to set cost of debt allowances so changes in the market which are outside of our control will continue to be passed on to consumers. There is a residual risk because financing costs, as a result of financing and capital structure choices, may be different to allowances. In this area, networks have full control in their choices and it is right they fully bear the consequences of their actions and manage the subsequent risks in line with the RIIO principles of allocating risk to the party best able to manage. The costs of financial instruments / hedging and the policies we adopt to manage our financial risk are appropriately allocated to the network.

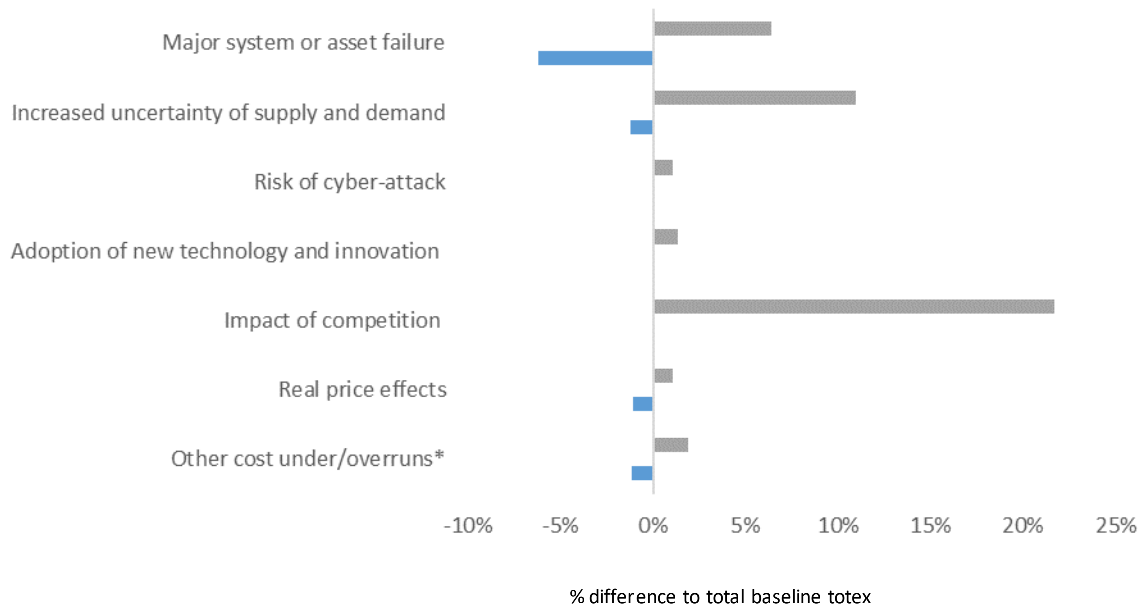
A3.4.9 Political and regulatory risks

There is a perception that since RIIO-1 utilities have operated in an increasingly uncertain political and regulatory environment with a potential for there to be more direct political intervention in the operation of the sector, the most extreme example being Labour's manifesto commitment to re-nationalisation. Whilst Ofgem is independent from political intervention, it is possible and even likely that regulatory uncertainty is influenced by the political environment and the current high-profile focus on the legitimacy of network returns in RIIO-1. This is evident in Ofgem's proposed RIIO-2 framework where we see a clear movement towards a form of regulation which is far more restrictive and interventionist in nature, a proposal which was met with surprise by the market when announced on the 18th December 2018. National Grid's share price fell by 9% in a single day, equivalent to a reduction of £2.6bn in the market cap of National Grid Group, relative to the UK regulated RAV of £19bn.

In light of the current political and regulatory landscape, National Grid commissioned Oxera to assess the political and regulatory risk faced by NG and other regulated utilities in the UK[45]. The report provides strong evidence that the increased risk is being considered by investors and is having an adverse impact on their valuation assessments. Given that the Capital Asset Pricing Model (CAPM) market beta is not sufficient to capture all of the risk premium associated with political and regulatory uncertainty, relying solely on CAPM is likely to understate required returns for companies with significant exposure to such risks.

