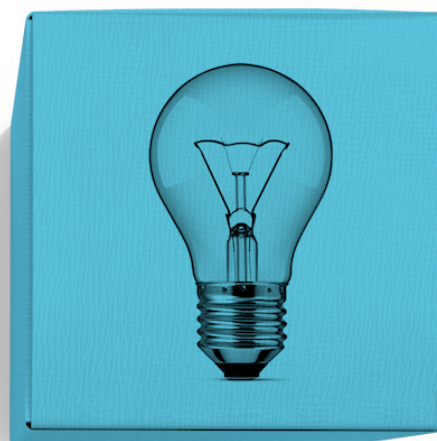


RIO-2: Electricity System Operator Returns

Ofgem

9 July 2020



FINAL REPORT (REDACTED)

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Contents

EXECUTIVE SUMMARY	4
1. INTRODUCTION	8
2. APPROACH TO FINANCEABILITY	9
2.1. Target credit rating	9
2.2. Targets, thresholds and constraints	10
2.3. Summary	15
3. APPROACH TO NON-RAV RISKS	16
3.1. ESO view	16
3.2. Proposed approach	20
4. TREATMENT OF RAV RISK	21
4.1. Cost of equity	21
4.2. Cost of debt	31
5. TREATMENT OF REVENUE COLLECTION ROLE	38
5.1. Sources of cash flow mismatch	38
5.2. Sizing the capital base	42
5.3. Remuneration	47
5.4. Assessment of residual risks	50
6. TREATMENT OF ADDITIONAL CONTINGENT CAPITAL	52
6.1. Sizing the capital base	52
6.2. Remuneration	56
7. SUMMARY	59
7.1. Total remuneration	59
7.2. Financeability assessment	61
APPENDIX A REVENUE COLLECTION – RESIDUAL RISK ANALYSIS	63

EXECUTIVE SUMMARY

This report considers the funding required by the ESO in order to be able to finance its various functions and responsibilities. Remuneration is required to cover both the cost of capital required to finance its Regulatory Asset Value (RAV) and the various financing costs related to the need for the ESO to maintain sufficient liquidity.

Two specific issues pertain to the ESO's funding requirement:

- Its asset-light nature – its regulated assets and the capital required to finance them are small in relation to its cashflows – means that it may face liquidity challenges that other regulated firms with larger asset bases may not face.
- Its revenue collection role requires it to manage cashflows – and potential timing mismatches relating to those cashflows – that are large in relation to its asset base. While the ESO is not exposed to risk associated with the eventual recovery of those revenues, without sufficient remuneration it may face liquidity challenges that would represent primary credit rating considerations.

In our view these issues can best be captured through identifying the different layers of capital required to manage the ESO's activities and risks and ensuring these layers of capital are remunerated. The ESO has proposed alternative options. Benchmark margins offer a high-level cross-check on returns but do not reflect the specific package of risks and liquidity challenges that the ESO faces. These are a function of the regulatory framework and are hard to compare against other businesses. Remuneration can be provided through applying uplifts to costs. This approach can be appropriate in the case of explicitly asymmetric cost disallowance frameworks but is less relevant given Ofgem's proposals to incorporate costs into an incentive regime with both upside and downside.

We first consider the capital remuneration required in relation to the ESO's RAV. Ofgem intends to remunerate the ESO's cost of equity based on a calculation that applies the Capital Asset Pricing Model (CAPM). Under this framework estimates of market-wide parameters (the risk-free rate and equity risk premium) are combined with a term 'beta' that captures the company's exposure to systematic risk. Ofgem intends to apply the same market-wide parameters as it applies to onshore networks. We therefore limit our advice to the ESO's asset beta.

The ESO itself is not independently listed and we are not aware of a listed direct comparator. We therefore consider available benchmarks for the asset beta:

- Evidence for GB regulated networks generally indicates an asset beta below 0.4. In light of the ESO's asset-light nature (and to a lesser extent its wider incentive regime, though systematic risk exposure arising from this may potentially be relatively limited) we judge the ESO's asset beta to sit above this range.
- Our estimation of the asset beta for NATS En-Route Ltd. (NERL), another asset-light regulated company that provides air traffic control services for UK airports, concluded on a range of 0.50-0.57 (restated based on a 0.125 debt beta). Although we viewed NERL's exposure to demand risk to be relatively limited this, combined with its asset-light nature, means its beta is likely to be higher than that of the ESO.
- The CMA's recent provisional finding of NERL's asset beta was 0.54-0.64 (restated based on a 0.125 asset beta). The CMA's view appears to accommodate a greater weight on demand risk exposure than our range and we judge the ESO's beta to be significantly below this range.
- The CMA's 2017 determination of SONI's price control appeal incorporated an asset beta assumption of 0.60. The asset beta was not, however, the basis of SONI's appeal and the CMA was not required to re-determine the appropriate asset beta. In our view the more recent NERL precedent, in which the CMA is required to re-determine the appropriate asset beta, is therefore more informative, bearing in mind that NERL too is an asset-light company.
- On balance, we consider that the ESO's asset beta is likely to **fall in the range 0.45-0.50**.

We have reviewed the ESO's proposed cost of debt mechanism. The mechanism provides for a floating rate cost of debt, in contrast to Ofgem's indexation mechanism for onshore networks which assumes fixed rate debt. It uses a short-term LIBOR benchmark interest rate as the basis for the calculation and adds a fixed ex ante margin on this calibrated to be consistent with raising BBB-rated debt over a 7-year term. It incorporates a 25bps uplift to reflect the ESO's assumed lower standalone credit rating and a provision for transaction costs.

The ESO's proposed approach appears reasonable in most respects. However, we identify the following adjustments to the mechanism:

- As LIBOR benchmarks will be phased out of use over the course of the price control, we recommend that the SONIA O/N rate (which will be the replacement for LIBOR benchmarks) is used as the reference index. Since it is not currently possible to estimate spreads relative to SONIA this also necessitates a small fixed ex ante adjustment to the mechanism to account for the historic difference between LIBOR and SONIA.
- Taking into consideration Ofgem's regulatory policy proposals and recent views on the ESO's credit rating from Moody's, the proposed 25bps uplift to the cost of debt allowance does not appear to be required.
- Should credit opinions continue to improve as the regulatory regime matures, we expect that the credit rating assumption could be increased from our BBB assumption.

We have assessed the capital that might be required to provide sufficient liquidity management capacity for the ESO's revenue collection role under two scenarios:

- Under Scenario 1, an as-is scenario based on current arrangements for revenue collection, we judge that £350-550m capital might be required. At the upper end this appears consistent with an ability to manage over 99% outturn scenarios, based on information provided by the ESO.
- Under a similarly calibrated Scenario 2, in which aspects of the ESO's revenue collection role move to a 'pay-as-invoiced' or 'pay-as-paid' basis, the amount of capital required would be significantly reduced. We judge in this scenario that £165-260m would be required.

We assume that the majority of the capital requirement could be met through a working capital facility. Based on the ESO's current facility the annual commitment fees for such a facility would be in the region of 0.3%. Our analysis indicates that Ofgem's current arrangements for remunerating the time value of money where revenue corrections are made would be sufficient to remunerate costs of drawing down on the facility.

Under both scenarios we assume that a portion of the capital required – £50m at the upper end of our Scenario 1 estimate and a pro-rata amount otherwise – would need to be provided as equity. Should this capital be drawn down it would be remunerated based on Ofgem's current arrangements for remunerating the time value of money where revenue corrections are made. Where this capital is not drawn it would be able to earn a risk-free rate of return. We therefore assume that the required rate of return would reflect the risk premium component of the ESO's cost of equity only.

The ESO has also argued that it might need to rely on sources of contingent capital. There are two reasons this might be the case:

- Where a regulated company is explicitly exposed to cost disallowance asymmetry as part of a sculpted incentive regime it may be appropriate to provide an additional ex ante allowance to ensure that a notionally efficient entity would expect to earn its cost of capital. While appropriate in principle this rationale no longer applies to the ESO as Ofgem has proposed to incorporate costs into an incentive regime that provides both upside and (more limited) downside.
- The ESO may also be expected to manage some downside risks that are large relative to its (small) capital base. This may result in a provision being required where none is necessary for networks with larger capital bases.

The ESO and its advisors proposed a wide range of estimates for the quantum of contingent capital that may be required. [✕]

Several aspects of this assessment are no longer relevant: Ofgem has proposed to treat costs under an incentive regime with upside and downside, in principle eliminating the asymmetric downside risk related to cost performance; it has removed the specific Black Start costs disallowance provision; and it has constrained overall cost disallowances to be a similar proportion of RAV to that faced by the networks. We judge that no more than £25m equity capital would now be required. In relation to each category of risk identified by the ESO and its advisors, a plausible case can be made that no provision would be required. The low end of our range is therefore zero, though we note that this requires summation of a series of low-end views.

As for the equity required for the ESO's revenue collection role we assume that the required rate of return would reflect the risk premium component of the ESO's cost of equity.

Tables A and B below illustrate the resulting annual cash remuneration ranges for the ESO under Scenarios 1 and 2 respectively. The allowances include ex ante provisions for the capital required to finance the ESO's RAV, revenue collection role and contingent capital. They include indicative ranges for the remuneration that the ESO might expect to recover through Ofgem's revenue recovery (prior year) adjustments allowances, though the precise amounts would depend on outturn revenue collection shortfalls or over-recoveries. The 'additional' ex ante allowance is the total return over and above the allowed return on the ESO RAV.

Table A: Illustration of total potential annual return range for ESO – Scenario 1 (£m)

	Capital base	Debt capital	Return	Equity capital	Return	Total return
RAV	303	167	0.8	136	6.9-8.7	7.7-9.5
Revenue collection role	350-550	322-500	1.0-1.5	28-50	1.9-4.0	2.8-5.5
Contingent capital	0-25			0-25	0.0-2.0	0.0-2.0
Sub-total: Ex ante allowance	653-878	489-667	1.8-2.3	164-211	8.7-14.7	10.5-17.0
Revenue recovery adjustments	N/A					3.5-12.3
Total						14.0-29.3
Total 'additional' revenue						6.3-19.8
'Additional' ex ante allowance						2.8-7.5

Source: CEPA analysis

Table B: Illustration of total potential annual return range for ESO – Scenario 2 (£m)

	Capital base	Debt capital	Return	Equity capital	Return	Total return
RAV	303	167	0.8	136	6.9-8.7	7.7-9.5
Revenue collection role	165-260	152-236	0.5-0.7	13-24	0.9-1.9	1.3-2.6
Contingent capital	0-25			0-25	0.0-2.0	0.0-2.0
Sub-total: Ex ante allowance	468-588	318-403	1.3-1.5	150-185	7.8-12.6	9.0-14.1
Revenue recovery adjustments	N/A					1.1-6.1
Total						10.1-20.2
Total 'additional' revenue						2.4-10.7
'Additional' ex ante allowance						1.3-4.6

Source: CEPA analysis

Finally, we return to an assessment of the ESO's financeability, drawing on insights from the relevant Moody's credit rating methodology. We would expect the key issue to be the provision of sufficient liquidity, particularly in relation to the ESO's revenue collection role. While there is no formal, quantitative definition of "sufficient" liquidity, in our view the total remuneration proposed in this report has been calibrated to accommodate a very wide range of scenarios and would likely be considered consistent with the ESO having access to sufficient liquidity.

The ESO's credit rating and financeability is also judged with respect to quantitative credit metrics. The key metrics under Moody's methodology are:

- $(\text{CFO pre-WC} + \text{Interest}) / \text{Interest}$.
- $\text{CFO pre-WC} / \text{Debt}$.
- $(\text{CFO pre-WC} - \text{Dividends}) / \text{Debt}$ (3-year average).
- $\text{Debt} / \text{Capitalization}$ (3-year average).

We have reviewed Ofgem's ESO Licence Model outputs based on the remuneration ranges proposed in this report, combined with its other price control proposals. Table C below summarises the average of each metric over the first three years of the price control relative to the range consistent with A and Baa ratings for each metric. These metrics together comprise 40% of the overall indicated rating (before adjustments).

Table C: Overview of key credit metrics

Metric	2021/22-2023/24 avg.	A rating range	Baa rating range
$(\text{CFO pre-WC} + \text{Interest}) / \text{Interest}$	21.7	4.5-6.0x	3.0-4.5x
$\text{CFO pre-WC} / \text{Debt}$	34.4%	19-27%	11-19%
$(\text{CFO pre-WC} - \text{Dividends}) / \text{Debt}$	32.2%	15-23%	7-15%
$\text{Debt} / \text{Capitalisation}$	26.8%	40-50%	50-59%

Source: Ofgem

All metrics are above the range consistent with an A or Baa rating, in some cases by a considerable margin. There is no evidence that any metric is on a problematic downward trend during the price control. Given that the regime is in the early stages of development – which has been reflected by Moody's in its score for the 'Consistency and Predictability of Regulation' rating factor – these strong credit metrics are helpful in underpinning an overall positive assessment of the ESO's financeability.

