nationalgridESO

ESO RIIO-2 Business Plan Annex 5 – Finance report

9 December 2019

Contents

A. Financing our plan

This annex provides further explanation of the areas covered in chapter 9 – Financing our plan, in the main Business Plan. We provide more detail on:

- our proposed funding model to finance our plan
- stakeholder views
- investor requirements
- our financial package, made up of cost of debt and cost of equity
- our assessment of the financeability of our Business Plan, based on Ofgem's financial working assumptions, and any alternative proposals we believe are necessary
- the case for additional remuneration to encourage the desired culture and behaviours from the ESO.

We are a different business from the network companies regulated under RIIO. We are an asset-light business that provides a range of services to the industry, including operating and balancing the system, market and industry services and an industry revenue management service. These services are not necessarily correlated to our regulatory asset value (RAV), and result in cash flow and revenue volatility at a scale many times greater than our size. For example, we transact over £4 billion of revenues every year, which is 20 times greater than our controllable revenues. We have a mix of largely intangible assets, including IT systems, delivered through the skills and expertise of our workforce and the enabling information systems that underpin our services.

RIIO-2 is a rare opportunity to design a tailored regulatory framework for the ESO. Our funding model, which has not yet been entirely outlined by Ofgem, needs to fully and fairly remunerate the services we provide and encourage the ambition and innovation needed to deliver our Business Plan and ultimately deliver first and foremost for consumers. This new price control is critical to the success of legal separation and ensuring we can demonstrate that we are a financeable, creditworthy and sustainable business, and to drive us to be ambitious and innovative.

A.1 The ESO's funding model

Ofgem has confirmed that we will be funded through a total expenditure (totex) approach with fast and slow money. Fast money will be passed through in the year it is incurred, with slow money added to the RAV and receiving a return at the weighted average cost of capital (WACC). There will be no totex incentive mechanism (i.e. no sharing mechanism, which allows under or overspends on totex to be shared between us and consumers) and therefore all our efficiently incurred costs will be recoverable and passed through to consumers.

Our view, shared by many stakeholders, is that a RAV*WACC model alone is not a sufficient or appropriate model for the ESO, given the differences we highlight above between us and the network companies. Rather than encouraging us to be ambitious and innovative on behalf of consumers, a RAV*WACC model alone is more likely to encourage a risk averse culture. A RAV-based model provides a return to investors based on the value of assets in the RAV. It does not provide remuneration for those risks or activities that do not rely on assets in the RAV, and so does not provide enough reward in those areas to encourage risk taking, innovation and pushing the frontier to deliver new benefits for consumers. This has been consistently asked of us by stakeholders.

If our funding model does not provide a fair return for our services and the risks we hold, it may leave us underfunded and with risks that are not remunerated. This could reduce business appetite to invest, encourage a risk averse culture and potentially lead to the unintended consequence of the framework not supporting the broader aim of delivering greater consumer benefits. It could also reduce our ability to attract essential investment and efficiently finance our plan. Any short-term consumer savings from lower funding of the ESO will likely be far outweighed by the risk of seeing consumer benefits deferred or not realised, working against our objective of being ambitious and proactive. In a workshop we held with stakeholders in 2018, they stressed that the activities we undertake and the risks we hold must inform our final funding model.

Ultimately, both the funding and incentives of the framework need to be designed coherently reflective of the asset-light nature of the business. We note that ESO internal operating costs are negligible in comparison to the benefits of the services provided to stakeholders and consumers.
Trade association

A.2 Stakeholder views

In developing our RIIO-2 Business Plan, we have undertaken almost two years of extensive customer and stakeholder engagement, carried out through our usual channels and via RIIO-2 specific engagement. We have met more than 900 individuals from around 350 organisations through some 1,500 interactions.[1] This has included generators, suppliers, consumer representatives, academics, network companies, service providers, trade associations, government and those with a wider interest.

Throughout the process, we have sought to understand what stakeholders want from the ESO and what kind of business they want us to be. A consistent message across our wide range of stakeholders has been that they they want us to be more ambitious, proactive, agile and innovative in fulfilling our critical role at the heart of the energy system to facilitate the decarbonisation of the energy system and unlock benefits for consumers. A number of quotes below show the culture they want to see created in the ESO, and the behaviours this should drive. These quotes come from a range of sources including bilateral meetings, workshops, and Ofgem consultation documents and responses.[2]

A trade association, generator, supplier, Ofgem and the RIIO-2 Challenge Group have all given a clear steer that they want an ambitious, innovative ESO that unlocks benefits for consumers and facilitates the transition to net zero carbon. They also want us be agile and work with other industry parties.

We believe that the RIIO-2 framework should encourage an ambitious ESO, incentivising it to take appropriate risk to deliver on activities, assisting industry and bringing benefits to consumers. Given the extensive change that the energy industry is going through at present, agility is key to the next price control period.
Trade association

Alongside the increase in decentralised generation, the ESO will need to become a forward looking, fast acting organisation to facilitate the transition.
Generator

We are keen that the new regime should drive real innovation and ambition. We believe that the ESO has the potential to have a substantial impact on the costs and effectiveness of the system as a whole, which is out of all proportion to the size of its own RAV.
Challenge Group

We strongly support the decarbonisation of the energy system and welcome the ESO's ambition to support this transition while continuing to deliver reliable, secure and affordable energy for all consumers.
Supplier

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[1] The number of interactions is higher than the number of stakeholders engaged with as we interacted with some stakeholders more than once.
[2] https://www.ofgem.gov.uk/publications-and-updates/riio-2-sector-specific-methodology-consultation; https://www.ofgem.gov.uk/publications-and-updates/riio-2-methodology-electricity-system-operator-decision-and-further-consultation; https://www.ofgem.gov.uk/publications-and-updates/riio-2-financial-methodology-and-roles-framework-electricity-system-operator

The decarbonisation of the energy system presents both challenges and significant opportunities for the ESO to unlock substantial benefits for consumers. To make the most of these opportunities, and to ensure the ESO maintains a reliable, resilient and efficient system throughout this energy system transition, we need the ESO to be ambitious, forward looking and proactive. We also need it to work closely with other industry parties and wider stakeholders to ensure there is a coordinated approach to solving system challenges. Finally, we need the ESO to be dynamic and flexible, so that it readily adapts to emerging issues and new developments.
Ofgem

Many stakeholders, including a trade association and generator / supplier, have also told us they don't want us to be risk averse. They feel this could threaten the delivery of key industry priorities and increase costs to consumers as other market participants, such as suppliers, price in the risk of disallowance of our costs.

The ESO may be exposed to an unacceptable level of risk or become risk averse in its approach, which would threaten delivery of key industry priorities.
Trade association

A risk averse ESO may want to pass risk through to suppliers to provide additional guarantees and warranties to deliver projects to schedule. Suppliers will in return raise their costs in order to comply and avoid potential disallowances on behalf of ESO.
Generator

Coupled with the risk of disallowance and unavailability of a sharing factor, we believe the calibration of the ESO price control results in a risk-heavy price control that does not incentivise change at the pace required to meet decarbonisation objectives.
Generator

A.2.1 A funding model that enables this culture

We have listened to these messages and worked extensively with stakeholders since June 2018 to develop a funding model that can enable this culture. We have specifically engaged on the design of the funding model with over 100 stakeholders through workshops, webinars, a podcast and written thought piece, and numerous bilaterals. Through this engagement we have collaboratively discussed how different funding model approaches can support the development of a culture that drives us to deliver for stakeholders and consumers.

In a workshop we held in June 2018, the majority of attendees (32 stakeholders) voted to support three main principles for a successful regulatory framework that:

- holistically supports and encourages us to take the actions and investments needed to deliver long term value for customers and consumers, using appropriate incentives to drive exceptional performance and value for consumers
- promotes innovation within the ESO and across the system and market
- encourages whole energy system thinking and use of market-based solutions to support the continuing low carbon transition of Great Britain's energy system.

Many stakeholders have supported a form of layered model (e.g. a combination of RAV*WACC and additional remuneration) as the most appropriate, with strong incentives to drive further positive outcomes. We have heard and seen through engagement and responses to Ofgem's consultations an overwhelming consensus that a pure RAV*WACC model is not appropriate for us.

A pass-through with margins-based approach to remuneration based on the ESO's activities makes sense given the asset-light nature of the system operator that makes a conventional RAV*WACC approach unsuitable.
Generator

The RAV model offers no incentive to be ambitious and change.
ESO workshop attendee, June 2018

The ESO RIIO-2 Stakeholder Group (ERSG) has taken a close interest in the development of the regulatory framework. Members have provided constructive feedback to our work and asked us to provide further evidence for why the RAV*WACC model on its own would not make us financeable. There has been concern from the group that Ofgem will not make the right decision on the final funding model for us, and the Chair has met with Ofgem to discuss the group's concerns. One member at a recent meeting commented that there is an assumption that funding will come through incentives as well as, rather than just the funding model. They feel it is important that we are accountable and equipped to handle some risk on behalf of the industry.

The group does not want us to be afraid of risk; it wants us to drive the market forward and be ambitious. We believe an appropriate framework can enable this and encourage the culture and behaviours stakeholders want to see. This was supported by many stakeholders in their responses to Ofgem's May consultation on our funding model.

It is our view that in some cases the ESO is best placed to hold risk on behalf of network users rather than placing this risk entirely onto the connecting customer. This is why the framework should be adaptable to changes where services could be added with specific margins applied. To this end, we would be supportive of the ESO's layered proposal, which will allow for profit margin to be applied and encourage the ESO to be much more service driven and innovative.
Trade association

A price control for an asset-light, service-based business should consist of a funding model which provides a cost pass-through plus an appropriate margin to provide a return based on risk and a clear incentive regime which is focused towards increasing customer value.
Distribution Network Operator

The ESO, as any other commercial organisation, should be paid for providing services and should be remunerated fairly for the risks it faces…any remaining residual risk that is not covered by a financial facility should be reflected in a margin on external costs.
Generator / supplier

If no additional return were granted, the ESO may be exposed to an unacceptable level of risk or become risk-averse in its approach, which would threaten delivery of key industry priorities.
Trade association

An additional return (or margin) will be needed. It is definitionally the case that a downside regulatory or political risk (compared to a scenario where there is no such risk) will reduce expected returns. An additional return will help maintain expected returns at levels that investors would require.
Distribution Network Operator

There are clear views from stakeholders that we need to be funded sufficiently to do our job effectively and remunerated for the risks we hold. In many cases, they believe we are best placed to do this on behalf on consumers. A generator and trade association stated in their responses to Ofgem that the proposed RAV-based funding model could be a "barrier to achieving" the ambition stakeholders have requested from us.

We explore further how the framework proposed by Ofgem can be used to deliver these aims in this annex, specifically in our section A.7 – Proposed alternative assumptions. Further detail on how we have used stakeholder feedback to shape our plan is in Annex 3 – Stakeholder report.

A.3 Investors

A.3.1 Why investor perception is important

We deliver a wide range of services across the energy industry, all of which require investment. Equity and debt investors take on risk when they commit capital to us, and require remuneration in the form of expected dividends (equity investors) and interest payments (debt investors).

Our regulatory framework needs to provide fair returns to investors to make sure the notional company can attract and retain both equity and debt investment. This is a view shared by ERSG, highlighted in chapter 9 – Financing our plan.

Without fair returns, investors are likely to invest in other regulated or defensive stocks, which could prevent us from delivering our services and making investments on behalf of consumers. Investors are very unlikely to commit capital to a business without an expectation of an appropriate level of return.

A.3.2 Debt investors

To place debt, investors need confidence that it will be repaid in full and they will achieve a suitable return on their capital in the form of interest payments. Significant reliance is placed on credit ratings as an indication of whether a company may default on its loan obligations, with investment grade rated companies carrying a lower risk of default.

To attract debt investors, it is critical for the organisation to hold and maintain an investment grade credit rating. Our initial rating by Moody's Investors Service (Moody's) in March 2019 demonstrates that credit rating agencies look for stability and predictability in the ESO.

The rating could be upgraded once the regulatory regime for NG ESO has established a longer track record of transparent operation, with NG ESO demonstrating predictable cash flows that provide for adequate and timely cost recovery and a fair return on its investments. The rating could be downgraded if the regulatory framework appeared likely to become less stable and predictable.
Moody's

To support an investment grade rating, as required by our licence, we must be able to demonstrate that we can pay the interest costs associated with our debt holding. This requires the regulatory regime to provide appropriate revenues to fund the actual costs of our efficiently incurred debt.

In section A.6, we set out more detail on our credit rating and the impact of rating agent expectation on our Business Plan financeability.

A.3.3 Equity investors

Equity investors require appropriate compensation for the risk of investing capital, whether committed or contingent. For equity holders, this return can only be realised via the payment of a dividend or through the sale of their investment. As a result, many equity holders see it as critical to obtain a regular return via dividend payments, and a stable dividend policy sends a strong signal of confidence.

This view is reinforced by feedback obtained via National Grid plc's annual investor survey.[3] For most investors, the dividend is fundamental to their assessment of National Grid plc. Utilities are seen as income stocks, so our ability to continue to pay and grow the dividend are priority considerations in investors' valuation of the stock, as evidenced by a number of investor responses as part of the recent investor survey.

Near term, the issue is about fair returns. For investors to have confidence in the UK system, there have to be good returns on investment.
Investor

In the UK, there is still a lingering and quite material political risk associated with being an investor in utilities.
Investor

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.
Investor

Many investors also see the dividend 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 a credible demonstration to potential investors that the regulatory regime is stable and will provide a return.

Every single respondent to the investor survey stated that the dividend was an important part of their investment decision.

Appendix A to this annex includes more detail on the investor survey and supports the analysis included in the dividend policy section below.

Dividend Policy

Within our peer group over the last 10 years, dividend yields have varied due to changes in market values and dividend policies. Nevertheless, there are some important observations.

The average yield in the utility sector has been higher than in the FTSE 100: 5.3 per cent and 4.2 per cent respectively. This difference can be attributed firstly to the fact that the FTSE includes companies that do not pay a dividend, and companies suffering financial distress (e.g. Royal Bank of Scotland after the 2008 financial crisis). Secondly there are characteristics of a regulated utility that make the dividend a more important feature, even relative to yield stocks in the FTSE 100. A consistent dividend policy, both in terms of yield and cover, 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 elsewhere; for example, European utilities average dividend yield was 5.7 per cent over the last decade. Sell-side analyst forecasts indicate that yields in the regulated utility sectors are expected to remain above 5 per cent over the next four years.

Dividend cover is another critical metric for investors. Not only do investors want to make sure they are able to obtain a return (dividend yield), they also want the yield to continue and grow. Dividend cover is monitored by investors to assess the sustainability of the dividend over the longer term. Dividend cover for the UK utility sector has averaged 1.33 times over the last decade, with FTSE 100 cover 1.91 times over the same period. This is consistent with our European utility peer group, which averaged dividend cover of 1.5 times.

[3]The 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.

Traditionally, the level of dividend yield that a company displays has some correlation with the amount of asset growth. Over the five years of the price control period, RAV growth is expected to be around 9 per cent per annum. Maintaining a stable gearing ratio with this level of RAV growth will require equity injections to help fund this growth. Equity investors will still expect to see a regular and stable dividend return, even if it means injecting more equity, and will not be satisfied to wait until the next regulatory framework to realise any return. This is because of the signal that the dividend (or lack of one) provides of the stability and strength of the regulatory commitment.

Ofgem's working assumptions for the network companies include a 3 per cent dividend yield and a 4.8 per cent return to equity (including outperformance assumption). This assumes a payout ratio of 0.63x. Applying the same payout ratio, our dividend yield would be around 4.9 per cent based on Ofgem's working assumption of 7.81 per cent cost of equity.

Investor feedback and our analysis demonstrates why our regulatory framework in RIIO-2 must provide investors with enough certainty, stability and fair returns to make sure the notional company is financeable. This is increasingly important when considering we are competing for capital, not just with other UK regulated companies, but worldwide. As set out later in this annex, we face significant risks across our business that are of a different nature and increased scale than those faced by the network companies. Investors will look at the risks faced by the business, including our ability to pay stable dividends, when deciding whether to commit capital, so it is important to consider their perception of risk.

Paying an attractive and competitive dividend is important. We believe a stable dividend policy of 5 per cent 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 commitment from the regulator that investors will get a return, rather than a promise contingent on future regulatory price controls, and will attract the necessary investment for us to be ambitious and deliver our plan.

A.4 Cost of equity

The cost of equity is an estimate of the return investors expect for the risks they take when investing in us. They receive their return through dividends funded by the cost of equity allowance, additional remuneration and incentive performance.

Ofgem's working assumption is that a cost of equity of 7.81 per cent should suffice to ensure a financeable ESO. Ofgem will continue to apply the Capital Asset Pricing Model (CAPM), supplemented with additional remuneration if deemed necessary. This provides a return to equity holders aligned with the capital invested in the RAV. In this Business Plan, we have adopted Ofgem's working assumptions of 7.81 per cent cost of equity and zero additional remuneration but include our thoughts on those assumptions below.

The CAPM approach involves three different elements to calculate the cost of equity in the following formula:

$$\begin{matrix}\text{Cost of} \\ \text{equity}\end{matrix} = \begin{matrix}\text{Risk-free} \\ \text{rate}\end{matrix} + \text{Equity beta} \quad x \quad \left(\begin{matrix}\text{Total market} \\ \text{return}\end{matrix} - \begin{matrix}\text{Risk-free} \\ \text{rate}\end{matrix} \right)$$

The equity beta represents the level of systematic risk in an organisation for which investors expect a return, and is estimated using the formula:

$$\text{Equity beta} = \frac{\text{asset beta}}{1 - \text{gearing}} - \text{debt beta } x \frac{\text{gearing}}{1 - \text{gearing}}$$

A.4.1 Equity beta

The more risk an organisation holds, the higher the return an investor will look for. The equity beta measures the relative risk of the company in relation to that of the market as a whole and is most commonly estimated using historic market data for listed companies.

For unlisted businesses, regulatory precedent shows a tendency to estimate the equity beta by calculating the equity betas of listed companies with similar characteristics and risk profiles. These are adjusted by their

capital structures to obtain their respective asset beta. Asset beta is thus a measure of a company's risk that is independent of its financial structure.

The asset beta is then re-levered to the appropriate notional company capital structure to provide an estimate of its equity beta.

A.4.2 Asset beta

To calculate the cost of equity to apply to the RAV, we agree with Ofgem's ESO-specific working assumption of an asset beta of 0.6, aligning with recent SONI precedent. We agree SONI is a good comparator organisation, undertaking many similar roles and providing similar services e.g. system operation, system planning and industry revenue management.

We commissioned Oxera to provide an independent report into the appropriate cost of equity, and it informs our views on asset beta.

We consider that the listed comparator sample for the asset beta estimation should be relative to our risks and key activities. We are essentially a combination of three core functions:

- **Operating and balancing the system** – a specialist service provider using advanced IT and qualified staff to deliver 24/7 operation – we balance the electricity system in real time, and run balancing markets in the short to medium term, to make sure the power continues to flow and the lights stay on.
- **Market and industry services** – a consultancy and administration service – our activities support the wider system and industry, including long-term network planning, administering four industry codes and standards, being the delivery body for Electricity Market Reform (EMR), producing future scenarios and outlooks, and fostering innovation and whole system solutions.
- **Industry revenue management** – a trusted counterparty – we collect, manage and distribute over £4 billion of use of systems charges annually for TNUoS[4] and BSUoS,[5] as well as administering connections charges.

Oxera analysed companies in the FTSE 350 index, identifying seven with similar characteristics to us.[6] The average asset betas ranged from 0.87 (five-year average asset beta from the range 0.65-1.08) to 0.94 (two-year average asset beta from the range 0.75-1.10). This implies an asset beta average of the whole two-year and five-year comparator sample of 0.91.

Our business is relatively asset-light compared to the network companies, which implies higher systematic risk exposure, e.g. due to higher operational gearing. Although the network companies are not directly appropriate comparators in calibrating an estimate of our asset risk, Oxera considered that it may be appropriate to give some weight to the network companies' beta. Our allowed asset beta could be derived with reference to (i) the asset beta derived from the comparator sample (i.e. 0.91), recognising our asset-light nature as well as our different functions; and (ii) the asset beta for network companies (i.e. a 0.38 asset beta proposed by Ofgem), recognising the limited competition we face in providing our services.

Oxera concluded that an appropriate asset beta range for us would be 0.60-0.65,[7] based on comparator organisations and regulatory precedent. We therefore agree with Ofgem's working assumption of 0.6.

[4] Transmission Network Use of System charges
[5] Balancing Services Use of System charges
[6] These companies are the London Stock Exchange Group, TP ICAP plc, Capita plc, Balfour Beatty plc, Experian plc, UDG healthcare plc, Sophos Group plc
[7] https://www.nationalgrideso.com/document/153396/download

A.4.3 Total market return (TMR), debt beta and risk-free rate (RFR)

We have used Ofgem's working assumptions for TMR, debt beta and RFR in our Business Plan. We share the views of ENA members, as presented in ENA submissions during RIIO-2 engagement,[8] in not agreeing with Ofgem's position on some of these parameters.

TMR is the estimate of the return investors expect for taking the market average level of risk. Ofgem has proposed setting a forward estimate for TMR across the RIIO-2 period using historic data.

Ofgem proposes to set an expected TMR range of 6.25-6.75 per cent (real CPIH). There is general academic consensus that TMR is relatively stable over short timeframes. However, Ofgem's working assumptions for TMR are a reduction from an equivalent figure of 8.32 per cent[9] (CPIH) in RIIO-1 This is a significant reduction and not consistent with the principle of a relatively stable TMR.

Debt beta measures the sensitivity of a bond's return relative to the market return. Ofgem's working assumption for debt beta is 0.125, which we consider to be inappropriate. The empirical analysis prepared by Oxera shows that current market evidence supports a debt beta of 0.05.[10]

An increase in the debt beta assumption to 0.125 does not appear reasonable, with reference to current market data. Specifically, a debt beta for debt issued by utilities can be observed from capital market data on publicly traded bonds using regression methods. Oxera's March 2019 report on beta and gearing presented detailed regression estimation for bonds issued by publicly listed regulated companies[11] between 1998 and 2018, and found that many of the debt beta estimates were not statistically significantly different from zero, with a correct specification of the regression model.[12] Oxera concluded that the evidence supported a debt beta of 0.05 and did not support Ofgem's May sector specific methodology decision range of 0.1-0.15 for the RIIO-2 network companies.

Regulatory precedents on debt beta are not necessarily supported by robust analysis. Specifically, the asset beta for SONI, which is used as Ofgem's working assumption for us, was underpinned by a debt beta of 0.10.[13] However, this assumption was anchored on the CMA final determination on Northern Ireland Electricity Networks (NIE (2014)), which in turn was not underpinned by any detailed analysis – the CMA 2014 NIE decision explicitly stated that the debt beta was assumed to be 0.1, but that it 'did not carry out work to assess the level of NIE's debt beta'.[14]

The RFR tends to be estimated with reference to UK Government debt as a proxy for a riskless UK investment. We agree with Ofgem's proposal that cost of equity indexation is best achieved through the indexation of the RFR.

We have not suggested alternatives in our plan as these are not ESO-specific parameters; the key issue is that some of our risks are not remunerated under a RAV*WACC model because they do not correlate to our RAV.

A.4.4 Notional gearing

The level of notional gearing is the proportion of debt to RAV. In terms of the cost of equity estimation, the assumed level of gearing affects the equity beta through re-levering the asset beta to the target financial structure of the regulated company.

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[8] https://www.oxera.com/publications/, search for 'The cost of equity for RIIO-2'
[9] Based on 7.25% TMR (RPI stripped) in RIIO-1, and assuming a 1% CPIH – RPI wedge
[10] Oxera (2019),'Review of RIIO-2 finance issues', 20 March
[11] I.e. National Grid, Severn Trent, United Utilities, Pennon Group
[12] A higher debt beta estimate would be erroneously obtained by simply regressing corporate bond returns on a firm's equity, or on an equity index. This is because both corporate bond returns and equity returns are correlated with government bond returns. Oxera therefore includes the return on government bonds as an explanatory variable, along with the return on the issuing firm's equity. The coefficient on equity provides an unbiased estimate of the elasticity, i.e., the sensitivity of a bond's return to the company's equity return.
[13] NIAUR (2016), 'Final Determination to the Price Control 2015-2020 for the Electricity System Operator for Northern Ireland (SONI)', p. 72
[14] CMA (2014), 'Northern Ireland Electricity Limited price determination', 26 March, p. 13–6

As a significantly more asset-light organisation than the network companies, with high operational gearing, economic theory suggests that we would not be able to bear as much debt as these organisations. Ofgem recognised this in its August ESO methodology decision document (ESOMDD) consultation, which set out a working assumption of 55 per cent notional gearing to RAV for us.

We have considered the following market and regulatory data points in calibrating a notional gearing assumption:

- A notional gearing ratio of 55 per cent was assumed by the Northern Ireland Authority Utility Regulator (NIAUR) in deriving a WACC allowance for SONI.[15]
- The gearing ratio in regulatory decisions for energy or water network companies tend to be in the 55-65 per cent range. Compared to network companies, an upper estimate of the notional gearing for us could be 55 per cent, as informed by the bottom end of the Ofgem RIIO-1 notional gearing range for network companies.[16]
- A debt / capitalisation ratio of 40-50 per cent and 50-59 per cent is consistent with an A and Baa rating, respectively, in Moody's Rating Methodology for Regulated Electricity and Gas Utilities. This includes independent system operators, among a wide variety of companies.

As outlined in our ESOMDD consultation response,[17] we anticipate an appropriate range in notional gearing of 50-55 per cent and have kept Ofgem's working assumption of 55 per cent. We have considered the impact of both higher and lower gearing on our plan within our financeability assessment.

A.4.5 Overall cost of equity

We have used Ofgem's working assumptions for the cost of equity as set out below and have not proposed alternatives.

Parameter	Working assumption
Risk-free rate	-0.75%
Total market return	6.5%
Asset beta	0.6
Debt beta	0.125
Gearing	55%
Equity beta	1.18
Cost of equity	7.81%

Figure 1 Cost of equity working assumptions

Our financeability assessment includes a scenario showing the impact of alternative assumptions for the non-ESO specific parameters of TMR and debt beta. This considers a cost of equity of 9.36 per cent based on a TMR of 7.2 and a debt beta of 0.05.

[15] NIAUR (2016), 'Final Determination to the Price Control 2015-2020 for the Electricity System Operator for Northern Ireland (SONI)', 22 February, p. 67
[16] Ofgem (2012), 'RIIO-T1: Final Proposals for SP Transmission Ltd and Scottish Hydro Electric Transmission Ltd', Overview document, 23 April, p. 55
[17] https://www.nationalgrideso.com/media-test/esos-response-ofgems-riio-2-finance-methodology

A.5 Cost of debt

As part of our new price control, we have reviewed the cost of debt mechanisms in line with Ofgem's principles 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 the lowest cost financing without incurring undue risk
- the calculation of the allowance should be simple and transparent, while providing adequate protection for consumers.[18]

A.5.1 ESO debt requirements

We need two major sources of debt financing:

- financing of the RAV
- financing of working capital fluctuations due to our industry revenue management role and the relative size of our pass-through costs and high operational gearing.

Ofgem recognises that we are different, and has indicated it is open to setting a bespoke cost of debt mechanism to reflect our different characteristics compared to the network companies.

This was supported by many stakeholders, including a supplier, DNO and the Challenge Group, in response to Ofgem's ESOMDD consultation.

A bespoke indexation mechanism for the ESO is appropriate, and the options consulted on appear broadly appropriate.
Supplier

We agree with the need for a bespoke arrangement and have proposed suitable arrangements in this plan.

A.5.2 Debt financing of the RAV

We are an asset-light business with a relatively small RAV. We invest in tools and systems to support our services to and for industry. Our fixed assets are typically related to IT rather than tangible construction and have useful economic lives that typically range from 5-10 years.

Although we need to access debt to finance these assets, the size of our debt requirements means that we may be restricted in accessing public markets, where investors typically seek a minimum size for secondary liquidity. We expect to rely more on bank debt, which better suits smaller funding requirements.

We have limited historic long-term embedded debt due to our recent legal separation from National Grid Electricity Transmission (NGET). We currently hold debt of £120 million in the form of an intercompany loan, which falls due on 1 April 2021 with a one-year extension clause. In our modelling, we have assumed that new debt will be issued as required to provide sufficient cash to facilitate capital investment and dividend payments. New debt issues are expected to be up to £30 million in any year. Equity injection is also assumed to make sure gearing is within a 5 per cent tolerance of the 55 per cent notional gearing working assumption.

[18] RIIIO-2 framework consultation available at https://www.ofgem.gov.uk/publications-and-updates/riio-2-framework-consultation

We do not expect to issue any index-linked debt,[19] given our debt is expected to be less than ten years in tenor and more reliant on bank debt.

Bespoke funding arrangement

Ofgem has retained a full indexation methodology for us, and we see the benefit of this in delivering Ofgem's principles. We propose a bespoke cost of debt mechanism that builds on options published by Ofgem in its ESOMDD consultation and seeks to deliver an ESO-specific application of the principles to incentivise efficient debt finance for the benefit of consumers.

Our proposed mechanism approximates the costs of floating bank debt, which is more reflective of the borrowing arrangements of a company of our size, scale and requirements. We are not aware of any market index of bank loan data that can be used directly to set allowances, but it is theoretically possible to create a cost of debt mechanism based on bank debt by linking the allowances to a benchmark inter-bank borrowing rate – LIBOR or its replacement, SONIA – and adding an appropriate credit spread and transaction costs. We explore this more below.

LIBOR

LIBOR has historically been the benchmark interest rate for loans in Sterling.

Bearing in the mind the Bank of England and Financial Conduct Authority's (FCA) transition from LIBOR to SONIA as the primary benchmark interest rate in the Sterling market, any such approach should be based on SONIA plus a credit spread. We describe an approach using LIBOR given the availability of data; however, we propose that a SONIA-based approach is developed, as this will reflect the market standard for floating rate bank debt in RIIO-2.

Credit Spread

We have set an expected credit spread with reference to the three-year average spread on five to seven and seven to ten-year BBB rated UK non-financial iBoxx indices. We have selected BBB indices because we are rated in this range. In its rating of the ESO, Moody's gave a rating uplift for parental support, implying that the standalone company has a weaker credit profile than the rating given. The price control financial package should not rely on parental support given the objectives of separation. We estimate the credit spread to be 154 basis points (bps, 1.54 per cent) based on September 2019 data.

Transaction Costs

At present, Ofgem's working assumption does not include any allowances for the transaction costs of borrowing. Previously, Ofgem and other regulators[20] have assumed the cost of issuing new debt to be around 20 basis points, mainly based on the costs of raising debt on the capital markets.

As we are proposing a cost of debt mechanism similar to the cost of securing bank-based debt, we believe it is appropriate to include at least 10 basis points for transaction costs associated with bank borrowing. These costs include the banks' upfront fees and legal fees and have been estimated around recent bank pricing proposals.

Notional company adjustment

In April 2019, the ESO was legally separated from NGET. It is important that our framework reflects this by funding us on the basis of the credit rating we would receive as a standalone business, without support from National Grid plc.

We suggest an adjustment is made to recognise the additional costs the notional company would be exposed to on a standalone basis, in line with this. We have estimated the value as 25 basis points[21] and include it in our proposed cost of debt allowance.

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[19] The market for index-linked debt for less than 10 years is materially smaller than for longer-term tenors, as buyers of index-linked debt such as insurance companies and pension funds are typically looking for long-dated assets to offset their long-dated liabilities

[20] https://www.ofgem.gov.uk/ofgem-publications/92249/riio-ed1finaldeterminationoverview-updatedfrontcoverpdf and https://www.uregni.gov.uk/sites/uregni.gov.uk/files/media-files/2016-2-22_SONI_PC_Final_Determination_2015-2020_Final.pdf

[21] https://www.nationalgrideso.com/media-test/esos-response-ofgems-riio-2-finance-methodology

This adjustment reflects the need for support as recognised by Moody's. However, should there be a reduction in the underlying volatility we believe influences this position, it may mitigate the need for this adjustment. This would likely be the case if the TNUoS revenue timing risk was fully transferred.

Forecast cost of debt

Based on the items set out earlier, our analysis results in an average CPIH stripped cost of debt across the RIIO-2 period of 0.61 per cent, reflecting October 2019 LIBOR and iBoxx data.

We have chosen an average of four LIBOR data points and would like to discuss with Ofgem how best to achieve a simple and transparent approach to setting a bespoke debt mechanism. Figure 2 below shows our expected cost of debt for each year of RIIO-2 based on prevailing market conditions on 23 October 2019.

Year	LIBOR (%) A	Credit spread (bps) B	Transaction costs (bps) C	Notional company adjustment (bps) D	Nominal yield (%) A+B+C+D	CPIH forecast (%)	Real cost of debt (%)
2021/22	0.705	154	10	25	2.59	2	0.58
2022/23	0.728	154	10	25	2.62	2	0.60
2023/24	0.729	154	10	25	2.62	2	0.61
2024/25	0.746	154	10	25	2.63	2	0.62
2025/26	0.777	154	10	25	2.67	2	0.65

Figure 2 Real cost of debt

Index = A+B+C+D

A Average implied forward three-month GBP LIBOR for 30 June, 30 September, 31 December and 31 March in each year

B Average index asset swap margin of BBB five to seven-year and BBB seven to ten-year iBoxx non-financial GBP indices over the last three years

C 10 basis points issuance costs

D 25 basis points for notional company adjustment

A.5.3 Working capital requirements

A working capital facility (WCF) is key to managing our short-term liquidity, as well as maintaining our target credit rating. The WCF we need differs to most businesses because of our industry revenue management role and scale of revenues we transact (more than £4 billion in network charges) compared to the size of our asset base (around £225 million[22]) or own internal expenditure (around £260 million per annum[23]). While a WCF is an essential tool to allow us to perform our industry revenue management role, it cannot cover all potential cash exposures as many of our risks are large and unpredictable.

[22] Based on our opening RAV in 2018/19 prices
[23] Average totex across RIIO-2 in 2018/19 prices

Sizing of the working capital facility

Figure 3 outlines the risks we have considered in sizing the possible range of cash flows and shows our proposed WCF provision.

Requirement	Detail	Range £m		Provision £m
TNUoS recovery	Under collection risk with a two-year lag. Sized at 2x annual historic peak.	(140)	140	140
TNUoS billing & collection	Customers pay us based on their own forecasts. Sized on 5% under collection.	20	275	150
Other transmission billing	Timing of true up of pass-through costs and other site-specific charges.	16	47	32
Terminations	Mismatch between amounts paid to TO and termination sums. Sized based on possible significant mismatch from historic data modelling.	(15)	67	67
Major customer failure	Based on average monthly billing of a top six customer with a two-month exposure.	0	100	100
Other	Smaller customer failure, BSUoS billing, AAHEDC,[24] spend prior to agreement of funding arrangements, income adjusting events.	5	113	61
Total		**(114)**	**742**	**550**

Figure 3 Sizing the working capital facility

Figure 3 illustrates the volatile nature and possible extreme ranges of our cash flow. Our revenue risk modelling shows that we have a 99.5 per cent probability of a negative cash flow and an expected mean negative cash exposure of around £155 million. We have sized the WCF to cover plausible rather than probable cash out flows, covering the higher end of our requirements. This ensures we can meet our licence obligations around sufficiency of resources and independence with only a minimal impact on consumer costs. It is also key to maintaining our credit rating.

We view the liquidity of NG ESO as satisfactory, despite its highly volatile cash flow, reflecting the large revolving credit facility that has been put in place to manage the risk associated with TNUoS charges.
Moody's

[24] Assistance for areas with high electricity distribution costs

Evaluating future working capital requirements

Our revenue management role presents the biggest challenge in managing cash flows. The role of cash collection agent exposes us to a significant risk of under-collection, with often a two-year delay in being able to recover cash from customers. The main areas of exposure are described below.

TNUoS recovery

Any differences between ex ante forecast recoverable revenue and ex post actual charges for use of the transmission system are borne by us, with recovery collected through customer billing two years later (the 'K' term). Any changes in demand patterns or unexpected weather events can affect revenue collection. In the RIIO-1 period we have seen demand-driven under collections of up to £70 million per annum. This level of under recovery in consecutive years could expose us to risk of £140 million.

TNUoS billing and collection

We are reliant on customers forecasting their own annual charges, which differ from ex post actuals, with recovery of any differences settled two months after the end of the relevant charging year. Customers can under forecast by up to 20 per cent before we can intervene. In previous years, the cash flow risk of customers under forecasting has been mitigated by significant embedded benefit credits paid to smaller embedded generators (<100 MW). If embedded generators have no TNUoS charges against which they can offset their embedded generation credits, we will make a payment to them relating to the whole charging year as part of the post-charging year demand reconciliation. As more embedded generation has connected to the network, these payments have risen to a level that largely offsets any supplier under forecasting.

Following the implementation of Customer Use of System Code (CUSC) modifications (CMP264/CMP265[25]), this embedded generator payment benefit has been significantly reduced (phased implementation over three years to March 2021). As a result, we have little mitigation to offset the cash flow risk of any under payments from suppliers. We estimate the reduction in embedded generation payments as part of the reconciliation process to be around £120 million. A level of customer under payment of 10 per cent would negatively affect cash flow by around £250 million (based on 2021/22 forecast allowed revenues), which would be borne by us until final settlement of liabilities through the demand reconciliation process. For sizing the WCF, we have used a less extreme under payment assumption of 5 per cent of the 2021/22 forecast (£2.5 billion) of TNUoS demand related revenues, giving a WCF provision of £125 million. This cash flow timing difference is quite separate from the under recovery of allowed revenues collected through the licence 'K' term.