In summary, many of the risks we will face in RIIO-2 are not new to us and as shown we have a robust and mature risk management process to manage them, but trends suggest a shift in the balance of risk towards National Grid.

Figure A3.5: Business Plan totex variability



***** we have included construction uncertainty within the relative categories as appropriate so here we have captured the potential for cost-over runs associated with other cost categories e.g. non-operational capex. It is inevitable that we will have uncertainties over what inputs may be required to deliver an output and the efficiency of our operations and have based assessment on historical ranges observed in TPCR4 and RIIO-1

[45] "Assessment of political and regulatory risk, prepared for National Grid Group", Oxera, 4 March 2019

A3.5 Risk impacts and combined scenario implications

The tables below summarise the impact of our stress tests on the ability to maintain financial resilience on both Ofgem and National Grid's proposed financial packages. These are in addition to the Ofgem prescribed scenarios. We have focused on AICR as the constraining factor when assessing notional company financeability.

Table A3.1: Impact of National Grid scenarios on Ofgem's proposed financial package including incentives performance

	Matched with allowance	Ofgem Package FY22	FY23	FY24	FY25	FY26
Base Case		1.46	1.45	1.45	1.46	1.47
Major system or asset failure	N	1.42	1.37	1.37	1.37	1.37
Increased uncertainty of supply and demand	Y	1.46	1.44	1.43	1.43	1.43
Risk of cyber-attack	N	1.46	1.41	1.44	1.45	1.45
Adoption of new technology and innovation	N	1.45	1.44	1.43	1.44	1.45
Impact of competition - CPM	N	1.46	1.40	1.03	0.95	0.77
- SWW	Y	1.46	1.45	1.44	1.42	1.41
Real price effects	N	1.46	1.44	1.44	1.44	1.45
Other cost under / overruns	N	1.45	1.43	1.43	1.43	1.44
+1% ODIs	N	1.27	1.24	1.23	1.23	1.23
Combined Scenario		1.18	1.13	1.11	1.09	1.08

Table A3.2: Impact of National Grid scenarios on our proposed financial package

	Matched with allowance	National Grid FY22	FY23	FY24	FY25	FY26
Base Case		1.56	1.54	1.55	1.58	1.62
Major system or asset failure	N	1.52	1.48	1.48	1.50	1.53
Increased uncertainty of supply and demand	Y	1.55	1.53	1.53	1.55	1.58
Risk of cyber-attack	N	1.56	1.51	1.54	1.57	1.61
Adoption of new technology and innovation	N	1.55	1.53	1.54	1.57	1.60
Impact of competition - CPM	N	1.56	1.51	1.22	1.14	0.98
- SWW	Y	1.56	1.54	1.54	1.55	1.56
Real price effects	N	1.56	1.54	1.55	1.57	1.60
Other cost under / overruns	N	1.55	1.53	1.53	1.56	1.60
+1% ODIs	N	1.41	1.39	1.38	1.40	1.42
Combined Scenario		1.34	1.29	1.27	1.26	1.26

The analysis shows the relative impact of the various sensitivities we have considered as part of our assessment. We have also looked at combined scenarios where the changing energy landscape, asset conditions and changes in the economy could lead to a severe but plausible downside exposure for the network. The combined scenario here is based on the outturn of a high capex scenario, 10% totex overspend and a -1.0% ODI performance.

From the sensitivities, we have assessed it is credible that a 10% totex overspend could incur within the period and whilst we may not expect it to be persistent this assumption also incorporates the risk of funding delays for the higher capex scenario. We have assumed spend is funded as it incurs which given the lags for within period determinations is unlikely. The results show that under Ofgem's proposed package the out-turn of the combined scenario would pose a significant challenge to our resilience, as AICR falls below levels consistent with an investment grade rating. Conversely, our proposed package demonstrates how by setting an adequate return we are able to maintain financeability and remain resilient, a position which is key in safeguarding our future investment ensuring we have the capacity to facilitate change to a low carbon economy and deliver the energy networks of the future.