1. INTRODUCTION

In April 2021, Ofgem will introduce the first standalone price control for the Electricity System Operator (ESO) under the RIIO-2 framework. Ofgem published its decision on the RIIO-2 financial methodology for the ESO in October 2019.² Ofgem has asked CEPA to consider the funding required by the ESO in order to be able to finance its various functions and responsibilities. Our assessment has been informed by the ESO's business plan and supporting advisory reports.

We have taken an approach that recognises the distinctive nature of the ESO's business. Its role as collection agent for multiple network payments means that the annual cash flows that it manages are large relative to its Regulatory Asset Value (RAV). It is important to make sufficient provision for this. We carry out our assessment for the ESO as a standalone notional entity. We do not assume continued support for the ESO as part of the National Grid group.

It would be insufficient simply to focus on the aspects of the ESO's business that relate directly to its RAV. We also consider the indirect or unobservable costs related to its revenue collection role. Ofgem is considering a range of options for allocating risks related to this role. The principles underpinning the required remuneration remain the same, in our view, across different options and scenarios considered. To illustrate how these principles would be applied we have considered two scenarios for risk exposure:

- **Scenario 1:** An 'as-is' scenario assumes that the ESO's role in relation to revenue collection is unchanged. This is the scenario today in which the ESO is responsible for managing the cash flow fluctuations and risks associated with its collection and payment role for Transmission Network Use of System (TNUoS) charges, along with other industry charges³.
- **Scenario 2:** A de-scoped scenario in which some aspects of the ESO's revenue collection role (e.g. TNUoS charges) move to a 'pay-as-invoiced' basis. This would considerably reduce the potential cash shortfall in any given year. We assume that the arrangements for remunerating the ESO for revenue over- or under-recovery remain 'as-is' but note that the issue of time value of money is also under consideration by Ofgem.

In each scenario the revenue collected by the ESO, and the potential annual cash flow fluctuations, would be large relative to its RAV. The primary consideration for lenders to and investors in the ESO is likely to be liquidity. Our approach therefore places significant weight on the availability of capital to provide liquidity and the implications of liquidity issues for financeability.

The report is structured as follows:

- Sections 2 and 3 set out two key aspects of our approach, focusing on financeability issues and the approach to remunerating non-RAV risks.
- Section 4 presents our analysis of the remuneration of risk in relation to the RAV.
- Sections 5 and 6 present our analysis of the required capital and remuneration of that capital in relation to the ESO's revenue collection risk and risks that create other requirements for contingent capital.
- Section 7 summarises our revenue provisions, compares these to the ESO's proposals, and summarises our resulting overall assessment of financeability.

In support of this report we have also carried out modelling of the ESO's revenue collection role in order to assess the scale of potential mismatches between the funding provided in relation to revenue timing issues and the direct costs of managing that liquidity. A summary of this modelling is provided separately in Appendix A.

² Ofgem: 'RIIO-2 financial methodology and roles framework for the Electricity System Operator', October 2019.

³ See Section 5 for a more extensive discussion of ESO's current revenue collection activities.

2. APPROACH TO FINANCEABILITY

This section sets out our understanding of the relevant considerations in assessing the ESO's financeability. We consider the appropriate target rating for a business such as the ESO, the targets, thresholds and constraints consistent with that and any provisions that may need to be made as a result.

2.1. TARGET CREDIT RATING

The first decision in relation to financeability is the appropriate target credit rating for a notional ESO. A stronger rating will be associated with greater stability and reduced debt costs but will also be associated with more stringent credit rating metrics and thresholds. Provided that the exposure to risk is correctly calibrated across the price control package, there is not a single 'correct' target rating.

Each credit rating is associated with a tangible probability that a company with that rating would transition to a different rating or ultimately default on its debt. This provides a guide to the amount of leeway that a price control package calibrated on each rating can be expected to provide. Figure 2.1 shows the average one-year rating migration rates as calculated by Moody's Investors Service for 1983-2019 based on its database of corporate debt. The table shows that, for example, among issuers of debt beginning a year with a Baa3 rating 4.78% are expected to end the year with a Ba1 rating and 0.22% are expected to default.

Figure 2.1: Moody's one-year rating migration rates (1983-2019)

[✕]

Source: Moody's Investors Service

Even a Baa1 credit rating – two notches above the lowest rating considered to be investment grade – has been associated with a material probability of a downgrade to sub-investment grade status (around 1.6% over a one-year horizon) and a 0.12% probability of default. For a business with systemic importance such as the ESO we expect that the additional security consistent with an A3 target rating may be beneficial. An A2 target rating, however, appears to offer more limited incremental benefits.

The ESO recognises that it has a duty by licence to maintain an investment grade credit rating. When assessing its financeability, the Moody's 'grid rating' is one of the criteria that it uses.⁴ As explained in the next section, the grid rating differs from the actual rating in that the former is a standard scorecard-based methodology used to assess all regulated entities, and the latter adjusts this rating based on other factors which specifically apply to the company in question. Moody's initial grid rating for the ESO was [✕] and the actual rating is Baa1, [✕], which is two notches higher than the minimum investment grade, Baa3. In its financial assessment, the ESO's threshold for its grid rating is maintained at A1 on average over the price control period.

⁴ ESO RIIO-2 Business Plan Annex 5 – Finance Report, pg. 21.

2.2. TARGETS, THRESHOLDS AND CONSTRAINTS

We have reviewed the Moody's rating methodology that it has applied to the ESO in practice. It places substantial weight on liquidity management – to the extent that if sufficient arrangements were not in place this issue would be likely to outweigh other rating considerations. We therefore focus our attention on the need to provide the ESO with sufficient liquidity both for its RAV-based business and for its revenue collection role. The latter role provides a greater potential challenge to liquidity – particularly under Scenario 1 (see Section 1) in which the potential for a cash flow mismatch exists across a wide range of revenue collection categories.

2.2.1. Overview of Moody's methodology

Ahead of the ESO becoming an independent entity responsible for SO responsibilities on April 1 2019, Moody's Investors Services published a research note outlining its assessment leading to its initial rating.⁵ It also published a Credit Opinion updating its view in April 2020.⁶ These notes used Moody's Rating Methodology for Regulated Electric and Gas Utilities to derive the ESO's rating.⁷ This section will give an overview of that scorecard-based methodology and the next section will explain how Moody's applied it to the ESO in its initial view (March 2019) and the subsequent update (April 2020). Table 2.1 shows a summary of the four factors and sub-factors used as inputs into the Moody's scorecard which produces the initial 'grid-indicated rating'. There are other considerations taken into account to derive the actual rating, which will also be explained below.

Table 2.1: Moody's Rating Methodology for Regulated Electric and Gas Utilities

Broad scorecard factors	Factor weighting	Sub-factor	Sub-factor weighting
Regulatory framework	25%	Legislative and judicial underpinnings of the regulatory framework	12.5%
		Consistency and predictability of regulation	12.5%
Ability to recover costs and earn returns	25%	Timeliness of recovery of operating and capital costs	12.5%
		Sufficiency of rates and returns	12.5%
Diversification	10%	Market position (10% if issuer lacks generation)	5%
		Generation and fuel diversity	5%
Financial strength, key financial metrics	40%	CFO pre-WC + Interest / Interest	7.5%
		CFO pre-WC / Debt	15%
		CFO pre-WC – Dividends / Debt	10%
		Debt/Capitalization	7.5%
Total	100%		100%

⁵ [Moody's Issuer In Depth Note: National Grid Electricity System Operator](#), 28 March 2019 (requires paid subscription).

⁶ Moody's Credit Opinion: National Grid Electricity System Operator Ltd, 29 April 2020 (requires paid subscription).

⁷ [Moody's Rating Methodology: Regulated Electricity and Gas Utilities](#), (registration required).

Factor 1: Regulatory framework (25%)

The first two factors score the regulatory environment and the utility's ability to operate within it. The regulatory framework determines how all decisions that affect the utilities are made. This factor is therefore driven by an assessment of the regulatory environment the utility finds itself in.

It is divided into two equally weighted sub-factors:

- Legislative and judicial underpinnings of the regulatory framework. Moody's state that "*[f]or this sub-factor, we consider the scope, clarity, transparency, supportiveness and granularity of utility legislation, decrees, and rules as they apply to the issuer.*" This also takes into account dispute arbitration and how much influence the utility itself has in shaping and navigating the framework. Importantly for the ESO, Moody's also assesses how well-developed and tested the framework is, and the extent to which there is 'a body of precedent'.
- Consistency and predictability of regulation. This sub-factor considers "*the track record of regulatory decisions in terms of consistency, predictability and supportiveness. We evaluate the utility's interactions in the regulatory process as well as the overall stance of the regulator toward the utility.*" Higher scores are awarded to technical, transparent processes, while the potential for political interference will reduce it.

Factor 2: Ability to recover costs and earn returns (25%)

This factor is the corollary of the first factor and measures the utility's decision-making and ability to generate timely cashflows given the regulatory environment, especially in challenging conditions. This factor is driven by management and business decisions taken within the utility.

It is divided into two equally weighted sub-factors:

- Timeliness of recovery of operating and capital costs. The criteria for this sub-factor includes "*provisions and cost recovery mechanisms for operating costs, mechanisms that allow actual operating and/or capital expenditures to be trued-up periodically into rates [...] as well as the process and timeframe of general tariff/base rate cases.*" Relevant for the ESO is that a track-record of timeliness is taken into account, if possible.
- Sufficiency of rates and returns. This sub-factor looks at "*statutory protections that assure full cost recovery and a reasonable return for the utility on its investments, the regulatory mechanisms used to determine what a reasonable return should be, and the track record of the utility in actually recovering costs and earning returns.*" This assessment is done by comparison with peers, ideally locally if possible. This also takes into account any disallowances over time.

Factor 3: Diversification (10%)

Moody's note that utilities are less exposed to the economic cycle than many other industries, but that diversification of business operations nonetheless mitigates against financial uncertainty at such times. For the purposes of the ESO, there is only one sub-factor here, comprising the entire score:

- Market position. This is comprised "*primarily of the economic diversity of the utility's service territory and the diversity of its regulatory regimes.*" This means standard economic and population metrics regarding the territory the utility operates in, the volumes of sales it makes and diversity of its customers (i.e. residential, commercial, industrial and governmental).

Factor 4: Financial strength, key financial metrics (40%)

Moody's note that utilities "*are regulated, asset-based businesses characterized by large investments in long-lived property, plant and equipment.*" As such they need the financial strength and performance to attract capital at a reasonable rate to provide services at a reasonable cost for users. The regulatory framework and nature of the business leads to a different financial environment than in many other sectors, which means a focus on cash flow is

more relevant than traditional net income metrics. However, the timing of some cash flows – i.e. when charges are collected and paid out – over short periods of time may not reflect the long-term balance. To capture long-term cash flows the key metric used in these ratios is Cash Flow from Operations Before Changes in Working Capital (CFO Pre-WC).

Another important factor for the ESO's assessment is that Moody's sees that *"it is important to analyse both a utility's historical financial performance as well as its prospective future performance, which may be different from backward-looking measures."*

There are four key ratios:

- $(\text{CFO Pre-WC} + \text{Interest}) / \text{Interest}$. The cash flow interest coverage ratio is weighted 7.5%. It represents the ability of the utility to cover its borrowing costs.
- $\text{CFO Pre-WC} / \text{Debt}$. This ratio is weighted 10% and is *"an indicator for the cash generating ability of a utility compared to its total debt."*
- $(\text{CFO Pre-WC} - \text{Dividends}) / \text{Debt}$. This important ratio is weighted 15% and captures both leverage and strength of cash flows after dividends are paid. Dividends can be a substantial, consistent outflow for some utilities, so this ratio measures its ability to cover its capital expenditure after these have been paid.
- $\text{Debt} / \text{Capitalization}$. This is a standard balance-sheet measure, weighted 7.5%. Higher debt levels can mean higher interest rate payments and greater difficulty in raising additional financing if necessary.

Other considerations

The above sub-factors are each assessed and scored using Moody's standard ratings (Aaa etc.). A weighted average is taken to get the overall 'grid-indicated rating'. Although the detailed descriptions of the sub-factors in the methodology document make it clear that Moody's makes adjustments and nuances within each category based on the particular utility being assessed, it is nonetheless a relatively simple framework for complex firms in a diverse, changing industry. Therefore, further adjustments are made in order to produce the 'actual' rating which is ultimately published and used. This is particularly relevant for the ESO as a new entity with no long-term track record as a separate regulated entity.