An additional risk in relation to generation TNUoS charges has been included in our provision. This is because there can be unexpected delays in generators becoming liable for TEC.[26] Some of the volume in the generation charging base is provisioned on 'expected' generation connections over the coming 18 months, and there is a risk that generators delay their connection. This is not uncommon, and it can be difficult to anticipate. There is a higher risk where a generator is due to connect towards the end of the charging year, as there is a risk they will slip into the following year. In this case, they could not be billed for TNUoS in the year as expected. Based on a forward view of the TEC register for projects that have consent or are commissioning and in zones of high tariff, this could represent a TNUoS liability of £25 million. We have incorporated this into our WCF requirement.

Other transmission billing

Any revenue related pass-through costs in excess of forecast (e.g. Ofgem licence fees, Inter-TSO compensation recovery) are funded through the ESO until recovered through future TNUoS charges two years later. We estimate that the impact of two years of under recovery could be up to £17 million.

Site-specific maintenance charges recover a proportion of the costs and overheads of maintenance activities conducted on a site-specific basis for connection assets of the transmission licensees. Income from sites can differ to forecasts from Transmission Owners (TOs) because there are differing ways of calculating amounts billed to customers compared to amounts the TO can recover. The mismatch borne by us is recovered via future years' TNUoS charges on a one-year lag. Based on historic levels of mismatch for the Scottish TOs

[25] https://www.ofgem.gov.uk/publications-and-updates/decision-industry-proposals-cmp264-and-cmp265-change-electricity-transmission-charging-arrangements-embedded-generators
[26] Transmission Entry Capacity (TEC)

and an estimate for the NGET mismatch,[27] we estimate the high end of the range to be a cash out flow of £30 million, but have sized the WCF requirement at £15 million.

Terminations

When a customer terminates its connection agreement, it becomes liable for a cancellation charge. This is made up of two elements: the spend on attributable schemes and a proportion of wider liability calculated on a £/MW tariff. At termination, the relevant TO delivering the connection will invoice us to recoup its attributable costs. This means the TO will charge us for spend on all schemes applicable to the terminating customer, whether or not they are applicable to the connection terminated (e.g. wider reinforcement works). In many cases, this will create a gap between what we are required to pay the TO and what can be recovered from the customer. Any shortfall between terminations sums and attributable costs will be funded by us until we can recover them via future years' TNUoS charges.

Figure 4 below illustrates the forecast spend profile for a current major connection scheme. If the customer terminated this scheme, we would be liable to pay the TO for the scheme spend, which is far in excess of the customer's termination liability as the scheme progresses. For example, if the customer terminated the scheme in 2029, the sums invoiced would be £25 million, while the amounts payable to the TO would be £110 million. However, if in 2029 the termination was due to insolvency, we could expect to incur a net cash out flow of £108 million until sums were recovered through TNUoS charges in 2030.

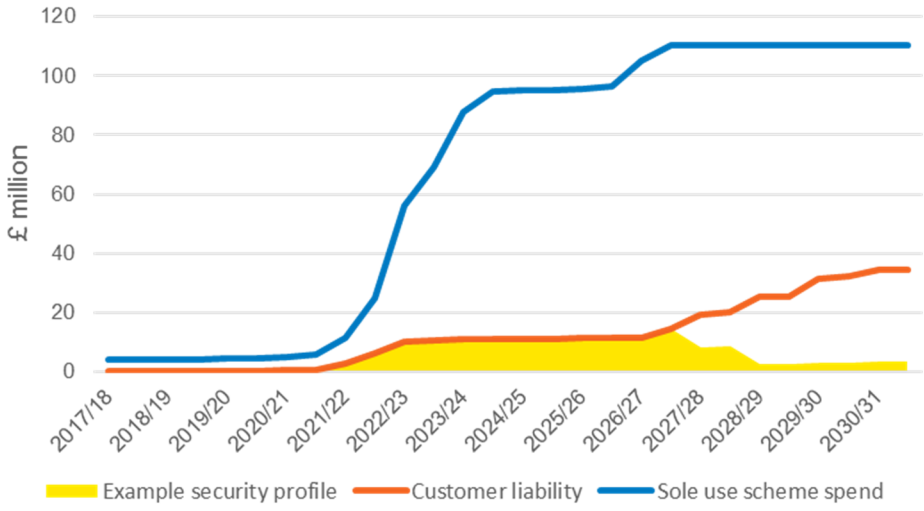


Figure 4 Illustration of connection spend profile vs customer liability for termination sums

While the example illustrated above provides for an exposure of £108 million, our modelling of historic termination sum mismatches (much of which was borne by NGET prior to ESO separation) indicates that the exposure could reasonably be up to £67 million. This is the value included in our WCF provision.

Major customer failure

Many mechanisms exist to protect us against exposure to customer failure; however, there remains some risk to working capital and the ultimate risk of unsecured bad debt. A proportion of bad debt would likely be recovered through the annual demand reconciliation process or via the insolvency process, but this could take some years. There is also currently no clear agreement on how or when any bad debt could be 'socialised'.

For a single major supplier default, assuming Ofgem would act quickly to appoint a Supplier of Last Resort to protect consumers, we would need to be able to manage the short-term impact. This could lead to a cash exposure of up to £100 million (covering TNUoS and BSUoS liabilities).

[27] There is no history as this is only a relevant licence obligation post-separation

Other exposure

Other short-term cash flow requirements provisioned through the WCF include the following:

- Balancing Services costs are billed daily and aim to recover the costs incurred over each half hour settlement period. Customers are billed and obliged to pay within 29 days of the settlement period. Each settlement period is reconciled, and any unbilled costs are recovered via a second billing cycle 14 months after the initial settlement period. Our historic cash position indicates a risk range of up to £63 million. This is in part driven by an event in 2016, when we agreed additional Black Start contracts for the period April 2016 to March 2017, amounting to £113 million. Since this gave rise to an increase in BSUoS costs to customers of around 10 per cent, we decided to defer billing of the first six months of contracted costs until the final settlement billing, which deferred the recovery of cash for 14 months. We have included £30 million for this risk in our WCF sizing.
- In addition to the risk of a major supplier failure, we manage the much more frequent cash risk of smaller market participants becoming insolvent. Recent bad debt history suggests this to be up to £20 million at any point in time.
- In the past, we have taken on additional roles or activities not envisaged or fully scoped when plans were agreed and allowances set (e.g. EMR Delivery Body role). Mechanisms exist to recover such costs, but we cover any incremental costs in the short term. Based on an assumption that recovery of costs could be agreed within a two-year timeframe, and based on additional roles in RIIO-1, we consider that there is a moderate funding risk of £8 million. We have included £3 million in sizing our WCF.

Other risks that informed the range of possible exposure but were not specifically provisioned include the following:

- We have a role to recover revenues with respect to Assistance for Areas with High Electricity Distribution Costs (AAHEDC). Any short-term mismatch between the ex ante forecast and ex post realised costs is funded through our working capital.
- Income adjusting events (IAE), as determined by Ofgem, can drive a timing difference between costs incurred and revenues collected.

Other possible high impact events

There are a number of possible high impact events where we might expect some advance notice but might require funding in the short term. We have made no specific provision for these types of events in our sizing of the WCF. For example:

- Significant charge setting event – we set TNUoS charges based on conditions set out in the CUSC. Network users can raise a challenge if they think we have made an error or misinterpreted the code. This may result in a working capital impact if we have made an error. A recent example was an alleged breach of the CUSC in charging generators the upper limit of the charge range set by the European Commission (CMP261).[28] This could have led to us returning £120 million to generators if the challenge had been upheld.
- CUSC changes – there is growing industry pressure to provide more certainty of future TNUoS and BSUoS charges by 'fixing' elements of the charges. This is likely to place greater cash flow risk on us by both funding larger under recoveries and carrying under recoveries for longer periods.

Ofgem is planning to consult on whether to transfer the TNUoS revenue collection risk we hold to other parties; in our Business Plan, we have assumed we will continue to hold the TNUoS risk. We estimate that the transfer of TNUoS billing risk to the onshore TOs would reduce our WCF requirements by approximately £300 million. Equally, we do not assume any fixing of BSUoS charges as a result of the charging task force. Any decisions taken by Ofgem to change these could affect the level of risk we hold and the size of WCF required.

[28] CMP261: 'Ensuring the TNUoS paid by generators in GB in charging year 2015/16 is in compliance with the €2.5/MWh annual average limit set in EU Regulation 838/2010 Part B (3)'

Options to fund a working capital facility

Funding must compensate us for the costs of the procurement and use of an appropriately sized and efficiently managed facility. This should not be limited to a pass-through mechanism for the fixed facility costs for the following reasons:

- The revenue timing risks described in sizing the WCF attract interest at varying rates. For example, under recovery of TNUoS charges because of inaccurate customer forecasts would attract interest from customers at the Bank of England base rate (currently 0.75 per cent), while interest charges incurred under current WCF arrangements would be higher (currently 1.32 per cent). We estimate that, for our mean expected cash out flow position of £155 million, the annual excess of interest incurred over that received would be £0.6 million per annum.
- Interest rates on the WCF are linked to LIBOR, so will fluctuate over time. This means that we would be taking on additional interest rate risk.
- In procuring a WCF, there is an implicit amount of underpinning equity capital, which needs to be remunerated. It is also possible that, in extreme circumstances, our cash flows could exceed the level of any WCF; for example, if one of the high impact events not included in the current sizing of the WCF were to occur. The ability to access additional funding at short notice would carry a cost premium as well as negatively affect our credit rating and investor confidence. This implies that the shareholder has contingent equity above that on the balance sheet invested in the business.

The question of funding a WCF is inherently linked to remuneration of the risk in our industry revenue management role. We further explain the revenue collection risks our views on additional remuneration in section A.7.

We think it is appropriate for the ESO to procure a working capital facility that is fully funded for by consumers.
Generator

A.6 Our assessment of financeability

We have set out an ambitious, stakeholder-endorsed plan that we believe will deliver what industry and consumers need across the RIIO-2 period. This plan requires investment over and above RIIO-1 levels to meet our ambitions, so that we can innovate and take risks to deliver benefits for consumers.

Ofgem has a statutory duty to have regard to the need to secure that the company is able to finance its licensed activities. We also have a duty to maintain an investment grade credit rating.

It is key that we can maintain a strong investment grade credit rating, to provide sufficient confidence to our counterparties and stakeholders in our important role at the heart of the industry, as well as to meet our licence obligation. In addition, we must be able to attract and retain equity investors to provide the capital needed to deliver our plan. This will enable us to unlock benefits across the energy system.

To achieve efficient financing costs, investors need confidence in the regulatory framework and the returns they expect to receive. Part of this is ensuring enough flexibility and financial headroom in the case of shock events or economic downturn. This also facilitates continued access to capital markets, so we can finance new investments for the benefit of stakeholders and ultimately consumers, without recourse either to Ofgem or shareholders, thus mitigating the risk of potentially postponing investment. Not remaining a strong counterparty to industry would not be in the interest of consumers.

We have targeted a rating of Baa1/BBB+ for the actual company as we believe this delivers against our objectives and balances the need for resilience and investor confidence.

A Baa1 rating is also in line with that awarded by Moody's in March 2019. We believe that, although it would be possible to remain compliant with our licence, any downgrade would have significant impacts on industry, investor, counterparty and stakeholder confidence in us, which would increase costs and not be in the interest of consumers. Recent market evidence suggests that this rating is lower than that obtained and targeted by our peers. For example, Moody's notes in its 2019 rating of the ESO that *"[NG ESO's] peers are rated between Aa2 and A1, reflecting the essential natures of their services and timely cost recovery under strong regulatory frameworks".* This suggests that Baa1/BBB+ is the minimum rating required for our business and it would be inappropriate to target a lower rating.

In this section we will:

1. look at our assessment criteria and our reasons for choosing them.
2. set out the scenarios/sensitivities we have considered.
3. provide our assessment of the notional company.
4. consider options to improve financeability.
5. summarise our assessment of the actual company.

All the analysis has been undertaken using Ofgem's Business Plan Financial Model (BPFM) on a best endeavours' basis. The BPFM was not available until 20 September 2019, and we did not receive a final version until 21 November 2019. Specifically, we have used BPFM version 7.4 as provided by Ofgem on 21 November 2019. Multiple versions of the BPFM are needed to provide Ofgem with the data and analysis requested.[29] Additional versions perform additional sensitivity testing and consider options to improve financeability. This approach has been agreed with Ofgem. All versions used to generate the cases discussed below have been supplied to Ofgem alongside this business plan.

As agreed with Ofgem, in some circumstances we have augmented BPFM outputs with our own analysis. Any instances of this have been clearly marked and supporting models provided to Ofgem as requested by the Challenge Group.

[29] Functionality of the BPFM is limited to one set of baseline information, should a scenario or sensitivity require an amended data set a new model must be completed. Different versions of the BPFM are required for the notional and actual company.

A.6.1 Assessing financeability

Our assessment considers whether we can meet the expectations of both our equity and debt investors.

This is the first price control framework and financeability assessment for the legally separate ESO. We have set out qualitative and quantitative criteria to aid us in our assessment given the lack of a tested methodology and precedent.

We have reviewed metrics used by credit rating agencies and a suite of other metrics to make sure different investor positions are considered. We believe looking at additional metrics is important given our asset-light nature and cash flow volatility.

Ofgem set out in its ESOMDD consultation and subsequent October 2019 decision a number of metrics that could aid the assessment of our financeability. These have been calculated in Ofgem's BPFM, and we include these alongside this annex in our scenario results file.

Our narrative focuses on our assessment against the criteria in figure 5 below. We explain each of the criteria and its respective threshold in more detail below.

Assessment criteria	Threshold
Alignment with regulatory principles	Qualitative factor
Enables required culture	Qualitative factor
Moody's grid rating	A1/A2
Adjusted Interest Cover Ratio	1.8x
EBIT margin (controllable revenue)	10%
Dividend yield	5%
Dividend cover	1.5x

Figure 5 Financeability assessment criteria

Alignment with regulatory principles

Our financeability assessment considers two qualitative aspects. The first seeks alignment with the principles of good regulatory practice applied by Ofgem. It considers the sustainability of the package and whether it can be expected to endure as a financial framework rather than introduce short-term amendments. It also asks whether it creates a financially sustainable framework.

A number of the regulatory principles considered are below.

- Companies can recover the efficient costs of running their operations, including the cost of financing their activities.
- Companies should be incentivised to obtain value for money solutions, minimising long-term cost without incurring undue risk.
- Risks are to be allocated appropriately between companies and consumers depending on who is the best placed to manage them.
- Companies should be incentivised to obtain better outcomes for consumers.
- Consideration should be given to the needs of both existing and future consumers. Costs should be paid for by the consumer generation benefitting from the investment, with assumed asset lives underpinning the depreciation policy to reflect expected economic life.
- A capitalisation policy that treats opex and capex consistently, both in terms of treatment in RAV and incentive strength, but is based on business plans and so closely aligns with actual opex/capex split.
- Investors can expect to receive a fair return on their investment, the activities they deliver and the risk they hold.

This is a subjective assessment, and we have chosen to apply a red, amber, green rating as follows:

- Green – principles are adhered to.
- Amber – demonstrates a potential move away from one or more principles. We have marked the principle that investors can expect to receive a fair return on their investment as amber in the base case under Ofgem's working assumptions as some of our roles do not receive an appropriate return. We set out our position in this further in section A.7.
- Red – one or more principle is broken.

Enables required culture

It is becoming increasingly expected that organisations should be more purpose-led and aware of their wider societal responsibilities, as evidenced by the rapid growth in socially responsible investing and ESG (environment, social and governance) focused funds. Corporate culture is a critical element of this.

As explained at the start of this annex, this our first specific price control, and it is important that the financial package is designed and calibrated in a way that actively enables the culture that Ofgem, stakeholders and we want.

Consideration needs to be given on how the ESO would be incentivised and resourced to take a more ambitious, forward-looking view.
Generator

Ofgem set out the below objectives in its October 2019 decision document, namely for us to:

- be ambitious, forward looking and proactive in maintaining a reliable, resilient and efficient system throughout the energy system transition
- work with Ofgem and other industry parties to solve system challenges
- be dynamic and flexible in adapting to emerging issues and new developments.

Economic literature also refers to the Principal-Agent problem and the risk that the interests of the Agent (ESO) and Principal (stakeholders) may not be fully aligned. The key to mitigating this problem is to closely align those interests. This criterion considers whether the regulatory framework does this, and whether it aligns the interests of investors and stakeholders and helps create the desired culture.

A framework encouraging a risk averse culture or that we 'check-in' with Ofgem before making decisions would score negatively. We apply only a red or green rating to this assessment.

Moody's grid rating

The legally separate NGESO Ltd obtained its initial rating in March 2019.[30] Moody's assigned us a rating of Baa1 with a stable outlook, using the Regulated Electricity and Gas Utilities Methodology rather than the Regulated Electricity and Gas Networks Methodology, which is used to rate the transmission networks.

The rating includes an uplift related to Moody's assigning a high likelihood of parental support should it become necessary to maintain the ESO's credit quality.

[30] https://www.Moodys.com/research/Moodys-assigns-Baa1-rating-to-National-Grid-Electricity-System-Operator--PR_396553

The outcome of the methodology grid is A1 on a forward-looking basis (following the legal separation of NG ESO from NGET). The assigned rating is three notches lower, reflecting NG ESO's unusually high cash flow volatility and associated liquidity risks, offset by its ownership by National Grid plc.
Moody's

A clear implication is that the standalone company has a weaker credit profile than implied by our published rating. Moody's has made two areas of judgement in reaching its final rating: 1) a downward adjustment of several notches due to ESO-specific issues such as levels of volatility and instability in our metrics; and 2) an upward adjustment for parental support.

Moody's has taken significant comfort in and reliance on a large WCF to support our liquidity risk.

NG ESO has mitigated this liquidity risk by putting in place a large revolving credit facility with a consortium of highly rated banks. We believe the facility will be sufficient to support several years of plausible under-recoveries and other downside scenarios.
Moody's

We view the liquidity of NG ESO as satisfactory, despite its highly volatile cash flow, reflecting the large revolving credit facility that has been put in place to manage the risk associated with TNUoS charges and the benefits resulting from being part of the wider National Grid group.
Moody's

We have applied Moody's approach in relation to its review of qualitative and quantitative metrics to achieve a grid rating score. Moody's rating assessment grid considers five qualitative metrics and four quantitative metrics.[31] Given the recent nature of the rating, we have assumed scores for the qualitative metrics are aligned with Moody's conclusions in March 2019.

Moody's has applied considerable judgement when rating us due to the high levels of volatility seen historically, as a result of our industry revenue management role. It has not issued any quantitative guidance, which we believe is because of the volatility in our metrics. This makes a quantitative assessment of credit strength challenging. As a result, we have considered the grid rating relative to our actual rating.

Despite peers providing similarly essential services being rated more strongly than us, we have targeted maintaining a grid rating of A1/A2, in the expectation that this allows us to maintain the Baa1 rating achieved by Moody's in its last evaluation of the company.

Adjusted Interest Cover Ratio (AICR)

We have also focused on the AICR, widely used in rating methodologies, which considers the largely non-discretionary nature of our capital expenditure on cash availability. Our business characteristics and risks are closer to companies that rely on intangible assets such as know-how, have limited infrastructure assets, and occupy a pivotal position in the market system; for example, NATS (the UK air navigation service provider). The lower score assigned to the qualitative factors (relative to UK utilities) in the rating agency methodology, and our higher levels of operational gearing, suggest the relevant threshold for AICR in the financeability assessment should be higher and correspond to the upper end of the solid investment grade rating in the indicated Baa range of 1.4 -2.0x. Given NATS has similar business characteristics to us, the 1.8-2.2x range for NATS[32] is relevant evidence to inform the benchmark. This led us to use 1.8x as a Baa threshold. Further rationale for this is provided in the December 2019 KPMG report, which is in Appendix C to this annex.

[31] https://www.Moodys.com/research/Moodys-assigns-Baa1-rating-to-National-Grid-Electricity-System-Operator--PR_396553
[32] 1.8-2.2x range per 2012 Moody's methodology

EBIT margin

It is difficult to quantify the total capital used by companies with limited tangible assets reflected in the RAV. Investors and financiers typically assess asset-light businesses based on margins, which are a critical measure of financeability from an equity and debt perspective. We have highlighted EBIT margin as it avoids issues with comparability and interpretation of capital charges across different sectors.

We believe the application of capital-based metrics is not sufficient to tell whether we will have enough resources to manage our downside risks, as these are unrelated to the scale of our fixed assets. Margins represent a measure of the financial headroom available over and above our operating costs, to manage risks and exposure. In unregulated markets and the regulation of asset-light businesses, margins are used to determine the required profitability. Using margins ensures competitive market outcomes are correctly approximated by regulation.

We apply a minimum threshold of 10 per cent based on analysis by our independent advisors.[33]

Dividend-based metrics

We also consider two dividend-based metrics. As we set out earlier in our Business Plan, equity holders see it as critical to obtain a regular return via dividend payments.

A stable dividend policy sends a strong signal of confidence to investors. We believe that a stable dividend policy of 5 per cent and 1.5x dividend cover is appropriate for the ESO.[34] This is consistent with our UK and European peer group over the last 10 years, against which we would be competing for investment. In section A.3 – Investors, we set out more detail around this investor expectation.

Sensitivity testing

As well as considering a baseline position, we need to remain financeable in a range of circumstances given the inherent political and economic uncertainty across the RIIO-2 period, as well as in the totex plan itself. We have considered the range of sensitives set out by Ofgem to test the impact of downside risk. These are:

1. interest rate sensitivity based on +/- 1 per cent compared to rates implied per base case in each year based on a trailing average cost of debt
2. inflation rate based on +/- 1 per cent in each year
3. 10 per cent totex variation to base plan
4. high RoRE and low RoRE with movement of 2 per cent around baseline
5. impact of sustained revenue under collection of £75m per annum.

We have also assessed additional sensitivities, including considering the impact of different notional gearing levels. We set out the results below and in our scenario results file.

[33] The KPMG report is in Appendix C to this annex (Annex 5). The Oxera report can be found at following link; https://www.nationalgrideso.com/document/153396/download

[34] For the purposes of financeability analysis we have assumed this as 5% of equity RAV for the notional company

A.6.2 Assessment of the notional company based on Ofgem working assumptions

We have initially considered the financeability of the notional efficient company. For this purpose, we assume the notional company to be an efficient standalone organisation that sits outside of the National Grid group, and therefore does not benefit from any parental support. Its finances are influenced by an assumed capital structure and include regulatory depreciation of its assets.

We have used Ofgem's working assumptions and BPFM for the base case notional company.

Figure 6 below sets out the main assumptions in our analysis. All return numbers quoted are CPIH stripped.

Parameter	Core assumption
Cost of equity	7.81%
Cost of debt allowance	25 basis points
Index linked debt	0%
Working capital facility expense	Pass-through of facility costs, assumed with zero draw down
Working capital drawdown	None assumed
Interest expense	Equal to cost of debt (but incurred nominal)
Gearing	55% opening position
Inflation	CPIH of 2%
Dividend yield	3% on notional equity RAV
Capitalisation rate	Aligned to capex proportion of totex, reset every 2 years
Regulatory depreciation period	7 years
Incentive performance	No under /over-performance[35]
Additional remuneration	None assumed

Figure 6 Notional company base case working assumptions

In the BPFM, Ofgem has classified WCF fees outside of financing costs, so they are not fully considered in a number of core metrics, e.g. AICR and (CFO+Interest) / Interest. We do not believe this treatment would be applied by rating agencies, and we present an additional view of AICR (AICR ESO) in the ESO-specific metrics in the BPFM, which are included in the accompanying scenario results file.

For calculating a Moody's grid rating for the notional company, we have assumed that debt/capitalisation can be approximated to total debt (including WCF drawings)/RAV. This is necessary as the BPFM does not contain a full balance sheet.

Our assessment of the notional company under the base scenario (set out in figure 7 below) sees gearing rise above notional levels, indicating the need for equity injections to deliver our plan. We have assumed equity injections to maintain gearing within a tolerance of 5 per cent of notional levels of 55 per cent.

This, combined with re-gearing to the new notional level of 55 per cent, drives a requirement for £43.3 million of new equity across RIIO-2.

If we assume this new equity is provided, the resulting metrics indicate a generic Moody's grid rating of A1. This is consistent with Moody's rating assessment, and we do not believe this suggests an issue with debt financeability given the subjective nature of the rating judgements.

[35] Ofgem is currently developing the ESO's incentive scheme. No financial parameters have been consulted on or set as working assumptions for business planning purposes.

Assessment criteria	2021/22	2022/23	2023/24	2024/25	2025/26	Average[36]
Alignment to regulatory principles	A	A	A	A	A	A
Enables required culture	R	R	R	R	R	R
Moody's grid rating	A2	A2	A2	A2	A1	A1
AICR (BPFM)	2.8	2.9	2.8	2.7	3.0	2.8
AICR (ESO)	2.3	2.4	2.4	2.4	2.6	2.4
EBIT margin	4.0%	4.4%	5.1%	5.2%	5.8%	4.9%
Dividend yield	3%	3%	3%	3%	3%	3%
Dividend cover	1.6x	1.6x	1.6x	1.6x	1.8x	1.6x

Figure 7 Notional company base case financeability assessment

Although credit metrics indicate we are debt financeable under Ofgem's working assumptions, there is a lack of equity investor offering. This indicates a challenge in ensuring a sustainably financeable organisation.

- The lack of investor offering is demonstrated by the low EBIT margins of less than five per cent on average across the plan. This is significantly below the threshold of 10 per cent and the benchmark positions set out by Oxera and KPMG in their independent reports.
- Dividends can be covered at the Ofgem working assumption level of 3 per cent yield (against the equity portion of RAV) and also maintain a cover ratio of 1.6x, but this is only possible with the injection of £43.3 million of new equity, meaning that no net cash return is provided to the shareholder across the five-year RIIO-2 period. We do not believe a rational investor would provide this equity injection, given the poor equity offering, with some services not remunerated appropriately under a RAV*WACC framework.
- With Ofgem's working assumptions, the regulatory framework does not incentivise and encourage us to be innovative, ambitious and proactive. Firstly, the assumptions encourage risk aversion. Faced with an option of investing additional operating cost to further consumer interests through additional activities, we can only hope to recover our costs; yet we face a risk of cost disallowance. Secondly, there is no reward for additional activities, or remuneration for any additional risks they may introduce, should the RAV not increase as a result. Thirdly, while the incentive scheme could offer reward, the fact that it is an ex post evaluative scheme makes any reward unpredictable and, based on recent experience, unreliable.
- The notional company may find it challenging to raise new equity, with investors preferring to put their money in alternative sectors (or countries) to achieve higher dividends for lower risk. This may be exacerbated by us being a newly separate entity without an established regulatory framework, which may increase investors' perception of risk around our ambitious plan to support net zero carbon delivery in the current uncertain political climate.

We conclude that the notional company is debt financeable under Ofgem's financial framework and working assumptions, but we do not believe it represents an adequate equity investor proposition. Being debt financeable is not sufficient to deliver the ambitious, proactive and agile ESO stakeholders want.

[36] Average presented is a simple (not weighted) average of annual metrics results

Sensitivity analysis of the notional company

We have considered the impact of several changing circumstances on our plan, taking account of both equity and debt metrics, running sensitivities against the notional company under Ofgem's working assumptions and assessing them against the quantitative criteria used earlier. A selection of results is presented in figure 8 below.[37] These are based on the RIIO-2 five-year average.[38]

Ofgem sensitivity	Base notional case	High interest rate	Low interest rate	High inflation	Low inflation	Totex 10% over-spend	Totex 10% under-spend	High RoRE	Low RoRE	Sustained under-recovery
Moody's grid rating	A1	A2	A2	A2	A2	A2	A1	A1	A2	Baa1
AICR (BPFM)	2.8	2.3	3.8	2.0	5.0	1.2	5.0	3.5	2.2	(5.0)
AICR (ESO)	2.4	2.1	3.0	1.8	3.6	1.2	3.9	2.9	1.9	(3.7)
EBIT margin	4.9%	5.2%	4.6%	4.9%	5.0%	2.1%	7.7%	6.0%	3.8%	(7.6)%
Dividend yield	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Dividend cover	1.6x	1.6x	1.7x	1.3x	2.1x	0.2x	3.2x	2.2x	1.1x	(6.6)x

Figure 8 Ofgem sensitivities over the notional company

ESO sensitivity	Mixed revenue timing	High gearing (60%)	Low gearing (50%)	No dividends	High gearing, high inflation	High gearing, high cost of debt	Ex post disallowance
Moody's grid rating	A2	A2	A1	A1	A2	A2	A2
AICR (BPFM)	1.6	2.3	3.5	2.9	1.6	1.9	1.5
AICR (ESO)	1.7	2.0	2.8	2.5	1.5	1.7	1.4
EBIT margin	4.2%	4.4%	5.4%	5.0%	4.3%	5.0%	2.7%
Dividend yield	3%	3%	3%	0%	3%	3%	3%
Dividend cover	0.7x	1.5x	1.8x	n/a	1.0x	1.4x	0.5x

Figure 9 ESO sensitivities over the notional company

[37] The alignment to regulatory principles and enables required culture criteria are not affected by these sensitivities
[38] All results are presented as simple average of metrics over the five-year RIIO-2 period

One of the metrics that shows the most movement between scenarios is AICR. AICR is used as a core metric in many regulated sectors' rating methodologies. Although not explicitly part of the Utilities methodology applied to us, it is possible that it will be considered in any rating assessment given our RAV*WACC framework. Figure 10 below[39] shows how AICR performs against economic, framework and performance sensitivities. In some scenarios, AICR dips below our threshold level of 1.8x under Ofgem's calculation, suggesting a risk to debt financeability under some highly plausible scenarios, such as an ex post cost disallowance of 2 per cent.

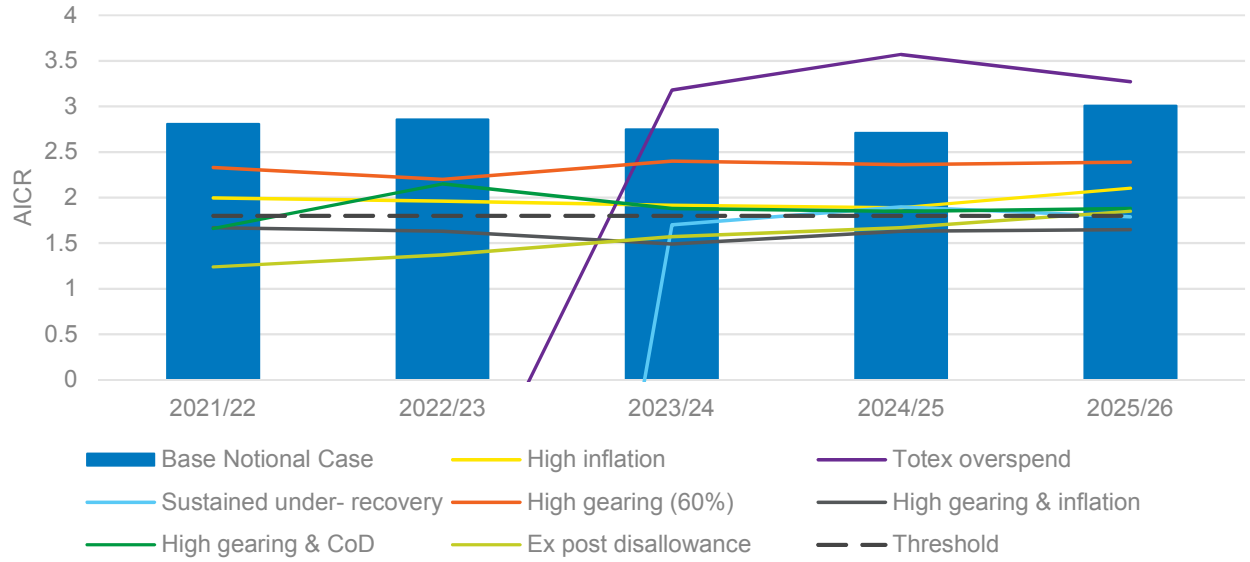


Figure 10 Notional company AICR (BPFM) sensitivities

We explore some of the sensitivities run in more detail below.

Sustained under recovery of revenue – in most sensitivities run, we can maintain a Moody's grid rating of A1/A2 on average across the five-year RIIO-2 period. However, the impact of differences in revenue collection in the form of a sustained under recovery of £75 million per annum would move the Moody's grid rating to Baa1. We note the notching approach taken by Moody's in our actual rating to reflect the potential for such high levels of volatility, and the importance of our WCF to help manage this risk while it remains with us.

The revenue timing scenario uses a £75 million mismatch between revenues and costs in every year of RIIO-2. For the first two years, we need to use £75 million each year to fund payments not recovered in revenue. This £75 million also has a direct impact on profitability in those years. It is trued up in the third year, so an under collection then is offset, and there is no significant profit (or cash) impact from that year on; but equally there is no surplus for repayment of the WCF, which remains drawn. In this scenario, with the WCF drawn, the Total Debt / RAV ratio shows significant deterioration.

This scenario also highlights the challenge of providing a stable dividend to the equity holder due to the potential volatility of accounting profits because of timing issues. Such volatility may mean it is more difficult to attract equity investment and may increase the cost of equity.

Ofgem is considering the transfer of all, or part, of our TNUoS revenue collection risk to other parties. This would reduce but not eliminate the risk of revenue timing impacts and would likely be credit positive, reducing the magnitude of rating agents' current assumption of support from National Grid plc.

Totex overspend – a scenario where totex expenditure exceeds the original forecast allowances set on an ex ante basis by 10 per cent sees the headline maintenance of a Moody's grid rating of A2. As we have no sharing factor in our proposed funding model framework, this has no long-term effect, but there is a requirement to fund the activity until revenues are adjusted in future periods. In the BPFM, this cash shortfall is met through a greater draw on debt financing; however, underpinning this is a need for significant additional

[39] Graph depicts AICR per BPFM calculation. Scenarios displaying consistent results above the threshold have not been presented. The first two data points for totex overspend and sustained under recovery scenarios are significantly below zero and have not been displayed for presentational purposes.

equity injections (increasing equity injections required to £77 million) to maintain gearing within notional tolerance. This means that no dividend return over the period is possible due to the impact on the profitability of the company in years where the overspend is not balanced by cash receipts. The negative impact on AICR and EBIT of any overspend on initial allowances demonstrates that we are discouraged from investing additional opex to further consumer interests (even if it discounts the risks of disallowance) due to this impact on EBIT. Equally, we are potentially encouraged not to spend allowances on the funded activities because an underspend can improve EBIT.

High interest and high inflation rate sensitivities – the interest rate scenario involves modelling the position where interest rates are 1 per cent different to those assumed in the base position. In the BPFM this affects cost of debt and cost of equity, but has not been factored into expected costs for the WCF. We can see a decline in the overall grid rating to A2 and a corresponding decline in AICR. The sensitivity also assumes that the 1 per cent movement in interest rates affects a trailing average cost of debt allowance. If this scenario assumed a cost of debt mechanism based on bank financing, without the diluting effect of a trailing average, it would reduce AICR further.

If inflation rates are 1 per cent higher than the baseline working assumptions, we see a similar deterioration. Although this does not indicate a debt financeability challenge, it indicates that we are sensitive to changes in macroeconomic conditions.

Gearing – we have also considered the impact of a higher and lower notional gearing level. An increase in notional gearing to 60 per cent appears to maintain a debt financeable position when considering credit metrics. However, headroom has reduced. When stress-tested under different economic conditions, headroom falls away, as can be seen through reduction in AICR, suggesting we may not be financially robust enough under this parameter.

A notional gearing assumption of 60 per cent would mean one of the quantitative rating metrics being accepted as sub-investment grade.[40]

Ex post disallowance – section A.7.2 describes the risk asymmetry that the proposed financial framework exposes us to. We have reviewed the potential impacts on financeability when considering a reasonable expected loss position of 2 per cent on totex and Black Start costs. This risk further exposes us due to our lack of sharing factor and high ratio of spend to RAV compared to the network companies. We believe this scenario shows insufficient headroom across the metrics, and a need to obtain greater clarity over the ex post review and disallowance process; as well as its consequences on the equity offering being proposed.

Mixed revenue collection – this scenario reflects the level of K that has been seen over recent history,[41] and only highlights one element of the revenue timing risk we could experience. Although it shows an average Moody's grid rating across the five years of A2, the annual rating moves significantly year-on-year, demonstrating our potential exposure to cash volatility.

Assessment criteria	2021/22	2022/23	2023/24	2024/25	2025/26	Average
Moody's grid rating	Ba1	Ba2	A2	A1	A3	A2
AICR (BPFM)	(12.6)	(13.1)	27.5	16.2	(9.9)	1.6
Dividend cover	(13.2)x	(16.8)x	29.8x	13.3x	(9.7)x	0.7x
Over/(under)-recovery included (nominal prices)	£(57.6)m	£(81.6m)	£82.9m	£(22.6)m	£22.0m	£(11.4)m

Figure 11 Annual impact of mixed revenue collection scenario on selected metrics

[40] Moody's Regulated Utilities Methodology sets general Baa threshold on debt/capitalisation at 59%
[41] This is based on the last five reported years of K experienced by the ESO – it covers the years 2014/15-2018/19 and is based on percentage of TNUoS in those years.

Making the notional ESO financeable

As explained earlier in this section, the baseline position is debt financeable without the need for additional measures, but does not offer an attractive equity proposition. This puts the sustainability of the framework in doubt.