A3.6 Overall RoRE range in our plan

The overall RoRE from our plan is dependent on the sharing factor which is assumed, and as such we have based our analysis on both a 50% and 32.5% rate to reflect the ranges within which we expect the business plan assessment to outturn.

Figure A3.6: Business Plan RoRE ranges

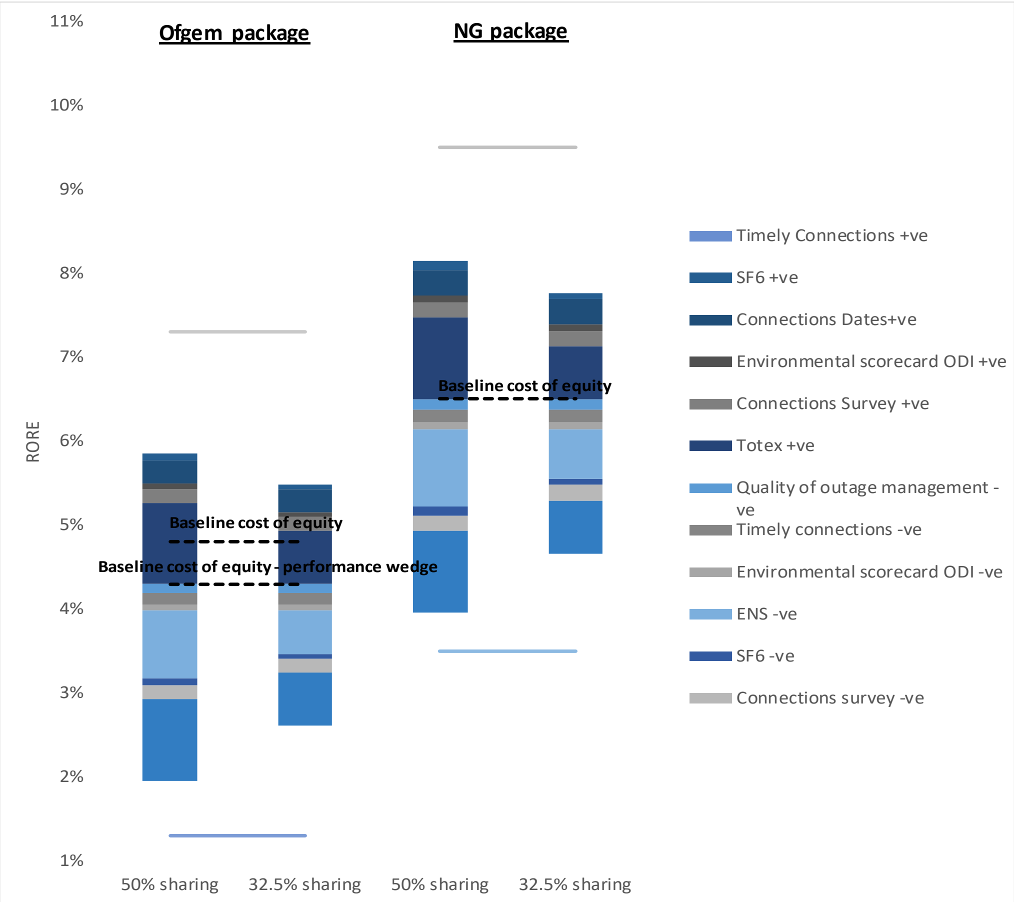


Table A3.3: RoRE ranges for Ofgem's and our T2 proposals

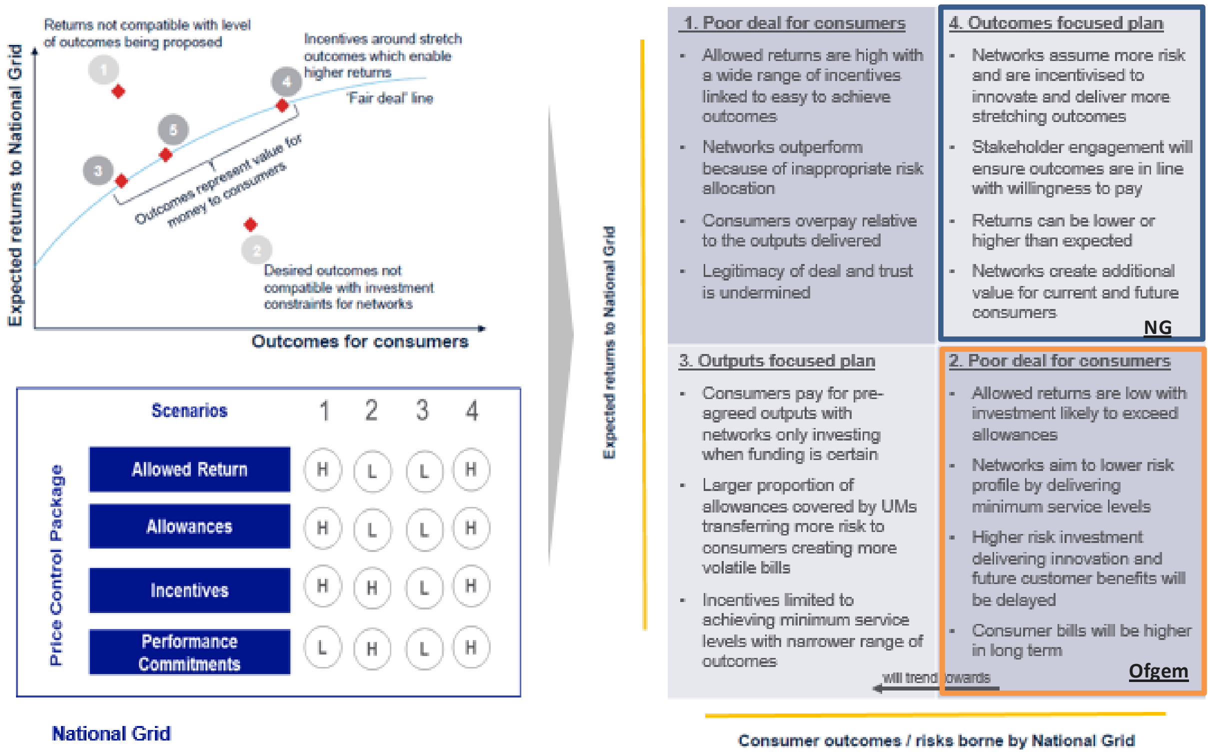
Presented in CPIH real terms	Ofgem		National Grid	
	Baseline return	Range	Baseline return	Range
50% sharing factor	4.3% + 0.5% assumed performance	2.0% - 6.0%	6.5%	4.0% - 8.0%
32.5% sharing factor	4.3% + 0.5% assumed performance	2.6% - 5.6%	6.5%	4.7% - 7.6%

RoRE represents the financial implications of being exposed to risk, we have calculated the range based on a 10% totex under / overspend combined with the potential scale of penalties and rewards for output delivery based on the proposed incentives package assuming 60% gearing. We have excluded financial performance on the basis it is not within the scope of the returns adjustment mechanism.

For Ofgem's package we have based our analysis on a 4.3% cost of equity with an assumed outperformance of 0.5%. The implication is that all networks have to create significant efficiencies and incremental service improvements before they can even earn a return in line with the baseline assumption. For a well performing network then, the package, under a 32.5% sharing factor, only allows the potential to earn an additional 0.6% return to outperform what is already an ambitious and challenging plan.

This range of return is unlikely to meet with investor expectations of what a well performing network can achieve. The ranges are significantly lower than those set for T1 and mean that the best performing companies in T2 can only earn a return in line with what the worst performing companies could have expected to achieve in T1. This does not provide the funding or incentivisation needed to compensate networks for assuming the levels of risk which are required to drive the stretching outcomes required to facilitate the energy transition. A balanced risk return package is key in ensuring value for consumers and what this RoRE range demonstrates is that returns are not compatible with the level. Linking back to our fair deal framework, the implications of Ofgem's package is to position us at a point below the fair deal line, representing a poor deal for consumers.