Under 'Assumptions, Limitations and Other Rating Considerations' in the methodology, Moody's notes that:

"The scorecard in this rating methodology represents a decision to favor simplicity that enhances transparency and to avoid greater complexity that might enable the scorecard to map more closely to actual ratings. Accordingly, the four factors and the notching factor in the scorecard do not constitute an exhaustive treatment of all of the considerations that are important for ratings of companies in the regulated electric and gas utility sector. In addition, our ratings incorporate expectations for future performance, while the financial information that is used in the scorecard is mainly historical."

Of particular relevance to the ESO among other rating considerations is 'Liquidity and Access to Capital Markets'. Moody's note the importance of liquidity for the sector, given long-lived assets, non-discretionary capex and persistent dividends. However, liquidity conditions vary greatly for different companies in the sector, which is why it is not formally incorporated into the scorecard. In normal circumstances, for the majority of utilities, they are well-funded, and this is not a major issue that deserves particular consideration when making rating decisions. However, Moody's state that *"when there is weakness in liquidity or liquidity management, it can be the dominant consideration for ratings."*

2.2.2. ESO rating

Moody's applied this framework to the ESO in order to derive its initial rating and an updated rating in April 2020. For the initial view, the grid-indicated rating was [Baa1], while the update was [Baa1]. However, in both cases the actual rating assigned was [Baa1] Baa1. This section will go through the scores for each factor and describe the other considerations – particularly liquidity – which led to this rating. Table 2.2 shows both sets of scores.

Table 2.2: Moody's rating for ESO

Factor / Sub-factor	Measure	March 2019 score	April 2020 score
Factor 1: Regulatory Framework (25%)			
a) Legislative and Judicial Underpinnings of the Regulatory Framework		[✕]	[✕]
b) Consistency and Predictability of Regulation		[✕]	[✕]
Factor 2: Ability to Recover Costs and Earn Returns (25%)			
a) Timeliness of Recovery of Operating and Capital Costs		[✕]	[✕]
b) Sufficiency of Rates and Returns		[✕]	[✕]
Factor 3: Diversification (10%)			
a) Market Position		[✕]	[✕]
Factor 4: Financial Strength (40%)			
a) (CFO pre-WC + Interest) / Interest (3 Year Avg)	[✕]	[✕]	[✕]
b) CFO pre-WC / Debt (3 Year Avg)	[✕]	[✕]	[✕]
c) (CFO pre-WC - Dividends) / Debt (3 Year Avg)	[✕]	[✕]	[✕]
d) Debt / Capitalization (3 Year Avg)	[✕]	[✕]	[✕]
Rating:			
a) Indicated Rating from Grid		[✕]	[✕]
b) Actual Rating Assigned		Baa1	[✕]

Source: CEPA analysis of Moody's publications.

Factor 1: Regulatory framework (25%)

- [✕]
- [✕]

Factor 2: Ability to recover costs and earn returns (25%)

- [✕]
- [✕] This score probably reflects some of the uncertainty around the new incentive scheme which could account for a significant portion of the ESO's revenues. This has moved from a mechanistic, metric-based methodology to a more subjective assessment, carried out by an independent panel and based on a scorecard approach. [✕]

Factor 3: Diversification (10%)

- [✕]

Factor 4: Financial strength, key financial metrics (40%)

- [✕]
- [✕]
- [✕]
- [✕]

Other considerations

[✂]

[✂]

Rating Outlook

The outlook for the ESO's rating is stable, due to Moody's *"expectation that the framework for the forthcoming RIIO-2 control, beginning 1 April 2021, will not result in materially weaker cash flow or a deterioration in the company's business risk profile."* They do not expect upward rating pressure (i.e. credit improvement) in the short/medium term due to the anticipated challenges of reduced electricity demand and revenue under-collection due to the coronavirus crisis.

Over the longer term, upward movements could occur if there were reduction in a) the cash flow volatility associated with revenue collection and/or b) the risk of underperformance of allowed revenues due to the high-powered incentives. As the regulatory framework becomes more established, this could also be positive (but conversely could create downward pressure if it was to become less stable or predictable). Due to the importance Moody's places on potential support from the wider National Grid group, the rating outlook for that business would also have implications for the ESO as actually structured.

2.3. SUMMARY

The distinctive nature of the ESO's business means that while the standard quantitative factors considered in credit rating assessments are important, the expected liquidity position of the ESO is likely to be the most important single factor. This issue cuts across the ESO's business and must be considered in relation to all of its areas of activity.

Importantly, in order for the ESO to be able to finance its functions and maintain a strong liquidity position it may need to have access to a significant amount of capital over and above that employed in the tangible assets on the company's balance sheet and RAV. This consideration drives the approach that we take to estimating the size and remuneration of the ESO's total capital base in the remainder of this report.

We assume that the ESO's allowed revenue will need to:

- demonstrate that it is financeable on a standalone basis without reliance on group-level support; and
- have access to sufficient capital not only to finance its RAV but also to manage its working capital requirements and contingent capital provisions.

The analysis of the remuneration necessary to achieve this will be complicated by the ESO's non-RAV business activities and, bearing in mind its asset-light nature, the potential for downside risks that may be harder to manage than they would be for other regulated businesses.

We consider that a relatively strong credit rating target would be consistent with meeting these conditions. An A3/A- rating would be defensible, minimising debt costs and signalling an intention to remunerate a capital base that would be ample for the ESO to manage even remote downside scenarios.

However, such a rating may be challenging to deliver in practice – though developments and clarifications of Ofgem's proposed policy regime since the ESO submitted its December 2019 business plan may have made such a rating more achievable. In practice we think that a lower rating of BBB+/Baa1 is likely to be a more manageable and realistic target – at least until there is a track record on the operation of the standalone regime for the ESO.

Irrespective of the chosen target rating the key consideration is the provision of sufficient liquidity, particularly in relation to the ESO's revenue collection role. Though Moody's does not have formal quantitative guidelines as to the definition of sufficient liquidity, based on the probabilistic analysis in Figure 2.1 we assume that the ESO's available liquidity would need to be consistent with a very low probability of downgrade to sub-investment grade status. The range of scenarios that can be managed within a given capital base can be expressed in probabilistic terms. For example, a 'P95' estimate of required capital would be expected to be sufficient to accommodate annual cash flow volatility in 95% of scenarios. Based on the rating transition and default probabilities in Figure 2.1 above we would expect that a P99 estimate would be appropriate for sizing the ESO's required capital base at a high target rating. In contrast, an estimate closer to a P95 figure may be tolerable for sizing the ESO's required capital base at a lower (but still investment grade) credit rating.

We consider these issues in further detail in subsequent sections of the report.

3. APPROACH TO NON-RAV RISKS

In this section we look at the ESO's non-RAV risks. The two main areas we focus on are risks related to its revenue collection role and asymmetric risk. The ESO strongly argues that the RAV*WACC does not adequately remunerate it for these risks and that some formulation must be found to additionally compensate it.

We agree that the revenue collection risk deserves consideration, not least due to the financeability considerations and liquidity risks associated with this role, as outlined in Section 2. In particular, Moody's highlighted liquidity as the key risk in determining the rating for the ESO. The volume of revenues the ESO is responsible for collecting are significant, especially when compared to its RAV, and have come under close scrutiny in other similar regulatory settings e.g. the Competition and Markets Authority (CMA) price review referral for SONI⁸.

The ESO uses the SONI case, as well as top-down and bottom-up benchmarking, to arrive at an estimate for what it considers an appropriate level of 'additional' or incremental remuneration (i.e. a return over and above the return required on its RAV) to compensate it for these additional risks. This results in a broad range of £13-39m, which we interpret as the ESO's estimate of the annual return over and above that required to finance the RAV.

3.1. ESO VIEW

The ESO gave its detailed view on how Ofgem's proposed financial framework dealt with its risk at an earlier stage of policy development. It used analysis it commissioned from KPMG which set out the risks the ESO is exposed to, and then used various approaches to try to quantify how much it should be remunerated for bearing these risks.

3.1.1. The ESO critique of the RAV funding model

The ESO takes a strong view that a standard RAV*WACC type-model is in their view not appropriate for their remuneration, especially for the revenue collection function.⁹ It argues that this is essentially a service-type role, driven by opex and unrelated to assets (i.e. the RAV) and therefore should be remunerated separately. On a separate but related point, it highlights that even if a RAV*WACC model was used, the ESO is an asset-light company and therefore the level of remuneration would not be proportionate to the level of risk they are taking on by collecting relatively large amounts of revenue as described in the previous sections.

To illustrate this, it sets out the RAV and return related to each of their three core functions – Operations and Balancing, Industry and Markets and Revenue Management – under the proposed Ofgem RAV funding model.

For the 'Revenue management' role, the average RAV over the period would be £9m (3% of the total RAV) and the return would be £0.3m (inclusive of *"an element relating to the cost of debt expected to be offset by an interest charge"*). For the 'Industry and markets' role the average RAV would be £59m (20% of the total RAV) and the associated return £2.0m. The ESO sees these two roles specifically as being service-based and asset-light with the result that the amount of remuneration for risk exposure provided through a RAV*WACC model risks being insufficient.

As a result, the ESO concludes that it would be forced to behave in a risk-averse manner when conducting its activities in relation to those two roles in particular, preventing innovation and limiting consumer value. This is further compounded by two further factors specific to the revenue collection role as proposed:

- Cost disallowances. The ESO recognises the importance of disallowances for efficiency reasons but implies that *"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."* They suggest that this unpredictability would lead to further risk-averse behaviour.

⁸ The Northern Ireland electricity transmission system operator.

⁹ ESO RIIO-2 Business Plan Annex 5 – Finance Report, A7.

- Lack of incentives. While disallowances provide further downside risk, there is no corresponding upside risk for the ESO in carrying out the revenue collection function, which in their view would further stifle innovation. In their view, “[n]o commercial organisation would take on such a high-risk role if the best-case scenario is essentially to break even.”

Finally, the ESO sets out its revenue management role against Ofgem’s risk taxonomy and finds that it correlates with five of the categories, as described in Table 3.1.

Table 3.1: Ofgem risk taxonomy

Risk category	Revenue management
Revenue collection	✓ ✓
Performance	
Cost	✓ ✓
Operational	✓
Reputational/political	
Legal	✓ ✓
Regulatory	✓

Source: ESO RIIO-2 Business Plan Annex 5 – Finance Report, page 36

The ESO concludes that, while the RAV model compensates for some of the risk that its business faces, this analysis makes a strong argument for ‘additional remuneration’. The ESO itself applies this conclusion across all three roles, though as indicated above it appears to be particularly relevant to the ‘Industry and markets’ and ‘Revenue collection’ roles. It recognises that there is no one correct method to calculate the additional remuneration requirement, so aims to ‘triangulate’ a range based on three approaches:

- regulatory precedent;
- margin benchmarks; and
- risks.

These approaches are discussed and summarised in Section 3.1.2 below.

3.1.2. Assessment of additional remuneration

Regulatory precedent

The CMA/SONI ruling is the key case which the ESO uses as evidence that it should receive additional remuneration for the risks related to its revenue collection role and exposure to asymmetric risk.¹⁰

The CMA found that the Utility Regulator should have taken into account the additional risk that SONI was taking on in its revenue collection role, and upheld SONI’s argument that the regulator “*had failed to take account of the non-systematic and asymmetric risks SONI faced when using CAPM to set its cost of capital*”. The ESO sees its own revenue collection role as analogous to SONI’s. The CMA also concluded that the Utility Regulatory failed to provide adequate remuneration to cover financing risks associated with the “*asymmetric risks associated with UR’s approach to financing of much of SONI’s investments, where returns are capped by the UR*”.¹¹

The specific remedies that the CMA applied in the context of the SONI appeal process to address these risks were as follows:

¹⁰ CMA (2017): ‘SONI Limited v Northern Ireland Authority for Utility Regulation – Final Determination’

¹¹ ‘SONI Limited v Northern Ireland Authority for Utility Regulation – Final determination’, CMA, 2017.

- The CMA determined that the remedy for revenue recovery risk should be in the range of 0.25% - 0.5% of revenues. The ESO believes this range should apply to it also and selected a value of 0.35% based on an independent Oxera report.¹²
- The CMA also remedied SONI for taking on asymmetric risk, through a fixed annual amount based on a 3% uplift to costs subject to disallowances. The ESO suggests that for them this value would be 2%, at the low end of the range of 2% to 4% that the CMA considered.
- The final remedy was a 1.75% return on SONI's parent company guarantee.

The ESO referred to these remedies in the context of its own RIIO-2 business plan and in calculating an additional return requirement of £34m per annum.¹³

Margin benchmarks

The ESO uses top-down benchmarking to calculate margins for similar competitive industries, which are assumed to be efficient. It uses two methods.