We believe that, in setting the first price control for the legally separate ESO, there is a responsibility to put in place a sustainable framework to encourage us to focus on long-term, strategic issues, rather than one that leaves us waiting for decisions by Ofgem or beholden to a parent company for additional finance.

Ofgem set out several levers in the ESOMDD consultation that could be used to improve financeability. We have assessed each of these in relation to the criteria we set out earlier.

Assessment criteria	**Base notional case**	**No dividend**	**Adjusted capitalisation rate**	**Reduced regulatory asset life[42]**	**Additional remuneration[43]**
Alignment to regulatory principles	A	R	R	R	G
Enables required culture	R	R	R	R	G
Moody's grid rating	A1	A1	A1	A1	A1
AICR (BPFM)	2.8	2.9	2.8	3.0	6.8
AICR (ESO)	2.4	2.5	2.4	2.5	5.4
EBIT margin	4.9%	5.0%	5.0%	5.5%	10.3%
Dividend yield	3%	0%	3%	3%	3%
Dividend cover	1.6x	n/a	1.7x	1.8x	4.8x[44]

Figure 12 Notional company financeability lever assessment

- **No dividend yield assumption** – moving away from the stable 3 per cent assumption in the modelling and removing the payment of any dividend has no significant effect on key metrics, although it does reduce the equity injection required over the period from £43.3 million to £27.2 million. This option does not improve the equity proposition.
- **Adjusted capitalisation rate** – the rate used in these scenarios is informed by our ratio of capex to totex. Across RIIO-2, that rate averages at 34 per cent but is reset biannually. Any reduction effectively pulls forward future revenues, with more spend reimbursed through fast money rather than deferred in the RAV as slow money. Although this will improve cash-based metrics, it will not improve EBIT. Under Ofgem modelling conditions, in the notional company, fast money revenues are assumed to equal operating costs in the profit and loss statement, so any benefit in the acceleration of revenue is offset by the presumption of cost. However, if we assume an accounting position, an average EBIT margin level of 10 per cent could be achieved by reducing the capitalisation rate to 29 per cent. Although this option achieves our financeability thresholds, it does not solve the underlying equity challenge or encourage the desired culture and behaviours.

  The option to adjust the capitalisation rate is not a long-term solution and cannot be deployed to a significant extent without breaking alignment with regulatory principles.

[42] This scenario assumes a longer-term change in the principle and therefore discounts the impact of RIIO-1 revenue timing items. Should the impact of RIIO-1 revenues be taken into consideration, the regulatory asset life would need to be reduced to five years to achieve the 10% threshold.
[43] This scenario considers the impact of additional revenues required to achieve target EBIT margin levels of 10%
[44] BPFM assumes fixed dividend yield to equity RAV and so assumes no distribution of the additional return achieved

- **Reduced regulatory asset life** – the shortening of regulatory asset lives would release slow money into revenue earlier and improve short-term, cash-based metrics. However, within the notional company, there is no equivalent improvement in profit-related metrics, as depreciation charges also move by a corresponding amount. Use of this lever starts to break the regulatory principle that consideration should be given to the needs of both existing and future consumers; that costs should be paid for by the consumer generation benefitting from the investment, with assumed asset lives underpinning the depreciation policy to reflect the expected economic life of the assets. Under the notional structure, the shortening of regulatory asset lives does not improve the equity financeability position. We consider further the impact of changes to regulatory asset lives in our assessment of the actual company below.
- **Additional remuneration** – the inclusion of additional remuneration for the services we deliver and the risks we hold would improve financeability on a sustainable basis. The addition of at least £13 million of additional remuneration per annum would facilitate the achievement of the EBIT margin threshold, allow greater protection against downside risk impacts and, if calibrated appropriately, encourage us to be ambitious and innovative. Section A.7 considers the potential for additional remuneration and the financeability impact.

To summarise, many of the potential levers to support financeability are focused on accelerating cash from future periods. These levers can improve certain metrics in the short term, but they present challenges:

- they ignore the principles of intergenerational fairness and approximating revenues over the lives of the assets in use
- the acceleration of cash does not provide a sustainable solution to a lack of appropriate return for activities and risks
- they do not encourage an ambitious, proactive, forward looking culture or remove the current disincentives
- rating agencies can look through this 'excess cash' to the underlying business dynamics and confer no rating benefit.

Of the options reviewed, we believe the only solution that creates the conditions to support the type of ESO stakeholders want, and provides sustainable financeability, is the inclusion of additional remuneration for our services and risks that are not fully funded. In section A7 – Proposed alternative assumptions, we set out our position in more detail.

A.6.3 Assessment of the actual company based on Ofgem working assumptions

The actual company differs to the notional company in several ways. It considers the actual financing structure of the company and reflects its actual accounting positions. We also include any cash flows recovered or incurred during RIIO-2 related to the RIIO-1 period.

Assessment criteria	2021/22	2022/23	2023/24	2024/25	2025/26	Average
Alignment to regulatory principles	A	A	A	A	A	A
Enables required culture	R	R	R	R	R	R
Moody's grid rating	A1	A1	A1	A2	A1	A1
AICR (BPFM)	14.3	9.3	3.1	1.9	2.6	6.2
AICR (ESO)	10.8	7.3	2.7	1.7	2.3	5.0
EBIT margin	18.9%	12.6%	2.0%	0.5%	1.9%	7.2%
Dividend yield	20%	15%	5%	5%	5%	10%
Dividend cover	1.7x	1.2x	(0.2)x	(0.7)x	(0.5)x	0.3x

Figure 13 Actual company base case financeability assessment

We have assessed the actual company on the same basis as the notional company. Two major items affect our analysis results:

- The inclusion of revenue timing adjustments, which bring additional revenues of around £75 million into RIIO-2 and demonstrate some of the volatility we can experience.
- A divergence between the accounting depreciation expense and regulatory depreciation received in revenues, driving a profit impact in RIIO-2 as depreciation expense outstrips regulatory depreciation.

In the first two years of RIIO-2 we have assumed a higher dividend distribution, recognising the receipt of backdated revenues from RIIO-1. These dividends have been calculated to maintain regulatory gearing levels close to notional levels, returning later in the plan to a 5 per cent yield assumption in line with equity investor expectation, as set out in section A.3. This results in a forecast dividend yield in the actual company of 10%. No equity injections are assumed in the base case actual company as a result.

We consider the actual company base case to be debt financeable under Ofgem's working assumptions, supported by additional revenues from SOMOD[45] and other revenue timing items.

Equity financeability deteriorates significantly as the impact of RIIO-1 forecast revenue timing items unwind, leaving the actual company loss making in the latter years of RIIO-2 and unable to satisfy investors with in-year profits. As noted above, the actual company is affected by the divergence of accounting and regulatory depreciation from RIIO-1. We set out in figure 14 below the impact this has on EBIT margin.

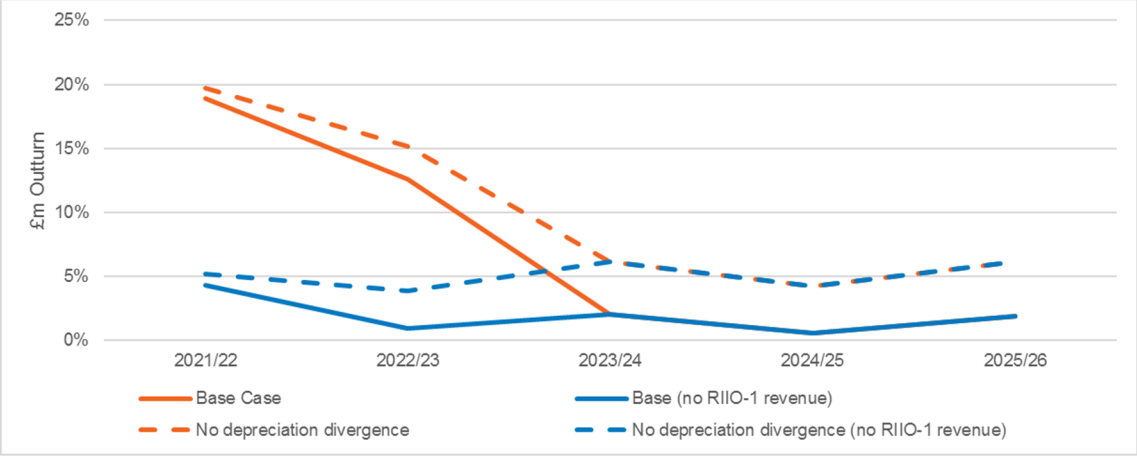


Figure 14 EBIT margins in the actual company, with and without the RIIO1 legacy revenue and the legacy depreciation divergence

[45] SOMOD is the value of the incremental change from the ESO's Opening Base Revenue Allowance as derived in accordance with Ofgem's Annual Iteration Process

Sensitivity analysis of the actual company

Ofgem sensitivity	Base actual case	High interest rate	Low interest rate	High inflation	Low inflation	Totex 10% over-spend	Totex 10% under-spend	High RoRE	Low RoRE	Sustained under-recovery
Moody's grid rating	A1	A1	A1	A1	A1	A2	A1	A1	A1	A3
AICR (BPFM)	6.2	6.4	6.0	4.5	10.2	4.1	9.3	6.9	5.6	(1.8)
AICR (ESO)	5.0	5.1	4.8	3.8	7.0	3.5	6.9	5.5	4.5	(1.2)
EBIT margin	7.2%	7.5%	6.8%	7.1%	7.3%	4.7%	9.7%	8.2%	6.2%	(3.7)%
Dividend yield[46]	10%	10%	10%	10%	10%	10%	10%	10%	10%	10%
Dividend cover	0.3x	0.4x	0.2x	0.2x	0.5x	0.0x	0.7x	0.6x	0.1x	(1.2)x

Figure 15 Ofgem sensitivities over the actual company

ESO sensitivity	Mixed revenue recovery	High gearing (60%)	Low gearing (50%)	No dividends	High gearing, high inflation	High gearing, high cost of debt	Ex post disallowance
Moody's grid rating	A2	A1	A1	A1	A1	A1	A2
AICR (BPFM)	4.5	6.0	6.5	7.7	4.3	6.3	4.9
AICR (ESO)	3.9	4.7	5.2	5.8	3.6	5.0	4.0
EBIT margin	7.8%	6.6%	7.7%	7.2%	6.5%	7.2%	5.2%
Dividend yield	10%	10%	10%	0%	10%	10%	10%
Dividend cover	2.6x	0.2x	0.4x	n/a	0.0x	0.4x	(0.2)x

Figure 16 ESO sensitivities over the actual company

We have applied the same suite of sensitivities to the actual company and the notional company. These show similar trends as within the notional company, but in all cases exhibit a general improvement due to the inclusion of RIIO-1 revenues bringing cash into the period. Equity metrics are similarly improved in the first two years of the plan for this reason. However, the trend declines as the impact of new revenue falls away, calling into question the sustainability of equity position in the actual company.

[46] Dividend yield is 10% on average across the RIIO-2 period due to the increased dividends in 2021/22 (20%) and 2022/23 (10%) as RIIO-1 revenue timing items are distributed

Making the actual ESO financeable

The potential levers to support financeability, set out earlier, show a similar impact. Use of capitalisation and depreciation rates will bring revenues forward and, in the case of depreciation rates, will also show an EBIT improvement due to statutory depreciation in the actual company, which remains over the useful economic life of the asset.

Assessment criteria	Base actual case	No dividend	Adjusted capitalisation rate	Adjusted capitalisation rate (sustainable)	Reduced regulatory asset life[47]	Additional remuneration
Alignment to regulatory principles	A	R	R	R	R	G
Enables required culture	R	R	R	R	R	G
Moody's grid rating	A1	A1	A1	A1	A1	A1
AICR (BPFM)	6.2	7.7	6.4	16.9	6.5	10.6
AICR (ESO)	5.0	5.8	5.3	12.4	5.1	8.1
EBIT margin	7.2%	7.2%	10.1%	14.8%	14.3%	12.1%
Dividend yield	10%	0%	10%	10%	10%	10%
Dividend cover	0.3x	n/a	1.8x	3.1x	3.2x	1.6x

Figure 17 Actual company financeability lever assessment

- **No dividend assumption** – as in the notional case, reducing the dividend payment in the actual company improves credit metrics but does not support the equity financeability challenge.
- **Adjusted capitalisation rate** – in the actual company, changes in the capitalisation rate affect all metrics, as revenues are affected while operating costs remain unchanged in the profit and loss account. A reduction in the capitalisation rate to 29 per cent on average across RIIO-2 will improve EBIT margins to 10 per cent. However, this must be lowered to 23 per cent on average to allow EBIT levels to meet the threshold on a sustainable basis, i.e. before the impact of RIIO-1 revenues. Although the capitalisation rate could be adjusted to a small degree for short-term support, we do not believe this should be used to any significant extent. The 23 per cent capitalisation rate example above shows that, to obtain the 10 per cent EBIT margin threshold, the rate adjustment starts at 29 per cent in the first two years of the plan but has reduced to 15 per cent by the final year of RIIO-2, as more and more revenue must be pulled forward to fill the gap.
- **Reduced regulatory asset life** – the shortening of regulatory asset lives would release slow money into revenue earlier and improve short-term, cash-based metrics. In the actual case this can also improve profitability if the statutory depreciation period remains unchanged. A reduction in the regulatory asset life from seven to four years would be needed to allow an EBIT margin of 10 per cent on a sustainable basis.

As outlined earlier, using the capitalisation and asset life levers ignores regulatory principles given the magnitude of the adjustment required in either approach:

- costs are no longer being paid for by the consumers benefitting from the investment

[47] This scenario assumes a longer-term change in the principle and therefore discounts the impact of RIIO-1 revenue timing items. Should the impact of RIIO-1 revenues be taken into consideration, the regulatory asset life would need to be reduced to five years to achieve the 10% threshold.

- assumed asset lives no longer reflect the expected economic life of the asset
- capitalisation rate is no longer closely aligned with actual opex/capex split.

Equally, neither of these levers encourage an ambitious, proactive, forward looking culture, or remove the current disincentives.

Additional remuneration is the only lever that achieves thresholds without compromising alignment with regulatory principles, while enabling the ambitious, proactive and agile ESO stakeholders are looking for. We explore this further in the following section.

A.7 Proposed alternative assumptions

As discussed in chapter 9 – Financing our plan, this is our first specific price control, which provides an opportunity to create a framework that will enable us to be ambitious and proactive, thereby delivering long-term benefits for consumers.

A long-term funding model should encourage an innovative, forward looking culture and deliver benefits for consumers, while encouraging and rewarding us to take on an appropriate level of risk. A RAV*WACC funding model in isolation does not support the ambitious regulatory framework needed to drive benefits for consumers, nor does it provide a fair return for the risks we will need to manage.

A RAV-based model does not recognise activities that do not rely on assets, and does not provide enough remuneration in those areas to enable us to take risks and innovate to deliver new benefits for consumers.

Under the current proposed RAV*WACC model, we receive a return on each role based on the size of the capital employed in the RAV. Figure 18 illustrates the relative size of the RAV for each of our three core functions.

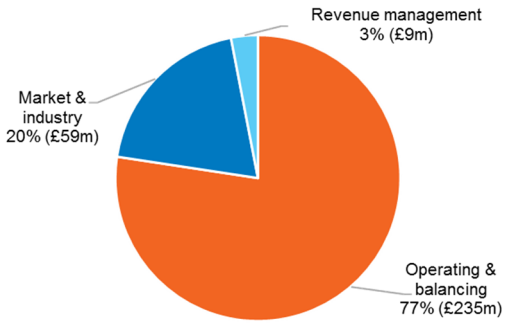


Figure 18 ESO average RAV 2022 - 2026

Figure 18 shows that our market and industry and revenue management roles are service-based and asset-light. Under the RAV*WACC model, we are remunerated on our capital employed in the RAV; however, these activities are mainly opex related. Furthermore, we could envisage a future scenario where IT and property assets currently forming the RAV are leased rather than being owned. This is not an unrealistic scenario given recent moves towards cloud-based computing. This would result in an extremely low RAV and, under a RAV*WACC model, a very minimal return.

The relative returns for each role are set out in figure 19. The return values include an element relating to the cost of debt expected to be offset by an interest charge.

Role	Return (£m)
Operating and balancing	9.2
Markets and industry	2.0
Revenue management	0.3

Figure 19 ESO return by role based on working assumptions WACC

Figure 19 shows the relatively low level of return in the service-based market and industry and revenue management roles. It is not that these roles are without risk; they simply have a low level of capital employed in the RAV.

This is demonstrated in figure 20, which correlates the seven risk categories in Ofgem's risk taxonomy (as set out in the ESOMDD) to each of these roles.

Risk category	Operating & balancing	Market & industry	Revenue management
Revenue collection			✓✓
Performance	✓✓	✓✓	
Cost	✓✓	✓✓	✓✓
Operational	✓✓	✓✓	✓
Reputational/Political	✓✓	✓✓	
Legal	✓✓	✓✓	✓✓
Regulatory	✓✓	✓	✓

Potential for risk in role	✓
Risk in role	✓✓

Figure 20 ESO risk exposure

Ofgem's current working assumptions, where there is no additional remuneration, encourage risk aversion. We are not incentivised to invest in our intangible service-based activities, where at best we expect to recover costs, yet also face a risk of cost disallowance. Disallowance assessments are important to guard against inefficiency, but very little assurance can be provided that a regulator will agree that costs have been efficiently incurred and would only be disallowed in exceptional circumstances. There are inherent difficulties in proving efficiency, and we will be making decisions without the benefit of hindsight, which the regulator will have.

A further downside is that there would be no reward, other than cost recovery, for additional activities, nor compensation for taking on additional risk should the RAV not increase. Cost disallowance drives a risk-averse culture, and a lack of motivation to take on additional activities is unlikely to drive benefits for consumers.

Our analysis of RAV returns (figure 19) and levels of risk (figure 20) illustrates the lack of correlation between risk and remuneration in our revenue management role. No commercial organisation would take on such a high-risk role if the best-case scenario is essentially to break even. There are significant risks in transacting more than £4 billion of industry revenue across a regulated and changing market.

There is a similar lack of correlation between risk and reward in our markets and industry role. This covers activities such as network planning, customer connections, provision of market data, future markets and code modifications, as well as our EMR Delivery Body role. These activities are not without risk and are similar to the activities performed by professional services organisations. They are undertaken by technical experts and are susceptible to litigation risks, staff attraction and retention risks, risks from human errors and operational risks. The EMR role contributes significantly to the RAV related to the markets and industry role due to the investment in EMR IT systems. The remuneration for non-EMR activities is £1.3 million per annum with an EBIT margin of 1.5 per cent – a level of return that no professional services organisation would accept.

The size of the RAV associated with our operating and balancing role means that a proportion of the risk is already remunerated. However, as supported by analysis in this section, the size of the RAV does not fully recognise the concentration of systematic risk, nor does the CAPM methodology recognise asymmetric risks such as the risk of cost disallowance

.

A.7.1 Sizing the risk and additional remuneration

We have explored different ways to calculate additional remuneration. Our ongoing discussions with Ofgem, engagement with external consultants and studies of relevant regulatory precedents have shown that no single approach can be deemed as the 'correct' one. All approaches have limitations, which is why it is important to explore different approaches to find a range for a suitable level of additional remuneration. We do not conclude on a specific value, but triangulate the range where a value would sit. This triangulation considers regulatory precedent, risk, and margin benchmarks as illustrated in figure 21.

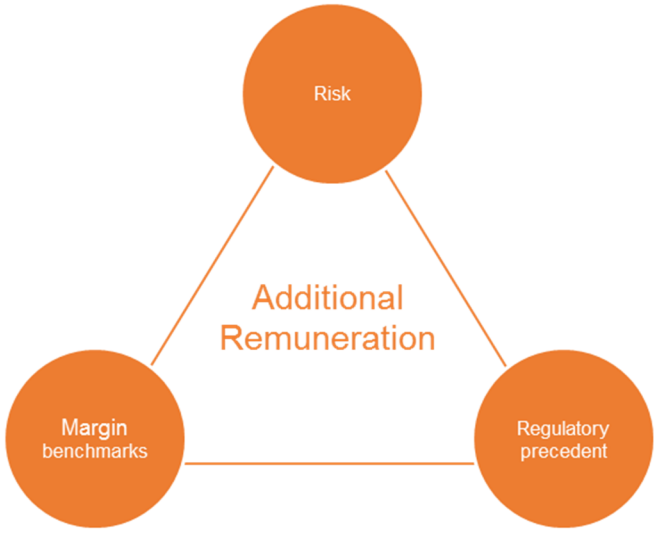


Figure 21 Points of triangulation for assessing additional revenue requirements

The outcomes for each of these points of triangulation are discussed below.

Regulatory precedent

The most relevant regulatory precedent is the SONI / CMA determination. SONI argued that:

- a RAV*WACC approach alone was not suitable for an asset-light business
- the Utility Regulator (UR) had failed to properly remunerate SONI for all the layers of capital invested in its activities, both actual and committed
- the UR had failed to take account of the non-systematic and asymmetric risks SONI faced when using CAPM to set its cost of capital.

The CMA remedied SONI on each of these grounds, which are all comparable to the limitations of the RAV*WACC model being proposed for us. The outcome of these remedies was:

- A fixed annual amount for the asymmetric risk of SONI's expenditure. This was based on a 3 per cent uplift to costs subject to disallowance.
- An annual amount equivalent to 0.5 per cent of revenues for revenue collection risks.
- A 1.75 per cent return on the parent company guarantee to remunerate the contingent capital supporting SONI's credit facility.

Applying these parameters to our Business Plan would imply an additional return of £34 million per annum. While the scale of our operations may be several times larger than SONI's, we believe these principles are relevant, and we have applied them in assessing our remuneration.

We understand Ofgem also intends to draw on precedent in the recent CMA energy market investigation. When assessing returns for energy retailers, the CMA considered distinct risks not correlated to the size of the businesses' asset base. The CMA acknowledged that when considering profitability on the basis of ROCE,[48] some capital may not be reflected on the balance sheet, but would still need to be taken into account where

[48] Return on capital employed

appropriate. The potential relevance of the energy market investigation is discussed in more detail in Appendix 9 of KPMG's December 2019 report.

Risk

Earlier in this section, we showed that the RAV*WACC funding model is limited in its correlation of risk and remuneration, due to the asset-light nature of our business and the spread of the RAV across our activities. For this reason, quantifying additional remuneration based on an assessment of risk is a valid and important triangulation point.

We have used two different approaches. The first looked at quantifying the capital associated with risk and applied a return to that capital. The second considered our systematic risk and applied a CAPM approach to determine an appropriate value. We made a further adjustment to reflect asymmetric risk and the risks of revenue collection, largely by drawing on regulatory precedent. Details of these approaches and results are discussed below.

Capital at risk

In our October draft Business Plan, we set out initial analysis to quantify our total capital base to estimate a range of possible returns. We commissioned independent analysis from KPMG, which built on risks we had already recognised by identifying the underlying drivers and consequences of these risks and quantifying a plausible range of downsides. A picture of the capital requirement in two plausible scenarios was built up from the RAV, a fully drawn WCF, an estimate of capital underpinning the WCF and a mixture of plausible downside sized risks. This identified a total capital requirement for the ESO business in the range of £955-1,060 million. KPMG's analysis provided an illustrative cost of remunerating this capital based on overall company WACC.[49] This suggested that we could expect an overall return in the range of £55-61 million, and therefore implied a funding gap in the range of £36-39 million.

As a further cross check of the capital requirements in KPMG's analysis, we have considered KPMG's estimate of risk capital within the business in the context of the actual equity invested in us. Of the £1 billion capital requirement, KPMG estimated a level of risk capital of £285 million. Its estimate compares to the actual level of equity invested at ESO separation of £330 million, which implies that an overall capital requirement of £1 billion is not unreasonable.

The level of equity invested in the business has also been an important factor in the assessment of our credit rating. Moody's rates us using its regulated utilities methodology (rather than the networks methodology applied to the network companies). This recognises that our capital base is more than our RAV. The relevant gearing measure that Moody's considers for us is Debt / Total Capitalisation. Our total capitalisation separation was £450 million (vs. RAV of ~£200 million), of which £120 million was debt and £330 million was invested as equity. This means that the gearing Moody's rated us on was less than 30 per cent, recognising the significant equity layer that National Grid plc had contributed. If National Grid plc had only invested equity of £80 million (equal to the equity portion of the RAV at separation, assuming 60 per cent gearing), we would have had a weaker credit position. Under Ofgem's proposals, a significant part of that equity layer is not remunerated, creating a clear disconnect between the funding model and financeability framework (with around £250 million of equity capital arguably remaining unremunerated).

The level of risk capital in KPMG's analysis makes sure the business could manage a range of severe but plausible downside shocks. To raise the necessary finance after an event may prove challenging and prohibitively expensive, as the risk will have happened rather than being a theoretical outcome. Under our licence, we must provide assurance annually that we have enough resources to support our activities for the following 12 months; this includes sufficient risk provision. So we need to maintain enough capital to finance risks (whether point in time or permanent losses) to ensure financial resilience. We consider that this analysis provides an important triangulation point when building a range for additional remuneration.

[49] WACC of 5.7% Nominal, CPIH stripped applied as set out as working assumption within Ofgem's ESOMDD

CAPM approach

In this approach, we commissioned KPMG to build on Ofgem's risk taxonomy and use the three tests set out in Ofgem's October 2019 decision document.[50]

We more explicitly used CAPM, which is based on providing a return to compensate for non-diversifiable or systematic risk. KPMG considered the relative concentration of systematic risk compared to the network companies, and the report[51] explains why we are subject to higher levels of systematic risk when the regulator is very disciplined (i.e. cost disallowances are unlikely) and the regime is unambitious. A more ambitious regime introduces even greater systematic risk, driving a systematic risk premium. KPMG describes an ambitious, disciplined regulatory regime as externally focused and strongly guided.

The approach also quantifies a return for liquidity risk and asymmetric risk.

The liquidity risk is assessed based on a margin on revenues. We used an independent report from Oxera, which estimates an appropriate margin on external costs by using two pieces of analysis: a benchmark analysis against comparator companies that undertake financial intermediation activities; and regulatory precedents, more specifically the regulatory parameters following the SONI / CMA determination, the relevant price control parameters for EirGrid, and the final determination for SEMO.[52] Oxera suggested a margin on external revenues of 35 basis points (0.35 per cent).

The asymmetric risk is assessed based on a percentage of costs subject to a risk of ex post cost disallowance, namely totex costs and Black Start costs. Any of our balancing costs could be deemed inefficient (and thus disallowed) in the context of our licence obligation to operate the transmission network in an efficient and economic manner. However, for the purposes of remunerating cost disallowance risk, we have only included Black Start costs, which are the subject of an express disallowance provision within our licence. We estimate a cost disallowance risk of 2 per cent in a strong guided regulatory regime. Further evidence in relation to levels of cost disallowance is included in Appendix B.

We have used judgement across these methods to suggest reasonable returns. For example, SONI was awarded a 0.5 per cent margin on external costs. While SONI is our closest comparator, it is not perfect, so we cross checked this with private sector benchmarks. These indicated a range, where we have proposed a reduced position of 0.35 per cent. Similarly, an uplift of 3 per cent on costs subject to disallowance was considered appropriate for SONI. We estimate that an uplift of 2 per cent would be valid within a disciplined disallowance framework.

The advantage of this approach is that it relates the additional remuneration to the factors driving a potential risk of loss, and puts a value on creating a more ambitious framework. KPMG indicates that, in a less ambitious framework, additional returns could be in the range of £20-22 million. However, in an ambitious regulatory regime, additional remuneration could be in the range of £30-35 million. The analysis indicates an incremental cost of £10-13 million to create a more ambitious regime to encourage proactivity and innovation.

Margin benchmarks

Margin benchmarks demonstrate the returns typically expected in competitive industries performing similar activities or subject to similar risks. Competitive pressures are generally acknowledged to reduce margins, so observed benchmarks represent an efficient outcome. The presence of margins in competitive markets reflects at least two things:

- investors require a return for risk
- companies that do not earn positive returns for activities and services are not sustainable in the long run.

We have used two approaches in our review of margin benchmarks.

[50] https://www.ofgem.gov.uk/publications-and-updates/riio-2-financial-methodology-and-roles-framework-electricity-system-operator
[51] KPMG (2019), 'Risk assessment & financeability', in Appendix C
[52] Single Electricity Market Operator

Margin benchmarking by role

In our October draft Business Plan, we assessed the benchmark returns for each of the three roles we undertake:

- For the industry revenue management role, we used a margin on revenues of 35 basis points from our independent report from Oxera.
- For the market and industry services role, we used KPMG's benchmark analysis of 72 comparator companies in the professional and commercial services industry, as set out in its report published alongside our July 2019 consultation response. This indicates an EBIT margin of 11 per cent.
- For the operating and balancing role, we used KPMG's benchmark margin, based on the London Stock Exchange forecast operating margin adjusted to remove our RAV return. This suggests a comparable operating margin of 13.9 per cent.

The above assumptions suggest a funding gap compared to the RAV*WACC funding model of £32-36 million.

Overall margin benchmarking

In our second approach, we considered a range of overall EBIT margins for the ESO. We drew this from the following sources:

- Moody's minimum required EBIT margin to achieve an investment grade credit rating for similar asset-light companies, based on its rating methodologies, would be in the range of 10-15 per cent.
- In the UK, some regulated companies have allowed revenues set with reference to allowed profit margins. Like us, these companies are typically asset-light, and a margin-based approach has been used to determine appropriate levels of return. We reference Ofgem's determination for Smart Data Communications Company (DCC), where allowed margins were 12 per cent.
- KPMG's December 2019 report draws on two comparable sectors: industrial and commercial services, and software and IT services. These were chosen for their similar financial and business characteristics. Analysis suggests the market benchmark range would be 10-13 per cent.

A range of overall company EBIT margins based on all the above would be 10-15 per cent. This would suggest the minimum viable margin would be £13 million, with a high end of the range of £26 million.

Conclusion

We have explored multiple approaches using three points of triangulation to identify a valid range where a level of additional remuneration should sit, as illustrated in figure 22.

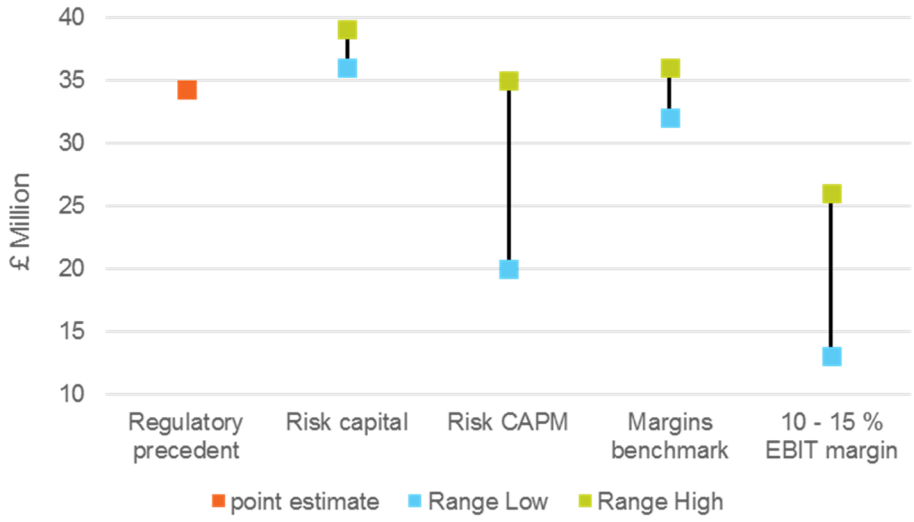


Figure 22 ESO additional remuneration ranges

Our analysis highlights a broad range of outcomes. As the CMA noted in its decision in the SONI case:

Some form of regulatory judgment is likely to be required – either in the choice of an approach from a range of possible valid approaches, or in the weighting given to a particular value from a range of potentially valid values for a given valid approach.
Competition and Markets Authority

Deciding a suitable level of additional revenue may be a matter of judgement, but we believe that it should not be zero. The minimum level to support a financeable proposition would be at least £13 million per annum, but evidence equally suggests it could be as high as £39 million.

The right balance must be achieved between risk and remuneration. A regulatory framework that encourages us to take measured risks will drive the ambitious culture needed to unlock greater benefits for consumers. As set out in section A.2 – Stakeholder views, stakeholders have stated that they do not want us to be risk-averse. In seeking to achieve this balance, we should aim to set additional remuneration in a way that best addresses these objectives.

A margin on controllable totex (set ex ante at the time when totex allowances are set) could provide remuneration for the asymmetric risks of potential cost disallowance and help to encourage the pursuit of innovative solutions and additional activities for the benefit of consumers. While it could be argued that this ex ante approach does not, in itself, avoid risk aversion, the fact that allowances are reset every two years would do so, as we would know that additional enduring value adding activities would be covered by a margin in subsequent allowance determinations.

Separately, margins could be applied to the different revenue streams to reflect the revenue management role. A uniform rate could be applied to give a simple, transparent approach, or different rates could be applied to each revenue stream to reflect the relative risks and activities involved. As with a margin on totex, we propose a fixed financial amount calibrated on a biannual basis.

In both cases, allowances could be set ex ante to remove any suggestion that we are incentivised to increase costs or revenues purely to increase the remuneration provided.

Other approaches may be equally valid, and we anticipate continuing discussions with Ofgem to reach agreement in time for draft determinations in summer 2020.

A.7.2 The ESO's risks

We are exposed to a wide range of risks given the varied nature of our activities. In this section, we set out a description of the most significant risks we face. However, the list is not exhaustive. A bottom up approach fails to capture or reflect the intangible, overarching risks, and the investor-perceived risks, for a relatively small business working to deliver a critical service, in a complex and rapidly changing environment, driven by a hugely ambitious agenda set by its customers and stakeholders.

It is therefore important to consider the business as a whole, as well as the individual risks, to ensure financeability and attractiveness from an investor point of view.

Revenue collection risk

A key role at the heart of the UK energy system is to carry out the industry revenue management role, collecting and distributing revenues between market participants for network charges including TNUoS, BSUoS and connections charges. This role is unique to us among the RIIO-regulated companies, and results in us transacting over £4 billion of revenue annually. This is almost 20 times greater than our controllable revenues.

SONI undertakes a similar industry revenue management role to us, but on a smaller scale: SONI transacts revenues around five times the size of its controllable revenues, compared to revenues around 20 times our size in our transactions. The CMA recognised these risks in reaching its conclusions for SONI, which are equally, if not more, relevant to us due to the much larger scale of industry revenues we manage.

The CMA decided that a risk premium would be appropriate for SONI, and that this should be in the form of a margin on revenues, *"as the level of risk is related to the size of the revenues handled".*[53] The CMA agreed with SONI that the risks associated with managing industry revenues were not sufficiently remunerated by simply reimbursing the direct costs of managing these revenue flows.

The revenue management role introduces significant cash flow and profit volatility risk at a completely different scale to the other risks we face, in addition to credit and wider business risks. This affects our ability to secure an investment grade credit rating as required by our licence; our ability to provide assurances over the financeability of the notional company; and for attracting investors and providing adequate returns.

There could be ways to mitigate some of the significant risks we hold through our revenue management role. Some timing risk could be transferred to other industry counterparties; for instance, the TNUoS revenue collection risk could be borne by the TOs. Even if all TOs were able to take on this risk, elements of risk would remain with us, such as the operational risks of transacting the revenues.

Providing a fully funded WCF would likely mitigate most of the cash flow risk, but still needs underpinning by contingent capital. However, this does not remove the profit volatility risk, which the shareholder must ultimately bear. Even with a prudently sized facility, there remains a risk of a combination of severe events leading to a need greater than secured lending. The bad debt risk we hold on behalf of industry could be partly mitigated by a formal mechanism to socialise the bad debt cost, which we are currently discussing with Ofgem.

Performance risk

Ofgem will continue to consult on the design and value of our incentive scheme, and we are working with Ofgem to consider the best design for RIIO-2 to work alongside our new funding model. Ofgem has confirmed that the scheme will be evaluated ex post, and that there may be a larger upside potential than downside (which could be zero). A positively skewed incentive scheme could mitigate a lot of our performance risk, but risk would remain with an incentive downside. We are expecting further consultation on incentives as part of draft determinations next year.

Cost disallowance risk

Ofgem has confirmed that our efficient costs will be passed through to consumers without a sharing factor. Costs that Ofgem believes are demonstrably inefficient will correctly be disallowed. However, disallowance assessments will be Ofgem's primary mechanism to achieve its objective of guarding against inefficiency, while the primary mechanism for network companies is the ex ante totex incentive mechanism (TIM). This means that the historical experience of disallowed costs in the network companies (where the scope for disallowance is a supplementary mechanism to the TIM) may not transfer to a regime where it is the primary mechanism (i.e. for the ESO). The fact that the cost disallowance risk is asymmetrical in presenting a downside only risk is further affected by information asymmetry. We will make expenditure decisions without the benefit of hindsight, which Ofgem will have. Further evidence regarding cost disallowance is presented in Appendix B.

The concept of cost disallowance relates generally to the transmission licensees' statutory duty[54] to develop and maintain an efficient and economical system and, in the context of the ESO, the licence obligation to operate the transmission network in an efficient and economic manner (including the most efficient actions to balance the system). Both these obligations are relevant requirements that Ofgem enforces. Ofgem may therefore disallow costs from future recovery where it is deemed that these costs have not been incurred on an economic and efficient basis. This means that disallowance could apply to any of our internal costs or external balancing costs, the value of which significantly exceeds our RAV.