Figure A3.7: Assessment of Ofgem's and our proposals against the fair deal framework



Our financeability assessment has shown that Ofgem's proposed level of return and downside risk exposure, creates a significant challenge for the resilience of the network. The objective of the financial package is to ensure that the major capital programmes required across our networks can be financed, by a combination of debt and equity, as efficiently as possible. Ofgem state in the 'Handbook for implementing the RIIO model' that: -

"*As long as the allowed return, depreciation profile and capitalisation policy are set appropriately and there is consistency in their respective future determinations, the notional company should be financeable*"

However, the finance package proposed by Ofgem contradicts this statement as it does not allow our networks to hit investment grade thresholds for core credit metrics without using financeability levers such as capitalisation or depreciation. This will inevitably lead to an environment of risk aversion and penalty avoidance, stifling improvement, rather than the progressive behaviours where companies strive to innovate, think large scale and discover what is possible.

Innovation and step changes in behaviours are supported by National Grid's financial package which provides the financial capacity required to invest in infrastructure and whole systems solutions ahead of secured funding and incentivises companies to innovate and drive efficiency to the benefit of end consumers.

Appendix A4: Results of financeability assessment for the notional company based on our financial model

Included by separate attachment:

- Appendix A4 Notional company - Ofgem package including outperformance wedge

Please see file: ***NGET_A15.01C_Appendix A4 - Notional company - Ofgem package including outperformance wedge.xlsx***

- Appendix A4 Notional company – Ofgem package excluding outperformance wedge

Please see file: ***NGET_A15.01D_Appendix A4 - Notional company – Ofgem package excluding outperformance wedge.xlsx***

- Appendix A4 Notional company – Ofgem package with 5% dividend yield excluding outperformance wedge

Please see file: ***NGET_A15.01E_Appendix A4 - Notional company – Ofgem package with 5% dividend yield excluding outperformance wedge.xlsx***

- Appendix A4 Notional company – National Grid financial package

Please see file: ***NGET_A15.01F_Appendix A4 - Notional company – National Grid financial package.xlsx***

- Appendix A4 Notional company – National Grid Financial Model

Please see file: ***NGET_A15.01G_Appendix A4 - Notional company – National Grid Financial Model.xlsm***

Appendix A5:Results of financeability assessment for the actual company based on our financial model

Included by separate attachment:

- Appendix A5 Actual company - Ofgem package including outperformance wedge

Please see file: ***NGET_A15.01H_ Appendix A5 - Actual company - Ofgem package including outperformance wedge.xlsx***

- Appendix A5 Actual company – Ofgem package excluding outperformance wedge

Please see file: ***NGET_A15.01I_Appendix A5 - Actual company – Ofgem package excluding outperformance wedge.xlsx***

- Appendix A5 Actual company – Ofgem package with 5% dividend yield excluding outperformance wedge

Please see file: ***NGET_A15.01J_Appendix A5 - Actual company – Ofgem package with 5% dividend yield excluding outperformance wedge.xlsx***

- Appendix A5 Actual company – National Grid financial package

Please see file: ***NGET_A15.01K_Appendix A5 - Actual company – National Grid financial package.xlsx***

- Appendix A5 Actual company – National Grid Financial Model

Please see file: ***NGET_A15.01L_Appendix A5 - Actual company – National Grid Financial Model.xlsm***

Appendix A6: Results of financeability assessment for the notional and actual company based on Ofgem's financial model

A6.1 Completion of Ofgem's financial model

We submit the version the BPFM published by Ofgem on 31st October 2019. This is consistent with the guidance issued by Ofgem to the Energy Networks Association on 12th November 2019.