In the first method, it uses benchmarks for each of its three functions. It uses the Oxera 0.35% margin for the revenue collection aspect of this calculation and KPMG benchmarks for the other aspects. It comes to a £26-32m funding gap.

For the second method, the ESO considers a range of EBIT margins it considers relevant for its business. These are drawn from three sources.

- Moody's methodology for similar asset-light companies is interpreted to imply a minimum required EBIT margin of 10-15% in order to achieve an investment grade rating.
- The ESO cites other ("typically asset light") regulated companies in the UK which have allowed revenues with reference to allowed profit margins. The only specific case the ESO references is Ofgem's determination for the Smart Data Communications Company (DCC), with 12% allowed margins.
- KPMG chose industrial and commercial services and software and IT services as comparable sectors for the ESO, based on similar financial and business characteristics. The market benchmark range is 10-13%.

Combining these sources, this approach produces a £13-26m range for the funding gap.

Remuneration of capital

The ESO argues that risk and remuneration are not correlated in Ofgem's proposed financial framework, so it attempted to assess its risk in order to do so. The first method it uses builds on KPMG risk capital analysis to quantify a capital base which takes all asymmetric risks into account and presents it under two scenarios, as in The detailed assessment of risk capital employed that is reflected in Table 3.2 was carried out in support of the ESO's October business plan. We understand that the ESO did not change its view of the overall required range in producing its updated December business plan, but the details of this analysis were not included.

¹² "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"

¹³ The ESO also used the results of two of these remedies – the 0.35% uplift for revenue recovery and 2% fixed amount for asymmetric risk – as inputs into a CAPM estimate for additional revenues. This implied an additional return of £20-35m, which is within the range found in the other methodologies described in this section.

Table 3.2. The detailed assessment of risk capital employed that is reflected in Table 3.2 was carried out in support of the ESO's October business plan. We understand that the ESO did not change its view of the overall required range in producing its updated December business plan, but the details of this analysis were not included.

Table 3.2: Implied capital requirements

	Lower end scenario	Higher end scenario
1 Working capital	[£]	[£]
2 Risk capital	[£]	[£]
3 RAV capital employed	£325m	£375m
4 Total capital requirements (= 1+2+3)	£955m	£1,060
5 WACC	5.7%	5.7%
6 RAV-only remuneration (= 3*5)	£19m	£22m
7 Total capital remuneration (= 4*5)	£55m	£61m
8 Additional remuneration (= 7 - 6)	£36m	£39m

Source: ESO RIIO-2 Business Plan Annex 5 – Finance Report; KPMG, National Grid ESO risk and capital requirements, 25 September 2019, pages 16-17; CEPA calculations

The total capital requirement based on the KPMG report used as the source for Table 3.2 includes:

- A provision of [£] for working capital consisting of [£], [£]
- The risk capital is KPMG’s analysis of the capital the ESO may plausibly need to deal with risks under lower and higher-end risk scenarios. The quantification of this is set out in Section 6.2.1 of this report.
- The assumptions underlying the two scenarios are not clear other than being higher or lower-end risk. This extends to the chosen RAV amounts in each scenario and how they differ.
- The WACC is “5.7% Nominal, CPIH stripped applied as set out as working assumption within Ofgem’s ESOMDD”.

In its report in support of the ESO’s December Business Plan, KPMG sets out an indicative estimate of the ESO’s capital requirement of £1,000m. This appears consistent with the breakdown in Table 3.2, though the breakdown is slightly different, and no range is provided. We assume that KPMG’s advice on the capital requirements in Table 3.2 and its component parts has not changed.

KPMG compared the resulting total remuneration to its own estimate of the WACC that would be earned on the RAV alone and find there should be additional remuneration of £36 - 39m.

Summary

Combining the ranges produced by the three methods produces a range of outcomes for additional remuneration of £13-39m. While the ESO “believe that it should not be zero” it does not set out a point estimate for what the overall amount should be.

The ESO’s conclusion on asymmetric risk remuneration is as follows:

“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.”

The ESO’s conclusion on revenue collection remuneration is as follows:

“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.”

It accepts that allowances could be set ex ante to remove perverse incentives related to the ESO incurring additional costs.

3.2. PROPOSED APPROACH

The ESO and KPMG have set out a wide range of benchmarks for the total remuneration that a business such as the ESO might require. In general, we accept the premise of these additional benchmarks: under the proposed regulatory framework and set of functions of the ESO, RAV-based remuneration alone would risk under-rewarding the ESO in relation to:

- the liquidity challenges that it faces in relation to its revenue collection role, which are of a different scale to the liquidity challenges it might expect to face in relation to its RAV-based business activities; and
- other contingent capital needs resulting from the ESO’s regulatory framework and operating environment.

Aggregate, margin-based benchmarks of the kind proposed by the ESO and KPMG are challenging to apply to the specific case of the ESO. Its fundamental exposure to risk in relation to its revenue collection role (as opposed to the short-term challenge of managing liquidity) is very limited by virtue of the protections of the regulatory framework. Similarly, the existence and scale of any asymmetric risk is a function of the regulatory regime rather than being a risk that the ESO may share with more general margin comparators.

The components of capital that the ESO may require are, however, reasonably clear. KPMG’s September 2019 advice to the ESO argues against attempting to define and remunerate different components of capital:

[✕]

We disagree with this position. Though we do not agree with all of the assumptions and benchmarks that it includes, the breakdown of capital required in Table 3.2 represents a reasonable starting point for assessing the remuneration required by the ESO. The different uses of capital and risks to which each component of capital would be exposed are quite distinct, even if the cashflows themselves are not legally separate. We do not consider it any more legitimate to determine revenue required on the basis of margin benchmarks from companies which may also carry out a range of different activities with different risk profiles.

In the previous section on financeability we also highlighted the importance of the ESO’s liquidity and access to sufficient capital to not only to finance its RAV but also to manage its working capital requirements and contingent capital provisions. Seeking to identify appropriate assumptions for the total capital requirement of the ESO’s regulated business helps address this core requirement for financeability directly.

In the following sections we therefore focus separately on three distinct categories of risk and required returns, namely those related to:

- RAV risks (Section 4);
- the ESO’s revenue collection role (Section 5); and
- additional contingent capital requirements (Section 6).

In our concluding section we also compare our estimates with the ESO’s benchmarks as a cross-check.

4. TREATMENT OF RAV RISK

In relation to the RAV-based part of the ESO's business no specific decision is required in relation to the required capital base. Based on the principles of financial capital maintenance, the RAV itself is a reasonable estimate of the capital that must be remunerated. We therefore do not comment further on the size of the RAV.

This section assumes that the ESO receives funding that allows it adequate liquidity to manage its revenue collection role, such that RAV-backed capital is not used as a significant source of working capital for this role. Additional contingent capital needs are also discussed separately.

4.1. COST OF EQUITY

The cost of capital for the RAV-based business will attract a cost of equity and a cost of debt.

In relation to the cost of equity Ofgem has previously decided to apply the same market parameters as determined for the RIIO-2 price controls more generally and has adopted an approach grounded in the Capital Asset Pricing Model (CAPM) under which investors are assumed to require compensation only for systematic risks. We therefore focus on assessing the degree of systematic risk associated with the ESO's RAV-based business. This is reflected in the CAPM in the beta term.¹⁴

Since the ESO is not itself independently listed, our analysis in this section first assesses the ESO's exposure to risk relative to available comparator companies. It then sets out evidence for these comparators and presents our assessment of that evidence.

4.1.1. Relative risk benchmarking approach

Selection of comparators

The ESO itself is not a listed company; as such we cannot use empirical evidence on the ESO itself in setting beta. Nor are we aware of other listed ESOs that could be used as direct comparators. To find suitable comparators, we first consider the key characteristics of the ESO in terms of risk exposure and consider whether there are suitable comparators we can consider in our relative risk analysis. The key characteristics of the ESO in terms of risk exposure are:

- its status as a licensed monopoly in the UK electricity sector;
- the RAV-backed regulatory framework;
- the price control building blocks that determine the revenues it is able to recover; and
- its asset light nature.

The first three of these features point strongly at the relevance of regulated networks, while the final point suggests that other comparators should be considered. We consider that the CMA's recent provisional findings for the upcoming RP3 price control period for NERL, the regulated provider of air traffic control services, are likely to be of relevance. We have also reviewed the earlier November 2017 CMA precedent determination of SONI's licence modification appeal.

Approach to relative risk benchmarking

We assess relative risk exposure to three different categories of risk:

¹⁴ We also adopt Ofgem's debt beta working assumption of 0.125 for the purpose of our asset beta analysis.

- *market risk* captures each comparator's exposure (if any) to demand risk and the long-term security of their market position and asset value;
- *price control building block risk* captures each comparator's exposure to differences between actual and allowed costs and to regulatory incentive regimes; and
- *firm structure risk* captures the extent to which particular features of each comparator's cost base may serve to dampen or magnify exposure to risks (noting that these are not risks in and of themselves)¹⁵.

A separate CEPA paper is available covering our approach to relative risk assessment and including further description of how we arrived at our judgement below.¹⁶ The following section summarises the results that are relevant to decisions on the ESO's asset beta, with an assessment relative to regulated networks first and then asset light comparators thereafter.

4.1.2. Context

In considering the different types of risks set out above, some but not all of the risks can be quantified. We present three separate pieces of analysis below, covering:

- the share of operational cashflows in total revenues;
- exposure to incentives; and
- totex-to-RAV ratios.

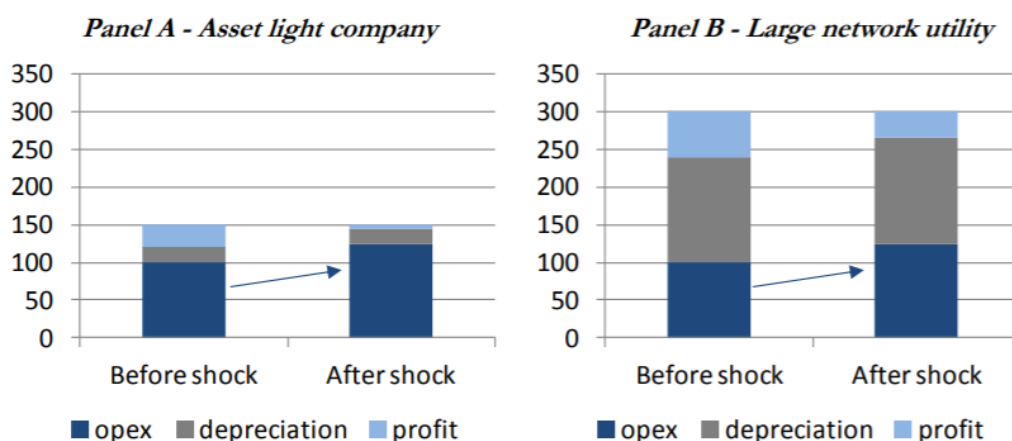
We also include discussion of issues specific to asset-light businesses, including recent regulatory precedent.

Share of operational cashflows in total revenues

The share of operational cashflows is relevant to the 'firm structure' risk category noted above.

There are three principal sources of revenue: opex or a 'fast money' allowance; depreciation of capex or a 'slow money' allowance; and the allowed return i.e. profit. With a higher proportion of profit and depreciation, the company has more of a buffer to absorb a cost shock. The cost of capital or profit margin in percentage terms is affected less for these companies (more typically large network utilities). For asset light companies, risks related to cost or revenue volatility can therefore be magnified. Figure 4.1 below provides a stylised example.