In the context of our balancing costs, there is a special condition in our licence covering Black Start costs. We have an obligation to make sure all Black Start costs are incurred in line with approved methodologies. If Ofgem determines otherwise, up to 10 per cent of revenues in relation to these costs can be disallowed. Current Black Start costs are approximately £50 million per annum. The Black Start Task Group[55] is currently working towards implementing a Great Britain restoration standard, which will require faster restoration times. As a result, we will need to procure additional restoration services, which could see these costs double in the

[53] CMA's Final Determination on SONI appeal, para 12.138
https://assets.publishing.service.gov.uk/media/5a09a73ce5274a0ee5a1f189/soni-niaur-final-determination.pdf
[54] Section 9, Electricity Act 1989
[55] An industry group comprising BEIS, Ofgem, TOs, ESO, DNOs and the generator community

short-term, significantly increasing the risk of disallowance. The potential impact of a 1-1.5 per cent disallowance of balancing costs could result in a permanent financial loss in the region of £10-15 million.

A regime where all efficient costs are recoverable allows us to be flexible and invest in new concepts without having to check if costs can be recovered. However, this has the downside of driving a risk averse culture, especially where we will be making decisions to invest in new, unproven ideas for the benefit of consumers.

In response to Ofgem's 24 May consultation on our funding model, stakeholders sought clarification on the definition of 'demonstrably inefficient'. They recognise that being subject to potential disallowance of costs of an unknown size could result in us not being able to manage the impact of disallowance, and potentially hinder achievement of the UK's zero carbon ambition.

If there is a risk these [disallowance costs] could be in excess of the ESO's business to absorb these (through margin and incentive payments) then the business might be caused financial distress and face higher financing costs than otherwise the case.
DNO

We believe the overall increased exposure to volatile revenues and the risk of disallowance will result in an extremely risk averse ESO that favours conservative options that may result in a failure to accomplish its ambitions in the required timeframe.
Generator

Our risk of cost overrun is mitigated through the regulatory framework's pass-through mechanism. The cost disallowance risk is partially mitigated through the short two-year business planning cycles, but could be further reduced through a cap on the maximum level of disallowance. This is particularly relevant for us, with significant balancing costs of £1.2 billion per annum incurred on a pass-through basis and at risk of disallowance.

Financing cost risk

Further cost risk occurs in the potential that interest rates or other movements in debt capital markets lead to a higher cost of debt financing than is remunerated through our funding model. We have assumed that allowances match costs (though allowance is provided as a real return). In this Business Plan, we put forward a proposal for a bespoke cost of debt mechanism centred around bank rather than bond debt, as more reflective of the borrowing arrangements of a company with our size, scale and requirements. We believe this reduces our risk of over or under funding, through indexation to LIBOR (or its replacement SONIA). Movements in interest rates also affect our potential cost exposure to our short-term borrowing. For example, a movement of 100 basis points in the LIBOR rate would have an impact of around £6 million on the cost of a fully drawn WCF.

The size of risk around changes in interest rates or other costs of debt may be mitigated through the design of the funding model, which is still under consultation.

Operational risk

Operational risk is seen in events such as IT failures, stranded investments, gaps in workforce skills, management and operational errors and cyber security.

System and operational errors could lead to a national power outage. This is one of the highest rated risks in the National Risk Register and would have a significant economic and social impact on Great Britain. Any such event would have significant costs for us, the economy and consumers, and lead to reputational damage for us.

Cyber-attacks are increasing in likelihood and sophistication and we continue to invest in detection and prevention. The impact of a successful attack could vary widely in scale of impact – from being locked out of key systems or datasets, to system shutdown and a power outage.

There are general risks such as human error, fraud and safety faced by all businesses employing people. For us, sitting at the heart of the energy system, any errors could lead to reputational and financial damage, loss of confidence and increased scrutiny from market participants and regulators. These errors also increase our risk of cost disallowance. We rely on highly skilled and experienced staff, particularly in specialist areas such

as real-time operation of the system. If we are unable to attract or retain the skills we need, this could adversely affect our ability to balance the network.

Operational risk is another downside only outcome. Investigations into any operational issues will be conducted in hindsight and could follow an event with wide reaching impacts, which has the potential to influence the perspective of the review. Any of these risks could ultimately lead to operational failure and financial penalties. We estimate potentially a permanent financial loss of £8-11 million, but regulatory fines could be levied on up to 10 per cent of our revenue.

We continue to invest in developing the skills and capabilities of our people and to invest in our data and cyber security programmes.

Reputational, political, legal and regulatory risk

We are exposed to significant reputational and political risk, and the nature of our central role in the energy system puts us at the forefront of any media coverage or industry debate, irrespective of our actions. We can mitigate this to an extent through our planning processes, but it is impossible to control everything.

A major power outage on 9 August 2019 and subsequent negative media coverage and industry debate is an example. The Final Technical Report we issued on 6 September sets out conclusions, lessons learned and changes implemented, but has not identified any breach of licence or standards. The Energy Emergency Executive Committee (E3C) is also undertaking a review of the incident (interim report issued 4 October 2019), and Ofgem and industry investigations are currently ongoing. Any investigation of this nature requires significant resources from all affected parties, leading to additional costs.

We are exposed to the risk of challenge from third parties. Like our reputational risk, this is asymmetric and downside only. It has potentially significant costs that do not scale to our RAV; they scale with our totex and balancing costs, and with the revenues linked to our industry revenue management role. Legal risk can be mitigated to an extent by the pass-through of our costs, but any legal challenge would likely result in additional scrutiny, including increased risk of cost disallowance, increased regulatory oversight, reputational damage and potentially an incentive penalty.

Failure to comply with obligations (licence conditions, regulation, legislation, operational requirements), either wilfully or inadvertently, can result in litigation, financial and/or reputational loss. This could be a data breach or operational failures that lead to third party litigation. We estimate the cost of third-party claims could be a permanent loss of around £3-10 million based on a typical CMA appeal.

There will always be uncertainty around our activities due to factors including the changing energy landscape, changes in regulatory requirements and changes in labour costs. A two-year business planning cycle provides some mitigation of this risk, but some will always remain.

Risk compared to network companies

Many of the risks we face have not changed since the beginning of RIIO-1, but have a significantly different impact on us as a legally separate, standalone business. We became legally separate on 1 April 2019, and retained the same financial parameters set as part of NGET's RIIO-T1 control for the remainder of the RIIO-1 period. The framework does not fully reflect the risks of a standalone system operator. These now need to be considered.

There are key differences in how risks affect us compared to the network companies:

- We are exposed to significant cash and profit volatility risk in our industry revenue management role, which is not correlated to the size of our RAV. Investor perception is affected by the resulting change in volatility and need for access to capital facilities.
- We have higher operational gearing, leading to greater impact of shocks and downside scenarios. Our RAV is small in relation to the comparatively high level of costs we manage, as illustrated in figure 23 below, and the proportion of revenues obtained via the RAV is small in comparison to the overall revenues we transact, which are around 20 times our RAV.[56] All this is in contrast to the larger, asset-heavy network companies.

[56] This figure represents opening RIIO-2 RAV of around £225 million, with expected Use of System and Connections charges in same period of around £4 billion

Figure 23 Opex / RAV[57]

Figure 23 shows that our opex is 73 per cent of our RAV compared to less than 10 per cent for network companies regulated by Ofgem. We have a very different scale of totex than network companies and yet have a higher risk profile. Our risk is not correlated to the size of our RAV and our framework needs to enable us to generate financial headroom to accommodate downside risk and substantial cash flow and profit volatility.

Risks due to the changing energy environment

Since the start of RIIO-1, system operation has become increasingly challenging and we expect this trend to continue. We sit at the heart of a complex, multi-directional electricity system where small-scale renewables, storage and demand-side participation make operation more challenging than ever before. Increased renewable generation (particularly at a distributed level), more market participants, and new technology make our job ever more complex and pose more risk in making investments in systems, given the rapidly changing nature of requirements.

For example, the prediction in 2012 was for 1 GW of installed solar PV[58] in the UK by 2020 – the actual figure in 2017 was 12 GW. 12 per cent of embedded generation was also predicted by 2020, but levels hit 27 per cent in 2017. An increasingly decentralised energy system creates multiple competing challenges for our control room.

There has also been a significant rise in the different technologies providing electricity, which has driven an increase in the number of connections and participants we engage with. This is demonstrated by a 60 per cent increase in active Balancing Mechanism Units in the system from 2014 to 2017, and a 42 per cent increase in the number of ancillary service customers between 2011 and 2016.

There is also a new UK commitment to deliver net zero carbon by 2050. We will play a central role in enabling this, and will need to take further risks to push the boundaries of innovation and provide access to all contributing technologies and parties.

Given the central role that the ESO has in enabling the energy transition, it is critical that the regulatory framework drives efficient behaviours and outcomes, so that the transition is delivered in an economic manner.
Generator

[57] Figures used for chart based on historical numbers sourced from the 2017/18 Price Control Financial Model (PCFM) published by Ofgem on 30 November 2018 for all companies
[58] Solar PV – Solar Photovoltaic (PV) is a technology that converts sunlight (solar radiation) into direct current electricity

Our Business Plan sets out our clear vision for how we must change. We must invest in new systems and market platforms to deliver significant future benefits to the energy system. Our capabilities and culture must evolve as we stand at the cutting edge of technology, trusted by the industry, consumers and society to deliver the energy transition. Leading and delivering change of this magnitude carries risk, and our funding model and incentive scheme should support us to hold this risk as we deliver a low carbon transformation.

A framework where we face a disallowance risk when we undertake new activities, with no predictable positive reward, disincentivises innovation and the delivery of change; something recognised by stakeholders. Additional remuneration, possibly as a margin on efficient cost, encourages rather than discourages the behaviours expected of us.

A.7.3 Financeability assessment based on our alternative assumptions

In section A.6 – Our assessment of financeability, we concluded that, although we are debt financeable on a notional and actual company capital structure, there is not an adequate equity investor proposition; and we do not believe that being debt financeable is sufficient to enable the ambitious, proactive and agile ESO that stakeholders want. Earlier in this section, we set out our assessment of risk and the need for additional remuneration. Ofgem's proposed funding model for us contains the ability to apply additional remuneration, although its working assumption is currently zero.

We consider below the additional remuneration needed to meet the minimum thresholds against our financeability assessment criteria in the notional company. This requires the inclusion of at least £13 million additional remuneration in Ofgem's proposed financial framework. We have also considered the impact of this on the actual company with and without the impact of RIIO-1 related revenues.

These scenarios assume no additional dividend distributions. Instead, they assume the creation of a retained cash buffer to mitigate the risks to which we are exposed.

Notional company		**Assessment criteria**	**Actual company**		
Additional remuneration	**Base notional case**		**Base actual case**	**Additional remuneration**	**Additional remuneration excl RIIO-1 revenues**
G	A	Alignment to regulatory principle	A	G	G
G	R	Enables required culture	R	G	G
A1	A1	Moody's grid rating	A1	A1	A1
6.8	2.8	AICR (BPFM)	6.2	10.6	5.7
5.4	2.4	AICR (ESO)	5.0	8.1	4.7
10.3%	4.9%	EBIT margin	7.2%	12.1%	7.4%
3%	3%	Dividend yield	10%	10%	5%
4.8x	1.6x	Dividend cover	0.3x	1.6x	1.7x

Figure 24 Comparison of financeability assessment of notional and actual company with and without additional remuneration

We are an asset-light business with high operational gearing and an ambitious Business Plan. There is a significant risk that the current financial framework encourages a risk averse culture rather than the ambitious objectives and innovation desired by the various stakeholders of the ESO. Ofgem's working assumptions do not provide an adequate equity investor proposition or encourage the behaviours stakeholders want from the ESO. If additional equity cannot be attracted there is likely to be a deteriorating trend in financeability, with

potential consequences for delivery of the business plan objectives. Using Ofgem's current working assumptions:

- investors receive minimal return for two of our three key services (the industry revenue management role and markets and industry role)
- the notional company requirement for equity injection exceeds the dividend returns provided
- the actual company is loss making before the inclusion of RIIO-1 timing balances.

If no additional return were granted, the ESO may be exposed to an unacceptable level of risk or become risk-averse in its approach, which would threaten delivery of key industry priorities.
Trade association

B. Directly remunerated services, other revenue and costs

B.1 ESO properties

Our sites are not reflected in the ESO RAV maintained through RIIO-1. These property-related assets generally have a useful life of 40 years and are significantly different to the rest of the assets we hold. As a result, a separate income stream was provided to NGET in RIIO-1 to cover the depreciation and return elements that would have been in place if a RAV had been maintained for these costs. This return covers the 40-year period from 2001-2041.

In our October draft business plan, we included this additional income stream in our plans for RIIO-2, along with the associated statutory depreciation cost consistent with the methodology applied in TPCR-4[59] and RIIO-1.

We have fully integrated these assets into our RAV at a value of £19 million in line with their forecast RIIO-1 closing expected value. This new element of our RAV continues to assume a regulatory depreciation period out to 2041.

B.2 Directly remunerated services

Directly remunerated services (DRS) are defined by Ofgem as specific activities of the licensee settled outside of the normal regulatory price control. Companies are allowed to charge customers directly for certain services. These services are directly remunerated by the customer.

We currently undertake two areas of DRS via our industry revenue management role. We are responsible for the charge-setting and revenue collection activities for direct connection charges as well as the administration of AAHEDC charges. With Ofgem's agreement, we have not included these two items within the Business Plan data tables.

We do not intend to perform any new DRS; however, circumstances may change across the course of RIIO-2 as we continue to adapt to changing industry requirements. Any new DRS during RIIO-2 would be agreed with Ofgem and covered as part of the following business planning cycle.

B.2.1 Connection charges

We act as counterparty to all Great Britain transmission network direct connections and are responsible for setting annual connection charges for all directly connecting assets. We collect these from the connecting party that has the sole use of those assets, and pass them on to the relevant network company.

Within our Business Plan we have forecast annual revenues of £237 million on average for connection charges. This is based on current customer connections revenues projected forwards and adjusted for expected new and terminating connections. We have forecast an equivalent cost from the network companies for these assets.

B.2.2 Assistance for Areas with High Electricity Distribution Costs (AAHEDC)

We also administer charges for AAHEDC under licence conditions C20-C23.

The remoter parts of the Great Britain electricity system, traditionally in the Highlands and Islands of Scotland, are more expensive to build and maintain than elsewhere in the country. As a result, the distribution companies responsible for the areas specified by Ofgem receive additional amounts on top of the use of system charges. These amounts are determined by Ofgem and administered by us; we bill suppliers accordingly and pass them on to the relevant distribution companies, retaining a small administration fee.

The fixed assistance amount is equivalent to £61.3 million per annum in 2018/19 prices, with inflationary increases being the only change each year. We have assumed this is carried into RIIO-2 on the same basis.

[59] Transmission Price Control Review 4 – Ofgem's previous framework for setting network price controls before RIIO

Recently, the AAHEDC scheme has been extended to include a Shetland cross-subsidy. We have included an additional £25.2 million (£27 million in 2020/21 prices, the first year of operation) in AAHEDC pass-through costs, with inflationary increases applied in all subsequent years.

Currently, we receive a small administration fee (£114k per annum in 2018/19 prices) for this collection function, which was originally calibrated as a margin on the amounts processed.

B.3 Non-totex pass-through costs

As part of our activities, we incur costs that are dealt with on a pass-through basis. That is, costs we incur are passed on to customers in full, with no opportunity for under or out performance. These costs are not within our full control. We set out below the details of the non-totex pass-through costs we administer.

B.3.1 Balancing pass-through costs

One of our crucial roles is to make sure the electricity network in the UK remains balanced, and that the network frequency is maintained within operational limits. To achieve this, we have various tools in our control room. Balancing the system incurs a significant amount of cost, which we pay for and pass on to customers through BSUoS charges.

These charges exceed £1 billion each year. We have included the costs and associated revenue in our Business Plan and financial projections. It is challenging to accurately forecast these costs as they are heavily dependent on the network conditions at any point in time, so our forecast is based on the most recent completed financial year, with inflationary increases each year.

B.3.2 TNUoS pass-through costs

We are a revenue collection agent for the electricity industry in Great Britain. We are informed, before the start of each year, of the level of revenue each of the TOs can recover (determined as part of their own price control process), and we seek to recover this amount from industry participants via TNUoS charges.

Each year, we publish a five-year charging forecast of expected future TNUoS charges, with the most recent publication being March 2019, covering the period 2020/21 to 2024/25.[60] We include the costs and associated revenue in line with this forecast in our Business Plan.

B.3.3 Termination fees (Term)

As part of our connection charges administration role, we charge users who reduce transmission entry capacity or developer capacity; or who terminate agreements for connection and/or access rights to the National Electricity Transmission System. This income is treated as a negative pass-through cost in TNUoS revenues. Given the intermittent nature of these items, they are not forecast in advance, so no values are assumed for the RIIO-2 period.

B.3.4 Inter-TSO compensation costs (ITC)

The electricity systems in Great Britain and throughout continental Europe are all linked (for the UK, this link is achieved through interconnectors, but elsewhere transmission lines span national borders). Consequently, each country is subject to a portion of the use of system charge levied by its neighbours to reflect the Europe-wide flow of electricity. This complex relationship is consolidated centrally and results in a net payment or receipt by each country's national SO; in Great Britain, we pass this on to customers.

In the first five years of the RIIO-1 period, we have incurred costs, in 2018/19 prices, of between £5.8-14.3 million a year.

[60] https://www.nationalgrideso.com/document/140806/download

We have included costs in our Business Plan at £9.5 million in 2018/19 prices, held steady across RIIO-2. This is the average cost incurred in the past four full years (2015/16 to 2018/19).

B.3.5 Licence fee

As a regulated entity, we pay a portion of Ofgem's operating costs, which are set by Ofgem and billed twice a year. We pass these costs on to customers as part of TNUoS charges. The amount we pay (and pass on to customers) is the complete Great Britain electricity transmission portion that Ofgem advises (as we would collect on behalf of individual transmission licensees in any event). We have estimated the Ofgem fee at just over £20 million per annum (in 2018/19 prices) for each year of RIIO-2, compared to an average of £19.3 million per annum during RIIO-1 and £20.9 million charged by Ofgem for the most recent year (2018/19).

B.3.6 Business rates

In RIIO-1, business rates qualified as pass-through costs if the licensee could demonstrate that it used reasonable endeavours to minimise the amount charged. Our property portfolio is significantly smaller in size and value than the network companies'. It has been agreed with the Ministry of Housing, Communities and Local Government that our properties will remain part of the central ratings list, and subject to central rates, until the end of this rating cycle, which runs to April 2021. From April 2021, they will then fall under local business rates. These will be subject to the same processes and changes as any wider business rates, including local revaluations and inflationary increases etc.

We have worked with our ratings advisors to prepare an expectation of local business rate costs for these properties, which we include in our plan. As the rateable values under local business rates will not be known until 2021, there is some risk that our estimate, which is less than £1 million per year in 2018/19 prices, will be incorrect and business plan allowances will lead to under/over funding. However, we believe this risk is small.

We will continue to work with rating agents to make reasonable endeavours to make sure that initial and subsequent ratings are minimised in line with our licence obligations.

Ofgem has confirmed its intent for our rates cost to be moved from a TNUoS pass-through cost to being treated as a Directly Allowed Revenue Term (DART), to be recovered via BSUoS charges. We have submitted our Business Plan on this basis and included business rates costs within our expectation of consumer bill impacts.

B.4 Real price effects

Our Business Plan costs will be affected by input price inflation, which Ofgem plans to remunerate through uplifts based on CPIH. However, costs will be affected by generic price increases and increases as a result of the nature of our business. More specifically, the specialised nature of our staff will mean trends in wage costs will move differently to general inflation measures such as CPIH. The impact of this is significant, given around 80 per cent of our RIIO-2 direct opex cost base is labour-related costs.

Figure 25 below illustrates movements in average private sector wages and the more specialist electrical engineering sector wages over the period since 2001, compared to general indices like RPI and CPIH.

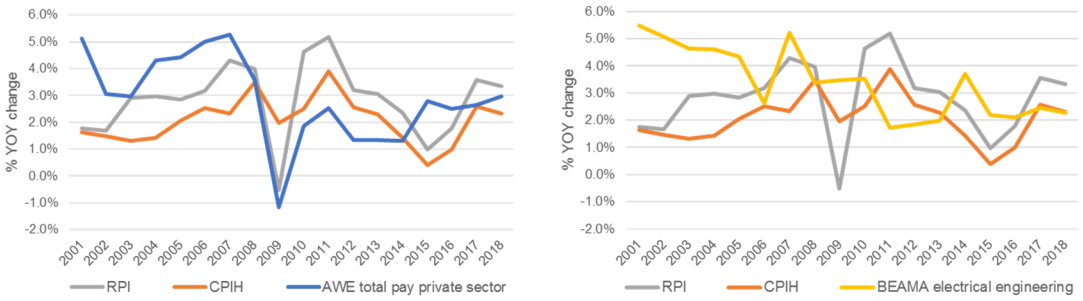


Figure 25 Private sector wages (on the left), electrical engineering sector wages (on the right)

There is no clear link between the general measures of inflation and changes in earnings. Furthermore, we are a long-term employer, and with much of our workforce being unionised, pay growth has been fixed through pay deals that have tracked above RPI in the RIIO-1 period. Recent benchmarking has shown that our pay is at market median, which suggests increases above CPIH are essential to retain critical skillsets.

We believe it is appropriate to look at the tracking of average pay over the long-term against CPIH to establish an appropriate uplift to ESO labour costs over the RIIO-2 period. We have considered the mix of skills within the organisation and the appropriate wage indices that most closely align to those skills. The breakdown of skills is shown below.

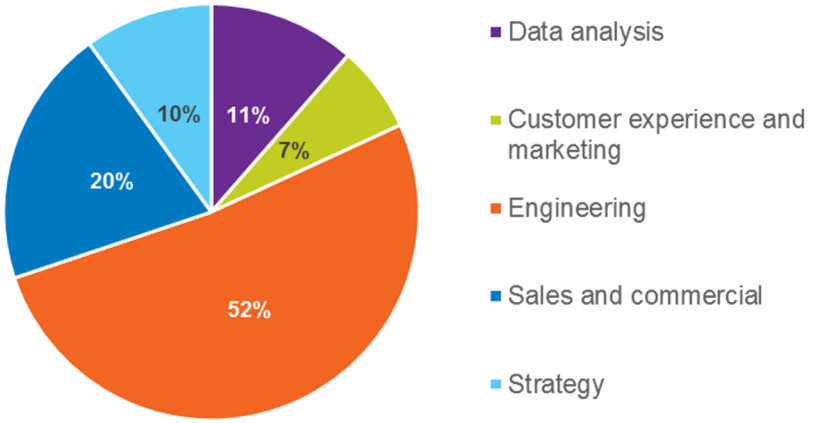


Figure 26 Skills breakdown for ESO direct labour

We have calculated a blended labour index based on the BEAMA[61] index for our engineering labour, and on average private sector wages for other capabilities. The chart below shows how this blended index has moved since 2001 compared to CPIH.

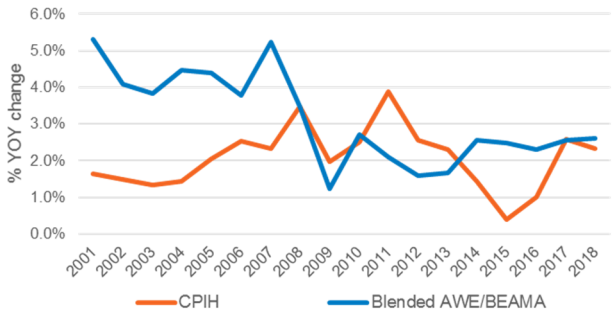


Figure 27 Blended labour index

Over the long-term, the blended wage index is on average 1.3 per cent higher than CPIH. We believe it would be appropriate to have RPEs of 1.3 per cent on our direct labour related cost base. We have assumed that labour relating to support functions is more aligned to a general wage index, and propose the 0.8 per cent long-term average gap between average private sector earnings and CPIH as an appropriate RPE for these costs.

While efficiently incurred labour costs would be fully remunerated under our RIIO-2 framework, we believe an uplift would more fairly reflect a view of expected outturn, which should be taken into consideration when assessing the efficiency of spend. We have included RPEs in the Business Plan data tables. Note that there is an error in the application of the RPE uplift in the accompanying data tables. We will discuss and agree the submission of an updated table with Ofgem. For the purposes of financeability modelling, we have included

[61] British Electrotechnical and Allied Manufacturers Association

relevant RPEs from the Business Plan data table as part of expected opex, as agreed with the Ofgem regulatory finance team, as the BPFM does not pull these in directly from the data tables.

We believe the indices used in RIIO-1 reflect a mix of general and specialised labour remain appropriate for the Business Plan, as much of our workforce is specialised, unionised and remunerated through long-term pay deals. This fairly reflects the cost of retaining the skilled staff we need to deliver our commitments.

B.5 Corporation tax

During RIIO-1, a tax allowance was based on the estimated tax costs of a notional, efficient company. Ofgem's current BPFM continues with this approach, while alternative mechanisms are considered from a policy perspective.

Ofgem's BPFM does not include the tax trigger and tax claw back functionalities that exist in the network company models. While policy decisions have not yet been made over the RIIO-2 treatment of tax allowances, we anticipate the retention of the uncertainty mechanisms in RIIO-1 to adjust allowances for changes in the prevailing rate of corporation tax, as well as other major tax changes, to make sure that both consumers and we are protected from changes outside of our control. Removing these protections could have a significant impact on our tax performance in RIIO-2, with the risk disproportionately sitting with us, given the current rate of corporation tax and the uncertain political environment. We recommend that the tax trigger mechanisms included in RIIO-1 are retained in RIIO-2.

We are subject to high levels of profit volatility, partly driven by our industry revenue management role, with timing differences flowing through accounting revenues. This could see tax charges varying significantly in line with these timing differences. One of the tax allowance mechanisms under consideration is the double lock. We believe such a mechanism would leave us inappropriately under-funded for tax.

We have provided relevant tax information as part of our Business Plan data tables. Intangible asset categories are absent from the capital allowances tables. Instead, we have allocated intangible asset investment (e.g. in balancing system software) to the general rate pool, as we believe it to be the most appropriate alternative.

Ofgem wants to see greater company disclosure on tax matters. National Grid is considering the tax disclosures in its published accounts in light of external benchmarks on tax disclosures, such as the Fair Tax Mark. The company currently goes beyond the statutory required level of UK tax disclosures in its accounts. However, the company is evaluating whether it can make further improvements to tax disclosures and the relative merits of obtaining approval of disclosures from a third party.

C. Consumer bill

In this section, we consider how our plans to deliver real benefits for consumers translate into consumer bills.

We explain how our costs translate into revenues and how this is then charged to consumers. In line with Ofgem's guidance, this is based on the financial assumptions set out in the ESOMDD and confirmed in the October 2019 decision document. We have also presented the impact of our alternative parameters.

C.1 How we recover our revenue

We provide a wide variety of services for and on behalf of industry. RIIO-2 will set the amounts we can recover from customers for these services. This process aims to make sure the costs we incur are appropriately shared between current and future customers. Our price control framework defines how this will be done.

Our revenues are recovered through use of system charges levied on generators and suppliers. We have two main streams of revenue:

- Revenues associated with our internal costs to deliver our licence commitments, which are the main focus of RIIO-2, such as RAV and totex-related revenues, business rates and pensions costs.[62]
- Revenues associated with the direct cost of undertaking electricity balancing activities (BSUoS). These are recovered from balancing participants.

Ofgem has confirmed that it will use a RAV-based funding model, coupled with an ex post incentive scheme, to remunerate us.

This model splits our totex expenditure between what is paid for by customers over time ('slow money'), and what is paid for immediately ('fast money'); and combines it with other cost items (e.g. pension deficit costs) and a baseline return to cover the cost of financing the plan. Ofgem has also retained an option to include additional funding for risks that cannot be appropriately remunerated through the WACC. Figure 28 below sets out the building blocks of our price control framework.

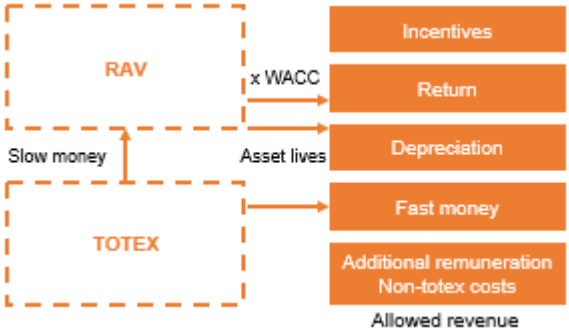


Figure 28 ESO price control building blocks

We incur significant external costs in balancing the system in real time. These costs are recovered via BSUoS charges.

We also perform an industry revenue management role, collecting other charges from network users on behalf of the TOs. These include TNUoS charges, assistance for areas with high distribution costs and connection charges. We illustrate the relative size of these flows in figure 29 below; however, this is not included in our assessment of our impact on the consumer bill.

[62]We have assumed that innovation related costs such as Network Innovation Allowance will continue to be recovered via TNUoS charges

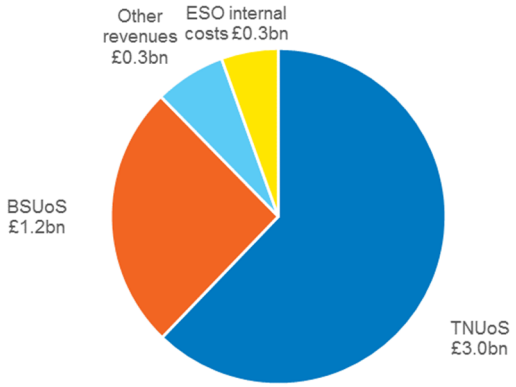


Figure 29 Breakdown of ESO average RIIO-2 revenue streams in 2018/19 prices

C.2 Our impact on consumer bills

We consider our impact on consumer bills by focusing predominantly on our own internal costs. Below, we set out our estimated internal revenue using Ofgem's proposed parameters.

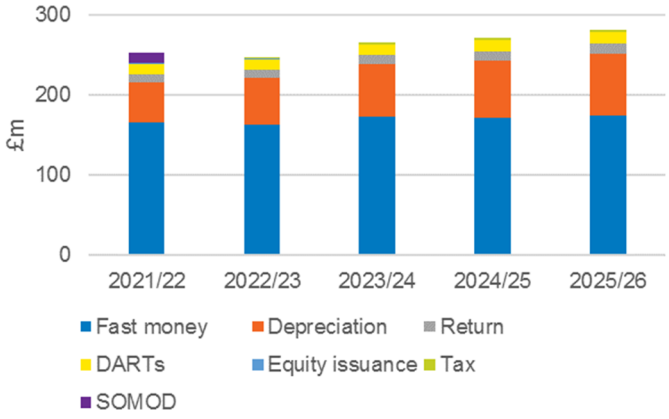
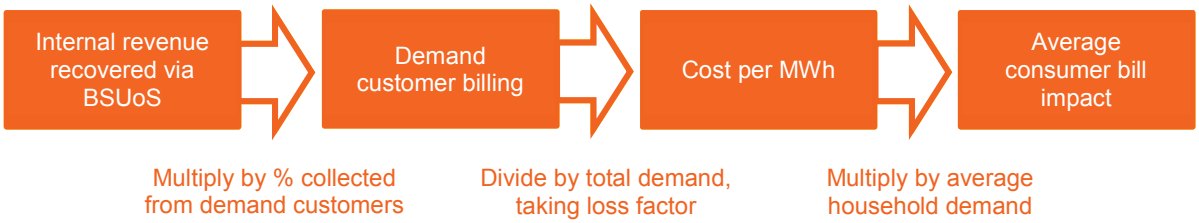


Figure 30 ESO controllable revenues in 2018/19 prices

We have used a simple top down approach, aligned with the methodology used by Ofgem,63 to calculate our impact on the average household bill. This follows a four-step process:



All internal costs collected via BSUoS charges are included. We have taken our estimated revenues as they would be calculated based on the price control framework Ofgem has set out, and using Ofgem's working

[63] Understand your gas and electricity bills (Ofgem 2019) available at https://www.ofgem.gov.uk/publications-and-updates/infographic-bills-prices-and-profits and www.ofgem.gov.uk/consumers/household-gas-and-electricity-guide/understand-your-gas-and-electricity-bills

assumptions. We have used the expected revenues of the actual company, so we have included the impact of SOMOD.

Of this estimated revenue, 50 per cent is assumed to be recovered from demand customers in line with current billing protocols.

We have assumed a constant system demand of 234 million MWh in line with 2019/20 forecast and applied a constant loss scaling factor of 1.09, in line with RIIO-1 levels. Our estimated demand customer revenues are allocated across total demand to provide a cost per MWh.

The average household demand of 3,100 KWh64 is in line with Ofgem's latest data. This has also been held constant across the RIIO-2 period.

We estimate the average Great British household will pay £1.80 per year on average for our services during the first two years of RIIO-2 under Ofgem's working assumptions, assuming no additional remuneration. This equates to around 0.3 per cent of the total electricity bill of £612 and less than 0.2 per cent of the dual fuel bill.

This is a fraction of the costs we manage in balancing the system, which account for £8.72 of the consumer bill, and the further industry costs we can influence.

Our Business Plan proposes new and transformational outputs that could lead to a reduction of around £4.70 on consumers' bills, so our impact on consumer bills is a net saving of just under £3.

Ultimately, both the funding and incentives of the framework need to be designed coherently reflective of the asset-light nature of the business. We note that ESO internal operating costs are negligible in comparison to the benefits of the services provided to stakeholders and consumers.
Trade Association

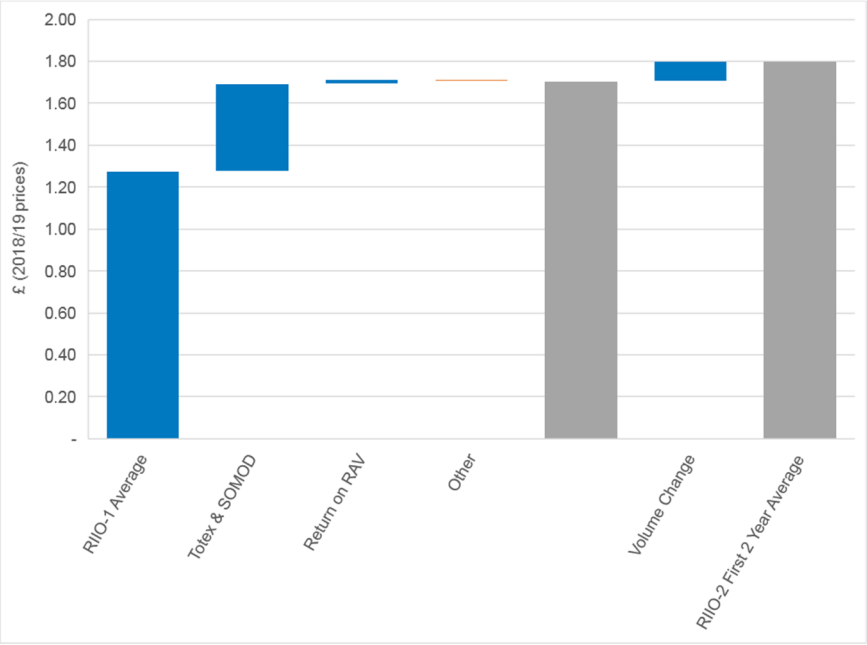


Figure 31 Change in consumer bill from average across RIIO-1 to that within the first two-year business plan cycle in RIIO-2

[64] This is under consultation to reduce to 2,900 KWh, which would reduce the consumer bill impact

Although our contribution to the average bill increases across the RIIO-2 period, feedback from stakeholders indicates general support to increase our costs to achieve better industry outcomes and support the challenging energy system transformation ahead. Figure 31 shows that this increase is driven by the ambition to do more for the industry, generating net benefits for consumers and increasing our operating costs. The other significant contribution to the increase in consumer bill is the steady decline in system demand across the RIIO-1 period, accounting for 10p of the increase between the two periods.

We want our framework to enable a culture to encourage us to take appropriate risks on behalf of industry and consumers: to be ambitious, innovative and facilitate the transition to a zero carbon energy system. The addition of 11-28p on the consumer bill (resultant total bill of £1.91-2.08) to cover the range of additional remuneration we have identified supports these aims, creating an environment that helps unlock wider benefits.

The ESO performs a crucial role within the energy system and its actions and expenditure influence much greater sums of industry costs. This means it is a far greater risk to consumers that the price control framework for the ESO does not provide adequate incentives to pursue initiatives that may realise value, compared to the ESO being overcompensated.
Generator

D. Pensions

D.1 Executive summary

Pension provision is integral to the overall employee remuneration package, which helps to recruit and retain the right people to operate our business safely, effectively and efficiently for the benefit of all consumers and stakeholders.

Given the huge levels of industry change, it is critical that we have the appropriate pension funding to fulfil our key industry role.

The overall pay and benefits package we provide is in line with our peers, and the efficient management of pension costs continues to be a key consideration.

Our approach over RIIO-1 (as part of NGET up to 31 March 2019 and as a separate business since) of placing consumer interests at the centre of all our decision-making has resulted in considerable financial savings for consumers, and reduced the length of time they are likely to be called on to fund our Defined Benefit (DB) scheme deficit.

Past cost reductions, together with our commitment to continue to reduce future consumer costs, have resulted in us forecasting totex pension costs in RIIO-2 that are lower per employee than in RIIO-1. These costs are forecast to decrease over the five-year RIIO-2 period and will tend towards a Defined Contribution (DC) cost over time.

Given these forecast costs are efficiently incurred and largely unavoidable, and considering the limited control we have over them, they should be covered in full by the RIIO-2 totex allowances.