Scenario analysis

The Business Plan Financial Model (BPFM) has been pre-populated, by Ofgem, with inputs for base case framework assumptions and stress test scenarios as per the Sector Specific Methodology Decision (SSMD) and Business Plan Guidance (BPG) publications. However, a single model cannot accommodate a view of our proposed financial package for the actual company because debt profiles cannot be changed within the same version and are specific to underlying assumptions. Therefore, two versions are required in order to reflect a debt profile in line with the corresponding financial package. We define below how each version of the BPFM should be interpreted.

With the competable projects' framework not sufficiently developed, there is considerable uncertainty as to how these costs would be funded. The BPFM is unable to assess the impact of contestable spend if funded outside the T2 financial framework. However, in order to fully understand the financeability risk to NGET, the impact of contestable spend looking at funding both within and outside the T2 framework, must be assessed.

The models are also still unable to accommodate a full sensitivity analysis for our proposed financial package in either the notional or actual company because there are insufficient scenario placeholders.

Model based on Ofgem's proposed financial package

This model enables assessment of our business plan under Ofgem's proposed financial package for the notional and actual company. This model uses financing requirements as per Table A1.52 based on Ofgem's financial framework working assumptions.

- For the notional company the BPFM can be used to assess:
    - Ofgem's base case including a 3% dividend yield;
    - scenarios as per May SSMD and BPG, already populated in the model by Ofgem; and
    - additional scenarios to assess sensitivity to dividend yield and capitalisation rates.
- For the actual company the BPFM can be used to assess:
    - Ofgem's base case including a 3% dividend yield; and
    - Scenarios as per May SSMD and BPG, already populated in the model by Ofgem.

Model based on our proposed financial package

This model enables assessment of our proposed financial framework for the notional and actual company as the financial requirements table, Table A1.52, linked to this version is consistent with the assumptions underpinning our proposals.

Summary of approach

We have completed the BPFM in line with the RIIO-2 LiMo Guidance – Electricity Transmission' issued on 9th November 2019.

We have run the actual company financeability assessment excluding MOD values which are generated within RIIO-2. This is consistent with the approach we take in our modelling which captures performance but excludes the impact of timing.

To ensure that the opening RAV position for the T2 period reflects forecast allowances and spend in the current price control, we have amended values in 'RIIO-1 net addition to RAV (after disposals) – from RFPR' to align to the RFPR tables as resubmitted to Ofgem in September 2019. Allowances and costs are based on a foresight view reflecting all outputs up to and including 2021, including adjustment for disposal proceeds, WHVDC allowance rephasing, Hinkley minded to allowances, TPG and TPD allowances and a true-up for the sole use connections component of excluded services.

We agree with Ofgem's proposal to set a natural capitalisation rate. We have based this percentage on a baseline view of the plan which includes real price effects and excludes competable spend and uncertainty mechanism outside of the common energy scenario. Our model assumption is based on these workings and not the totex view seen in the BPFM.

The PAT/Regulated equity ratio is calculated based on the real cost of debt input, whereas the nominal rate should be used. We do not adjust for this in the BPFM but it does form part of our reconciliation between the ratio output from our financial model to that derived from the BPFM.

We also note that the nominal cost of debt used to calculate the interest charge which drives the financial ratio calculations is based on a 2% CPI uplift from the real rate for each of the scenarios. This is an incorrect assumption for the pre-populated scenarios where inflation rate changes are assumed.

A6.2 Reconciliation of Ofgem's financial model to our financial model

The data used in our financeability analysis in Section 8, Financeability assessment is sourced from our financeability model. Our financial model enables extension of Ofgem's proposed assessment period of five years which inherently limits focus to the short term. We have calculated T3 revenues by assuming proposed parameters are rolled forward against our ten-year business plan. We also used our own models to assess the impact of contestable spend and to generate our consumer bill analysis, neither of which are available in Ofgem's financial model.

Our model produces different financial ratio values to the BPFM although the trends and absolute values remain similar. The differences between our model and the BPFM arise due to differences between either input assumptions or calculation methodologies.