Figure 4.1: Stylised example of the impact of a cost shock on profit



Source: CEPA

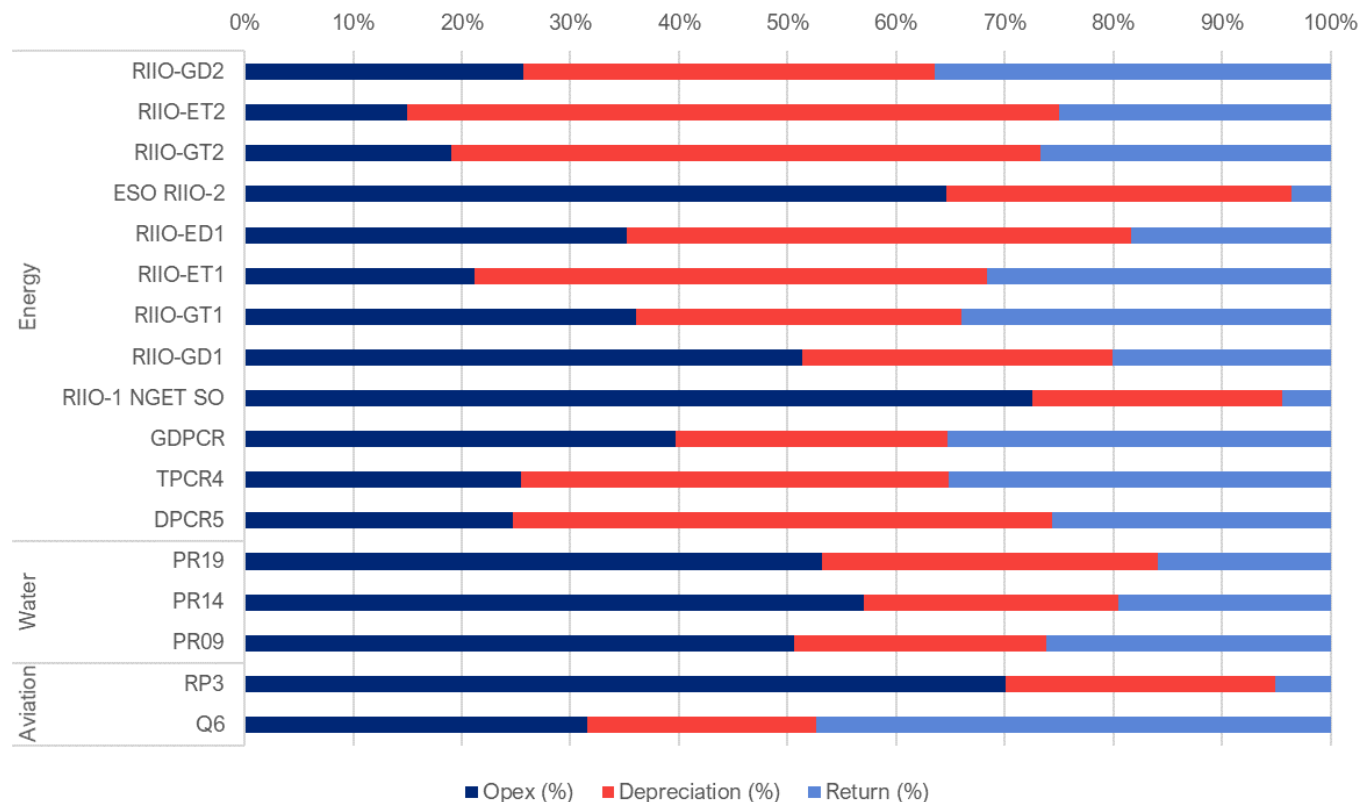
¹⁵ For consistency this should reflect scaling of risks that Ofgem considers the ESO should be compensated for.

¹⁶ 'RIIO-2: Beta estimation issues', CEPA, 2020.

We note that this aspect of our analysis, referred to as asset intensity in our relative risk analysis, is not a risk in itself and we must be careful to ensure that we consider the contribution to risk exposure without double counting the impact¹⁷.

Figure 4.2 below shows the share of operational cashflows across a range of price control determinations. The ESO in RIIO-2 has a smaller share of combined depreciation and return than many other networks considered here, broadly commensurate with RP3 for NERL.

Figure 4.2: Share of operational cashflows by type



Source: CEPA analysis of regulatory determinations. Opex refers to fast money and PAYG equivalents where relevant.

Where there are risks that are not already constrained within the regulatory framework, we would expect this asset-light characteristic to lead to increased systematic risk for the ESO for a given level of revenue.

Exposure to incentives

The exposure to cost and performance incentives is one aspect of the regulatory building blocks category. In considering incentives, we are most interested in understanding the incentives in relation to the capital invested in the ESO, i.e. the RAV. We note that cost and performance incentives will contain both systematic and non-systematic components i.e. some of this risk is diversifiable.

We consider incentive exposure for NERL in RP3, the ESO and other networks in RIIO-2. Our approach to estimating incentive exposure for both the ESO and other networks in RIIO-2 is based on working assumptions. Should these working assumptions change, the analysis should be updated.

¹⁷ An example of double counting could be where the risk is calculated relative to the RAV, with a mechanistic adjustment applied thereafter for the share of operational cashflows.

Table 4.1 summarises incentive ranges for the ESO, onshore networks and NERL; we present outturn and forecast RoRE ranges for a broader range of price controls in our separate report¹⁸. We focus on incentive ranges as a proportion of RAV as a broad measure of investors' exposure to risk.

Table 4.1: Comparative incentive exposure as a % of RAV¹⁹

Sector	Assumed incentive exposure	Incentive exposure as % of RAV (per annum)
Networks RIIO2	We assume +1.5% to - 2% RoRE as plausible outcomes, using 60% notional gearing ²⁰ .	+0.6% to -0.8% (plausible range)
ESO RIIO2	We understand that there are potential annual rewards of £15m, compared to a maximum £6m penalty.	+5.0% to -2.0% (capped)
NERL RP3	Calculations of potential rewards and penalties across capacity, 3Di target and capex delivery incentive of +£4.8m to -£17.7m per annum ²¹ .	+0.4% to -1.5% (capped)

There are two reasons why the figures are not perfectly comparable here:

- The RIIO-2 networks figure is a plausible range, rather than the cap shown for the ESO in RIIO-2 and NERL in RP3. In previous price controls, we have witnessed outcomes materially outside the range shown²².
- The distribution of potential outcomes within this range has not been discussed. Investors will consider the most likely outcomes in their assessment, rather than simply the range presented.

The figures above do not reflect traffic-based demand risk for NERL in RP3. This risk is more systematic in nature than the incentive exposure discussed above. The traffic risk sharing mechanism for NERL in RP3 leads to a maximum exposure of 4.4% of revenues. Annual revenues are approximately half of the RAV, leading to an annual +/- 2.2% of RAV exposure from volume risk.

While comparison here is imperfect, the evidence suggests that the risk for the ESO in RIIO-2 is likely to be higher than other networks for the same price control. By calculating the figures in relation to the RAV, this takes into account the asset light characteristics of the ESO.

Totex to RAV ratios

This ratio is one component of risk for total expenditure under the regulatory building blocks category. As with the share of operational cashflows discussion, this is not a risk in itself but may indicate the degree of risk exposure faced by investors relative to the capital invested. This will also be dependent on the treatment of totex under- and over-spending: for example, a high totex to RAV ratio would not indicate high exposure to risk if all totex were subject to pass-through treatment.

The ratio will take into account any asset light characteristics. Figure 4.3 shows ratios for selected price controls. There is a material difference between the NERL RP3 and ESO RIIO2 totex to RAV ratios, in relation to other networks. The ESO has a significant level of totex compared to its asset base.

¹⁸ 'RIIO-2: Beta estimation issues', CEPA, 2020.

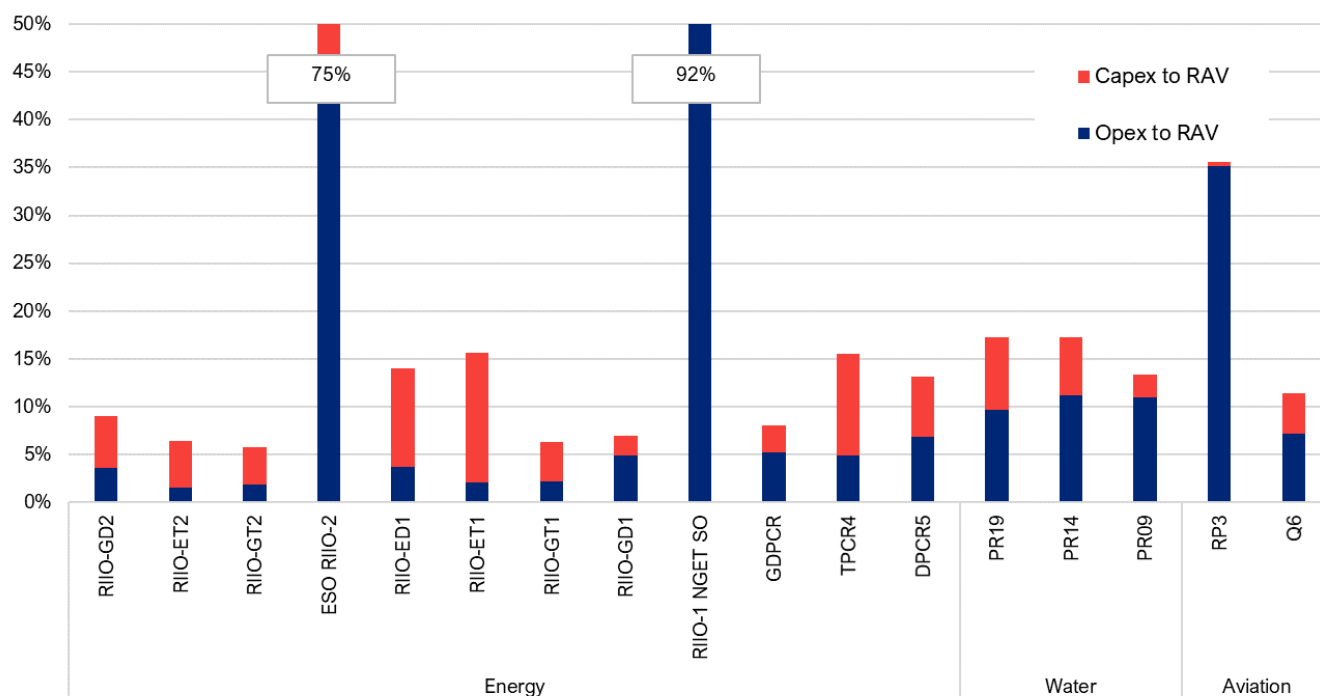
¹⁹ We have not made adjustments to reflect tax impacts for this high-level comparison.

²⁰ We have assumed 60% notional gearing for all networks in this example. Using 55% gearing would increase the RoRE range to +0.7% to - 0.9%.

²¹ Based on CMA provisional findings for NERL in RP3.

²² The use of caps and collars on ODIs would reduce the likelihood of large-scale deviations occurring in RIIO-2.

Figure 4.3: Totex to RAV across regulated sectors



Source: Regulatory determinations. RIIO2 based on company submissions.

This may lead to additional risk where the ESO is subject to a sharing factor or need to manage cost shocks, where a small shock as a % of totex could have large consequences as a proportion of allowed return (or assets). Ofgem's approach to cost incentives for the ESO, with no direct application of a sharing factor and allowing for the consideration of external factors, mitigates this issue.

Asset light issues

For asset light companies, we need to select the most relevant comparators. We present below evidence for both SONI and for NERL during RP3.

We focus more on RP3 as it is more recent precedent and a listed comparator, ENAV (responsible for Italian air traffic control services), was used in making this assessment. The SONI precedent is more difficult to interpret as the CMA did not make an independent assessment of the asset beta in the same way as it did for NERL.

SONI determination (November 2017)

The CMA, as part of its determination in the UR-SONI case, ruled on the asset beta which the UR had applied in its price control decision.²³ The CMA used an asset beta value of 0.6 in the appeal, consistent with the UR's Final Proposals.

The UR derived an asset beta value of 0.6 for its Final Proposals, which was an increase from an initial value of 0.45 in its draft determination. In deriving this uplift, the UR acknowledged that SONI faced more risk than a typically regulated network company due to its operational gearing. It found these companies typically had an asset beta in the 0.3-0.4 range. It argued that SONI, as a monopoly, faced less risk than competitive firms, which have an asset beta range of 0.7-0.8. In setting the value at 0.6, it concluded that it had addressed issues of operational gearing.

SONI argued that the revenue control function and asymmetric risks it faced were not covered by this asset beta, and the CMA agreed: "The UR made an assumption of a higher beta to reflect higher operational gearing, but it did

²³ [SONI Limited v Northern Ireland Authority for Utility Regulation Final determination](#), November 2017

not do any analysis which would have demonstrated whether this higher beta was sufficient to cover the risks faced by SONI.” The CMA noted that, as part of the appeal, the UR submitted more quantitative evidence for how it calculated the asset beta other than the qualitative approach described in the previous paragraph.

NERL provisional findings (April 2020)

The CMA, as part of its provisional findings in the NERL case, came up with a range for the asset beta using a comparator approach.²⁴ They recognised that finding suitable comparators was particularly difficult for NERL, given its unique responsibilities. However, they accepted that it is normal regulatory practice and that both parties - the CAA and NERL - had used it in their own calculations. The CMA assessed various comparators based on evidence from the CAA, NERL and third parties.