D.2 Background

D.2.1 Overview

This section covers our pension arrangements over the RIIO-2 period. It explains how pension costs arise, how they have been managed over RIIO-1, and how they will continue to be managed over the RIIO-2 period. It covers the following totex costs:

- ongoing normal service contributions to both DB and DC pension schemes
- payments for pension scheme administration and PPF levy costs (part of totex for the period commencing 1 April 2021, following Ofgem's May 2019 RIIO-2 sector specific decision)
- payments for pension scheme incremental deficit costs.

It also details measures to manage non-totex Pension Scheme Established Deficit (PSED) costs, recovered through separate allowances and reset triennially outside of the RIIO-2 price control review process. All numbers and analysis have been prepared using the latest complete revaluation exercises (March 2016 revaluation). The March 2019 revaluation exercise is ongoing and expected to conclude in 2020.

All pension costs, both totex and non-totex, are reported on a cash (not accounting) basis.

D.2.2 Pension Schemes

National Grid has two large DB pension schemes: the National Grid Electricity Group of the Electricity Supply Pension Scheme (NGEG), and the DB section of the National Grid UK Pensions Scheme (NGUK(DB)); as well as the DC section of the National Grid UK Pensions Scheme (YouPlan).

The DB schemes pre-date the privatisation of the gas and electricity industries, and arrangements were put in place at privatisation to protect the interests of employees.

New members to the DB section of the NGEG scheme were limited from 2002, and it closed to new members in 2006. All new employees are invited to join National Grid's YouPlan Scheme.

Most ESO employees are members of either the NGEG Scheme or the YouPlan Scheme. However, some members of the DB NGUK scheme work for us, and some members of the NGEG scheme work in gas transmission. Support costs include members of all three schemes and are allocated to the relevant licenced

entity. This Business Plan presents information on a basis consistent with RIIO-1. We assume all our defined benefit employees are members of the NGEG scheme.

The pension benefits provided to employees of electricity networks (including us) at privatisation are subject to protected persons' legislation, which effectively ensures the sponsoring employers cannot reduce pension benefits for those employees. Scheme rules also prevent the reduction of member benefits unless approved by those members in a vote carrying a majority of no less than two-thirds.

We have taken measures, wherever possible and practical, to manage costs and mitigate any impact on consumers.

D.3 Totex pension costs

D.3.1 Overview

We are a participating employer of the NGEG scheme as well as the YouPlan scheme, which is open to all employees who are not members of the DB pension schemes. Employees make contributions in addition to our employer scheme contributions.

DB pension schemes provide a guaranteed salary-related pension at retirement, with the investment and longevity risk effectively underwritten by the sponsoring employer.

D.3.2 Ongoing accrual costs

Ongoing accrual costs for both DB and DC schemes arise as members accrue service with continuing employment. These are part of totex, and are included in the totex forecasts in our Business Plan.

DC scheme contributions as a percentage of a member's salary are largely unaffected by age or financial market conditions. However, ongoing costs as a percentage of a member's salary for DB schemes typically increase as members age, longevity improves and/or market interest rates decline. These factors have led to contribution rates increasing significantly in the NGEG scheme since the beginning of RIIO-1.

When setting the DB scheme contribution rates, scheme trustees and scheme actuaries have a duty to take account of these factors, all of which are outside our direct control. Triennial scheme valuations entail a robust negotiation with the scheme trustees; National Grid is a strong advocate for consumers' interests in all its interactions with the scheme trustees and their advisors.

Unlike some other totex costs, pension-related costs do not lie fully within our control. For example, setting the level of ongoing DB scheme contribution rates requires negotiation and agreement with independent scheme trustees and their advisers, who have a number of fiduciary duties.

Over the course of the RIIO-1 price control period, DB pension scheme sponsors have faced challenges that have put pressure on pension scheme costs; including falling bond yields, sedentary investment returns and continued increases in scheme members' life expectancy.

For example, 20-year UK gilt yields have fallen from 2.32 per cent per annum in March 2016 to 1.60 per cent per annum in March 2019. This fall alone can increase the ongoing accrual rate from 33.7 per cent at March 2016 to an estimated accrual rate in excess of 40 per cent at March 2019.

The reducing overall headcount of DB members goes some way to mitigating the overall cost of increasing annual contribution rates.

D.3.3 Scheme administration and PPF levy costs

The Pensions Regulator (TPR) requires trustees to ensure enough time and resources are spent on robust pension scheme governance. Trustees incur expenses to run and manage pension schemes to meet this regulatory obligation. We reimburse a proportion of these costs.

TPR and the Pensions Protection Fund (PPF) levy charges on all DB pension schemes in the UK. The amount is set by those bodies and remains largely out of National Grid's control.

Scheme administration costs must be incurred to manage schemes efficiently, and as the DB scheme approaches full funding, managing its investments and risk inevitably becomes more complex and expensive.

The focus on incurring only efficient admin costs is reflected by NGET's[65] scheme admin and PPF levy costs benchmarking favourably against other energy networks. It is consistently below Ofgem's latest median measure of these costs as a percentage of scheme liability.[66]

Measured against membership size, NGEG's average admin costs per member over the three-year period from 1 April 2013 to 31 March 2016 was also lower than the same (RPI-adjusted) average for very large schemes, as measured in the report "Defined benefit (DB) scheme running cost research" of April 2014, prepared for TPR by IFF Research.

D.3.4 Pension scheme incremental deficit costs

The proportion of pension scheme deficit costs that relate to pensionable service after 31 March 2012 is called the Incremental Deficit and has been treated as part of totex since 1 April 2012. It is also known as the pension scheme deficit cost relating to post cut-off date service.

It is recalculated triennially as part of the Pensions Deficit Allocation Methodology (PDAM) process, separate to the RIIO price control review. NGET has incurred and recorded this annual totex cost since 1 April 2012, and we expect total incremental deficit costs of about £0.13 million per annum, increasing with inflation for NGEG over the course of RIIO-2.

D.3.5 Cost reduction measures

There are significant constraints to reducing costs by reducing the level of scheme benefits.

A large proportion of NGEG members are categorised as Protected Persons, who enjoy specified minimum past and future pension scheme benefits in law, which cannot be reduced without the consent of all affected members. This prevents the closure of NGEG to future service accrual.

Despite these constraints, we have championed both consumer and shareholder interests in our actions to control costs, including those set out below.

- A benefits cap on pensionable pay was introduced from April 2013 to reduce the impact of rising future service contributions on totex costs. The immediate benefit was shared with consumers through the totex incentive mechanism during RIIO-1. This approach was challenging, in part because National Grid was an early adopter of this measure. Capped pensionable salary is pensionable salary at 1 April 2014 increased by an individual's annual pay rise, RPI or 3 per cent each year, whichever is lowest.
- Bonuses for NGEG members are excluded from pensionable pay, limiting contributions and liabilities. Historic staff pay deals have also included a non-consolidated lump sum payment rather than a higher rise in pensionable pay.
- In 2009, a salary sacrifice arrangement was introduced to reduce total employer pension costs. Several voluntary redundancy exercises over the RIIO-1 price control period have significantly reduced overall DB headcount and ongoing pension scheme costs. All new staff recruited after the closure of the DB pension scheme in 2006 are offered entry to the DC pension scheme, which carries lower costs as a percentage of salary than the DB scheme. This has contributed to an increase of overall membership from DB to DC over RIIO-1 greater than previously forecast.
- We also passed on to scheme members the increase to annual contribution costs from the ending of Contracting Out at 1 April 2016 (several hundred thousand pounds), preventing consumers from having to pay this cost increase. This applies to both DB and DC ongoing costs and will continue throughout RIIO-2.
- By reducing the scheme deficit, the risk-based levy payable to the PPF was reduced to zero in 2017, saving consumers money over the remainder of RIIO-1.

[65] NGET costs benchmarked as the relevant historic data set available. ESO costs going forwards are an apportionment of NGEG scheme costs, which were the NGET costs previously benchmarked.
[66] See Appendix 2 – Summary and analysis of administration and PPF allowances in Ofgem's October 2017 document https://www.ofgem.gov.uk/system/files/docs/2017/10/provisional_revised_pension_allowances_letter_0.pdf

- Despite the restrictions on benefit reductions, we are actively engaging with the DB scheme trustees over a range of options. This includes giving non-retired members greater opportunity (where appropriate) to take a transfer value of their DB benefits from the scheme in a way that gives them greater flexibility over their pension and benefits the scheme's funding.
- We reduced the impact on consumers of the increases in contributions at the scheme's 2016 actuarial valuation (due to falling interest rates), by negotiating a revised actuarial approach.

D.3.6 Summary costs

£m 2018/19 prices	2021/22	2022/23	2023/24	2024/25	2025/26
Ongoing service	8.9	8.8	9.1	8.8	8.4
Scheme admin and PPF levy	0.6	0.7	0.7	0.7	0.7
Incremental Deficit	0.1	0.1	0.1	0.1	0.1

Figure 32 Employer contributions for pension schemes

Ongoing annual employer contributions are applied as a percentage of pensionable salary (capped for DB schemes) of current members. The rate is recalculated by the scheme actuary every three years for DB schemes. For YouPlan, the employer contribution rate is set at twice the members' contribution rate plus administration and risk benefit costs.

These estimates are based on long-term market implied real interest rates at 31 March 2019, with longevity adjustments based on continuous mortality investigation 2018 levels over the forecast period. Contribution rates are assumed to become effective in the year following each triennial actuarial valuation.

NGEG DB

Employer contributions are expected to increase across the RIIO-1 and RIIO-2 periods. We believe the contribution will increase by 3 per cent in 2023/24 due to overall membership ageing effects. Forecasts for contribution rates are based on current rates adjusted for market condition changes since the previous valuation. The method has applied forecast changes in gilt yields, implied inflation forecasts, adjustments for ageing and changes in longevity data to give an indication of the likely level of rates that might be agreed with trustees. Discussions with trustees and actuaries are at preliminary stages, so the rates agreed at the 2019/20 and subsequent valuations could be substantially different than those forecast below.

	2021/22	2022/23	2023/24	2024/25	2025/26
			Rate reset		
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

Figure 33 Annual employer contribution rate NGEG DB scheme

Ordinary annual decrement rates[67] over the period 2010/11-2016/17 are assumed to continue to apply for the period from October 2019 to 2025/26. This is a 6 per cent annual decrement. While the effect of the 2018/19 voluntary redundancy programme has been considered in membership figures at 31 March 2019, no attempt has been made to predict or forecast extraordinary decrement rates after October 2019. Headcount numbers below include members working on dual-fuel and/or support service activities, as well as those directly working for us.

[67] Ordinary Decrement rates are the rates by which contributing membership declines due to the voluntarily withdrawal from participating scheme membership

	2021/22	2022/23	2023/24	2024/25	2025/26
NGEG active members	754	709	667	627	589
NGESO DB active members	226	213	200	188	177

Figure 34 Forecast NGEG headcount – all assumed as average headcount

YouPlan

YouPlan members can contribute at 3, 4, 5 or 6 per cent per annum with an average contribution of over 5 per cent currently. We do not anticipate this changing significantly across the RIIO-2 period.

Administration costs are currently 0.5 per cent of salaries per annum, but are assumed to increase to 0.55 per cent in 2020/21 and 0.6 per cent in 2023/24. We anticipate a similar increase in the risk benefits costs, which are currently 1.6 per cent of salaries per annum, but are assumed to average 1.8 per cent over the period 2018/19 to 2025/26.

	2021/22	2022/23	2023/24 Rate reset	2024/25	2025/26
YouPlan	13.7%	13.7%	13.8%	13.8%	13.8%

Figure 35 Annual employer contribution rate YouPlan DC scheme

Scheme administration and PPF levy costs

As a sponsoring employer, we will have to provide annual contributions to the DB scheme to cover PPF and admin costs. Forecasts are based on past experience and known and expected future work. However, as these costs are managed by the trustees and are not directly controlled by the sponsoring employers, they are based on approximations. An increasing level of investment and de-risking complexity is expected over the coming years, and this is expected to increase admin costs, as in the forecast.

D.3.7 Summary

- Our forecast ongoing pension cost per employee is lower in RIIO-2 than in RIIO-1, is decreasing over the five-year period, and will tend toward a DC cost over time.
- We are a strong advocate of consumer interests in managing costs.
- With a focus on the impact on consumer bills, we (and formerly NGET) have undertaken several steps in the past to mitigate these costs, and will remain focused on continuing to do so in the future.
- As a result, we are forecasting reducing pension costs for the RIIO-2 price control period, as the higher proportion of lower cost DC scheme members outweighs the increase in the DB contribution rate as a percentage of salary.
- While there is limited ability for us to further reduce pension costs, we will explore any future opportunities.
- We consider that totex allowances should reflect the constraints in pension costs, and the limited control we have over these costs.
- Given these forecast costs are efficiently incurred and largely unavoidable, they should be covered in full by the RIIO-2 totex allowances.

D.4 Pension scheme established deficit costs (non-totex)

D.4.1 Overview

For DB pension schemes, funding requirements are highly uncertain because factors such as fund investment returns and longevity assumptions are volatile. Contributions made at the time of a member's pensionable service are set to cover the expected liability resulting from that service. However, market conditions, mortality experience and other developments can be at significantly different levels than assumed when contributions were set. As a result, scheme surpluses or deficits can arise at each triennial valuation by the scheme actuary.

Ofgem has a long-standing commitment to consumer funding of efficiently incurred deficits in regulated DB pension schemes and introduced price control pension principles in 2003 as a framework for dealing with efficiently incurred costs associated with deficit funding. Ofgem reviews pension scheme deficit costs triennially as part of the PDAM process, which runs in parallel to, but outside of, the RIIO price control process.

D.4.2 Pension scheme established deficit costs

Ofgem's triennial PDAM process sets a level of pass-through funding by consumers of the PSED for each licensed entity. This remains constant for three years and is reset at the next PDAM exercise.

Although we have provided forecasts of our expected future PSED costs as part of our Business Plan submission, these costs do not form part of the totex forecasts, because Ofgem has confirmed the PDAM process will continue to sit outside of the RIIO-2 price control review.

A deficit of £500 million was determined for the entire NGEG DB scheme by the triennial valuation at 31 March 2016. This represents a decrease of around £300 million since the 2013 valuation, mainly as a result of favourable investment returns.

D.4.3 Cost reduction and risk management measures

The same cost constraints highlighted in the totex cost section above also apply, limiting the extent by which we can reduce pension deficit costs.

Despite these constraints, we (and formerly NGET) have championed both consumer and shareholder interests in our actions to control costs:

- As the funding level of the scheme has increased, the risk in the investment strategy has been significantly reduced, locking in previous positive investment performance for consumers. National Grid has encouraged this in the interest of consumers. Additional de-risking triggers will provide further protection as the deficit reduces, lessening the exposure of consumers to future funding shocks.
- Risk has been reduced principally by hedging exposure to interest rates, inflation and currency hedging, and by reducing the scheme's exposure to equity. This has led to a very positive experience in the investment portfolio for several years, offsetting the impact of falling gilt yields and helping to reduce deficits.
- At the 2010 valuation, National Grid negotiated a 17-year recovery plan to reduce the impact of increased deficit funding on consumers. This was facilitated through low-cost security arrangements providing trustees with confidence that the recovery plan would be acceptable to TPR.
- At the 2013 valuation, the increased deficit should have led to a very significant increase in deficit contributions for consumers. However, National Grid proposed the inclusion of an investment outperformance assumption in the recovery plan to reduce the funding burden on consumers. This resulted in a reduction in consumer funded deficit contributions of around £35 million for us.
- At the 2016 valuation, liabilities had again increased as a result of falling gilt yields; however, these were more than offset by the positive investment performance over the period. The investment strategy agreed in consultation with National Grid protected the funding position during this volatile period, not least because of the high level of interest rate hedging. This allowed a new recovery plan that maintained contributions at previous levels. The use of a lower discount rate assumption in Ofgem's price control financial model (PCFM), compared to when allowances were reset in 2015, resulted in the 2018 deficit allowances borne by consumers falling by 14 per cent compared to previous allowances.
- A further reduction in risk has occurred through a longevity hedge in 2017. This hedge covered two thirds of members' liabilities and reduced the scheme exposure to longevity risk by approximately 50 per cent, giving added protection to consumers against potentially volatile future deficits due to unanticipated changes in longevity.

D.4.4 Consumer impact

The impacts of investment decisions and valuations are continually analysed for their effect on consumers. The risk reward balance is an integral part of the decision-making process for NG in negotiating valuation and investment decisions.

Over RIIO-1, this approach has resulted in considerable financial savings to consumers and reduced the length of time they are likely to be called upon to fund our DB scheme deficit.

This has been coupled with risk reduction to decrease the likelihood that consumers will face volatile or significantly increased deficit levels in future.

D.4.5 Summary cost table

The deficit costs included in the below table are based on a notional deficit in line with the 2016 updated valuation, consistent with Ofgem's preferred approach on deficit funding.

£m 2018/19 prices	2021/22	2022/23	2023/24	2024/25	2025/26
Established Deficit	11.7	11.7	11.7	11.8	11.8

Figure 36 ESO pension deficit forecast costs

The values above are based on our allocation of 23 per cent of the overall scheme deficit, which will be settled directly to the scheme each September.

D.4.6 Summary

- The PDAM process is well established, efficient and effective in incentivising and facilitating companies in reducing costs for consumers.
- Significant measures have been taken over RIIO-1 to protect consumers and reduce their funding burden.
- Consumers are further protected as the investment strategy is now much lower risk than at the beginning of RIIO-1, and a large tranche of longevity risk has been removed.

Appendix A – Evidence on equity investor requirements

Equity investors require a return that provides appropriate compensation for the risk they take in investing capital, whether committed or contingent, in the business. For equity holders, this return can only be realised via the payment of a dividend or through the sale of their investment. As a result, many equity holders see it as critical to obtain a regular return via dividend payments, as a stable dividend policy sends a strong signal of confidence to investors.

In this appendix, we present our evidence regarding equity investors.

Evidence from National Grid plc shareholder survey

We have obtained feedback from National Grid plc's annual investor survey to get further insight into equity investors' thinking and expectations.[68] Representatives from 18 leading institutions with over £8.0 trillion of global equity assets under management were interviewed. A number did not hold any National Grid plc shares, to provide a broad range of views. The institutions that did hold shares represented just over 16 per cent of National Grid plc's share register at the time, a significant proportion of our investor base.

The survey covers views for the whole of the National Grid group, rather than for the ESO specifically. However, we can expect prospective investors in our notional company would be in the same sector, and so the results can inform what an investor would look for in the ESO.

The key themes arising from the equity investor engagement[69] are:

- Most investors consider the dividend fundamental to their assessment of National Grid plc, with several stressing the importance of a sustainable growing dividend.
- The political and regulatory environment is a key concern in contrast to the lead up to RIIO-1, when the UK regime was considered 'gold standard'.

This is demonstrated by some quotes below from stakeholders in the investor survey.

Near term, the issue is about fair returns. For investors to have confidence in the UK system, there have to be good returns on investment.
Investor

In the UK, there is still a lingering and quite material political risk associated with being an investor in utilities.
Investor

I think being able to invest a lot of capital at what is an attractive rate of return is key.
Investor

This engagement also made it clear that investors look at a mixture of equity and debt metrics when considering a business. They look out over the medium to long-term (a range of two to ten years) and expect to see regular returns over that timeframe.

[68]The 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.
[69]Quotations from the survey that are presented in this annex came directly from equity fund managers 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.

I take a longer-term approach, and the way we would like to be positioned is in companies that have good near-term growth prospects as well as the potential to reinvest in good projects and assets over time.
Investor

If there are no investments because of lack of return, consumers ultimately lose out.
Investor

For most investors, the dividend is fundamental to their assessment of National Grid plc. Utilities are seen as income stocks, so our ability to continue to pay and grow the dividend are priority considerations in investors' valuation of the stock. Some investors highlighted their use of a dividend discount model and the direct implications of changes in the level of the dividend on the valuation. Several investors stressed the importance of a sustainable growing dividend, and one interviewee stated that even a halt in dividend growth (as opposed to a cut in dividend) 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.
Investor

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.
Investor

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

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.
Investor

As well as referencing the key role of the dividend in their own funds, investors highlighted its importance as a discipline on management.

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 a credible demonstration that the regulatory regime is stable and will provide a return to investors. Investors are 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.
Investor

Every single respondent stated the dividend is an important part of their investment decision.

This feedback shows that our regulatory framework in RIIO-2 must provide investors with enough certainty, stability and fair returns to make sure that the notional company is financeable. This is increasingly important

when considering we are competing for capital, not just with other UK regulated companies, but worldwide, given the increasingly global nature of investment funds. As set out in Annex 5, we face significant risks of a different nature and increased scale compared to the network companies. Investors will look at the business risks when deciding whether to commit capital, so it is important to consider their perception of risk.

Our framework needs to properly remunerate these risks to meet investor requirements so that we can attract investment and be proactive in delivering benefits for consumers. Our proposed funding model can provide fair remuneration for investors.

Evidence from Northern Gas Networks

Oxera has recently published a review of financial analysis into Northern Gas Networks for RIIO-2.[70] It reviewed the costs of delaying dividends to investors and on investor preferences for dividend distributions in the utilities sector. Oxera's main conclusions were:

- Reducing or foregoing dividend payment is likely to entail significant costs to equity holders, which could increase the cost of capital.
- Reducing or delaying dividends may reduce the relative attractiveness of UK-regulated assets. Trends show that yields for UK utilities have been higher and more consistent than the market average, when comparing all the FTSE 100 to FTSE 100 utilities, and all the S&P 500 to S&P 500 utilities, between 2001 and 2018. It is likely that investors in utilities have strong preferences for high and consistent dividend yields, so a reduction or delay in dividends may make UK utilities unattractive in the international market for capital.

Utilities tend to continue to pay a dividend even when they need to raise equity, as this is expected by shareholders. Our volatility as a result of our industry revenue management role has an impact on our ability to pay stable dividends, which in turn affects our ability to attract equity investment.

Evidence on historic dividend yields

Within our peer group over the last 10 years, yields have varied due to changes in market values and dividend policies. Nevertheless, there are some important observations: firstly, the average yield in the utility sector has been higher than for that of the FTSE 100: 5.3 per cent and 4.2 per cent respectively. The range containing the second and third quartiles across the peer group was reasonably narrow at between 4.0-6.7 per cent.

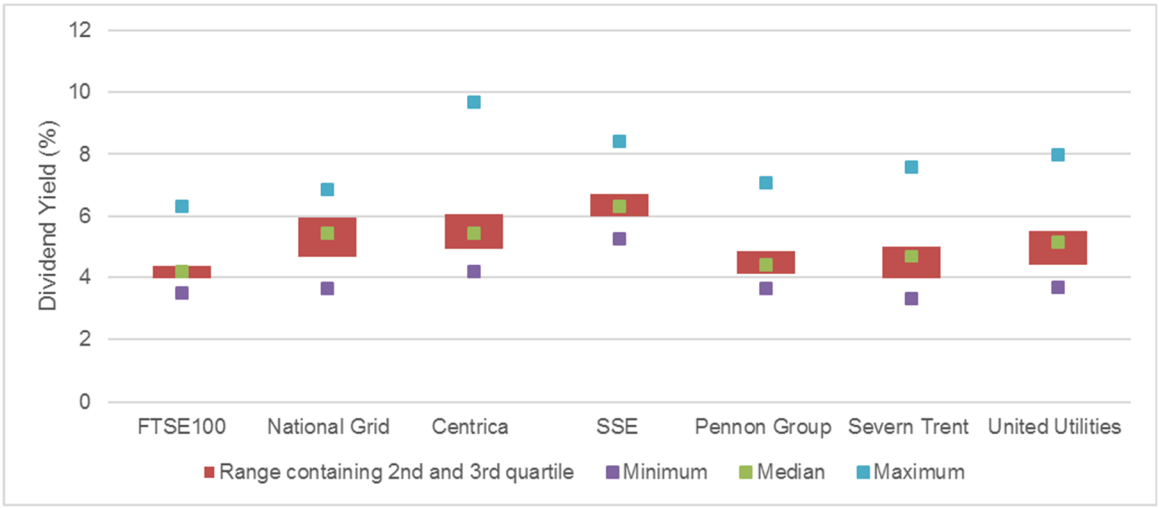


Figure 37 UK regulated utility and FTSE 100 dividend yields since January 2009

The relatively higher yields compared to the FTSE 100 can be attributed to two factors:

- While the FTSE 100 covers the largest UK listed companies, there are some shortcomings in its use a comparator, as it includes companies that do not pay a dividend (e.g. Ocado and Just Eat), or companies that have made very significant cuts to their dividend during times of financial distress (e.g.

[70]https://www.ofgem.gov.uk/publications-and-updates/riio-2-sector-specific-methodology-consultation, 'Response documents', 'Responses F-R', folder 'Northern Gas Network[71] Credit Suisse estimates are an average for European regulated utilities within their coverage: Italgas, National Grid, Pennon, Severn Trent, Snam, Terna and United Utilities

Royal Bank of Scotland after the 2008 financial crisis). There are currently 24 companies in the index whose dividend yield is below 2 per cent, indicating that their investor proposition is more focused on growth than yield, relative to the rest of the FTSE 100 constituents.

- There are characteristics of a regulated utility that make the dividend a more important feature, even relative to yield stocks in the FTSE 100. These characteristics include the regulatory price controls that set their revenues. A consistent dividend policy, both for yield and cover, provides confidence 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 elsewhere; for example, European utilities average dividend yield was 5.7 per cent over the last decade.

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

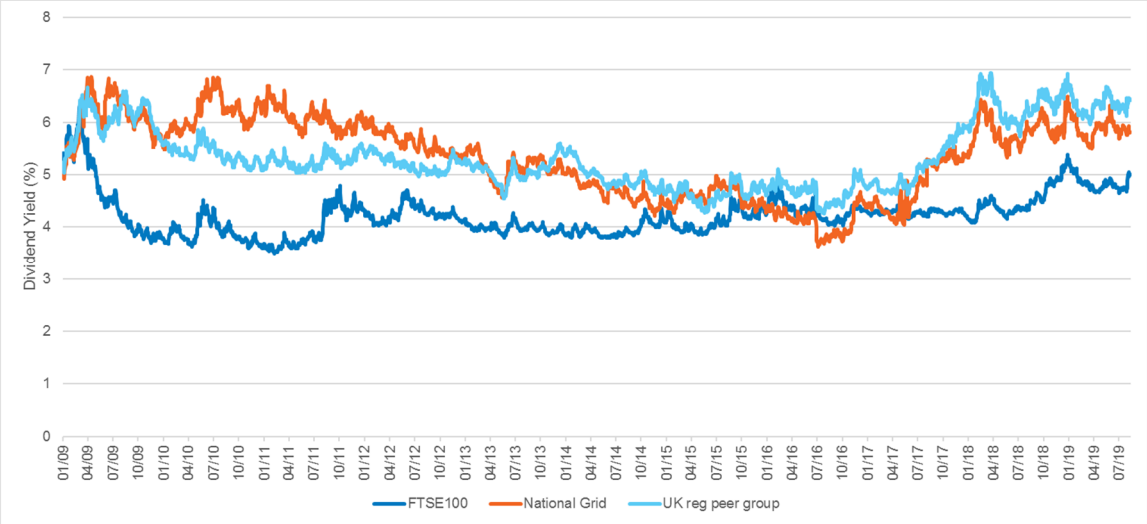


Figure 38 Dividend yields over the past 10 years

Evidence on expected dividend yield

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

Bank	2019	2020	2021	2022
Credit Suisse[71]	5.4%	5.6%	5.2%	5.3%
JP Morgan[72]	6.1%	6.7%	-	-
Morgan Stanley[73]	5.5%	5.4%	5.6%	-

Figure 39 Sell-side dividend yield expectations

A forecast of dividend yield is very important to equity investors and a key driver of value. Figure 40 summarises the sell-side analysts yield assumptions used in their published sum of the parts (SOP) calculation.

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

Bank	Dividend yield assumption	Weighting in SOP valuations	Date of note	Forecast year
HSBC	5.0%	50%	21/06/19	2020
Goldman Sachs	5.9%	20%	19/09/19	2020

Figure 40 Sell-side yield assumptions

Investors also assess how changes to the regulatory model will affect the dividend capacity in the next regulatory review. The changes that accelerate cash flows – 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.

Evidence on historic dividend cover

Dividend cover is another critical metric for investors. Not only do they want to make sure they can obtain a return (dividend yield), they also want that yield to continue and grow. Dividend cover is monitored by investors to assess the sustainability of the dividend over the longer term.

Average dividend cover for the UK utility sector has averaged 1.33 times over the last decade, with FTSE 100 cover 1.91 times over the same period. The greater level of pay-out by UK regulated peers relative to the FTSE 100 is consistent with the differences in dividend yields above. This is consistent with our European utility peer group, which averaged dividend cover of 1.5 times.

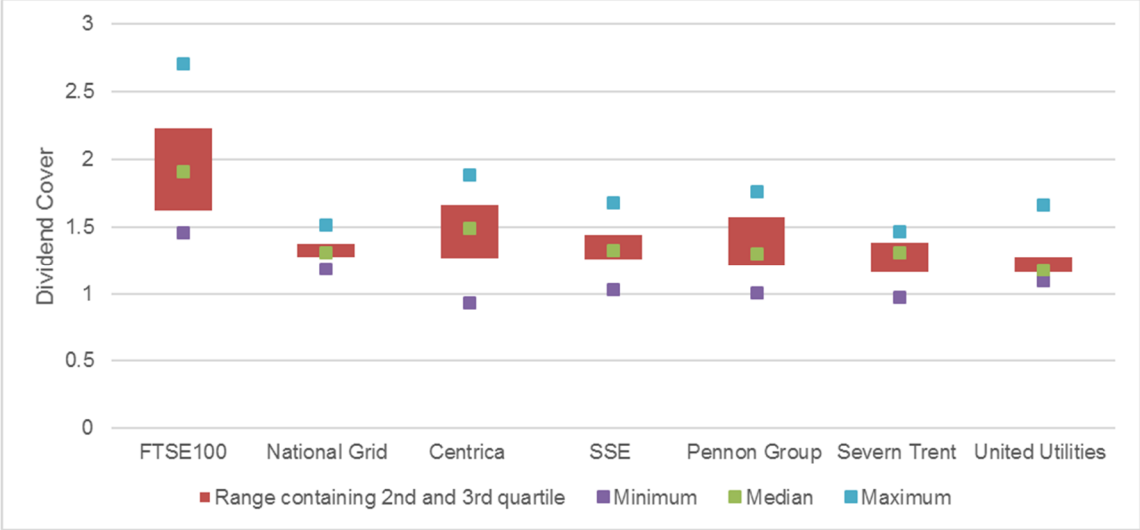


Figure 41 Average UK regulated utility and FTSE 100 dividend cover since January 2009

Evidence on expected dividend cover

Sell-side analyst forecasts expect dividend cover within the regulated utility sectors to range between 1.1 and 1.4 times.

Bank	2019	2020	2021	2022
Credit Suisse[74]	1.3x	1.2x	1.3x	1.4x
Morgan Stanley[75]	1.3x	1.1x	1.1x	-

Figure 42 Sell-side dividend cover expectations

Traditionally, the level of dividend yield a company displays has some correlation with its asset growth. Over the five years of the price control period, RAV growth is expected to be around 9 per cent per annum. Even though we are expecting significant RAV growth over the RIIO-2 period, we anticipate that equity investors will still expect a regular and stable dividend return and will not be satisfied to wait until the next regulatory framework.

Paying an attractive and competitive dividend is important, even in the context of the RAV growth expected in RIIO-2. The ability of the notional company to pay a dividend is a commitment from the regulator that the investor will get a return, rather than a promise based on future regulatory price controls.

Conclusions from evidence

The existence, and value, of a dividend makes a difference both to the willingness of investors to provide capital, and to the return required. A model that sees dividend as an output and does not recognise the impact it has on the required return is flawed.

Ofgem has provided a working assumption to the network companies of 3 per cent dividend yield in comparison to the cost of equity working assumption of 4.8 per cent (including outperformance assumption). Applying the same pay-out ratio, our dividend yield would be around 4.9 per cent based on Ofgem's working assumption of 7.81 per cent cost of equity.

We believe a stable dividend policy of 5 per cent 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 and will enable us to attract the necessary investment to be ambitious and deliver our plan.

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

Appendix B – Evidence on cost disallowance

We have looked at other businesses that are exposed to disallowance risk to provide some benchmarking of the risk. There is regulatory precedence for a disallowance being applied, as illustrated in the examples below.

Smart Data Communications Company (DCC)

Compared to the network companies, Smart DCC is a relatively close comparator to the ESO, in terms of:

- size of organisation – headcount around 380, internal costs around £61 million
- price control model – ex post evaluative by Ofgem
- industry role – central operational role plus facilitator of industry transformation
- organisation maturity – relatively recently created, transitioning to steady state
- small asset base, but significant skills and IT programme spend.

Disallowance	RY 2017/18	RY 2016/17	RY 2015/16
Proposed	£2.34m	£1.75m	£0.7m
Final	£1.02m	£0.92m	£0.58m
% of cost base (proposed)	3.8%	4.2%	2%
% of cost base (final)	1.6%	2.2%	1.7%

Figure 43 Smart DCC internal costs disallowance over the last three regulatory years (RY)

In our risk-based approaches to assessing the range of additional remuneration, we make provision for managing the asymmetric risk of disallowance and avoid driving a risk-averse culture. We assume a cost disallowance of 2 per cent, which is in line with DCC's cost disallowance shown in figure 43 above.

In the case of DCC there is also evidence of a non-zero risk of forecast cost disallowance, creating further operating uncertainty, financial planning risk and evidential burden, as shown by figure 44.

Disallowance	RY 2017/18	RY 2016/17	RY 2015/16
Final	£132.5m	£67m	£79.5m
% of cost base (final)	28.1%	19.8%	27%

Figure 44 Smart DCC disallowance

Major infrastructure programmes

We have also looked at recent disallowances relating to major infrastructure programmes. These examples can be considered instructive as we may face similar challenges that lead to disallowance, such as: a need to establish credible needs cases for major investments; a need to demonstrate efficient project management and procurement overheads; and a need to reflect a reasonable view of risk into budgets.

Disallowance	Feeder 9	Burbo Bank	Milford Haven	St Fergus	Heathrow 2017
Final	£29m	£2.0m	£71m	£19m	£4m
% of cost base (final)	20%	1%	8%	25%	5%

Figure *45 Major infrastructure programmes disallowance*

As shown in figure 45, disallowances have typically been up to 25 per cent of major projects. While the network companies invest substantial amounts of money, these are typically a small proportion of the underlying RAV of their businesses. A disallowance of 25 per cent on an individual major project within our RIIO-2 portfolio has a much higher proportional effect on us given our shorter asset lives and smaller RAV.

Appendix C – Risk assessment and financeability, KPMG report

KPMG

NG ESO

Remuneration requirement & financeability

2 December 2019

Important notice

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Contents

1 Scope and structure of this report

Scope of this report

National Grid Electricity System Operator (NG ESO, or the ESO) commissioned KPMG to consider the remuneration requirement and financeability of the ESO with a view to inform the company's final Business Plan submission to Ofgem in early December 2019, in particular in light of Ofgem's decisions on the financial methodology and roles framework for the ESO for RIIO-2 published on 25 October 2019.

The purpose of this report is to consider the ESO's remuneration requirement through a number of different 'lenses' to triangulate a remuneration range that is likely to be appropriate for the ESO and compare that with Ofgem's current working assumptions. The report also specifies appropriate financeability tests in the context of an asset light, services focused business to inform the analysis of the ESO's remuneration.

Structure of this report

This report sets out a number of perspectives on the ESO's remuneration requirement.

The main body of the report is relatively short in order to help the reader understand the broad themes involved without detailed analysis, which is set out in the Appendices.

The report starts by setting out the general economic and regulatory contexts for estimating the ESO's remuneration requirement (Chapters 2 and 3). These chapters explain how differences in the economic and regulatory models between the ESO and the typical, asset-heavy regulated energy networks lead to marked differences in the way that the remuneration requirement needs to be thought through.

Chapter 4 discusses the three tests specified by Ofgem for recognising components of the remuneration requirement. It discusses the relevance of the tests and also identifies how they can be interpreted for a business with a fundamentally different business and risk profile to the energy networks.

Chapter 5 brings together a number of perspectives on the remuneration requirement that follows from the discussion in Chapter 4. The results from most of these perspectives seem to indicate a relatively narrow band for the remuneration requirement. These need to be considered in light of additional insight into the interaction between risk and regulation that could impact these results– this is particularly relevant since some key components of the regulatory regime for the ESO are not yet finalised.

Chapter 5 draws out these insights and set out the conclusions. The fact that Ofgem has not yet decided on the key components of the regulatory framework means that the overall conclusion cannot be limited just to the question about the quantum of the remuneration requirement, but also needs to consider how the insights from the analysis can help inform a balanced outcome for the RIIO-2 regime for the ESO. This is particularly relevant where the impact of the regime on behaviours, the ESO's risk profile and its remuneration requirement are all aligned to help deliver Ofgem's strategic objectives.

The Appendices set out supporting analysis for the remuneration perspectives and the main insights involved.

2 Economic context

The economic context for NG ESO's risk profile

For most regulated networks, such as TOs, DNOs and GDNs, the monopoly status is derived from the prohibitive infrastructure construction costs associated with any competitor entry. The networks are asset-heavy and the incumbent network has considerable economies of scale. The capital-intensive nature of the business means that most if not all of their risks can be readily associated with its tangible capital base, the debt and equity needed to finance continuing infrastructure investment, recovered on a slow money basis (the RAV).

NG ESO's monopoly status derives not from its high infrastructure costs, but instead from a 'network effect' where there is no practical scope of entry for a competing ESO looking to attract networks to its service offering. The natural monopoly status of the network infrastructure-owning businesses conveys a natural monopoly status for the ESO as well. However, that status is not based on the ESO's own assets.