Input assumptions

- Totex differences

  The totex plan used as a basis for the financeability narrative differs from that used for the BPFM calculations as:

  - Our financeability assessment is based on a plan inclusive of real price effects which are required to be excluded from data tables and therefore BPFM calculations.
  - Baseline totex as defined in our Business Plan Submission is used to assess financeability while BPFM enforces the use of total totex including uncertainty mechanisms.

- <u>Tax Pool Reset</u>

  Our financeability assessment modelling assumes that the capital allowances pools are reset at the start of RIIO-2. The opening value of the capital allowance pools in the BPFM are based on a roll forward of the closing value of the pools as at the end of the RIIO-1 period.

- <u>Inflation rate scenarios</u>

  For the scenarios which reflect changes in inflation rate assumptions, the BPFM assumes deviation from the central base case scenario from 2019-20. For example, for the High inflation scenario, the BPFM assumes that the +1% divergence in CPIH from the central case commences in 2019-20. In our modelling we assume the inflation rates remain the same in T1 in all scenarios and begin to diverge in T2. This creates only a minimal difference in the financial ratios derived from our model compared with those calculated in the BPFM.

Calculation methodology

- <u>Interest charge</u>

  Our financeability assessment modelling uses a different methodology for the closing debt balance used in the interest calculation. Our model uses the closing debt post the interest payment whilst BPFM uses the closing debt position before interest payment.

  The calculation of the principal inflation accretion for the actual company also differs between our model and BPFM. Our model assumes that the inflation rate for the index linked debt is the effective accretion percentage whereas BPFM uses the share of net interest expense value from the BPDT. This difference between the models is only applicable to the assessment of the actual company.

As an example, we evaluate the variance between the financial ratio outputs between our and Ofgem's financial models for Ofgem's proposed financial package (defined as "Base Case" scenario in the BPFM).

Table A6.1 Comparison of outputs from our financial model and the BPFM

	National Grid model					BPFM					Variance (BPFM - National Grid model)				
	2021/22	2022/23	2023/24	2024/25	2025/26	2021/22	2022/23	2023/24	2024/25	2025/26	2021/22	2022/23	2023/24	2024/25	2025/26
Interest Cover ratios															
FFO interest cover ratio (including accretions)	3.79	3.72	3.70	3.68	3.66	3.84	3.79	3.75	3.73	3.69	0.05	0.06	0.06	0.05	0.03
FFO interest cover ratio (cash interest only)	4.31	4.26	4.23	4.23	4.20	4.38	4.33	4.30	4.28	4.24	0.06	0.07	0.06	0.05	0.04
Adjusted interest cover ratio	1.46	1.45	1.45	1.46	1.47	1.49	1.48	1.48	1.49	1.49	0.02	0.03	0.03	0.03	0.03
Nominal PMICR	2.08	2.07	2.08	2.09	2.11	2.14	2.14	2.14	2.15	2.16	0.05	0.07	0.06	0.05	0.05
Net Debt ratios															
FFO / Net Debt	10.99%	10.53%	10.37%	10.30%	10.15%	11.03%	10.61%	10.43%	10.31%	10.11%	0.04%	0.08%	0.06%	0.01%	-0.05%
RCF / Net Debt	9.01%	8.57%	8.41%	8.34%	8.19%	9.04%	8.64%	8.46%	8.34%	8.14%	0.02%	0.07%	0.05%	0.00%	-0.05%
Gearing ratios															
Net Debt / Total closing RAV	60.74%	61.25%	61.37%	61.21%	61.05%	60.37%	60.88%	61.03%	60.99%	60.97%	-0.37%	-0.37%	-0.33%	-0.21%	-0.09%
Equity ratios															
EBITDA / RAV	9.68%	9.40%	9.24%	9.13%	8.98%	9.67%	9.40%	9.22%	9.09%	8.91%	-0.02%	0.00%	-0.02%	-0.04%	-0.07%
PAT / Regulated equity (RoRE)	9.03%	8.86%	8.67%	8.54%	7.99%	12.06%	11.90%	11.65%	11.50%	10.92%	3.03%	3.04%	2.98%	2.96%	2.92%
Dividend cover ratio	2.95	2.86	2.79	2.76	2.59	2.94	2.87	2.80	2.75	2.56	-0.01	0.01	0.01	-0.01	-0.03
Dividend/RegEquity	3.06%	3.10%	3.11%	3.09%	3.08%	3.09%	3.09%	3.08%	3.07%	3.07%	0.03%	-0.01%	-0.03%	-0.02%	-0.01%