- In the first instance the CMA excluded all UK utilities, arguing that NERL is exposed to much more variability in volumes than a traditional utility and also that its profit margins and equity capital are relatively small as a proportion of opex and capex, leaving shareholders more exposed.
- All parties agreed on including ENAV, the Italian air traffic control services company, as the only traded European company similar to NERL. The CMA made adjustments based on operating leverage, traffic volume risk and ENAV's terminal service component which does not apply to NERL. All parties agreed to some extent that these factors made ENAV less risky, though it was not possible to determine the magnitude.
- Both parties submitted lists of airports and their asset betas for use as comparators. The CMA took an expansive view in terms of inclusion, but ultimately focussed on three large European airports due to their shareholders' interest in long-term trends and risk exposure in the aviation sector, their large size and liquidity implying more accurate beta estimates and the majority of their operational businesses being somewhat comparable to NERL. The CMA recognised that NERL (and ENAV) face much lower operating margins than airports, however, and ultimately conclude that while the specific risks for airports are different, there is no evidence of direction or magnitude. Based on this, the CMA used the airports' asset betas as direct comparators.
- After choosing the list of comparators, comprising ENAV and the three airports, there were a number of other factors that had to be considered:
 - the length of period over which to calculate beta – the CMA used both 2-year and 5-year betas where possible, as the parties had done;
 - focussing on weekly rather than the daily betas as the parties had done, while recognising that there was not a single view on this and that it was a subjective choice (the fact that daily data sometimes gave a much lower beta weighed in favour of using weekly);
 - excluding betas measured with reference to domestic indices and focussing on international indices – the Eurostoxx 600 was used as best available market benchmark;
 - the CMA did not regard tax in the calculations, consistent with the parties; and
 - using 1, 2 and 5-year 'rolling betas' where possible to minimise errors and take account of stability over time.

Taking all of the above variables into account produced a range of beta estimates, depending on the comparator, time period, spot vs. past betas etc. The CMA considered all of these calculations informative and that given the subjectivity and data issues inherent in these calculations that there is no single 'correct answer' for NERL's asset beta, meaning a range of outputs would be more suitable. The provisional determination assumes a range for the

²⁴ [NATS \(En Route\) Plc / CAA Regulatory Appeal Provisional findings report](#), March 2020

asset beta of 0.52-0.62. The CMA used a debt beta of 0.05. Reflecting a debt beta of 0.125 leads to an asset beta of 0.54-0.64²⁵.

In our view, however, by placing no weight on regulated network comparators this range risks understating the value to investors of NERL's RAV-backed regulatory regime. We have previously concluded that the unlevered beta range for NERL should be 0.43-0.50²⁶. With a 0.125 debt beta, this translates into an asset beta range of 0.50-0.57 for NERL.

4.1.3. Qualitative assessment of ESO risk

ESO relative to regulated networks

Our high-level summary of the ESO's exposure to systematic risk relative to UK networks is found in Table 4.2, with key factors discussed below. We recognise that regulated networks do not face the exact same level of risk.

- Although the nature of the ESO's business is different from that of regulated networks the two categories do share one important feature. In each case the long-term value to shareholders is secured by their natural monopoly position and RAV-backed regulatory regime. Neither faces significant market risk with respect to demand.
- To the extent that regulated energy companies are exposed to market factors over the longer term, the ESO's exposure is likely to be slightly lower than for networks. Its asset life is shorter, meaning recovery of existing investment is faster and hence it has less exposure to uncertainty over decarbonisation for example. In terms of the financial stranding risk of existing assets, the ESO is more shielded from market forces - it would continue to have a central role under a wide range of different future states of the world.
- On building blocks, the ESO may face slightly higher systematic risks than the networks. The overall range of potential outcomes appears larger for the ESO as a proportion of RAV, though the ranges are difficult to compare as the ESO's exposure is capped. The qualitative nature of the ESO's cost and incentive regime in our view makes it less likely that its exposure is systematic in nature.
- The ESO's asset-light nature may magnify some sources of risk. This effect has already been taken into consideration in our assessment of price control building block risk exposure as a percentage of RAV, and so the additional impact of this aspect of our assessment may be relatively limited. We capture this effect under 'firm structure' risks.

Table 4.2: Summary of ESO's systematic risk exposure relative to regulated network companies

	ESO risk relative to regulated networks	Rationale
Market risk	Similar	ESO and regulated networks each exposed to limited market risks given the regulatory framework
Price control building block risks	Slightly higher	<ul style="list-style-type: none"> • The ESO faces lower risk in relation to totex. • The ESO faces greater risk to output incentives as a proportion of RAV, though the scheme design is likely to limit the extent to which this is systematic.
Firm structure	Higher	Asset-light nature magnifies risk exposures that exist
Overall	Higher	Asset-light nature magnifies residual risks that we consider are broadly similar across the ESO and regulated networks

²⁵ With 30% notional gearing, a debt beta of 0.125 may be more difficult to justify. However, with the lower relative level of notional gearing, the impact on the asset beta is more muted.

²⁶ A notional gearing assumption of 55% was used.

ESO relative to asset light businesses

Our overall summary of the ESO's exposure to risk relative to NERL is found in Table 4.3, with key factors set out below:

- We conclude that the ESO's market risk is slightly lower than for NERL, depending on the view of how significant volume risk is for NERL. While the market positioning risk and long-term value of the companies are similar, with both companies providing essential services under a monopoly licence, demand risk drives our assessment. The ESO does not face the demand risk that air traffic control companies face – as noted above, this could be up to 2.2% of RAV exposure each year through demand risk.
- The ESO's and NERL's respective exposure to systematic risk in relation to price control building blocks is difficult to quantify. The ESO's overall incentive regime range is slightly broader than that of NERL. However, it faces no mechanistic sharing factor on costs, with the incentive reward or penalty instead based on a qualitative assessment. This is likely to reduce the extent to which risk exposure is systematic in nature. We therefore do not consider that the evidence conclusively indicates the ESO is exposed to materially greater risk than NERL (or vice versa).
- Finally, the ESO's firm structure characteristics are similar as NERL is also asset-light in nature and faces higher returns as a share of revenues than more asset intensive networks (as illustrated in Figure 4.1 above).

Note as part of market risk, our judgement involves an assessment using the CEPA view of NERL's risk and the perceived view of the CMA on NERL. Using the CMA view on NERL would lead to a greater adjustment from NERL to the ESO from a higher starting point.

Table 4.3: Summary of ESO's risk exposure relative to NERL

	ESO risk relative to comparator	Rationale
Market risk	Slightly lower (vs CEPA) Lower (vs CMA)	No demand risk for ESO
Price control building block risks	Similar	Slightly broader range for ESO mitigated by lack of systematic risk exposure
Firm structure	Similar	Both the ESO and NERL are asset-light
Overall	Slightly lower (vs CEPA) Lower (vs CMA)	

4.1.4. Empirical evidence

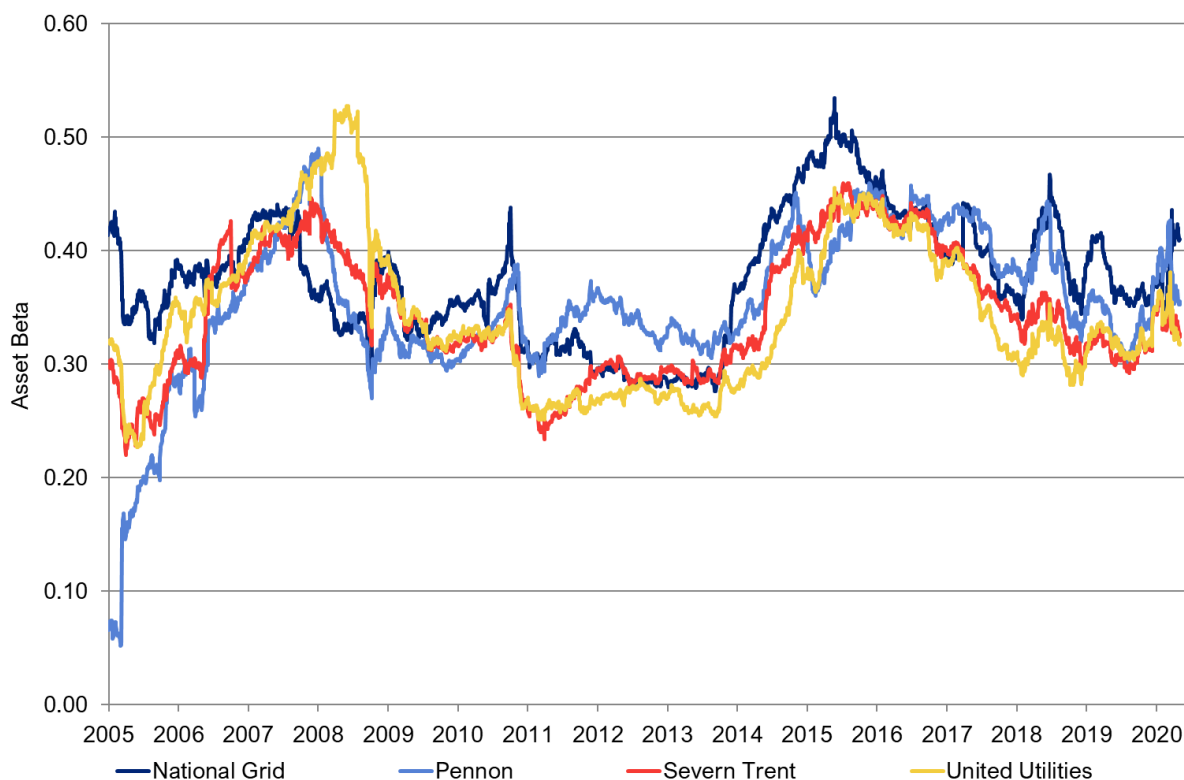
Regulated networks

Our relative risk analysis indicates that we expect the ESO to be higher risk than regulated networks. This section considers the implications of this for the ESO's asset beta range.

We focus on four UK regulated networks: three water networks (Severn Trent, United Utilities and Pannon) and one energy network group (National Grid). A fifth company, SSE, also has significant regulated network activities – but in the context of this analysis, for which a high-level estimate of regulated network betas is required, the challenges of interpreting its non-regulated business mix outweigh the benefits of including it in the sample.

Figure 4.4 below shows evidence on the four companies' asset betas.

Figure 4.4: Asset beta for regulated networks (2005-20)



Source: CEPA analysis of Bloomberg data. We assume a debt beta of 0.125 in line with Ofgem's current working assumption.

All four data series fluctuate significantly, with each company having periods in which its asset beta is below 0.30 and above 0.40.

Asset light businesses

Our relative risk analysis indicates that we expect the ESO to be slightly lower risk than NERL and ENAV. This section considers the implications of this for the ESO's asset beta range.

As NERL is not independently listed we are not able to draw on direct estimates of its beta. We have previously concluded, however, that the Italian air traffic control services provider ENAV is a reasonably close comparator. It operates in the same industry under a similar regulatory regime. While there are some differences in the two firms, as a high-level benchmark against which to compare the ESO we consider that ENAV is informative.²⁷

Figure 4.5 below shows evidence on ENAV's asset beta. Data prior to August 2017 is not available as the company is newly listed.

²⁷ Our position on the relative risk of NERL and ENAV is similar to that of the CAA in its final determination for NERL's RP3 price control. As we discuss in Section 4.3 below, however, the CMA's provisional findings in relation to NERL's appeal of the RP3 final determination indicate that it considers NERL's beta to be above that of ENAV.

Figure 4.5: ENAV - 1-year and 2-year rolling asset betas



Source: CEPA analysis of Bloomberg data. We assume a debt beta of 0.125 in line with Ofgem's current working assumption. We constrain gearing to no lower than zero per cent.

Although ENAV's 1-year beta has fluctuated widely, longer-term (2-year) estimates appear relatively stable at around 0.45 prior to Covid-19's impact on financial markets, albeit with a limited number of observations. In general, we prefer longer-term estimates of beta, but show 1-year rolling estimates in the case of ENAV to give a greater indication of how its measured beta has varied over time given that it has been independently listed only recently.

4.1.5. Assessment of ESO asset beta

ESO relative to regulated networks

Ofgem's updated policy on the ESO has more closely aligned theoretical cost and performance incentive exposure as a percentage of RAV to UK regulated energy networks.

Empirical evidence on the asset beta of regulated networks suggests a figure no higher than 0.40. This may be plausible for the ESO if you consider that its risks have been constrained to a manageable proportion of RAV and that its incentive regime is unlikely to generate much systematic risk exposure. Nevertheless, the ESO is significantly more asset-light than the networks and in our judgement an assumption in the networks range would be hard to justify.

With our approach to estimating risk exposure through costs and incentives we do not believe that a mechanistic extrapolation of network betas based on the share of operational cashflows is appropriate. We have already taken account of the cashflow impacts relative to the value of the firm in our relative risk analysis; further extrapolation would represent double-counting.

On the basis of this evidence and our relative risk analysis we therefore conclude that the risk for the ESO in RIIO2 is likely to sit above the asset beta for the regulated networks shown above.