Put simply, the ESO provides services, not infrastructure, including its critical systemic role of operating the electricity system overall. Its role is to ensure and secure efficient operations and development of the infrastructure for the benefit of its users, consumers and wider society. ESO's role is about optimising the value of the service to users or society provided by that infrastructure, even though it does not itself own that infrastructure.

The ESO does not own or in any way help finance the relevant infrastructure. The assets it does employ, generally IT systems, cash and trade debtors, are incidental to the infrastructure itself. Instead, the ESO's operations are largely based on the significant human capital, know how, experience, processes, operations and procedures it employs to provide manage the electricity system overall.

3 Risk and regulation

The ESO became a legally separate business on 1 April 2019. This separation from a traditional integrated TSO model has led to a fundamental shift in organisational risk profile, in which the newly formed ESO holds a number of major risks, but at the same time has significantly less tangible assets on its balance sheet. As a result, there is an increase in the 'concentration' of risk against its capital base compared to the previous, integrated business.

Many of the ESO's underlying risks are not proportionate to the value of tangible assets on its balance sheet as the majority of the ESO's economic value is driven from intangible assets such as employees' specialised expertise, software algorithms and intellectual property. In addition, there is an assumption that the ESO can rely on wider group's resources, mitigating actions and additional capital at the time of need.

While this lack of correspondence between the ESO's own limited tangible asset base and its business risk exposure was not a significant issue under the integrated model given the relative scale of the businesses (the TO being orders of magnitude larger than the ESO), under a separated model it has become crucial for the financeability of the ESO. It is therefore important when considering the appropriate regulatory framework for the ESO to fully account for the risks characteristic of its business, what type of capital these risks are associated with, and how to remunerate all the capital within the ESO.

Ofgem approach on the ESO's regulated regime

In December 2018, Ofgem published a consultation that suggested a remuneration method for the ESO based on a build up of margin requirements, calibrated against the different activities that sit within the ESO. In its May 2019 Methodology Decision, Ofgem decided that a RAV*WACC framework is appropriate for the ESO and considered an initial working assumption of zero for any additional remuneration of risk attributed to:

- The ESO may not be exposed to the same level of revenue collection risks in RIIO-2
- Long-term financing sources and facilities for the ESO remain unclear
- The ESO's submissions, and work referenced in supporting consultancy reports, highlight a large degree of uncertainty with respect to the associated cost of any additional funding

At the same time Ofgem recognised that some risks may be better accounted for by specific remuneration mechanisms, rather than a quantum increase in the WACC allowance, as the RAB isn't a relevant proxy to quantify these risks (para. 2.28).

In its decision on the RIIO-2 financial methodology, Ofgem decided to use three tests to assess each possible ESO risk, and thus determine the subsequent required remuneration thresholds. These are outlined below:

Test 1: CAPM and double-count test
— Has remuneration been provided elsewhere in the price control?
— Is this risk already captured in the beta judgement?
— Is this risk symmetrical?
Test 2 :Mitigation
— Can the ESO/investors address the risk in whole or in part?
— To what degree does the regulatory framework mitigate this risk?
Test 3: Scale
— How significant is the risk for the ESO?
— What drives the scale of the risk?

3 Risk and regulation (cont.)

Traditional approach to risk and return

One of the most important elements of a price control, including the current one for the ESO, is to create the right balance between risk and remuneration. This is in effect balancing the primary duty of protecting the interests of consumers and having regard to the need to secure that licence holders are able to finance the activities which are the subject of obligations on them.

Historically, economic regulators have discharged their protection and financeability duties for energy networks through frameworks based on the RAV*WACC model alongside financeability metrics which are primarily related to a companies ability to meet its debt obligations. The reason the RAV*WACC regime has worked well is because for asset heavy network utilities the majority of assets are those which make up the RAV, eg tangible, network related infrastructure. Due to the nature of these businesses, it is also reasonable to determine that the risks in the business are proportional to those assets. Therefore, by ensuring that the RAV is reflective of the assets in the business and periodically adjusting the WACC to reflect dynamic market conditions, the balance of risk and return is maintained.

Issues with this model for the risk profile of the ESO

The ESO is a fundamentally different business to a traditional network utility as it does not own any of the typical infrastructures such as substations and cables. The ESO's physical assets tend to be in the form of buildings and IT investments – noting that neither of these actually require ownership in order for the ESO to perform its duties, eg both could be leased in which case the ESO would have no tangible assets. Alongside these physical, tangible assets, the ESO has a significant amount of intangible assets such as intellectual property, engineering expertise, sector knowledge etc as well as contingent capital. This results in a business with a much smaller balance sheet exposed to a set of business risks not proportional to its tangible assets.

This can be illustrated by imagining the situation alluded to above where the IT assets and property assets currently forming the RAV are leased rather than being owned. This is not an unrealistic scenario given the recent movement towards cloud based computing and the fact that many service providers do not own the buildings from which they operate. In such a scenario, the ESO would have a RAV of zero and therefore under the traditional RAV*WACC model zero profit. However, it would still retain all the business risks currently associated with meeting its licence obligations, risks that no investor would reasonably take for zero remuneration.

This demonstrates that the majority of capital explicitly and implicitly associated with the ESO is not employed in tangible assets on the balance sheet and in the RAV. Therefore, applying a pure RAV*WACC framework to this business risks significantly undervaluing the total capital and implicitly under-remunerating the business.

In addition, the fundamental systemic role the ESO has to play in the electricity market, especially in the delivery of net zero and the decarbonisation of electricity, gas and transport, is different to traditional networks. In this context the relevant question is not how capital is employed in ESO's infrastructure and hence the RAV, but what is the appropriate level of remuneration that a commercial investor would be prepared to accept in a competitive market to take on all the risks and obligations associated with the system operator.

It is also important that the regulatory framework is designed to encourage the crucial societal outcomes that are expected of the ESO rather than encourage a focus on internal cost savings. The significance of the ESO is recognised by Ofgem in its October 25th methodology, which states;

"The Electricity System Operator (the ESO) has a central role in our energy system. The decarbonisation of the system presents both challenges and significant opportunities for the ESO to unlock substantial benefits for consumers. To make the most of these opportunities, and to ensure the ESO maintains a reliable, resilient and efficient system throughout this energy system transition, we need it to be flexible, collaborative and ambitious."

3 Risk and regulation (cont.)

The ESO has a fundamental role to play in unlocking value for customers and delivery of net zero, and in doing so it requires an entrepreneurial mind-set and an ability to take on risks. Given the pace of change and need to transition to a substantially different energy system while maintaining quality and cost, the ESO needs to be able to 'push the art of the possible' and, in doing so, be prepared to try new things and also be prepared for some of these to fail.

In order to achieve this, it is important that the regulatory regime encourages this type of innovative behaviour, i.e. the ESO must have an incentive regime that encourages it to take risks, invest in ambitious projects with inherent uncertainties, and receive remuneration consistent with its risk profile. It is in a unique position in the energy sector. The ESO is a relatively small yet systemically important business, centrally placed to drive outcomes across the sector's infrastructure providers and energy markets for the benefit of consumers and wider society.

This evolution has also been recognised in the recent National Infrastructure Commission (NIC) review of utility regulation published on 11th October and carried out by Sir John Armitt, the report states;

"The current system has yielded unprecedented and much-needed investment in the utilities we all rely on, with improved outcomes for the public in recent years. But it was designed for different times. The world is changing and the consequences for our regulatory landscape will be significant in the coming decades…. the regulatory system has not adequately addressed societal interests: it needs to work more effectively to achieve net zero greenhouse gas emissions by 2050, transition to full-fibre digital networks, and manage the increasing risks of floods and drought. To achieve the transformational change required, public and political confidence in the system must be improved, to provide greater stability and certainty for investors. It is vital that the right conditions are in place to ensure government, regulators and industry can respond as effectively as possible to these challenges"

Given the structural difference of the ESO's risk profile compared to other players in the electricity market, a more bespoke regulatory regime will likely be needed to create a framework that encourages the ESO to take measured risks in order to unlock greater value for customers and ensure that the challenging net zero objectives are delivered.

Regulatory precedents

There are few for-profit standalone system operators in existence. The majority are either integrated with transmission owners, or are publically owned not-for-profit organisations. The two most relevant examples of similar organisations to the ESO are EirGrid and SONI which are the system operators for the Republic of Ireland and Northern Ireland respectively. Both of these frameworks now include various building blocks in the remuneration framework, both including RAV*WACC and both also including additional layers.

SONI is of particular relevance because it is part of the UK, and also because its price control was the subject of a CMA appeal in 2017. It is worth noting that the subject of the CMA appeal in 2017 was similar to the current discussion around the ESO framework in that SONI submitted that a RAB*WACC approach, even with an adjusted WACC was insufficient for the risks it faced. The CMA agreed with this stating

"*We have concluded that SONI has made the case that the UR's approach does not fully reflect the risks that it faces. We agree with SONI that increasing the return on a small and unstable asset base to allow for higher operational gearing is not a reliable mechanism for addressing the risks faced by a business with the characteristics of SONI"* and

"*We recognise that the circumstances are complex for SONI and that in other regulatory contexts an adjustment to the WACC would be an appropriate mechanism and would be sufficient to address such risks, as part of an 'in-the-round' assessment. However, given the small size of SONI's RAB, and the fact that it fluctuates significantly over time, we do not consider that this is a sufficient or reliable approach in this case, and that it would pose significant risks to SONI's financeability."*

3 Risk and regulation (cont.)

Combining different approaches

Given the complexities and special characteristics of the ESO, as well as the issues surrounding the use of a traditional RAV*WACC framework, it is important to consider alternative frameworks and methodologies for determining the appropriate level of remuneration for the ESO.

In the context of relatively few comparators and limited regulatory precedent, there is a need to consider and utilise a range of approaches to ensure a robust process has been followed.

A number of possible approaches exist, each of which is likely to have particular limitations. By triangulating the outputs of all the approaches, comfort can be gained that whichever approach is ultimately followed, the overall level of remuneration is properly informed by their combined insights.

This report brings together the outputs and conclusions of a number of perspectives, including;

- Traditional RAV*WACC
- CMA building blocks approach
- EBIT margin implied by CMA approach
- Bottom up capital based requirement
- Relative risk analysis
- Pricing benchmarks

4 Relevance and limits of Ofgem's three tests

NG ESO has presented its remuneration requirements in terms of comparable benchmarks and the company's overall capital requirements, both calibrated to its overall risk profile and the risks attaching to its separate activities.

Ofgem's three tests require consideration of the ESO's remuneration requirements explicitly using the CAPM, which must include consideration of systematic and asymmetric risks, as well as potential mitigation of these risks and their materiality. In principle, this requires robust identification of the total capital employed and delineation of all risks, which is particularly difficult for the ESO. Moreover, in the case of the ESO, it is not possible to rely on market benchmarks to derive CAPM parameters as a substitute for the bottom up analysis.

The three tests were proposed in paragraph 3.22 of Ofgem's 28 August further consultation and confirmed in paragraph 2.42 of its 25 October 2019 decision. These are set out in the following table.

	Test name	Ofgem's questions
Test 1	CAPM and double-count test	Has remuneration been provided elsewhere in the price control? Is this risk already factored into the beta judgement? Is this risk symmetrical?
Test 2	Mitigation	Can the ESO/investors address this risk in whole or in part? To what degree does the regulatory framework mitigate this risk?
Test 3	Scale	How significant is this risk for the ESO? What drives the scale of the risk?

Ofgem recognises that some risks may be better funded by specific funding, rather than by an increase in the WACC allowance on the capital employed in the RAV, as these risks are not related to the RAV (para. 2.28 of Ofgem's 25 October 2019 decision). This is a pragmatic observation about how a remuneration requirement should be structured to reflect what drives the relevant risks. To address these tests, three components of NG ESO's risk-based remuneration requirement are considered:

The first component is the premium for systematic risk, arising from the covariance of the ESO's cash flows with returns in the market and the insight that this covariance would be priced in a risk premium derived using CAPM (providing it is applied to all capital employed in the business, i.e. that all capital and associated risk is recognised and remunerated, and all risk exposures are symmetric around the expected mean return). To consider this in the ESO's case, a taxonomy of risk drivers has been developed and used to help identify the related mechanisms that transmit systematic risk exposure from the wider economy through to the ESO—see Appendices 2 and 3.

The second component is the premium for asymmetric downside risks, which is based on the requirement for the ESO's financial exposure to represent a 'fair bet' before the CAPM-derived risk premium is applied. This is consistent with CAPM, which assumes that all one-side risks are already reflected in the expected cash flows based on all possible scenarios. If they are not, then there is a gap, which has to be recognised in regulatory allowances to ensure a probability adjusted expectation of the required return (this component might be small for asset-heavy networks but is material for the ESO)—see Appendix 3.

The third component of NG ESO's remuneration requirement is cash flow risk, which relates to both systematic and asymmetric dimensions of the cash flow volatility that NG ESO must manage. This needs to be considered separately for the ESO because it is so significant and can result in large variances of ESO's cash flow position depending on the ESO's capital and financing requirements unrelated to the RAV. This component would not have to be analysed separately if the cost of capital could be applied to the total maximum capital requirement of the ESO that investors implicitly have to commit to up front (rather than just the RAV).

4 Relevance and limits of Ofgem's three tests (cont.)

NG ESO's exposure to cash flow volatility is very large relative to its RAV. Over the next five years, it forecasts that it will collect some £4.4 billion of revenues annually on behalf of the sector while its RAV is forecast to average about £0.3 billion.

At the same time, NG ESO's downside risk exposure is heightened by adverse wider economic circumstances (e.g. recession, credit crunch or other financial crisis) that could lead to:

— risk of non-collection of TNUoS and BSUoS charges from financially distressed or failing suppliers

— risk of non-collection of connection charges from financially distressed or failing generators

— risk that financial institutions would be unwilling or unable to renew or extend working capital facilities at required levels

— risk of divergence of cash flows from forecasts caused by economic disruption

— high costs associated with facility renewal or extension associated with a heightened risk that Ofgem would disallow them due to judgements, with the benefit of hindsight, that they are demonstrably inefficient

All of these risks are associated with potentially significant cash flow volatility. With the exception of the last example, there might be an expectation that any potential financial exposure associated with these risks will be recoverable under the ESO regulatory regime, but from the investor's perspective it is the variation and timing of these cash flows that impacts remuneration and capital requirements.

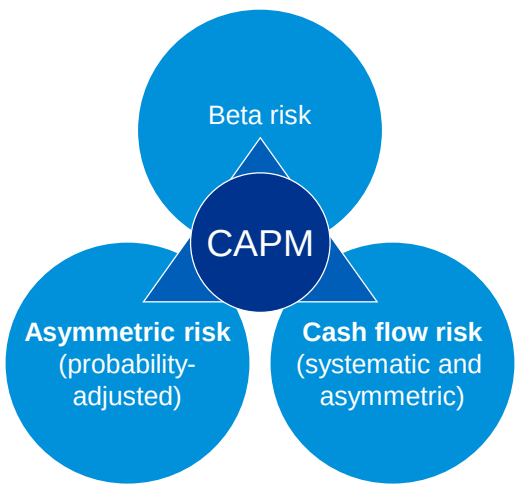
The consumption-based CAPM (C-CAPM), as a generalised, multi-period and hence more universal version of CAPM (from which CAPM can be derived), provides insights into the relevance of these risks and implications for the ESO's remuneration. Under C-CAPM, expected utility of economic agents is maximised by minimising covariance of cash flows with consumption in the economy. Investors value assets with low covariance as they minimise uncertainty of consumption. Assets (or businesses) that produce less cash, or even require additional capital investments at the time of when consumption and capital are most desired are particularly unattractive.

The ESO is exposed to large variances in cash flows and fluctuations in capital requirements. This means that from an investor's perspective, the ESO might not only produce a lower return, but in fact require *additional* capital (negative cash flows) at the time when this capital is most valuable in the market. This implies that its investors would require a higher return to accept exposure to and profile of such financial flows.

These considerations are less relevant for asset-heavy networks where most of the capital is employed in tangible assets, as reflected in the RAV, on a long term basis without significant variations. But they have a disproportionately large impact for a company such as NG ESO.

For these reasons, it is inappropriate to attribute no revenue requirement in relation to these risks. If the total return would be limited to a return on the RAV, no rational investor would put their capital at risk on that basis.

The remuneration requirements for NG ESO's cash flow risk are addressed in more detail in Appendix 4.



5 Perspectives on the remuneration requirement

NG ESO is a complex business with a diverse range of activities and exposed to a diverse range of risks.

One of its most striking characteristics is that its tangible asset base, represented in regulatory terms by its RAV, is small relative to the scale of the company's activities. It is an asset-light business. The tangible fixed assets it has invested in to support its activities are in large part incidental to the system that NG ESO is responsible for – the transmission system in Great Britain. The RAV associated with the transmission system infrastructure, owned by the TOs, is close to 50 times the size of NG ESO's own RAV.

Estimating the revenue requirement of such a business requires a recognition that there are many components of risk and there is a need to consider the implications for the company's revenue requirement of each one. The three primary reference points and three further top-down reference points have been considered below.

The first is Ofgem's working assumptions set out in its 25 October 2019 publication on RIIO-2 financial methodology and roles framework for the ESO. Ofgem indicated its working assumption of providing for a return on the company's RAV, but to provide no additional remuneration requirement.

The second is the exercise that the CMA undertook in the case of SONI, reported in its November 2017 final determination. The CMA's analysis establishes important principles that are directly relevant to NG ESO. Its analysis also sets useful benchmarks that help guide the build-up of a remuneration requirement for a similar business. This is considered in more detail in Appendix 1.

The third is a bottom up analysis of the ESO's risk exposure. This exercise was undertaken to provide insights relevant to Ofgem's three tests. Ofgem's tests emphasise the methodology it uses for the asset-heavy regulated networks, and an analysis of NG ESO's total risk exposure is built up relative to those networks. This analysis is described in more detail in Appendices 2 to 5.

The top-down reference points are:

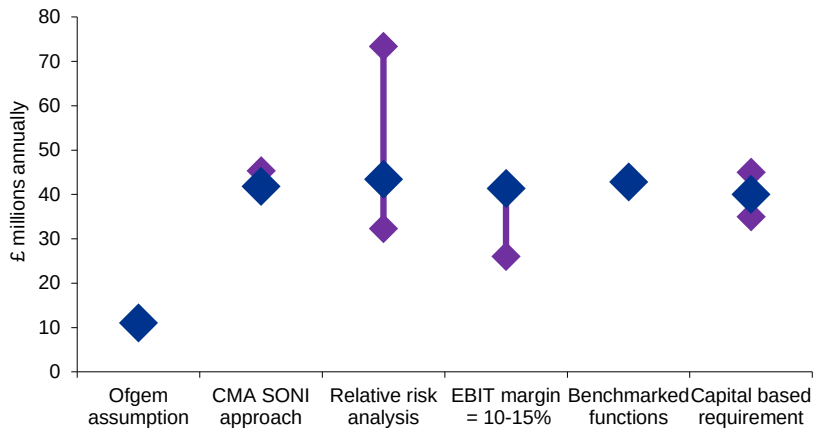
— key profitability metrics, notably EBIT margins. This analysis is set out in more detail in Appendix 8

— benchmark profitability metrics for NG ESO's separate functions described in Appendix 7

— remuneration levels indicated by estimates of the business's total capital value in Appendix 6

These reference points each indicate estimates or ranges of estimates for NG ESO's remuneration requirement, as indicated in the following chart.

NG ESO total remuneration requirements



6 Drawing out the insights

The availability of a recent CMA determination for a uniquely and directly comparable UK regulated business has helped inform many of these perspectives. There are a number of references to the CMA final determination for SONI in the benchmarking sections and also in the calibration of assumptions. This is because the CMA final determination for SONI can be considered as authoritative and was itself informed by triangulation across many sources of evidence. Appendix 9 provides an explanation of why it is more relevant than CMA's retail profitability analysis as a reference point for NG ESO's remuneration requirement.

The bottom-up risk analysis provides additional insights that help interpret the revenue requirements for NG ESO under different possible regime stances. Ofgem has not yet finished its specification of the regime for NG ESO and there are some key components still to be decided on. The principal outstanding components are:

— the specification of Ofgem's approach to incentives under ESORI, including how it chooses to drive the ESO towards its stated ambitions in Paragraph 1.2 of its 25 October paper; and

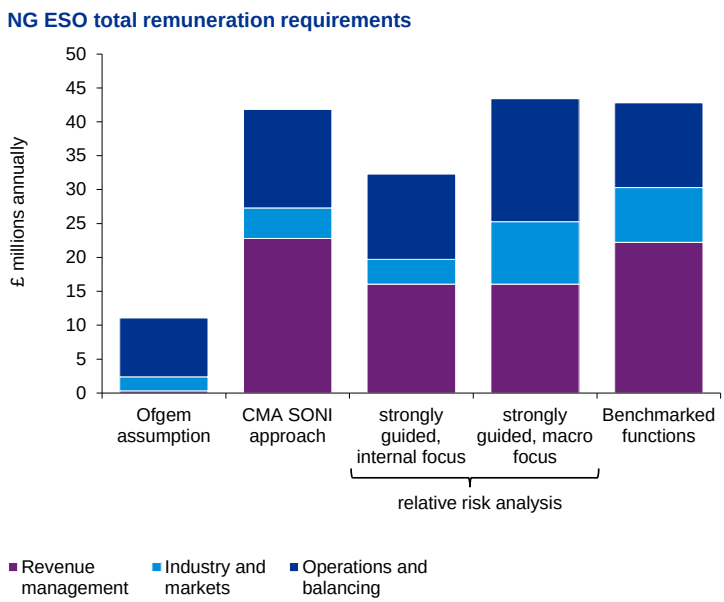
— the form of guidance for future ex post cost assessment reviews, including how it seeks to counteract inherent information asymmetries.

The relative risk analysis (Appendices 2 to 5) highlights that these outstanding components of the regime will have substantial influence over the risk context of the business and, in particular, its exposure to asymmetric risk (expected losses) and systematic risk.

The outstanding components of the regime for NG ESO, those not yet fully finalised by Ofgem, have the potential to give the company a more strategic alignment with Ofgem's objectives and ambitions. This would imply exposure to additional risks as an inherent feature of incentives. Although there is a cost involved for consumers, it could be considered that the risk would be productively harnessed to achieve wider societal aims, at costs which could be disproportionately small relative to the potential benefits.

Function-level analysis

Analysis of the different perspectives into the three NG ESO functions described in Appendix 7 is revealing. The following chart indicates the break-down of remuneration requirement into these functions:



6 Drawing out the insights (cont.)

The inclusion of benchmarked remuneration requirements from Appendix 7 in the function level analysis shown in the chart on page 12 indicates that:

— the Professional and Commercial Services industry benchmark used for the industry and markets function is more closely aligned with a 'macro focus' regime stance, and

— the LSEG benchmark used for the operations and balancing function is more closely aligned with the 'internal focus' regime stance.

The Professional and Commercial Services industry benchmark reflect a level of commercial risk and reward that would be driving behaviours in that sector. These behaviours could plausibly be analogous to those that would be needed for the strategically-driven ESO in Ofgem's ambition and incentivised in the 'macro focus' regime stance.

Conclusions

The analysis in this report points to levels of remuneration requirement for NG ESO that combines a range of reference points and is informed by the bottom up analysis of the risk drivers and the associated transmission mechanisms for relevant systematic risks. As well as rationalising the remuneration requirements in terms specified by Ofgem's three tests, this analysis provides insights into the impact of the regime stance that Ofgem will in due course finalise.

The analysis indicates that Ofgem's suggestion of no additional remuneration beyond the base return on the RAV is not appropriate. The inference, as illustrated in the chart on page 11, is that a regime that is consistent with Ofgem's stated aims would indicate a remuneration requirement of around £40 million per annum.

The appropriate calibration of the required remuneration for the ESO is also dependent on decisions that Ofgem has not yet finalised, in particular relating to the quality of guidance it is able to establish for future ex post cost reviews and the quality of incentives it puts in place for the strategic outcomes it evidently seeks. The analysis in Appendix 5 sets out how these choices would affect the ESO's remuneration requirement.

Finally, although we have not evaluated whether the NG ESO would be financeable on a stand alone basis under any regime stance that Ofgem might adopt, Appendix 10 sets out the issues relevant to an appropriate framework for assessing its financeability, an assessment of the suitability of Ofgem's suite of financial metrics for the ESO and an evaluation of relevant thresholds.

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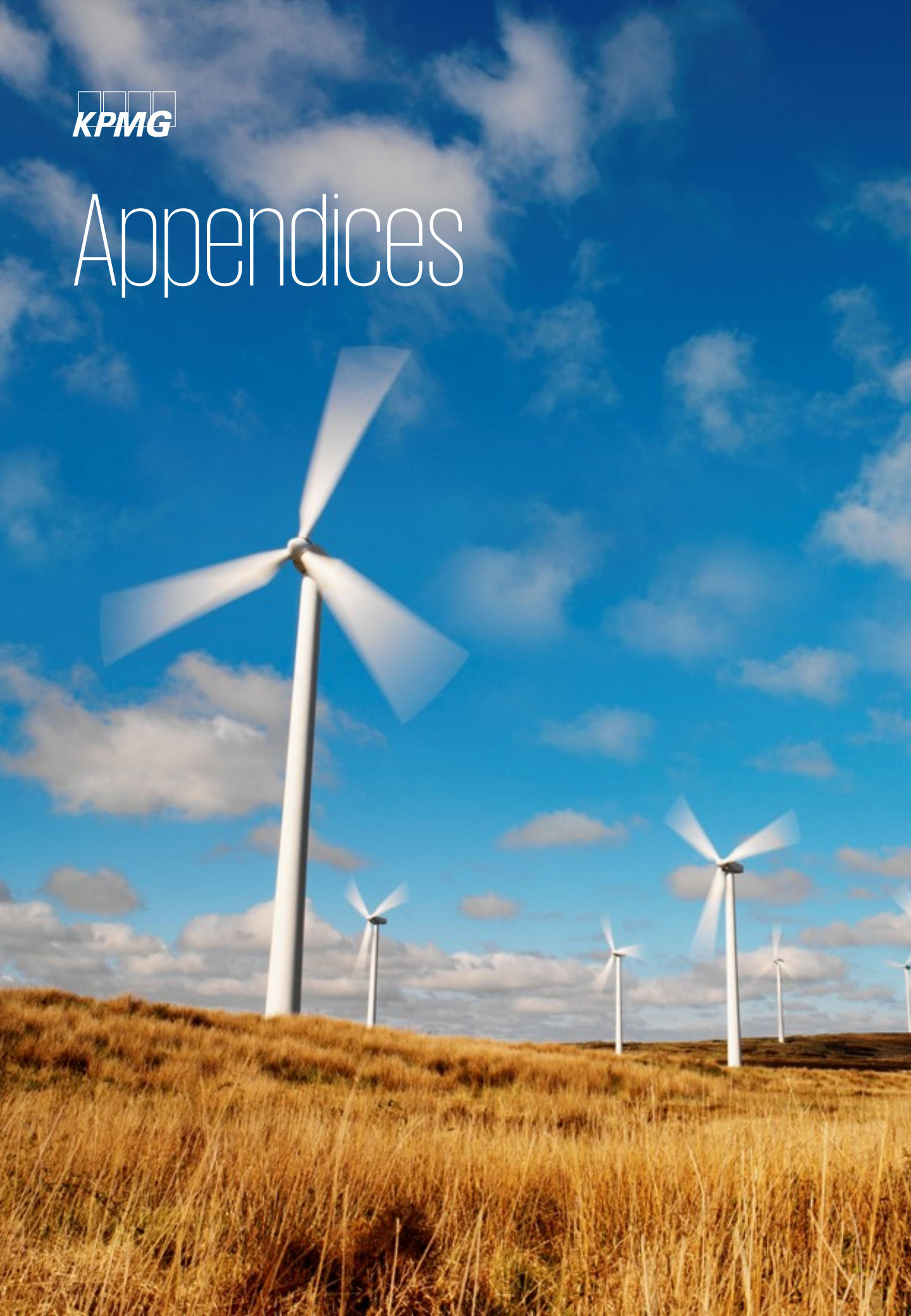
Appendices



Appendix 1:

Regulatory precedent – CMA SONI

In November 2017 the CMA reached a determination on SONI v NIAUR in regard to SONIs price control.

The CMA determined that the RAV*WACC framework was not sufficient to fully remunerate SONI for the levels of risk that it faced and set out a series of layers in addition. These can be summarised as

1. RAV*WACC with an uplifted asset beta to reflect operational gearing
2. 0.5% margin on pass-through costs relating to the revenue collection function
3. 3% premium for asymmetric risk associated with costs which were subject to an ex-post review and potential disallowances
4. 1.75% return on the Parent Company Guarantee (PCG)

It should be noted that the ESO and SONI are not identical in terms of licence obligations and risks though there are a number of important similarities. While both organisations are situated in the UK and carry out system operation activities, SONI carries out pre-construction activities which the ESO does not. Conversely, the ESO is responsible for a number of duties such as the capacity market auction which SONI does not have. SONI's core business, excluding its pre-construction activities, is more asset-light than NG ESO, but its pre-construction activities (on which the WACC is earned) make the asset weights broadly comparable overall. SONI is subject to ex ante incentives for much of its internal costs, and ex post cost assessment for its pre-construction activities and major IT projects. At the time of the CMA determination, SONI was subject to its share of an incentive regime for managing dispatch balancing costs on an all-island basis and the potential of a further all-island incentive in relation to the DS3 System Services project.

Acknowledging these differences, it remains relevant to consider the precedents determined by the CMA in relation to NG ESO.

Firstly, that the RAV*WACC component remains. Ofgem's WACC estimate is evidently informed by the CMA basis for determining the WACC, and to this extent does not represent a departure from the CMA basis.

Secondly, the CMA determination provides for a margin on pass-through costs which relates to an almost identical licence requirement around revenue collection.

Thirdly, the CMA determined an allowance for asymmetric risk. Although the scope of ex post cost assessments is in part different between the two businesses, the CMA's rationale remains relevant to the ESO.

Fourthly, there is no licence requirement for the ESO to secure a PCG, or similar contingent equity. That is not to say that no contingent equity might implicitly exist, but simply that it is not a requirement of NG ESO's licence. SONI's PCG, scaled up for NG ESO's activity levels, would be about £200 million.

The following table compares the total annual remuneration requirement on the basis determined by the CMA applied to the relevant NG ESO financial metrics with Ofgem's working assumptions.

Annual remuneration requirement	Ofgem assumed	CMA basis	NG ESO base	Ofgem basis	CMA basis
	%	*%*	*£m*	*£m*	*£m*
Base return on the RAV	3.65%	3.65%	303	11.1	11.1
Revenue collection activities	0.00%	0.50%	4,445	0.0	22.2
Asymmetric risk	0.00%	3.00%	284	0.0	8.5
Remuneration requirement before PCG				11.1	41.8
Cost of the PCG	0.00%	1.75%	200	0.0	3.5
Total remuneration requirement				11.1	45.3

Appendix 2:

Risk drivers (1/7 - taxonomy)

The following table sets out a taxonomy of risk drivers affecting the sector, both the ESO and the network owning companies.

It adopts a structured approach, considering how systematic, or economy-wide, risk could transmit through to systematic risk in the regulated company. It's the wider economy risk that would tend to impact on the investment market taken as a whole. It considers how those wider economic influences affect regulated company activities and how those then translate through regulatory mechanisms into investor returns.

Driver	Relevance and regulatory mitigation	Systematic risk transmission mechanisms		NG ESO			TO/ DNO/ GDN
		returns	cash	returns	cash	asym-metry	comp-arator
Uncertain demand levels	Uncertain demand is main driver of systematic risk for many businesses in the wider economy. For regulated networks, risk is reduced/ eliminated by revenue caps and volume drivers.	Primary risk eliminated by regulatory mechanisms. Residual risk for ESO in demand balancing and ESORI.	Demand uncertainty affects balancing forecasts	★	★	—	—
Uncertain input prices	Input prices may sometimes have a counter-cyclical rather than pro-cyclical influence on business returns. Risk is mitigated by RPE index.	Risks mitigated by RPE index	N/A	—	—	—	—
Uncertain delivery/ productivity/ efficiency	Likely to be idiosyncratic risk (company or sector-level factors). Scope for information asymmetries mitigated by high cost confidence incentives in ex ante forecasts. For ex post, mechanisms imply downside asymmetry (dealt with under regulatory discretion below)	N/A	N/A	—	—	—	—
Uncertain revenue collection	Potential systematic exposure for returns, but negated by regulatory mechanisms. Systematic component of liquidity risk remains.	NG provider of backstop facility	NG provider of backstop facility	—	★	—	—

Appendix 2:

Risk drivers (2/7 - taxonomy)

Driver	Relevance and regulatory mitigation	Systematic risk transmission mechanisms		NG ESO			TO/ DNO/ GDN
		returns	cash	returns	cash	asym-metry	comp-arator
Uncertain market balancing	Behaviours of participants in the market, generally operating in their own competitive markets, will be influenced by wider economic (ie systematic) factors. (Risk arising from evaluative nature of incentives is dealt with under regulatory risk below.) Liquidity risk arising from timing of pass-through mechanisms.	ESORI – participant behaviours	Timing of pass-through mechanisms	★	★	—	—
Uncertain network asset performance (asset owners)	Company-level idiosyncratic risk factors, but affected by generator, storage and consumer behaviour.	N/A for ESO	N/A	—	—	—	—
Uncertain system/ service performance (ESO)	System affected by behaviour of market participants indicates systematic influences. (Risk arising from evaluative nature of incentives is dealt with under regulatory discretion below.)	ESORI – participant behaviours	N/A	★★★	—	—	—
Uncertain market interest rates	The interest rate environment may be a significant source of exposure to the wider economy. Largely mitigated by cost of debt indexation or pass-through.	Negated by regulatory mechanisms.	Residual	—	—	—	—

Appendix 2:

Risk drivers (3/7 - taxonomy)

Driver	Relevance and regulatory mitigation	Systematic risk transmission mechanisms		NG ESO			TO/ DNO/ GDN
		returns	cash	returns	cash	asym-metry	comp-arator
Defined benefit pension schemes	A scheme's investments in risky asset classes (e.g. equity) would generally expose the sponsoring employer to beta risk.	Negated by triennial regulatory process.	N/A	—	—	—	—
Stranded network risk	Scope for systematic risk influences. Potential mitigation through inter-generational balancing and capital maintenance strategy. Impact is downside asymmetric.	Recover-ability	N/A	—	—	—	— to ★★★
Regulatory discretion	Regulatory behaviour will be directly or indirectly informed or influenced by the wider economic circumstances, and may be downside asymmetric. This affects: — ex post evaluation of performance under ESORI — ex post evaluation of costs for disallowance — penalties for failures under the licence — other responses to events or perceived performance issues	Inter-period and in-period evaluative processes (ex post dis-allowance and ESORI)	Evaluative processes around high facility costs when markets under stress	★★★	★	★★★	★★
Political risk	Political sensitivity liable to be amplified when wider economy is under-performing. Downside asymmetric. If severe, could interfere with regulatory incentives	Regulatory influence and legislation	N/A	★	—	★	★★

Key for significance of transmission mechanisms for systematic risk:

— none identified, ★ small but significant, ★★ moderate, ★★★ strong

Appendix 2:

Risk drivers (4/7 - key insights)

The taxonomy and analysis of risk drivers and associated transmission mechanisms for systematic risk help to structure NG ESO's remuneration requirement in the CAPM-based terms Ofgem specifies in its three tests (para. 2.29 of Ofgem's 25 October 2019 decision).

In large part, this taxonomy reflects thinking that has emerged across economic regulation in recent years. The taxonomy has been extended to include risk areas specific to the ESO business.

In summary, the principal drivers for the ESO business's remuneration requirements in the table below. This is a summary of the full table, which is set out on pages 16 to 18.

	Systematic risk transmission mechanisms		NG ESO			TO/DNO
Driver	**returns**	**cash**	**returns**	**Cash**	**asym-metry**	**comp-arator**
Uncertain demand levels	Residual risk for ESO in demand balancing and ESORI.	Demand uncertainty affects balancing forecasts	★	★	—	—
Uncertain revenue collection	—	NG provider of backstop facility	—	★	—	—
Uncertain market balancing	ESORI – participant behaviours	Timing of pass-through mechanisms	★	★	—	—
Uncertain system/ service performance (ESO)	ESORI – participant behaviours	N/A	★★★	—	—	—
Stranded network risk	Recoverability	N/A	—	—	—	— to ★★★
Regulatory discretion	Inter-period and in-period evaluative processes (ex post dis-allowance and ESORI)	Evaluative processes around high facility costs when markets under stress	★★★	★	★★★	★★
Political risk	Regulatory influence and legislation	N/A	★	—	★	★★

Two high level insights from the taxonomy are:

— Leaving aside stranded network risk (that may be relevant to some networks, although not currently factored into Ofgem's remuneration requirement estimates for them), the main drivers for systematic risk in networks relate to inter-period regulatory processes.

— The ESO is also exposed to these drivers, but in addition is exposed to systematic risk drivers through its ESORI Arrangements (The Electricity System Operator Reporting and Incentives Arrangements). It has further some residual systematic exposure in its cash flows.

These insights may not be immediately intuitive and bear some unpacking.