Variance analysis	Error in interest rate in BPFM in PAT calculation					Totex differences					Brought forward tax pool					Additional difference mainly attributable to use of pre interest debt used to calculate BPFM interest charge				
	2021/22	2022/23	2023/24	2024/25	2025/26	2021/22	2022/23	2023/24	2024/25	2025/26	2021/22	2022/23	2023/24	2024/25	2025/26	2021/22	2022/23	2023/24	2024/25	2025/26
Interest Cover ratios																				
FFO interest cover ratio (including accretions)						-0.01	0.00	-0.02	-0.02	-0.04	0.00	0.00	0.00	0.00	0.00	0.05	0.06	0.06	0.05	0.03
FFO interest cover ratio (cash interest only)						0.00	-0.01	-0.01	-0.03	-0.04	0.00	0.00	0.00	0.00	0.00	0.06	0.07	0.06	0.05	0.04
Adjusted interest cover ratio						0.00	0.00	0.00	-0.01	-0.01	0.00	0.00	0.00	0.00	0.00	0.02	0.03	0.03	0.03	0.03
Nominal PMICR						0.00	0.00	0.00	-0.01	-0.02	0.00	0.00	0.00	0.00	0.00	0.05	0.07	0.06	0.05	0.05
Net Debt ratios																				
FFO / Net Debt						-0.03%	-0.04%	-0.06%	-0.12%	-0.18%	0.00%	0.00%	0.00%	0.00%	0.00%	0.04%	0.08%	0.06%	0.01%	-0.05%
RCF / Net Debt						-0.02%	-0.03%	-0.05%	-0.11%	-0.17%	0.00%	0.00%	0.00%	0.00%	0.00%	0.02%	0.07%	0.05%	0.00%	-0.05%
Gearing ratios																				
Net Debt / Total closing RAV						0.06%	0.09%	0.15%	0.31%	0.48%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.37%	-0.37%	-0.33%	-0.21%	-0.09%
Equity ratios																				
EBITDA / RAV						-0.01%	-0.02%	-0.03%	-0.04%	-0.06%	0.05%	0.03%	0.03%	0.02%	0.01%	-0.07%	-0.03%	-0.05%	-0.06%	-0.08%
PAT / Regulated equity (RoRE)	3.06%	3.06%	3.06%	3.06%	3.06%	-0.02%	-0.02%	-0.04%	-0.06%	-0.10%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.03%	-0.02%	-0.08%	-0.10%	-0.14%
Dividend cover ratio						-0.01	-0.01	-0.02	-0.04	-0.06	0.00	0.00	0.00	0.00	0.00	-0.01	0.01	0.01	-0.01	-0.03
Dividend/RegEquity						0.00%	0.00%	0.01%	0.03%	0.04%	0.00%	0.00%	0.00%	0.00%	0.00%	0.03%	-0.01%	-0.03%	-0.02%	-0.01%

A6.3 Results of financeability analysis

Included by separate attachment:

- Appendix A6 – BPFM Notional company scenarios

Please see file: ***NGET_A15.01M_Appendix A6 – BPFM Notional company scenarios.xlsx***

- Appendix A6 – BPFM Actual company scenarios

Please see file: ***NGET_A15.01N_Appendix A6 – BPFM Actual company scenarios.xlsx***

Appendix A7: Our financial model supporting consumer bill analysis

Included by separate attachment:

- Appendix A7 Consumer bill – National Grid Financial Model

Please see file: ***NGET_A15.01O_Appendix A7 - Consumer bill – National Grid Financial Model.xlsm***