ESO relative to asset light businesses

Our view has the ESO's systematic risk below that of NERL and ENAV on the grounds of more limited sector and demand risk. For a debt beta assumption of 0.125, the CMA's range for NERL is 0.54-0.64, compared to the previous CEPA view of 0.50-0.57 based on the same debt beta assumption. The difference in the two estimates appears to be due to the CMA placing greater weight on NERL's exposure to demand risk. In translating this to an ESO facing no demand risk, both CMA and CEPA approaches should generate a similar conclusion.

Based on this assessment we conclude that the upper end to our range for the ESO in RIIO-2 should be 0.50.

Summary

Evidence from regulated network comparators could plausibly indicate an asset beta assumption of 0.40 or below. However, this would require the strong assumption that all of the ESO's exposure to systematic risk has been constrained to be consistent in scale with its light asset base. Some evidence and regulatory precedent from asset light comparators is consistent with an asset beta assumption of 0.55 or above – but this would be very hard to reconcile with the ESO's absence of demand risk and policy updates by Ofgem that significantly constrain its cost and incentive risk.

On balance we consider that a range of **0.45-0.50** is appropriate for the RIIO-2 asset beta for the ESO, assuming a 0.125 debt beta. At the low end, an asset beta of 0.45 accommodates a degree of aiming up from the evidence for regulated networks. At the high end, an asset beta of 0.50 places more weight on the ESO's asset light nature – but remains below evidence from comparators that combine asset light characteristics with exposure to demand risk.

We have not assessed the overall cost of equity resulting from this range as Ofgem intends to apply its own assumptions on market parameters in order to estimate the cost of equity.

4.2. COST OF DEBT

In this section we discuss an allowance to reflect the cost of the ESO's debt. The ESO, as part of its Business Plan, has assumed that it would raise floating rate bank debt in light of its size and financing needs. Unlike the debt indexation approach used for networks, under the ESO's proposed approach the interest rate payable varies over the tenor of the debt rather than being fixed in advance. Since a representative benchmark index for the total cost of floating rate bank debt is not available (to our knowledge) the ESO has proposed a mechanism that approximates the interest rate it will be charged at each point in time based on available benchmarks. We have assessed the mechanism proposed by the ESO and provide a risk-based review of each component of the mechanism.

4.2.1. Context

Unlike an all-in cost of debt allowance (where the overall rate is based on a benchmark), an allowance for floating rate debt involves combination of an underlying benchmark with a spread over that benchmark. Consistency is required between those components. For example, if the 3m London Interbank Offered Rate (LIBOR) is always 10bps higher than 6m LIBOR, we would expect a spread calculated against 3m LIBOR to be 10bps lower than a spread calculated against 6m LIBOR²⁸.

A further difference between the approach Ofgem has taken for networks in the RIIO price controls relative to an approach using a floating rate debt assumption is the resulting variability of the allowance. A fixed rate debt allowance can be thought of as combining a fixed benchmark and a fixed spread, based on expectations of market rates over the tenor of the debt. While floating rate debt has a fixed spread, the benchmark changes over time.

When setting an ex-ante allowance, a consistent approach should lead to the same expected cost of debt irrespective of the choice of underlying benchmark. However, the actual cost of debt will differ where outturn values for the benchmark differ from the ex-ante assumptions. This implies that we should use the benchmark that best

²⁸ This assumes the same overall cost of debt.

represents the debt structure faced by the ESO to avoid unnecessary mismatches between actual and allowed costs of debt.

A further consideration for Ofgem in setting their approach is the transition from LIBOR to the Sterling Overnight Indexed Average (SONIA) as the basis for loan and derivative pricing. SONIA measures the rate paid by banks on overnight funds. Issues with LIBOR mean that LIBOR may not be published beyond 2021 and SONIA is intended to replace LIBOR as the benchmark for debt and derivative products.

For overnight rates, SONIA rates have limited counterparty risk and are based on actual transactions. LIBOR contains counterparty risk and is based on submissions by banks. We would expect overnight rates for SONIA and LIBOR to be similar, with SONIA slightly lower. The implied all-in expected cost of debt should be identical irrespective of which benchmark is used as the basis for the mechanism; again, however, outturn values for LIBOR and SONIA may diverge meaning the two benchmarks may not produce identical results in practice.

There are currently forward-looking term rates produced for LIBOR, not just an overnight rate. Examples would be 3m and 6m LIBOR. Data on forward-looking rates for SONIA do not yet exist at the time of writing, although there has been an increase in transactions with SONIA as the reference rate. We note that references to “6m compounded SONIA” relate to a weighted index of outturn values over the past six-months, hence this measure is backwards-looking and is not comparable to 6m LIBOR, which is forward-looking.

Comparisons between SONIA and term LIBOR rates are more challenging as the latter will contain a term premium element. Historic differences between SONIA and term LIBOR rates can inform the expected difference between the two provided the period over which the historic average is calculated is representative.

4.2.2. ESO view

The ESO’s proposed floating rate bank debt indexation mechanism is based on a spread over an underlying benchmark. We understand that under the ESO’s proposals, the underlying benchmark to be reflected in the cost of debt allowance is the 3m LIBOR rate. The exact figure will represent the value from the end of each quarter over the preceding year, with annual updating in place.

The ESO has proposed a fixed 154bps margin on the 3m LIBOR over the price control based on the following assumptions:

- iBoxx BBB rated non-financial corporate indices of 5-7yr and 7-10yr tenor are used to reflect the expected credit rating and tenor of 7yrs (linked to the ESO’s asset lives). This is used to estimate an all-in cost of debt.
- The split between the benchmark and spread component is dictated by the ESO’s preferred use of iBoxx’s Index Asset Swap Margin (IASM) as the spread.
- The implied tenor-reflective benchmark can then be calculated by subtracting the spread from the all-in cost of debt. iBoxx indicates that the IASM is calculated against a 6m LIBOR swap curve equal to the weighted average tenor of the debt²⁹.
- The implied tenor-reflective benchmark reflects the fixed rate at which floating 6m LIBOR over a 7yr tenor could be swapped into.
- The fixed estimate of the margin is based on a three-year average spread (to 10 September 2019).

²⁹ The ESO highlights that the spread when calculated against a 3m LIBOR swap curve would be 6-8bps higher than against the 6m LIBOR swap curve.

- An additional allowance is provisionally included to reflect the ESO's standalone credit rating being at BBB-; the calculation of this addition is based on the spread between the A and BBB rated iBoxx indices noted above, divided by three to reflect the notch differential.
- An allowance will be required to reflect expected efficient transaction costs.

4.2.3. Market data

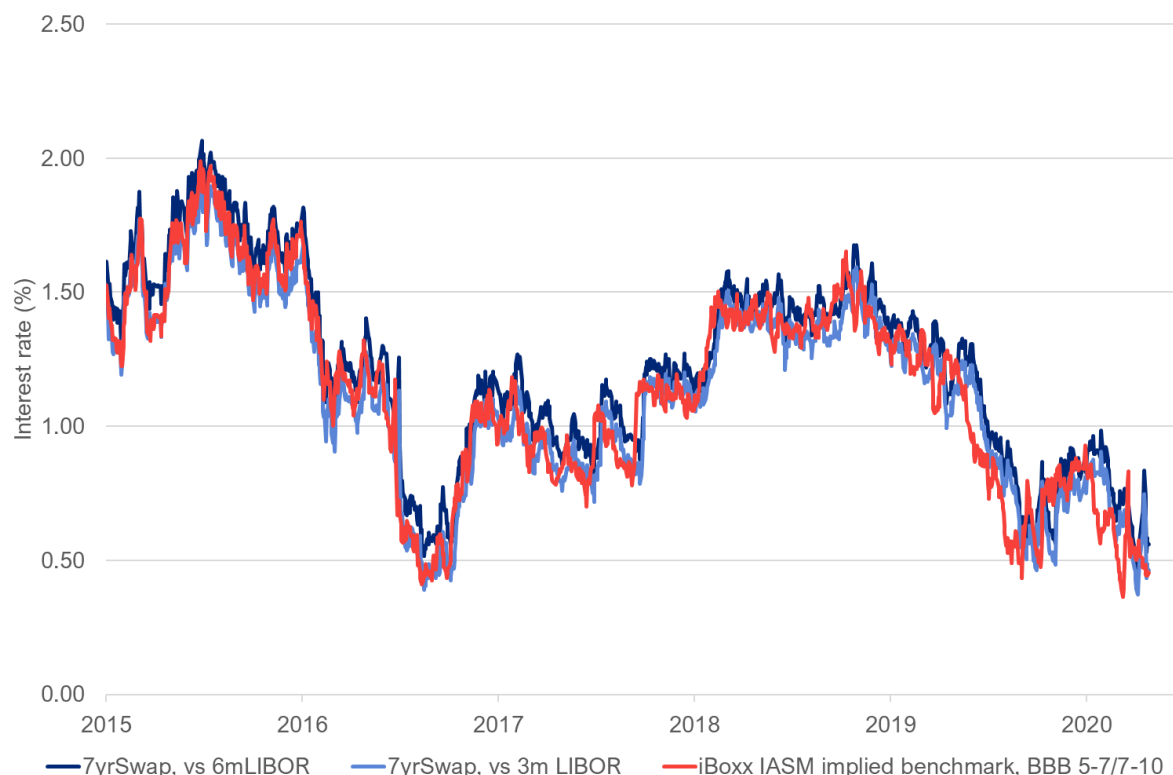
In this sub-section we compare different underlying benchmarks, discuss what the Index Asset Swap Margin (IASM) data represents and show movements in the spread over time using the ESO's preferred approach.

We present the market data to provide an insight into the levels and stability of different indices over time, ahead of selecting a recommended approach.

What is the IASM (spread)?

iBoxx makes available an IASM series for each bond series. This represents a spread over a benchmark. The benchmark is linked to the tenor of the bond index under consideration. Based on the overall cost of debt, we can calculate an inferred benchmark yield for the BBB 5-7yr and BBB 7-10yr index. In Figure 4.6 below we compare the average of the implied benchmarks under these two series to 7yr swap rates. For the 7yr swap rates, we present information on swaps against both 3m LIBOR and 6m LIBOR. This shows that differences do exist between the implied benchmark and the 7yr swap rates. However, this could potentially reflect slight differences in tenor with the iBoxx indices.

Figure 4.6: Understanding the implied benchmark used for the iBoxx IASM series



Source: Markit iBoxx, Bloomberg

How stable is the spread over time?

In Figure 4.7 below, we show movements in the spread against a suitable benchmark. We have used the all-in iBoxx non-financial BBB 5-7yr index for illustration purposes. The dark blue line reflects the spread, as proxied by the IASM. The light blue line reflects the implied benchmark component over the tenor of the debt. Combining the light blue and dark blue lines gives the all-in cost of debt. There are material changes in the spread over time, with

changes moving in the same direction as the underlying benchmark at times and moving in the opposite direction to the underlying benchmark at other times. Recent spread data reflecting the Covid-19 crisis is particularly challenging to interpret.

Figure 4.7: Interactions between benchmark rate and spread

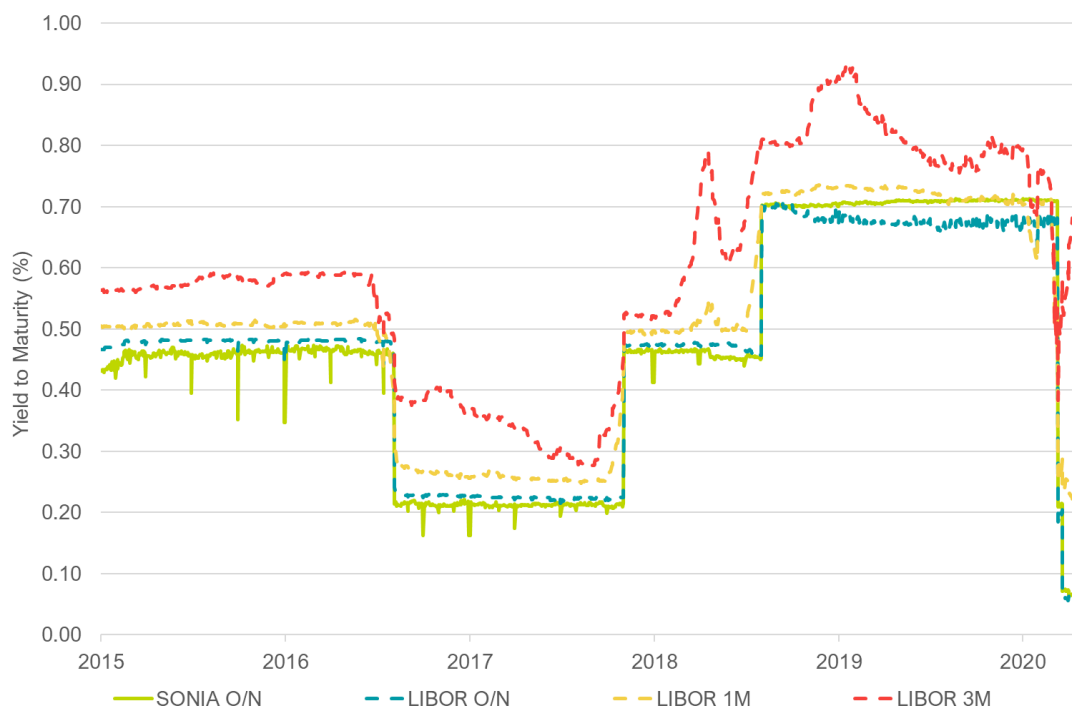


Source: Markit iBoxx

Comparing underlying benchmarks

For context we present information on underlying benchmarks in Figure 4.8 below. These benchmarks would not be used directly for estimating spreads as they do not reflect the appropriate tenor for the underlying benchmark.