Appendix 2:

Risk drivers (5/7 - regulatory discretion)

Predominance of inter-period regulatory processes for networks

This analysis does not include uncertain in-period totex risk as a driver of systematic risk. While this is a dominant risk factor for efficiency incentives and a key driver for outturn return uncertainty it is not clear to what extent totex uncertainty transmits **systematic** risk, e.g. economy-wide risk, to investor returns. For example, if the economy more generally is suffering, it might be expected that capacity surpluses in some sectors as demand dries up, and it might then be expected that suppliers in those sectors reduce prices to maintain activity levels. This would tend to have counter-cyclical effects on regulated company returns, which might rise as a more competitive environment for the company's inputs would generate cost savings and incentive gains. Other market exposures may also be relevant. However, no clear pro-cyclical transmission mechanism for systematic risk can be immediately identified.

Furthermore, regulatory mechanisms protect networks within control periods from what is, for the generality of firms in the economy, the main driver for systematic risk. This is uncertain demand for the firm's products or services – when the economy suffers, demand falls and firms either sell less or have to reduce their prices. This dynamic does not apply to regulated essential monopolies that are always permitted to recover their allowed revenues. Meanwhile, performance in managing networks' cost programmes or the performance of their physical networks will substantially be driven by idiosyncratic firm-level or sector-level factors.

However, there is clear evidence from observations of betas in network share prices relative to the market that there is unambiguous systematic risk. It is simply by deduction that the primary source of systematic risk for networks can only reside in inter-period regulatory processes, and specifically the scope for regulatory decisions to be informed or influenced by wider factors in the economy.

This deduction has important ramifications for an understanding of systematic risk drivers more generally. Regulatory discretion is in many respects unavoidable, and in some respects is seen as a desirable feature of an incentive regime where complexity precludes mechanistic approaches. But the absence of any other credible explanation for systematic risk in networks leads to the conclusion that regulatory discretion is a primary transmission mechanism for systematic risk.

The workings of this mechanism can be characterised. A regulator makes many trade offs in its judgements at the time of a price control review. It would aim to maintain the confidence of a wide range of stakeholders in its judgements, and seek insights from them about their priorities and preferences through its consultation processes. Since the generality of stakeholders – notably consumers, opinion formers and regulatory decision-makers themselves – live in the real world, their priorities and preferences are likely to be conditioned by their real world environment, and in particular the wider economic conditions and their effects on their personal (or corporate) economic outlook. This means systematic risk.

Read across to NG ESO

It is reasonable to generalise the evident presence of systematic risk in regulatory discretion in inter-period regulatory processes to regulatory discretion more widely. Specifically in Ofgem's RIIO-2 regime for NG ESO, this applies to the ex post regulatory evaluation of ESORI incentives and its costs.

Appendix 2:

Risk drivers (6/7 - ESORI)

ESORI – underlying systematic risk drivers

The ESO provides services, not infrastructure. Its role is to promote and help secure efficient development and use of the infrastructure for the benefit of its users, consumers and, indeed, wider society. Its role is about optimising the value of the service to users or society provided by that infrastructure, even though it doesn't itself own that infrastructure.

Consistent with paragraph 1.2 of Ofgem's 25 October 2019 decision on our RIIO-2 financial methodology and roles framework, NG ESO faces the challenges of decarbonisation and is committed to seizing the opportunities to unlock substantial benefits for consumers. Ofgem expects the ESO to:

— be ambitious, forward-looking and proactive in maintaining a reliable, resilient and efficient system through the transition,

— work in a coordinated way with Ofgem and other industry parties to solve system challenges, and

— be dynamic and flexible in adapting to emerging issues and new developments.

It is evident that Ofgem and NG ESO share a vision for its central role in securing the strategic decarbonisation outcomes. This end will be at least facilitated by, and likely necessitate, a properly incentivised ESO. That means an incentive regime that's sufficiently aligned with those outcomes.

An important part of NG ESO's role will be to influence outcomes through its interactions with other participants in the market. It can influence, but cannot control their behaviours. Some of them will be regulated monopolies, but most of them will be operating in their own competitive markets and accordingly be subject to wider economic forces. To that extent, NG ESO and the outcomes it is incentivised to secure through its ESORI Arrangements will be affected by those forces. That means systematic risk.

This risk is amplified with the number and diversity of participants in the electricity market. The system is no longer centred on large providers of power and their retail arms but are increasingly driven by an ecology of small, variable or intermittent and often embedded users. NG ESO cannot realistically have direct commercial relationships with these parties or full data visibility. It must instead operate more strategically to ensure that the market and balancing operations continue to be effective. The increased diversity and dispersion of market participants means that the system is more deeply integrated into the wider economy and more exposed to the systematic risk influences that drive covariance with investment markets.

ESORI – regulatory discretion in incentive evaluation

The fluidity of the issues that NG ESO will be addressing means that they cannot be comprehensively distilled into simple output measures. It is therefore natural for there to be an evaluative aspect to its incentives, and this is built into the ESORI Arrangements. The ESORI Arrangements incorporate two layers of evaluation, by the ESO Performance Panel and by Ofgem. Their judgements should be informed by the real world needs of consumers and societal objectives, both of which sit within the wider economic context. As discussed on page 20, regulatory discretion is evidently subject to systematic risk drivers.

ESORI Arrangements – promoting real world outcomes

Taken together, these insights indicate that the ESORI Arrangements combine two transmission mechanisms for systematic risk. The first is an underlying exposure to wider economic forces – this can be seen as a quite distinctive feature of NG ESO without parallel in the networks. The second is the naturally systematic risk inherent in regulatory discretion.

There is a rationale for this being the case. NG ESO's roles include market development, system insight, planning and network development, all of which take place in the real world and in the context of complex market dynamics. Protecting the business from a proportionate exposure to the inherent risks could compromise the strategic intent of the incentive regime.

It is therefore important, that the risk exposure is proportionate and controlled.

Appendix 2:

Risk drivers (7/7 - cost assessment)

In its May 2019 decision on sector specific methodologies, Ofgem decided that NG ESO would not be subject to the Totex Incentive Mechanism (TIM) but would instead operate a generalised cost pass-through regime with a cost disallowance mechanism for demonstrably inefficient costs.

Two dimensions of investor risk arise – asymmetric risk and systematic risk.

Asymmetric risk

The regulatory principles involved in a cost disallowance mechanism were confirmed by the CMA in its November 2017 final determination for SONI. In the SONI case, the Utility Regulator operates a cost disallowance mechanism for some classes of cost for 'Demonstrably Inefficient and/or Wasteful Expenditure' (DIWE). This would appear to be a similar mechanism to to that Ofgem proposes more generally for NG ESO's costs.

In paragraphs 7.361 to 7.365 of its final determination report, the CMA noted that it "represents an example of an expected loss: where there is zero probability of an outperformance against the expected return on capital, and some probability of a lower return." The CMA concluded that, unless the regulator is saying that the company will always be able to recover its costs, "this framework must as a matter of principle be asymmetric."

To remedy this problem, for SONI, the CMA provided a fixed ex ante allowance to compensate for asymmetric risk. This is referred to again in Appendix 3.

Systematic risk

The CMA also explored the possible impact on risk of having a defined framework, or guidance, for operating such a DIWE mechanism. In paragraph 6.271, it noted that "although guidance may produce additional certainty on matters of procedure and timing as regards the application of the DIWE term, it could not produce 'certainty as to when, how and why the UR might seek to adjust its revenues downwards to account for DIWE' as sought by SONI. Such decisions will by their nature depend on the relevant facts." This conclusion reflects the reality that there is judgement involved in assessing what is demonstrably inefficient. The purpose of the mechanism would be ensure the ESO's governance of its costs outside the TIM remains diligent, for the protection of consumers. So as not to weaken this safeguard, the CMA noted the importance of ensuring that the disallowance mechanism "is not so rigid and prescriptive that it has the effect of fettering the [regulator's] discretion in the application of the mechanism to particular sets of circumstances."

As in SONI's case, investor concerns would be mitigated if the cost disallowance mechanism is defined clearly to ensure it properly reflects Ofgem's intention that it is used only where the ESO has been demonstrably inefficient. But the need for discretion remains integral to the mechanism, and thereby there will be an exposure to systematic risk.

Appendix 3:

Remuneration for asymmetric risk

The CMA confirmed that an ex post cost disallowance mechanism results in an asymmetric downside adjustment to expected returns, and a corresponding need to provide a compensating additional revenue requirement (see page 22).

To remedy this problem for SONI, the CMA provided an additional fixed ex ante allowance for asymmetric risk. Although it provided an allowance scaled at 3% of relevant expenditure, it is evident that it estimated the expectation of loss (absent an additional allowance) at about 2% (see paragraph 12.109 of the CMA final determination for SONI). Its estimate was based on an assumption that the regulator would provide contingency in budgets against which outcomes are assessed and that it would have in place a formal and structured process for those ex post assessments.

A strongly guided approach to cost assessments would give investors confidence that future regulatory reviews would be directed to secure, as far as possible, objective outcomes. This would mean that the discretion of those undertaking the reviews is informed by awareness of the inherent difficulties in proving efficiency and some important inherent information asymmetries (see below).

It is encouraging that Ofgem has committed to clarify its description of the cost disallowance mechanism with a view to mitigating ESO and investor concerns.

It should be noted that disallowance assessments will be the primary mechanism to achieve Ofgem's incentive intent of guarding against inefficiency for the ESO while the leading mechanism for networks is the ex ante TIM. This means that the historical experience of costs being disallowed in the networks (where the scope for disallowance is a supplementary mechanism to the TIM) may not read across to a regime where it is the primary mechanism.

The CMA established that, even with suitable safeguards, asymmetric risk would remain and an additional revenue requirement would follow.

It is possible that an appropriate revenue requirement might be provided by way of asymmetry in other aspects of the regime. The scope for information asymmetries to the advantage of the ESO is practically negated by the ex post nature of the proposed incentive mechanisms. It may also be possible to introduce a structural asymmetry elsewhere to provide a realistic expectation of an equivalent revenue addition. For the purpose of this report, the focus will be on scaling that revenue addition rather than on how it might be conveyed.

There is however an important information asymmetry that goes the other way. That is that the ESO will be making expenditure decisions without the benefit of hindsight, while Ofgem will be evaluating spend with that benefit. The CMA referenced the inherent difficulty in proving efficiency in this context in paragraph 7.98 of its final determination for SONI. The challenge for Ofgem in framing its arrangements will be to somehow mitigate this in-built information asymmetry as well as the structural asymmetry of downside-only adjustments.

Recognising, as the CMA did, that some areas of expenditure will have a higher risk of disallowance and others will have a lower or even zero risk of disallowance, it could be assessed that a reasonable loss expectation under a disciplined disallowance framework could be 2% of relevant costs. The loss expectation would have to increase, perhaps to 4%, if the framework does not credibly provide confidence that levels of objectivity will be maintained. Recognising that the public's appetite for a strongly long-term-focused ESO in benign economic circumstances may shift to greater concern around bill and profit levels in less benign circumstances, it would be important that the strength of guidance for cost assessments can credibly maintain a sufficiently neutral stance, structurally insulated as far as practicable from external pressures.

Appendix 4:

Remuneration for revenue collection

NG ESO is an asset light business with a heightened and systematic dimension to its cash flow risk in its revenue management role (see page 10 and Appendix 2). Since there would be scope for regulatory disallowance of the costs of securing working capital facilities, there would also be an asymmetric component to risk.

The discussion on page 10 showed why it would be unsafe to disregard a revenue requirement in respect of these risks.

In its November 2107 final determination for the Northern Ireland ESO, SONI, the CMA found that its regulator, the Utility Regulator (UR), was wrong to provide no additional remuneration above that required to cover working capital facility fees. In paragraph 12.132, it found that the UR was wrong because it failed to remunerate SONI for the risks taken. It found that there are risks associated with managing the cash flows and that SONI would not, by choice, manage these cash flows without remuneration. In paragraph 12.137, it noted that size of the cash flows is so large relative to the SONI's business that "we do not consider it reasonable to assume that there is no incremental cost of managing this risk".

The CMA noted that it is not possible to evaluate the revenue requirement directly using a calculation methodology like CAPM with an observed risk metric such as beta. However, it is possible to consider benchmarks for the revenue requirement in other businesses with broadly similar exposures to cash flow risks. It concluded that, as the level of its risk is related to the size of the revenues handled, it would be appropriate to provide for a risk premium in the form of a margin on the relevant revenues.

The CMA considered a wide range of comparators, discussed in paragraphs 12.144 to 12.153. These included SONI's equivalent regulated ESO in the Republic of Ireland, invoice discounting (factoring) services and other comparators submitted by SONI in its evidence. These included credit and debt card and custodian services.

The CMA assessed a margin requirement for SONI's revenue collection activities at 0.5% of the relevant revenues, towards the top end of its range of 0.25% to 0.5%. NG ESO has indicated a requirement of 0.35%.

Given the similarities of the revenue collection functions there appears to be no compelling rationale to suggest any significant change in margin requirements.

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Appendix 5: Relative risk (1/5)

Deriving a measure of relative risk

This appendix considers the exposure of NG ESO to systematic risk, building on the taxonomy of risk drivers discussed in Appendix 2. An important reference point, referred to by both Ofgem and the CMA in deriving their asset beta estimates, is the exposure in more conventional regulated networks.

The first key insight from the analysis of the taxonomy of risk drivers and associated systematic risk transmission mechanisms, discussed on page 20, is that systematic risk for networks derives in large part from inter-period regulatory processes and the application of regulatory discretion.

These processes relate in part to the estimation of required returns and in part to levels of a company's activities, notably its costs. The RAV itself is generally not subject to review, but its value does broadly correlate with the scale of the business and its activities that are periodically subject to review.

The analysis in Appendix 2 indicates that the drivers of risk for the ESO also relate to its activities, its transactions, rather than its RAV. Furthermore, for the ESO, the discussion on page 6 showed there is not necessarily any clear relationship between the RAV and the business's risk exposure.

In light of this, it would seem helpful to derive a beta measure that relates systematic risk exposure to activity levels rather than RAVs. In this way, we can derive meaningful measures of relative risk exposure.

The ratio we derive is precisely analogous to gearing adjustments to beta. The starting point is a recognition that we can observe an equity beta (for a listed share). We measure the equity beta as the covariance over time between the variations in investor returns (measured relative to the value of equity) and the variations in returns on the market . We can convert an equity beta to an asset beta, which similarly represents the covariance over time between the variations in investor returns (measured relative to the value of the enterprise) and the variability of returns in the market.

We can normally compare asset betas between different companies more readily than equity betas because there is more likely to be a stable relationship between risk and enterprise value than with equity value, since equity value can be materially affected by incidental decisions about gearing levels.

For NG ESO, even the asset beta may not be a stable measure of risk exposure since the tangible fixed assets employed by the ESO, and thus its RAV, are in large part incidental to its wider activities and the risks it is exposed to.

It would therefore seem more meaningful to relate beta risk to activity levels rather than asset levels. This is simply identifying a more meaningful 'ratio' to measure and compare risk.

The following table uses the same logic involved in converting equity betas to asset betas to show the calculation of 'activity betas' for NG ESO, taking Ofgem's estimate of the ESO's asset beta as the starting point. From those activity betas, it then shows the calculation of the risk concentration in ESO activities relative to TO/DNO activities.

`		NG ESO	TO/DNOs
Ofgem's view of asset beta	(A)	0.60	0.375
Activity leverage (RAV/expenditure*)	(B)	1.06	7.85
Activity beta	(C = A x B)	0.64	2.94
Relative risk concentration in ESO activities	$C_{ESO}/C_{TO/DNOs}$	0.22	

* TO/DNOs totex expenditure and RAV data are taken from the November 2018 PCFM while the ESO's expenditure (capex plus opex excluding pensions etc) and RAV are taken from NG ESO's December 2019 business plan.

Appendix 5: Relative risk (2/5)

Relative risk and cost assessments

This measure of relative risk concentration indicates that there is about one fifth (0.22 times) of the exposure to systematic risk in the ESO's activities compared with the TO/DNOs activities, £ for £.

The analysis of risk drivers points in Appendix 2 points to where the difference might be explained, in the inter-period regulatory processes and in particular the necessary exercise of regulatory discretion.

One of the more prominent differences in the evaluation regimes for the ESO and the networks is that the networks are subject to periodic reviews for determining **ex ante** allowances while the NG ESO is subject to **ex post** reviews of outturn costs with the scope to disallow expenditure judged to be demonstrably inefficient.

Both processes have the same intended purpose, which is to encourage efficiency. However, the degree of variability in the assessments of cost forecasts might reasonably be greater than that for outturn costs. This could be the case even after recognising that the impact of a reviewer's judgement on network investors would be attenuated by the sharing factor while the impact of any disallowance for the ESO would be attributed to the company.

It therefore appears plausible that the ESO could be exposed to significantly lower levels of systematic risk per £1 of its activities than the networks.

Recognising that Ofgem's estimate of the asset beta for the ESO was informed by the CMA's estimate for SONI, it may be reasonable to judge that the risk concentration factor is most likely calibrated for a SONI-like regulatory regime, or at least the regime that pertained at the time of the CMA review. We discuss this at a high level in Appendix 1. We also discuss the relevance of the guidance regime for cost assessors in Appendix 3 and how the CMA highlighted that its judgements were underpinned by an assumption that the Utility Regulator would put in place strong guidance. Appendix 3 identified that a strong guidance framework would help insulate the cost assessments as far as practicable from external pressures.

It can be supposed that the absence of this kind of strong guidance framework for cost assessments would tend to increase the sensitivity of judgements to influences in the wider economy, and thus create an increased exposure to systematic risk.

Accordingly, it would be reasonable to attribute a significantly higher relative risk concentration if Ofgem were unable to establish a strong guidance framework. For the purpose of considering the possible implications for the ESO's remuneration requirement, an indicative estimate of about 0.4 rather than 0.22 is attributed to a normally guided assessment regime. The base level risk concentration of 0.22 would be appropriate where there is a strongly guided regime, as Ofgem intends.

Appendix 5: Relative risk (3/5)

Relative risk and ESORI

The second key insight from the work on the risk driver taxonomy is that the ESORI Arrangements combine two transmission mechanisms for systematic risk. For the ESORI Arrangements to be effective in driving the ESO towards decarbonisation and other desired outcomes for our energy systems, they need to engage the ESO meaningfully and proportionately with the risks that are inherent in its regulatory regime.

Ofgem is still consulting on key questions around the design and scale of the ESORI Arrangements, and it is also difficult to judge how the arrangements will operate in practice, especially as there is such a strong evaluative component to them. Ofgem may choose to remain within relatively modest bounds or it may choose to open up the scope for a more assertive ESO capable of driving forward change in the industry towards the Government's and Ofgem's longer term decarbonisation objectives.

Having decided on a general direction in its stance, the exercise of discretion inherent in its ex post cost assessments and the operation of the ESORI Arrangements would still be influenced by real world factors – the public's appetite for a strongly long-term-focused ESO in benign economic circumstances may shift to greater concern around bill and profit levels in less benign circumstances.

The value of balanced incentives

While its rationale is understandable, Ofgem's adoption of a cost pass-through subject to a disallowance mechanism for the ESO heightens the need for a balanced approach to overall incentive design. The potential disadvantage with a disallowance-based scheme is that, without strong outcome-based incentives on the company to take risks, it will naturally lead to severe risk aversion. If the risk of disallowance is the dominant variable for a company's returns, it would inevitably drive investment strategy and management culture within the company. This would lead to a strongly risk-averse ESO and its capacity to respond positively to achieve longer term strategic objectives for society would be impaired.

Accordingly, Ofgem could maintain the ESORI Arrangements, including (but not only) specifying ranges for rewards and penalties, so they are consistent with the positive strategically-driven ESO described in paragraph 1.2 of Ofgem's 25 October 2019 decision. It would be important to frame the arrangements to make it credible that the intent, and the associated balance between positive outcome incentives and negative cost incentives, will be maintained through both benign and less benign economic circumstances. This report calls this incentive stance a "macro focus".

To achieve its objective of a strategically-driven ESO, Ofgem would need to consider how its ESORI incentives provide an offsetting balance to the natural risk aversion associated with NG ESO's ex post cost incentive regime. Given the systematic risk drivers in ESORI described on page 21, creating this kind of balance is liable to mean increasing the relative risk concentration in NG ESO's framework. It is plausible that just ensuring risk-parity between outcomes and costs, effectively doubling the systematic risk exposure, may be sufficient. For a strategically-driven ESO, the risk of not achieving an incentive reward may need to be at least as great as the risk of triggering the penalty of cost disallowance.

The alternative is what this report calls an "internal focus" to incentives, where little risk is ascribed to the ESORI arrangements. This may be consistent with a low specification of an incentive range or an upside-only arrangement where the realistic scope for substantial outperformance rewards would be strictly limited.

Scope for mitigation

As noted on page 25 (and discussed on page 20), the first key insight from the analysis of the taxonomy of risk drivers and associated systematic risk transmission mechanisms is that systematic risk for networks derives in large part from inter-period regulatory processes and the application of regulatory discretion. Mitigation is therefore a matter of regulatory process and culture. This report highlights the importance of the mitigations relating to asymmetric risk, and the scope for Ofgem to put in place a strongly guided regime for evaluating costs as discussed in Appendix 3. Mitigating this risk gives Ofgem greater scope for ESORI incentives that can neutralise unhelpful risk-aversion and drive the ESO business positively to fulfil its intended roles.

Appendix 5: Relative risk (4/5)

Relative risk concentration

On the preceding pages, the drivers of risk set out in the taxonomy were evaluated, in accordance with Ofgem's three tests, in terms of CAPM and the scope for mitigation. Those components are now brought together to establish the scale of the associated remuneration requirements and secure that any double counting is avoided.

A key theme has been that the drivers of risk for NG ESO are much affected by the regulatory stance – on its ex post cost assessments (strongly guided or normally guided, see Appendix 3) and its ambition for strategic ESORI incentives (an ambitious macro focus or an internal focus).

The following table summarises the conclusions in the preceding pages as they relate to the expected loss from asymmetric risk and systematic risk concentration in activity levels relative to TO/DNOs (the baseline for which is first calculated in the table on page 25).

Regime stance matrix, risk concentrations	Loss expectation	Internal focus	Macro focus
		relative systematic risk concentration	
Strongly guided	**2%**	**0.22**	**0.40**
Normally guided	**4%**	**0.40**	**0.80**

These estimates of relative concentration of systematic risk, applied to the ratio of activity levels in NG ESO relative to the electricity networks and priced according to Ofgem's WACC assumptions allow us to calculate the remuneration required for the systematic risk premium. The table below shows the total remuneration requirements taking this component and adding the loss expectations for asymmetric risk on the relevant costs and the margin requirement for NG ESO's revenue management role, as discussed in Appendix 4.

Regime stance matrix, remuneration requirements	Internal focus	Macro focus
	total remuneration requirement (£m)	
Strongly guided	**32.3**	**43.4**
Normally guided	**49.1**	**73.4**

The following page explains how this total remuneration requirement is built up.

Appendix 5: Relative risk (5/5)

Building up the remuneration requirement

To help explain the build-up of these remuneration requirements, the table below shows the calculation for one regime stance, with a strongly guided cost assessment and incentives with an internal focus. The risk concentration attributed to this stance on page 26, 0.22, also corresponds to the risk concentration calculated in the table on page 25 under Ofgem's RAV-based asset beta assumption. The calculation in the table below therefore derives the same answer as Ofgem, an equivalent WACC of 3.65%, but the form of the calculation readily allows other risk concentration estimates to be substituted for the estimate of 0.22.

Base return on the RAV		Rate	Base	Total
Regime stance: strongly guided and internal focus		*% or x*	*£m*	*£m*
TO/DNO asset beta x ERP x ESO RAV	0.375 x 7.25%	2.72%	303	8.2
Relative risk concentration x activity leverage factor*	0.22 x 7.85/1.06			
Cost of systematic risk	= 1.60 x	1.60 x		13.2
Risk free rate on RAV		-0.75%	303	(2.3)
Non-systematic cost of debt premium		0.09%	167	0.2
Base return on the RAV				11.1

(equivalent WACC on RAV = 3.65%)

** The activity leverage factor is the ratio of TO/DNOs activity leverage to NG ESO's, as shown on page 25*

The next table builds on this base return on the RAV by adding the additional premium required for systematic risk where risk concentration estimates are higher than the base level of 0.22. To this is then added the additional margin for revenue collection activities, explained in Appendix 4) and required allowances for asymmetric risk (explained in Appendix 3).

For example, the additional systematic risk premium for the strong/macro stance shown in the table below as £11.1 million is calculated by substituting the risk concentration estimate of 0.4 for the estimate of 0.22 in the table above. This gives us a scaling factor of 2.95 instead of 1.60, a difference of 1.35. 1.35 times the cost associated with the TO/DNO asset beta of £8.2m equals £11.1 million. It is only coincidence that it is the same value as the base return on the RAV.

Annual remuneration requirement	Rate	Base	strong/ internal	normal/ internal	strong/ macro	normal/ macro
Relative risk concentration			0.22	0.40	0.40	0.80
	% or x	*£m*	*£m*	*£m*	*£m*	*£m*
Base return on the RAV	3.65%	303	11.1	11.1	11.1	11.1
Additional systematic risk premium			0.0	11.1	11.1	35.4
Revenue collection activities	0.35%	4,445	15.6	15.6	15.6	15.6
Asymmetric risk: internal costs (excl. pensions etc)	2%, 4%	234	4.7	9.4	4.7	9.4
Asymmetric risk: black start costs	2%, 4%	50	1.0	2.0	1.0	2.0
Total remuneration requirement (return + margin)			32.3	49.1	43.4	73.4

Appendix 6:

Risk and capital requirements (1/3)

To consider the wider context for NG ESO's remuneration requirement and financeability, it is helpful to consider the business's requirements for capital.

To help understand the need for a capital base, the capital requirements of NG ESO are categorised in four components, with stylised purposes set out in the following table.

Capital component	Purpose
Working capital facility (WCF)	Handling operational cash flow uncertainties, including timing differences in TNUoS and BSUoS, subject to facility providers' appetite for . Facility providers' appetite will depend on perceived levels of risk in the business and its financial resilience. This includes the presence or otherwise of risk capital, including equity (the extent to which assets exceed liabilities), cross-guarantees and other formal or implied commitments by shareholders or parties related to them.
Debt	Financing of fixed assets (or capitalised totex) recognised in the RAV, subject to appetite for lenders to lend. As with the WCF, lenders' appetite will be dependent on perceived levels of risk in the business and the presence or otherwise of cross guarantees and other formal or implied commitments. Shareholder risk appetite may lead to targeting lower levels of debt than lenders' maximum appetite to lend.
Equity	The value of the assets in the business less its liabilities. In notional regulatory terms, represented by the equity in the RAV. An appreciable level of equity gives confidence to lenders and facility providers (and other stakeholders) that the business has some resilience to downside losses.
Contingent risk capital	The risk capital implied in any cross-guarantees and other formal or implied commitments. These give further confidence to lenders and facility providers (and other stakeholders) that the business would be resilient to downside losses. Accordingly, lenders, facility providers or the regulator may seek a level of formal contingent risk capital. The providers of that risk capital would be exposed to the associated downside return and liquidity risks

Differentiated roles of the different components of capital means that that risky activities undertaken by a company will have distinct implications for the company's capital base.

- Debt may be appropriate to help finance any assets needed to support the activities
- WCF may be needed to finance any associated short term cash flow uncertainties (generally reflecting movements in trade debtors and creditors)
- The company would need sufficient risk capital to satisfy the concerns of the relevant lenders and facility providers (and its own risk appetite)
- If there is not enough risk capital within the company relative to the scale of risk (and risk appetites), it would either need to raise new equity or alternatively reassure lenders and facility providers that there is commitment from the parent or other company, ie contingent risk capital.

Where a business engages in different activities, the company's capital base could be decomposed into separate capital layers for each activity. Where the aggregation of activity-driven risks involves some risk diversification, the aggregate capital requirement may be less than the sum of the capital requirements for each activity component. Assuming the associated revenue requirements are framed in CAPM market-covariant terms, the aggregate revenue requirement should equal the sum of the revenue requirements for each activity.

Appendix 6:

Risk and capital requirements (2/3)

KPMG has previously made estimates of NG ESO's capital requirements in the region of £1 billion. This is necessarily an indicative estimate, but it is scaled to be broadly consistent with the activity levels and associated risks of the company.

This estimate of NG ESO's capital requirement can be decomposed as follows:

Analysis of indicative capital	Total	Debt	Debt capital	Risk capital
	£m	*%*	*£m*	*£m*
WC Facility	550	100%	550	0
RAV	300	55%	165	135
Other risk capital *(including contingent capital in NG group)*	150	0%	0	150
Total	1,000		715	285

The company was initially set up prior to the transfer of the ESO business with £330m of equity (cf £285m of risk capital in the table above). In large part, this represented implied goodwill in the deemed value of the transfer and has been subsequently incorporated in a merger reserve in the company's statutory accounts. Another reference point is the parent company guarantee required for SONI (noted in Appendix 1) which, if scaled up for the activity levels of NG ESO, would be equivalent to about £200 million (cf £150m in the table above). Taken together, these suggest that £1bn might be an underestimate.

The level of systematic risk exposure can be related to this risk capital from the bottom-up relative risk analysis. The following table shows the implied levels of beta risk attaching to the risk capital shown in the table above for the different Ofgem stance scenarios. Levels substantially in excess of 1.0 would indicate that the company may have insufficient risk capital. The results are shown as a beta attaching solely to RAB-based 'regulatory equity' (RE) and the beta attaching to the totality of risk capital (RC), in both cases taking into account the beta assumed in debt (debt beta of 0.125).

Regime stance matrix, risk capital betas	Internal focus	Macro focus
	beta attaching to RE/RC	
Strongly guided	**1.18/0.57**	**2.31/1.11**
Normally guided	**2.31/1.11**	**4.76/2.29**

The results suggest that a capital base of about £1 billion may be reasonably framed for all but the normally guided and macro focus stance. In that stance, the combination of heightened downside cost assessment risk and the need for geared-up ESORI incentives to provide the necessary counterbalance would most likely need more robust implied or formal commitment from the ESO's parent.

In the circumstance of a strongly guided approach to cost assessment but combined with an internal focus approach to incentives, these results suggest the need for recourse to the parent company might be reduced. However, it is important to recognise that risk capital is also required to support the cash flow variation risk associated with the revenue collection role. It might be expected that the rating agencies would continue to rely on recourse to the parent as part of their rating assessment.

Appendix 6:

Risk and capital requirements (3/3)

While, this estimate of NG ESO's capital does not by itself determine a remuneration requirement, combined with some insight into the quality of its risk exposure, it does help indicate the scale of that requirement.

That the ESO is exposed to risk is uncontroversial, and its need for capital will relate to its overall risk profile. It is necessary to recognise the total capital base and all the risk associated with it to determine a remuneration requirement safely.

Ofgem must consider how much of that risk requires remuneration. Under Ofgem's three tests, after correcting for any downside asymmetry, it is only the systematic component of risk that would require additional remuneration. Appendices 2 to 5 set out the rationale and related calculations for the components of NG ESO's revenue requirement in the context of these tests.

The presence of betas on risk capital close to 1.0, calculated on the previous page for the strongly guided macro focus regulatory stance, suggests a relatively normal relationship between systematic risk exposure and risk capital relative to businesses across the economy.

Recognising the level of leverage within that capital base is affected by the company's working capital facilities, a range of 4% to 5.5% might be considered reasonable. The WACC, adopting Ofgem's assumptions, applied to the indicative capital base disregarding the WCF and with a beta of 1.0 on risk capital, would be 4.2%. Correcting for asymmetric risk would lift this to about 5.5%. The presence of the WCF significantly dilutes this rate to about 4% after taking account of some additional premium for revenue management risk.

This would represent a total annual remuneration requirement of about £40 million, with an error margin of say £5m.

There is an inevitable circularity in this assessment, as it is informed by an understanding of the company's risk profile, and caution is therefore needed when comparing it with a revenue requirement that is built up in a more granular way but informed by that same understanding. It does however provide a useful sense check.

Appendix 7:

Function-related benchmarks

In a separate exercise for NG ESO in July 2019, KPMG identified broad benchmarks for businesses engaged in comparable activities.

In this exercise, we characterised NG ESO's functions in three dimensions:

— **Operations and balancing,** including control centre operations and also characterised as a real-time balancing function

— **Industry and markets,** including system insight, planning and network development and also characterised as a future systems function

— **Revenue management,** including revenue collection as collection agent for third parties

Some of the activities in Ofgem's description of NG ESO's 'market development and transactions' role would be included, for this purpose, in the first two functions above.

In surveying for appropriate benchmarks, we identified the operating margin on internal operating costs exhibited by securities exchanges such as LSEG (the London stock exchange), with reference to analyst reports, as relevant to the operations and balancing function. For the industry and markets function, we developed an appropriate benchmark for the operating margin on internal operating costs using a database of financial reports for companies in the 'Professional and Commercial Services' industry.

We identified benchmarks for operating margin on internal operating costs of 13.9% for operations and balancing and 11% for industry and markets.

For revenue management, we considered a similar population of comparators to that considered by the CMA in the SONI appeal and identified a benchmark of 0.5% of relevant revenues, consistent with the CMA final determination.

The calculation of the corresponding total remuneration requirement for the ESO is summarised in the following table.

Benchmarked functional revenue requirements		Rate *%*	Base *£m*	Result *£m*
Operations and balancing	Internal costs	13.9%	89.7	12.5
Industry and markets	Internal costs	11.0%	73.6	8.1
Revenue management	External costs	0.5%	4,445	22.2
Total remuneration requirement				42.8

Sources: Ofgem DCC Consultations, Ofgem DCC Decisions, DCC Business Plans, DCC Annual Reports, DCC Annual Service Reports, DCC Charging Statements, Ofgem/DECC Smart Meter Communication Licence and KPMG analysis.

Appendix 8:

EBIT margins - controllable revenues (1/3)

Moody's credit rating methodology for asset-light sectors

Credit rating agencies refer largely to margins when rating asset-light businesses. While there is no single overall methodology/assessment used to evaluate asset light companies, Moody's have issued specific guidance for particular sectors as summarised in the table below.

An EBIT margin range consistent with a Baa-Ba credit rating is considered for the following reasons:

— Baa is used at the upper bound as the ESO should achieve a credit rating that is at least investment grade.

— Ba is used at the lower bound as the ratings scorecard considers multiple factors, both qualitative and quantitative. As a result, it may be possible for a company to score Ba on the EBIT margin, but score higher on other factors and thereby achieve an investment grade rating.

The EBITDA margins for potential asset-light comparators in the table below may only partially reflect the business activities NG ESO undertakes, and the risks it is exposed to.

— The diversified technology sector designs and distributes technology and hardware, and is therefore comparable to the ESO's technical role in system balancing and network planning. However, diversified technology may differ from the ESO given the upfront risks and investments required for technology and hardware development;

— The business and consumer service industry may in part capture the intangible assets of NG ESO, i.e. human and innovation capital can be compared to a professional services or similar firm; and

— In our view NG ESO does not closely resemble a logistics company (i.e. distribution and supply chain services); as a result limited weight is attached to this sector in deriving benchmarks.

Overall, the evidence above suggests that an EBITDA margin range of 10-25% would be appropriate. However, other factors are also considered when determining the relevant target range against which the benchmarking analysis is conducted. These include:

— The rating agency methodologies are assumed to be applied to companies that are in competitive industries and exhibit demand risk. Rather than apply adjustments to the ratings criteria, the analysis considers the lower bound of the ranges defined to take into account the fact that the companies assessed by the methodology operate in competitive industries;

— More weight is placed on the lower bound of Baa and upper bound of Ba and for the Diversified Technology and Business & Consumer Service Industry sectors, which implies a range of 15-18%.

— The Moody's benchmarks are for EBITDA margins, whereas the margins analysis is conducted for EBIT margins. An analysis of the comparator companies (as explained in the following slide) suggest that median and mean difference between EBIT and EBITDA margins is c.3% and c.5% respectively. Applying these adjustments to the range above results in a range of 10-15%.

Overall, the rating agency methodologies and adjustments suggest a minimum total profitability of 10-15% is required, which is broadly in line with the market evidence on comparable companies.

Rating Methodology	EBITDA margins required for the ratings:	
	Baa	Ba
Diversified Technology	18-21%	15-18%
Business and Consumer Service Industry	20-25%	15-20%
Distribution and Supply Chain Services	10-20%	5-10%
Overall range implied (EBITDA)	**10-25%**	
Target range considered (EBIT)	**10-15%**	

Sources: Moody's (2016), 'Business and Consumer Service Industry'; Moody's (2018), 'Diversified Technology'; Moody's (2011), 'Global Postal and Express Delivery Methodology'.

Appendix 8:

EBIT margins - controllable revenues (2/3)

EBIT margins for comparable companies

An analysis of EBIT margins for comparable companies using publicly available market data identified 68 comparator companies across two comparable sectors; Industrial and Commercial Services, and Software & IT services. These sectors are considered comparable to NG ESO as; 1) they have similar financial and business characteristics, in particular in relation to revenue (size), asset turnover, systematic risk and capital intensity; 2) they can be characterised as having low-pass through costs, which implies that their total revenue is comparable to NG ESO's controllable revenue; and 3) they are service based industries that use human capital (i.e. intangible assets) provide services. All of these factors reflect the nature of ESO's activities.

The two comparator sectors exhibit average EBIT margins within a range of 10.4-12.5% as illustrated in the table below.

Sector name	# of firms	EBIT margin (%) – 5 year average
Industrial & Commercial Services	44	10.4%
Software & IT Services	24	12.5%
	68	**11.5%**

EBIT margins represent a meaningful measure of a commercial rate of return and can therefore be used as an indicator of a business' financeability position by both rating agencies and lenders. However, the averages hide quite wide ranges of margins across the respective populations of companies. Some of this variation might be due to companies under or over performing, and some of it might reflect the diversity of business risks they face.

An investor looking to provide capital is likely to use the expected profitability of a business as a proxy for its minimum required return. As such, individual companies underperforming against an industry average should not be used to infer a minimum threshold for returns – rather, it is more appropriate to look to an industry average as a relevant indicator. However, the relevance of that average must be interpreted in light of the activity mix and risk profile of the business being benchmarked.

It can therefore be concluded than an EBIT margin range of 10-13%, based on the average and expected profitability of both industries may be an appropriate from a financeability perspective, but subject to consideration of relative risk profile.

Smart DCC

The CMA in its final determination for SONI for the price control period 2015-2020 highlighted the Smart Data and Communications Company (DCC) as a recent example of an asset-light company being price regulated on the basis of margins[1]. Ofgem has described the DCC as unique[2] owing to its asset-light structure, a fundamental business characteristic shared with NG ESO.

The DCC would be an appropriate comparator to benchmark margins against as it closely resembles NG ESO's business activities as well as operating and financing risks. In particular; the DCC's primary role is delivering the core smart metering infrastructure and investing in service operations to support the mass roll-out of smart metering. [3] The centralised IT services in an energy context resemble the business activities that NG ESO undertakes,[4] although not necessarily its incentive context.

Source: (1) CMA (2017), SONI Limited v NIAUR: Final Determination, November 2017, Footnote 745
DCC is a central communication body with a role to manage communications and data transfer for the GB smart metering rollout programme. It was granted a 12 year licence to operate by BEIS (formerly DECC) following a competitive tender process which set the base margin.
(2) Ofgem (2015), DCC: Price control decision 2013/14, February 2015, Para 1.2;
(3) Ofgem (2019), DCC: Price control decision 2017/18, February 2019, Executive Summary;
(4) Ofgem (2015), DCC: Price control decision 2013/14, February 2015, Executive Summary

Appendix 8:

EBIT margins - controllable revenues (3/3)

Smart DCC (cont.)

The DCC's activities have a focus on scoping, designing and building in the early years of its existence, which most closely reflect the dynamic business environment of the ESO. The later years are considered less relevant because they reflect DCC's operations entering a steady state phase, with a materially different risk profile compared to the earlier years and compared to the ESO. Accordingly, the report discounts these years for the purpose of setting margin benchmarks.

Overall, the DCC benchmarks during the dynamic phases of its evolution relevant to the ESO, the scoping and design & build phases, suggest an average margin of **12%**.

	2013/14	2014/15	2015/16	2016/17	2017/18
Activities	**Scoping**	**Design & Build**	**Testing**	**Delivery**	**Steady-state**
Implied baseline margin (%)	**13.53%**	**9.75%**	2.83%	1.09%	0.99%
Pass-though costs	£1.5m	£4.9m	£4.5m	£5.2m	£11.9m

Conclusion

An evaluation of the appropriate level of benchmark for EBIT margins needs to be sensitive to the actual mix of activities for the company concerned.

Our calculations indicate that the CMA determination for SONI would be consistent with EBIT margins on controllable revenue of about 10.3%, and this level would seem broadly consistent with the range of benchmarks identified above.

For a SONI-like business, the appropriate benchmark would be critically affected by the balance between revenue collection and other activities. The revenues related to revenue collection activities are not represented in the denominator in the EBIT margin on controllable revenues. A higher proportion of revenue collection activities would therefore naturally imply a higher EBIT margin benchmark.

Revenue collection activities represent a substantially higher proportion of revenues for NG ESO than they do for SONI. Adjusting for this, we calculate an equivalent EBIT margin benchmark of 15%. We retain 10% as a low end estimate for reference.

Source: Ofgem DCC Consultations, Ofgem DCC Decisions, DCC Business Plans, DCC Annual Reports, DCC Annual Service Reports, DCC Charging Statements, Ofgem/DECC Smart Meter Communication Licence and KPMG analysis.

Appendix 9:

Relevance of the CMA's retail profitability analysis (1/2)

Ofgem have asked the ESO to consider whether the CMA's analysis of profitability of GB energy retailers in its Energy Market Investigation is relevant.

The CMA view

In its SONI appeal, the CMA described the relevance of its retail profitability analysis in the Energy Market Investigation in paragraphs 7.181 to 7.185 of its final determination. It concluded that its approach to retail profitability "acknowledged that some capital may not be reflected on the balance sheet, and that where appropriate, this would still be taken into account [in a return on capital employed]."

The two particular adjustments to capital employed in the retail profitability analysis it considered relevant to SONI's situation were:

— a recognition of contingent capital (parent company guarantees, or PCGs) for large retailers, estimating its opportunity cost with reference to the premium paid on forward energy purchases by mid-tier retailers without PCGs, and

— the need for a retailer to hold a cash buffer to withstand shorter term shocks, even if it has a prudently hedged exposure to wholesale market costs.

Paragraph 7.185 identified that CMA's analysis in the Energy Market Investigation recognised distinct risks that did not directly relate to the retailers' investments in fixed assets. For the Energy Market Investigation, the CMA was able to make adjustments to capital employed so that it could still analyse profitability on the basis of a return on capital employed. Paragraph 7.181 characterised this as "**an example of an approach** to setting expected returns for a low asset business" (our emphasis).

For SONI, paragraph 7.187 indicates that it is equally valid to adopt a different approach by combining a return on capital with other adjustments which can, in combination, take account of the risks faced by the company.

This suggests that, in the case of SONI, the remuneration requirement for the distinct risks and associated layers of capital can be more readily considered separately rather than being consolidated into a more complex construction of the totality of those capital layers. In this way, the CMA was able to determine remuneration requirements for SONI's separate layers of capital without opining on how much actual capital would in each case be involved.

Under CAPM, the risk premium component of the cost of capital relates to the quantum of risk the enterprise, and by extension its investors, is exposed to. Under the model, incremental capital only has the effect of diluting the risk and reducing the required rate of return on that capital, but does not affect the total risk premium required. This is the essential insight behind conventional beta gearing and de-gearing adjustments. This shows how the CMA's approach to building up the remuneration requirement for SONI without reference to the values of separate capital layers is coherent and remains consistent with CAPM.

Appendix 9:

Relevance of the CMA's retail profitability analysis (2/2)

Reading across to NG ESO

The previous page shows how CMA's approach to SONI's remuneration requirement did not need to quantify the layers of capital that were so central to its thinking. In the same way, Ofgem's Test 1, being centred on CAPM, is naturally not driven by the quantum of capital employed but is instead driven by the quantum of systematic risk.

But identifying, even indicatively, a capital structure that's consistent with the risks involved could provide a useful reference point.

To accommodate risk, a contention could be that the risk appetites of the investors, taken together, may indicate a need for additional risk capital beyond the inherent equity in the assets employed by the business (the difference between the value of those assets and the obligations to lenders and other creditors).

— For many businesses, those circumstances would indicate a need for fresh equity. This could, for example, be provided by way of cash or by way of a receivable from the holders of new shares. Any such cash or receivable, assuming it is not itself risky, would have the effect of diluting the beta risk on the assets employed in the enterprise (which would now include cash or receivables), but would not affect the total risk premium required.

— Alternatively, lenders may be satisfied by a formal or implied commitment by the parent company, effectively contingent risk capital. The presence or inference of such additional risk capital could provide evidence, and even compelling evidence, of the associated risk.

In both cases, a need for additional risk capital indicates that stand-alone financeability, longer term financial sustainability and the avoidance of cross-subsidy would all depend on that risk being properly remunerated.

In this way, considering NG ESO's remuneration requirement both from a risk perspective and from a capital perspective provides a useful cross-check and, importantly, also relates the remuneration question to NG ESO's financeability.

Importance of a robust financeability assessment for a standalone ESO business

The financeability of a regulated company provides a secure context for business management and decision-making in a risky environment, and therefore underpins the delivery of services to consumers. In general, therefore, the protection of consumers' interests and financeability are highly complementary and mutually reinforcing.

This underscores, on the one hand, the importance of considering how ensuring the financeability of regulated companies supports consumers' interests and, on the other hand, the potential costs to consumers of undermining utilities' financial position. For example, a strong financeability position secures:

— Strong financial risk profile and appropriate level of financial headroom, which reduce the risk of distress and hence the potential for negative externalities for customers; and

— Continuous access to capital markets, which means that companies can finance new investments when required to the benefit of customers and the wider stakeholder group and do not have to postpone capital expenditure.

It is therefore important for the regulator to specify an approach to testing financeability that is clear, meaningful and provides assurance to investors that the regulator is adequately discharging the finance duty.

A core principle of the financeability test is that the business is able to deal with business risks and raise financing on a standalone basis.

NG ESO has secured a credit rating from Moody's, which implies that the rating assigned 'looks through' to the wider NG Group; this implicit support implies a cross-subsidy from NG Group to ESO. Moody's notes in its 2019 rating assessment for NG ESO that *"NG ESO's rating is supported by Moody's assessment that there is a high likelihood that National Grid would provide financial assistance… should it become necessary to maintain NG ESO's credit quality"*. Rating agency reliance on Group support implies that NG ESO is prima facie not financeable on a standalone basis.

Testing projected metrics is not sufficient to draw a conclusion on ESO's financeability if it is not considered to be financeable on a standalone basis from the lender's perspective as it implies that banks are not willing to commit capital on the assumed terms to the business in the absence of external support from its parent company.

As a result it is critical to test whether the business is financeable on a standalone basis.

— It is a necessary but not sufficient condition of the framework that allowed remuneration provides sufficient headroom to meet key credit metrics and required profitability benchmarks, commensurate with the capital required and the risk exposure in order for the business to be financeable.

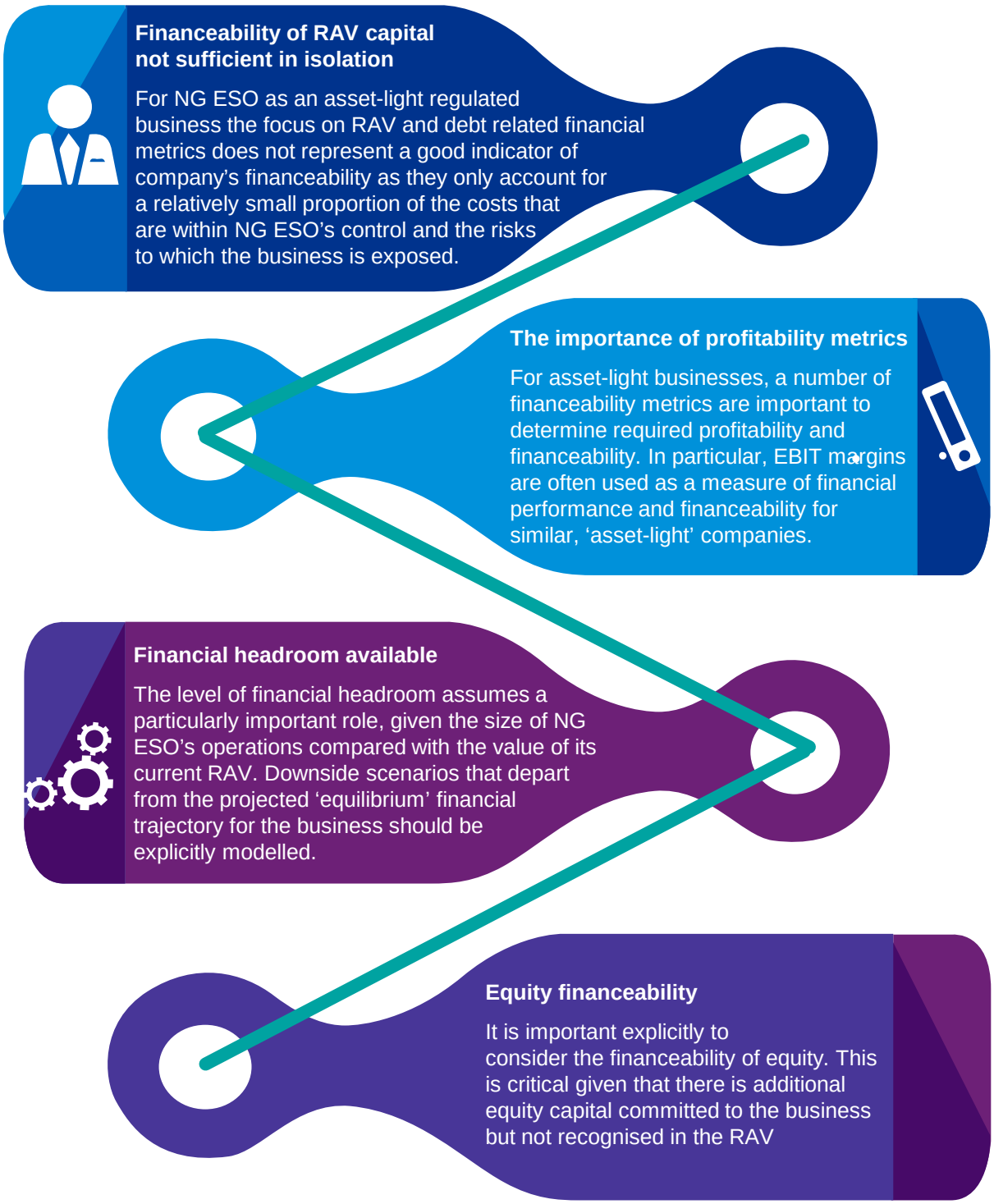
— The standalone financeability of the business is dependent on Ofgem's remuneration of all key risks and capital committed. Where risk exposure and material activities are not priced, this would not secure the standalone financeability of the ESO. All capital required will need to be committed to the business upfront and continuously remunerated given risk exposure.

— Overall pricing and financeability has to be 'in the round' for the ESO business as a whole, taking into account the overall capital requirements associated with all activities carried out by the business and risks to which the business is exposed. *Assuming that all capital committed to the business is fully drawn* and appropriately remunerated, (1) projected metrics for the business as a whole should be consistent with investment grade thresholds; (2) financial projections should be consistent with key profitability benchmarks; and (3) the 'gross margins' used to price individual risks and activities should be consistent with market benchmarks.

Appendix 10: Financeability assessment framework (2/10)

Approach to financeability assessment in an asset-light context

For asset-light businesses a simple, one size fits all approach to financeability is not appropriate; new approaches are needed. Moody's rating methodology as applied to the ESO is not on a standalone basis and needs to be supplemented.



Appendix 10: Financeability assessment framework (3/10)

Principles of a financeability assessment

The principles of a financeability assessment can broadly be grouped into three categories:

1) What is the nature of the tests that will be applied?

The financeability tests are the means by which the Regulator can clearly and transparently demonstrate that it has discharged the finance duty by securing that regulated companies can finance themselves. The financeability assessment needs to be based on the underlying characteristics of the business; its business plan and associated risk exposure; and assumptions about its financial structure and capital requirements in the context of the risks to which the business is exposed and investors' expectations.

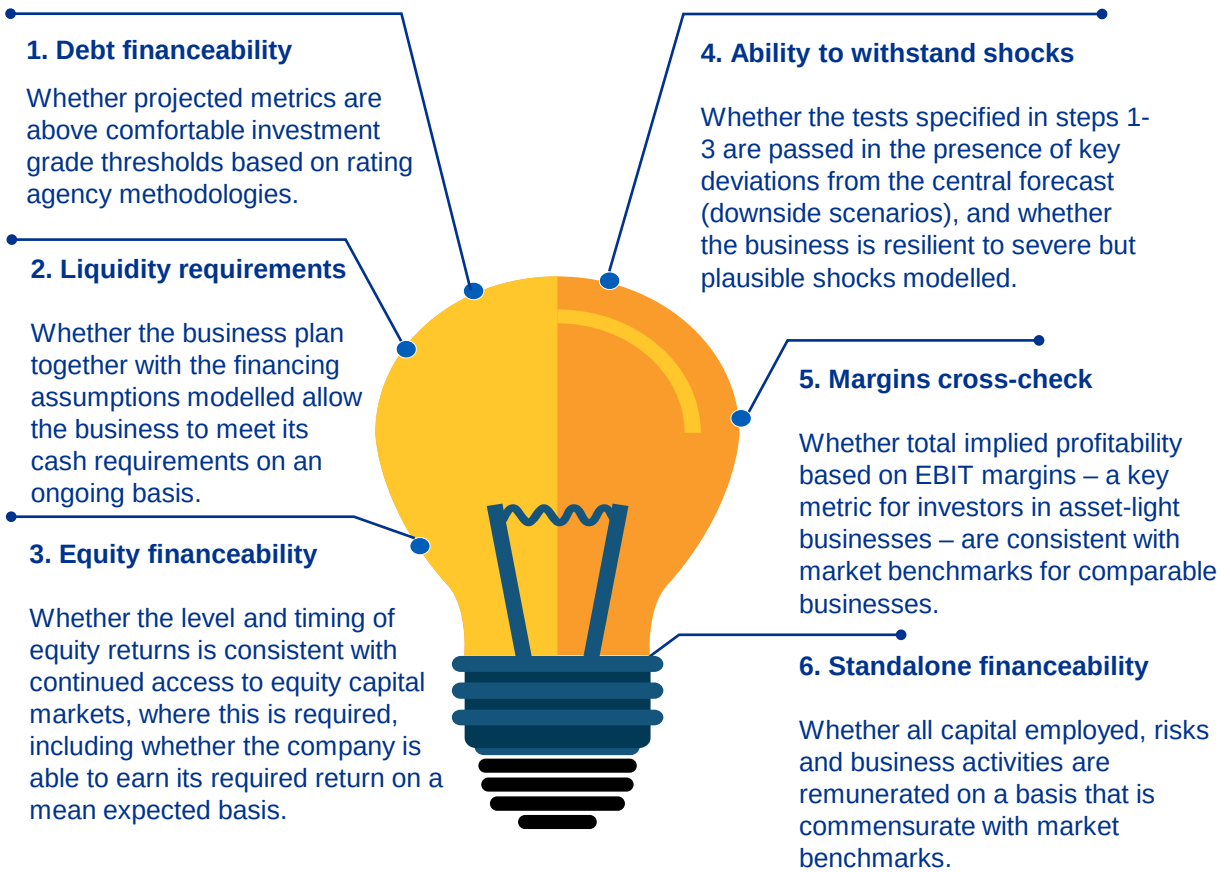
2) What are the benchmarks to ascertain that the company's business plan meets the financeability requirement?

Several considerations are relevant in this regard concerning equity financing, including the maximum acceptable level of financial risk and how that is reflected in the tests, the extent of required financial headroom in the company's financial position given the nature of its operations and the risks that it faces.

3) What are the implications if the business plan fails specified financeability tests?

Where a financeability issue is identified, mitigating actions should be identified to secure that the licence holders can finance their functions on a standalone basis, including ensuring financial sustainability in the long-term.

Overview of key financeability tests



Appendix 10: Financeability assessment framework (4/10)

Independent assessment criteria to identify relevant metrics

Whilst debt metrics do not represent a good indicator of the company's financeability where debt and equity capital largely reflects capital directly employed in the RAV, assessing the ability of the company to service debt employed in the RAV remains a key financeability test. In this context Ofgem has developed a list of 14 metrics to assess whether NG ESO's financial projections and projected metrics are financeable from a debt perspective.

If there is evidence from these metrics that the company might not be financeable i.e. not able to maintain a solid investment grade, or appropriate headroom to manage exposure to downside risks, then this would indicate a problem with balance of risk and return under the regulatory framework.

There is a risk that given the number of measures that projected metrics are not indicative of the creditworthiness of the ESO (either from a debt or an equity perspective), which could undermine the extent to which financeability tests are meaningful, binding and robust as a cross check on the calibration of the RIIO2 package for the ESO. In comparison, rating agencies typically assess 4 to 5 primary metrics. As a result, a set of criteria have been developed to justify and evidence the prioritisation of core metrics for the financeability assessment.

Criteria

1	**Complete**	Metrics need to be complete and comprehensive, considering the ESO business as a whole, taking into account the overall capital requirements associated with all activities carried out by the business. For example, equity must reflect all capital committed to the business (rather than solely equity employed directly in the RAV).
2	**Applied as a market test**	It is important to consider whether the metric is applied in market tests by lenders or rating agencies for businesses with comparable characteristics, dynamics and risk exposure. Ensuring the required return on equity and hence headroom to absorb risks is not arbitrary if the ESO's regulatory framework fails robust, market-based tests.
3	**Measureable**	Companies require headroom to financing costs; the level of financial headroom available underpins and is a key determinant of credit quality. In this context each metric selected requires a robust threshold or benchmark to allow interpretation of financial projections and implications for financeability. This criterion assesses whether a robust, evidence-based threshold can be determined for each metric, for example rating agency thresholds required to achieve a certain credit rating or market benchmarking.
4	**Reflective of risks and business characteristics**	The ratio should target and capture the characteristics and risks inherent in the business, on a basis that is consistent with how investors approach and assess the creditworthiness of comparable businesses.
6	**Indicative of financeability problem**	A number of metrics are indicative and highlight the differences between NG ESO and more asset-heavy utilities. Whilst informative, these ratios cannot constitute a meaningful, binding constraint on the price control and do not necessarily indicate that the business cannot attract capital at assumed rates, meet minimum investment grade thresholds or earn a return that is consistent with market benchmarks (a core tenet of standalone financeability). This criterion considers whether each metric could facilitate clear identification of an underlying financeability problem.

Appendix 10: Financeability assessment framework (5/10)

Assessment of Ofgem metrics based on criteria

We have carried out an assessment of the metrics considered by Ofgem based on the criteria set out above. The following ratios are considered to be the most relevant for the ESO:

AICR and CFO pre WC + interest/interest: Core coverage metrics applied under the Moody's methodologies for regulated networks and utilities respectively. It is important to assess whether the ESO can service debt under both notional and actual structures.

Debt/Capitalisation: Given the limited tangible fixed asset base it will also be important to consider a measure of leverage as well as coverage; this measure of leverage could indicate a financeability challenge and a number of asset-light utilities have gearing-based covenants, and is applied by Moody's to NG ESO

EBITDA or EBIT: For companies with limited tangible assets reflected in the RAB, it is difficult to quantify the total capital employed in the business. Hence investors and financiers typically assess profitability of asset-light businesses based on margins. Margins are a critical measure of financeability as an estimate of total profitability from an equity as well as a debt perspective. In our view EBIT would be more appropriate as by excluding depreciation and amortisation, it avoids issues associated with the comparability and interpretation of capital charges across different sectors.

A number of metrics will not be used to assess financeability directly but as business indicators to highlight the dynamics and scale of the risks to which NG ESO is exposed. Opex/RAV in particular is likely to capture the asset light nature of the business and high operational gearing, however does not indicate a financeability problem for the ESO.

Metric	Relevant metric?	Criteria				
		1	2	3	4	5
AICR	✓	✓	✓	✓	✓	✓
Debt/RAV	×	×	✓	✓	✓	✓
Opex/RAV	×	×	×	×	✓	✓
CFO pre WC + interest/interest	✓	✓	✓	✓	✓	✓
CFO pre WC/Debt	✓	✓	✓	✓	×	✓
CFO pre WC – dividends/Debt	✓	✓	✓	✓	×	✓
Debt/Capitalisation	✓	×	✓	✓	✓	✓
EBITDA or EBIT	✓	✓	✓	✓	✓	✓
Opex/Total Revenues	×	✓	×	×	✓	×
EBIT/K factor revenues	×	×	×	×	×	×
RAV/K factor revenues	×	×	×	×	×	×
Regulated equity/EBITDA	×	×	×	×	✓	×
Regulated equity/PAT	×	×	×	×	✓	✓
EBITDA/RAV	×	×	×	✓	✓	✓

Appendix 10: Financeability assessment framework (6/10)

Assessment of Ofgem metrics based on criteria (cont.)

The following provides an assessment of Ofgem's ratios against each of the five criteria identified.

Metric	Assessment
AICR	— Core coverage metrics applied under the Moody's methodologies for regulated networks and utilities respectively. It is important to assess whether the ESO can service debt excluding the impact of 'regulatory levers, which adjusting FFO by an amount of money ("Capital Charges") that can be influenced by regulatory decision making in the allowed revenue calculation. — Moody's notes that '*the adjusted ICR is our preferred metric for networks where allowed revenues/tariffs are determined using a 'building block approach' and where the components of allowed revenues/tariffs are routinely published and can be verified by an independent source*'. This is the case for NG ESO. — Market evidence/precedent is available for thresholds used to evaluate standalone asset-light businesses, e.g. NATS
Debt/RAV	— Given the limited tangible fixed asset base it will also be important to consider a measure of leverage as well as coverage; this measure of leverage could indicate a financeability challenge and a number of asset-light utilities have gearing-based covenants. — RAV does not fully reflect all the layers of the total capital requirement for the business. As a result, the metric does not fully capture all activities and risks.
Opex/RAV	— RAV does not fully reflect all the layers of capital employed. As a result, the ratio does not fully capture all activities and risks. — Opex/RAV in particular is likely to be capture the asset light nature of the business and high operational gearing, however does not indicate a financeability problem for the ESO.
CFO pre WC + interest/interest	— The cash flow interest coverage ratio is an indicator for a utility's ability to cover the cost of its borrowed capital. It is important to assess whether the ESO can service debt under both notional and actual structures. However as indicated by Moody's own analysis for ESO, this metric can be volatile for ESO given (1) exposure to non-RAB related cashflows; (2) short asset-lives (which imply short payback periods); and (3) potential application of regulatory levers. — As a result AICR (above) is considered to be the preferred coverage metric for assessing the underlying financial headroom available to cover interest costs.
CFO pre WC/Debt **CFO pre WC – dividends/Debt**	— These metrics are an indicator for the cash generating ability of ESO compared to its total debt. They effectively measure the payback period and are both included in NG ESO's rating assessment from Moody's. However as indicated by Moody's own analysis for ESO, these measures are likely to be volatile for ESO given (1) exposure to non-RAB related cashflows; (2) short asset-lives (which imply short payback periods); and (3) potential application of regulatory levers. As a result these metrics are not included as primary financeability metrics, as they are unlikely to indicate underlying financeability issues for NG ESO.
Debt/Capitalisation	— High debt levels in comparison to capitalisation can indicate higher interest obligations, can limit ability to raise additional financing, and can lead to leverage covenant violations. This measure of leverage could indicate a financeability challenge and a number of asset-light utilities have gearing-based covenants, and is applied by Moody's to NG ESO — 'Capitalisation' does not fully reflect all the layers of the total capital requirement for the business, as it only measures capital directly employed on the balance sheet. Nonetheless, it is likely to be a more complete estimate than RAV (as applied in the Debt/RAV metric) and is applied by Moody's in its assessment for NG ESO.

Appendix 10: Financeability assessment framework (7/10)

Assessment of Ofgem metrics based on criteria (cont.)

Metric	Assessment
EBITDA or EBIT	— For companies with limited tangible assets reflected in the RAV, it is difficult to quantify the total capital employed in the business. Hence investors and financiers typically assess profitability of asset-light businesses based on margins. Margins are a critical measure of financeability as an estimate of total profitability from an equity as well as a debt perspective. - Credit rating agencies refer extensively to margins when rating asset-light businesses: although credit rating agencies do not have a single overall assessment methodology for evaluating asset light companies. For example, Moody's rating methodologies for asset light businesses include profitability metrics such as the EBIT margin; - EBIT margins are often used as a measure of financial performance and financeability for similar 'asset-light' companies; and - There is clear regulatory precedent for using the EBIT margin in evaluating the adequacy of allowed returns for asset-light regulated utilities. — The application of capital-based metrics will not be sufficient to ascertain whether the business will have sufficient capital resources with which to manage risks associated with system quality and failure. This is because these risks are likely to be unrelated to the scale of the business's fixed assets. — Measures of profitability based on EBIT or operating margins are relevant in this context, since the risks associated with system quality and failure are likely to scale with the magnitude of the company's operating costs. Margins represent a measure of the financial headroom available to the company (over and above its operating costs) to manage and respond to risks and exposures required by an efficient, commercial investor to undertake these activities. — In both unregulated (competitive) markets and in regulation of asset-light businesses, margins are used to determine the required profitability of asset-light businesses. Estimation and determination of required profitability using margins in such cases ensures that competitive market outcomes are correctly approximated by regulation. — In our view EBIT would be more appropriate than EBITDA for NG ESO, as by excluding depreciation and amortisation, the metric avoids issues associated with the comparability and interpretation of capital charges across different sectors.
Opex/Total Revenues	— This ratio is typically a measure of how efficient a company is. In particular, how much is being spent to earn revenue. On its own, it does not provide any indication of creditworthiness (particularly where total revenues include indirect costs) and this metric is not considered by rating agencies and investors.
EBIT/K factor revenues	— The interpretation of k-factor revenues is over or under-recovery of revenues. As a result, this does not fully reflect all revenues; and therefore the ratio is not complete nor is it measurable as there are no adequate benchmarks to compare it to. — By only capturing a sub-set of revenues, it is not likely to provide any indication of a financeability issue nor would it be able to capture the full risks of the business.
RAV/K factor revenues **Regulated equity/EBITDA** **Regulated equity/PAT** **EBITDA/RAV**	— These ratios are predicated on capital directly employed in the RAV. As RAV and consequently regulated equity do not fully reflect the total implied capital requirement or risk exposure for NG ESO, these metrics are unlikely to represent a good indicator of financeability for the business as a whole. — There are specific examples of types of capital captured in the RAV, valued or remunerated in full, for example implicit guarantees from the parent company, working capital requirements, and the option to draw on further equity capital. — In extremis, RAV-based metrics imply from a financeability perspective that NG ESO's business operations could be undertaken on a non-profit basis in the absence of tangible assets recognised in the RAV.

Appendix 10: Financeability assessment framework (8/10)

Specification of thresholds for selected metrics

Ofgem does not specify minimum thresholds in its approach to assessing the financeability of the ESO business as a whole.

We therefore set out thresholds/benchmarks for the key metrics selected based on market evidence and the underlying risk exposure of NG ESO. Thresholds are calibrated using evidence for other asset-light industries.

Debt financeability	Threshold
AICR	1.8x
CFO pre WC + interest/interest	4.5x
Debt/Capitalisation	55%

Equity financeability	Threshold
EBIT/Non-controllable revenues	0.5%
EBIT margin	10%

Target credit rating

It is first necessary to determine which threshold to target. The notional financeability test is in part designed to check that notional company is able to achieve the rating of the index used to set the cost of debt allowance. **Ofgem has not presented a view on which indices (and their credit rating) will be used to set the cost of debt allowance.** The thresholds identified above are based on a BBB+/Baa1 rating, which is consistent with the strong credit rating typically targeted by rating agencies, two notches above the minimum investment grade which networks are required to maintain by license.

Recent market evidence suggests that this rating is lower than that obtained and targeted by peers. For example, Moody's notes in its 2019 rating methodology for NG ESO that "[NG ESO's] *peers are rated between Aa2 and A1, reflecting the essential nature of their services and timely cost recovery under strong regulatory frameworks.*" This report therefore assumes that a BBB+/Baa1 rating is the minimum rating required for the ESO business as a whole.

AICR

— NG ESO's business characteristics and risks are closer to companies that rely on intangible assets such as know-how, have limited infrastructure assets, and occupy a pivotal position in the market system, such as e.g. NATS (the UK air navigation service provider), than to more typical asset-heavy UK network utilities. However, there are some notable differences between NATS and ESO. In particular, NATS could be seen as exhibiting lower operational gearing and hence risk compared with ESO.

— The lower score assigned to NG ESO (relative to UK utilities) for the qualitative factors in the rating agency methodologies (such as stability and predictability of regulation, cost and investment recovery), suggests that the relevant thresholds for the financeability metrics should be higher and correspond to the upper end of the solid investment grade rating in the indicated Baa range of 1.4-2.0x. Given that NATS has a number of similar business characteristics to ESO, the 1.8-2.2x AICR range for NATS (per the 2012 Moody's methodology) would also be considered as relevant evidence to inform the benchmark. Overall, this suggests that an AICR benchmark of 1.8x could be considered reasonable, at the lower end of the 1.8-2.2x range indicated by the evidence above.

— In addition, a distribution lock-up (introduced in 2012) is triggered for NATS if the Intra-Control Period Cover Ratio falls below 1.70x, (where the ratio is calculated as cash available for debt service less capital costs divided by debt service obligations). Given that the AICR only includes cash interest in the denominator of the ratio, this suggests that the threshold applied to AICR could be even higher than 1.7x. A threshold of at least **1.8x** AICR is therefore proposed, with 0.1x headroom above threshold, as typically limited headroom against core metric thresholds can result in companies being placed on negative outlook.

Sources: Moody's (2019), 'NATS (En Route) PLC, Update to credit analysis following outlook change to negative'. March I& Moody's (2017), 'Rating methodology - Privately Managed Airports and Related Issuers', September.

Appendix 10: Financeability assessment framework (9/10)

Specification of thresholds for selected metrics (cont.)

AICR (cont.)

— In majority of cases for regulated utilities, the ratio of opex to RAV and operational gearing of the company is such that the financial buffer provided by the returns on assets is sufficient to absorb the most likely downside shocks. However, this is not the case for the ESO. Operational gearing is higher for the ESO than for typical regulated network utilities. This is because, unlike in the case of traditional utilities, their RAV is relatively small and principally composed of IT and real estate assets, while its principal asset is human capital, which is reflected in the opex. This leads to a situation whereby any small changes in opex costs can have a significant impact on profits. This indicates that a comparable downside shock could have a considerably greater effect on the ESO's financial projections and headroom than for NGET. This would warrant an AICR threshold closer to the upper end of the 1.4-2.0x AICR range above.

CFO pre WC + interest/interest

— The lower score assigned to NG ESO (relative to UK utilities) for the qualitative factors in the rating agency methodology for utilities (such as Consistency and Predictability of Regulation, Timeliness of Recovery of Operating and Capital Costs), suggests that the relevant thresholds for the financeability metrics should be higher and correspond to the upper end of the solid investment grade rating in the indicated Baa range of 3.0x-4.5x. Overall, this suggests that a benchmark of **4.5x** could be considered reasonable, at the higher end of the range indicated by Moody's. By contrast NATS has maintained an FFO Net Interest Cover of 7.0x-8.5x over the last five years, with significantly higher implied financial headroom relative to borrowing costs.

Debt/Capitalisation

— The lower score assigned to NG ESO (relative to UK utilities) for the qualitative factors in the rating agency methodology for utilities (such as Consistency and Predictability of Regulation, Timeliness of Recovery of Operating and Capital Costs), suggests that the relevant thresholds for the financeability metrics should be higher and correspond to the upper end of the solid investment grade rating in the indicated Baa range of 45%-55%. Overall, this suggests that a Debt/Capitalisation benchmark of **55%** could be considered reasonable.

— The definition of 'Capitalisation' is key when developing thresholds. If under the notional structure, Capitalisation is equal to the RAV, then the 55% threshold is consistent with the notional structure. Under the actual structure, Capitalisation would normally reflect total debt and equity capital recognised on the balance sheet (i.e. net assets). A 45% threshold would appear to be low relative to the notional gearing of 55%.

— By contrast, NATS is subject to a target ratio of net debt to RAB of 60% over the course of a regulatory period. If this exceeds 65%, NATS would be prohibited from paying dividends.[1]

Appendix 10: Financeability assessment framework (10/10)

Specification of thresholds for selected metrics (cont.)

EBIT margin

Margins are a primary metric for the assessment of financeability in an asset-light context and is also used in Appendix 8 to provide a perspective on remuneration requirements. Appendix 8 concludes that an appropriate EBIT margin benchmark over controllable revenues for NG ESO would be 15%, with a lower bound estimate of 10%.

EBIT/Non-controllable revenues

— This margin is based on 'non-controllable revenues', i.e. revenues attributed to collection agent activities taken in isolation.

— Following the SONI appeal, the CMA concluded that a reasonable range for the additional margin requirement for revenue collection risk to be in the range 0.25-0.5%, and determined an allowance of 0.5% at the top end of the range.

The two EBIT margin benchmarks outlined above relate to different scopes of business activities: EBIT/Non-controllable revenues is a benchmark for a business segment that undertakes revenue collection activities, whereas the EBIT margin is a benchmark for asset-light businesses, which are involved in a wide spectrum of activities. Given, the diverse nature of the revenue collection function versus the other activities of the ESO's business, it is difficult to find a meaningful comparator set for the ESO as a whole. Therefore, it makes sense to look at these two areas separately and additively. The EBIT/Non-controllable revenues benchmark can inform a remuneration requirement (on an additive basis) and also be used as a financeability metric (applied to the segment in isolation).

Dividend yield/payout ratio(s)

Ofgem has dismissed the use of dividend and profitability ratios for assessing financeability on the grounds that there is no clear link between the risks faced by the ESO and how these compare to the companies that use these metrics. Specifically, Ofgem state;

"We therefore do not consider the ESO's proposal to use dividend and profitability ratios, for financeability purposes, has been adequately justified. This is particularly in the absence of a clear link to associated risks and how these risks compare to other companies in other sectors that use these metrics."

Dividend obligations of utilities are often substantial, quasi- permanent outflows, and are a key component of the equity financeability test.

A threshold of **c.4%** for the dividend yield is considered. This is based on the average dividend yield of FTSE 100 companies for the past 3-5 years of c. 4-4.3%, though it should be noted that comparable businesses typically exhibit yields above the average.

Temporary and small shortfalls in dividend yields below this benchmark are likely to be acceptable, providing that they are offset with projections or potential of higher future dividends within a defined time period. The inability to pay dividends, reductions in dividend payments, or significant requirements for equity injections (especially when these are large relative to the existing equity capital invested in the business) are likely to imply a significant financeability concern from an equity perspective.

Sources: KPMG analysis, Moody's and Eikon, (1) Moody's (2019), 'NATS (En Route) PLC, Update to credit analysis following outlook change to negative'. March. Oxera (2019), 'NGESO financial price control parameters for RIIO-2', September..

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