Figure 4.8: Yields on potential benchmark indices



Source: Bloomberg.

Up to 11 May 2020, there is a 14bps difference between SONIA O/N and 3m LIBOR, or a 23bps difference between SONIA O/N and 6m LIBOR, based on the same three-year average used to calculate the spread.

What is the impact of the chosen credit rating?

We have considered the impact of using broad A rated non-financial indices of the same tenor rather a BBB index over the previous three years. The impact would be 62-87bps lower from this change in approach³⁰.

4.2.4. CEPA views

Based on the analysis and discussion above, we have undertaken a risk-based assessment of the ESO's proposed cost of debt indexation mechanism. Overall, we consider that the ESO has proposed a broadly sensible cost of debt indexation mechanism, although elements of the assumptions in the calculations require discussion.

Our provisional thoughts (see out below) reflect the information we have available to date and should continue to be updated as further information becomes available, in particular on the actual and achievable credit rating for a standalone ESO and on the availability of IASM data relative to SONIA benchmark indices:

- We consider that it is **appropriate to use SONIA O/N as the reference index** as this can be adopted as an enduring approach (as opposed to a LIBOR based reference index which is expected to be phased out during the price control period). The SONIA O/N rate should be updated annually. For our indicative figures we present a 12-month trailing average. An average of particular dates in the year could be plausible if that best reflects the ESO's actual financing approach.
- We are comfortable that the ESO's proposed approach of **assuming a fixed spread** is consistent with the principles Ofgem has outlined in its approach to setting the cost of capital. In order to calculate a current estimate of a fixed spread, we use an all-in nominal cost of debt index from iBoxx and use the Index Asset

³⁰ 87bps is calculated for the 5-7yr index, while 62bps is calculated for the 7-10yr index.

Swap Margin (IASM, as proposed by the ESO). The ESO has indicated that a 3yr average is reasonable and representative.

- The IASM is currently calculated relative to 6m LIBOR. In order to convert this into a value amenable to use alongside a SONIA O/N reference index we include an adjustment based on the difference between 6m LIBOR and SONIA O/N calculated over the same period. This amount (+22bps) is added to the spread.
- In selecting the all-in nominal cost of debt index, **the ESO's approach with a debt tenor of 7yrs appears reasonable** (with use of iBoxx non-financial corporate 5-7yr and 7-10yr indices as set out by the ESO). An alternative approach would be to use the iBoxx Utilities indices to reflect this tenor. This is an option that we understand Ofgem is currently considering.
- We are **comfortable with the rationale set out by the ESO around the debt tenor** and that, absent of testing around the comparability of bank debt and bond debt pricing, that the iBoxx indices chosen by the ESO are a sensible approach to reflect this debt tenor.
- In Section 2 we concluded that a target credit rating for the ESO could be BBB+. Recent credit ratings and opinions have not reached this target: the 29 April Moody's report on the ESO suggests that a broad BBB rating is generally reflective of the current standalone ESO credit rating³¹. For the purpose of estimating a fixed spread we are therefore **comfortable that a BBB rated index currently represents an appropriate benchmark**. As the regulatory regime matures and should credit opinions on the ESO improve we consider it plausible that Ofgem could consider a higher rated index in the future. An advantage of this would be consistency with the credit rating assumed for the networks.

The average IASM over the 3yr period to 11 May 2020 is 155bps for the indices set out above. With the additional 23bps to reflect the difference between SONIA O/N and 6m LIBOR, the spread increases to 178bps. We agree that an allowance should be made to reflect efficient transaction costs. We have not conducted analysis to advise on the size of this allowance.

We summarise the potential risk of a mismatch between efficient financing costs and allowances in Table 4.4 below.

Table 4.4: Risk-based review of ESO's proposed approach

Component	Risk	Comments
Floating debt approach		Consistent with our understanding of the ESO's proposed financing approach
Target credit rating assumption		Could be subject to review in future as the achievable credit rating for the notional entity becomes clearer
Tenor assumption		Consistent with our understanding of asset lives
Benchmark index choice		While a SONIA-based approach is suitable for the enduring regime it is not currently possible to calculate all components of the debt allowance relative to SONIA benchmarks
Credit spread calculation		Spread based on 3m LIBOR is a reasonable estimate
Transaction costs		
Notional company uplift		Does not appear to be required based on most recent credit opinion

Source: CEPA analysis

Key: Green shading – no or negligible risk; Amber shading – small risk; Red shading – high risk.

³¹ Moody's (2020) National Grid Electricity System Operator Ltd: Update to credit analysis, 29 April 2020 (requires paid subscription).

Overall, the ESO's proposed approach appears reasonable, though we recommend that Ofgem considers removing the proposed notional company uplift. Should credit opinions continue to improve as the regulatory regime matures, we expect that the target credit rating assumption could be increased from a BBB assumption.

We present a summary of the calculation for the cost of debt, as of 11 May 2020.

- Reference rate: 12m trailing average of SONIA O/N = 0.61%
- A premium is used to reflect the difference between SONIA O/N and 6m LIBOR (SONIA is lower than 6m LIBOR) = 0.23%.
- Spread: 3yr trailing IASM from selected non-financial corporate indices³² = 1.55%
- Transaction costs: placeholder assumption included for now = 0.10%
- Opening nominal cost of debt = 2.49%.
- Opening real cost of debt = 0.48%³³.

These numbers represent an illustrative calculation based on current data.

³² As discussed previously, Ofgem may instead choose to use Utilities indices, rather than non-financial corporate indices.

³³ This is an estimate based on an assumed 2.0% CPI inflation.

5. TREATMENT OF REVENUE COLLECTION ROLE

As discussed in Section 0, a key issue for financeability is the ESO's ability to manage the liquidity requirements associated with its revenue collection role. In this section, we consider the available evidence to inform a judgement on the potential magnitude of the capital base needed to meet these requirements and an appropriate level of remuneration on this capital.

Our approach focuses first on an estimate of the amount of capital that may be required before considering how that capital would be remunerated. This allows us to directly test the assumptions that need to be made regarding the rate of return required to allow the ESO to be sufficiently liquid to manage this role. We acknowledge that in principle the required remuneration for this role could be set with reference to top-down benchmarks and have reviewed the benchmarks proposed by the ESO in Section 3. We compare our results to the ESO's proposed funding in this section and in our summary conclusions in Section 7.1.

5.1. SOURCES OF CASH FLOW MISMATCH

In performing its revenue collection role, the ESO is required to recover certain charges from market participants (generators and suppliers) and redistribute these to third-party service providers, including the Transmission Owners (TOs) and providers of balancing services. Mismatches between amounts the ESO collects and redistributes create a requirement for liquidity. That is, if the ESO collects less from market participants than it must pay out, it will need working capital to fund the shortfall until it can be recovered. We also capture in this section working capital requirements and associated revenue adjustments that arise as a result of expenditure incurred pre-approval, though this does not specifically relate to the ESO's revenue collection role.

The cash flows that the ESO currently manages, and the main sources of mismatches between cash inflows and outflows, are described in Table 5.1 below.

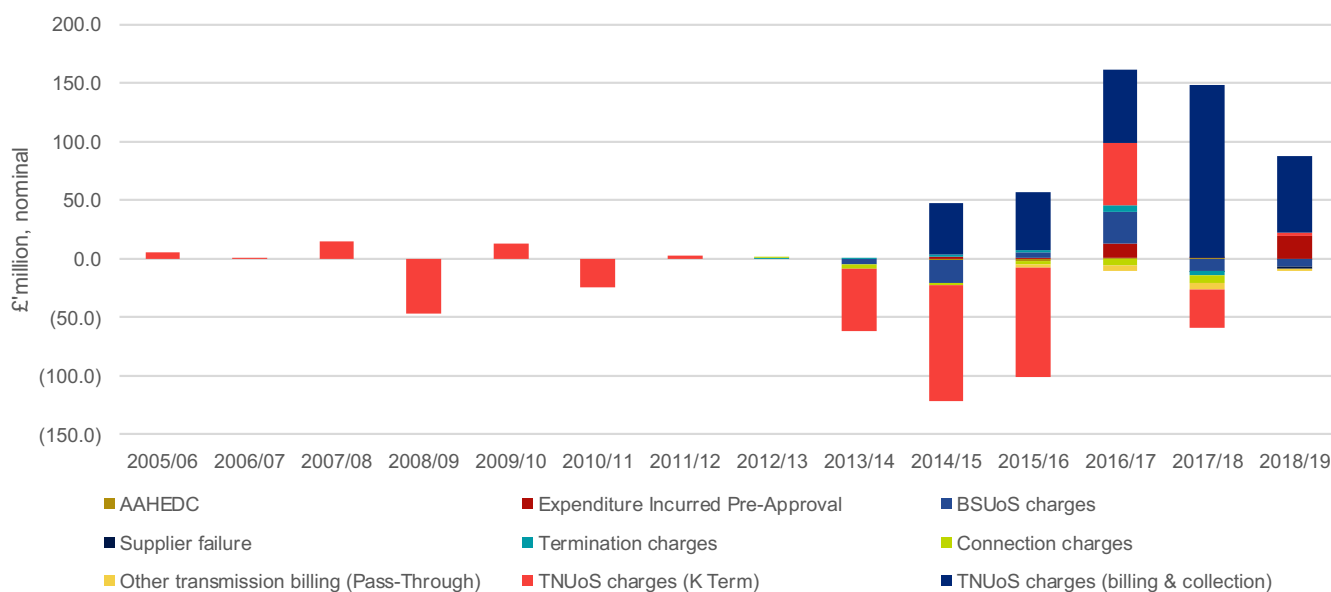
Table 5.1: Sources of working capital requirements

Cash flow	Description
TNUoS charges (Billing & Collection)	<p>The ESO pays the onshore and offshore TOs their revenue allowance, as set through the price control determination. It recovers these costs through collection of TNUoS charges paid by transmission network users (generators and suppliers).</p> <p>During a charging year, demand TNUoS recovery is based on supplier demand forecasts, while generator TNUoS recovery is based on reported Transmission Entry Capacity (TEC). Differences between supplier forecasts and actual demand are reconciled four months after the end of the charging year. If generator reported TEC is different from actual TEC, a reconciliation adjustment is made two months after the end of the charging year.</p> <p>These arrangements can create a within-year working capital requirement, that the ESO must fund until reconciliations take place.</p>
TNUoS charges (K-term)	<p>After the post-charging year reconciliations have taken place, there may still be a mismatch between actual and allowed TNUoS recovery. This is because TNUoS charges are set on the basis of the ESO's forecasts of demand and TEC, which may differ from actual outturn values. Any residual under-recovery is borne by the ESO until it can be recovered.</p>
Other transmission billing (connection charges)	<p>The ESO recovers site specific connection charges from generator on behalf of the TOs. The ESO states that there can be differences in the amounts that it bills generators for site-specific maintenance charges, relative to the amounts that are recovered from the TOs, due to differences in the methodologies for calculating site-specific charges.</p>
Other transmission billing (pass-through)	<p>Pass-through costs incurred by the ESO (business rates, licence fees, Inter-Transmission System Operator compensation) are recoverable through TNUoS.</p> <p>If actual costs are higher than allowances, this creates a working capital requirement.</p>

Termination charges	<p>In the event that a generator disconnects from the transmission system, the ESO collects termination charges from the generator and pays the associated termination charge.</p> <p>The amounts that the ESO can recover from generators who terminate their connection can differ from the amounts that it is required to pay TOs and OFTOs.</p>
BSUoS charges	<p>The ESO incurs costs in balancing the system (its own internal costs, payments to balancing service providers, and the net costs of the balancing mechanism). It recovers these through the collection of Balancing System Use of Service (BSUoS) charges paid by system users (generators and suppliers).</p> <p>The ESO states that there can be mismatches between initial BSUoS charges and actual BSUoS costs, which are not recovered until the final reconciliation (14 months after the relevant period).</p>
AAHEDC charges	<p>The Assistance for Areas with High Electricity Distribution Costs (AAHEDC) scheme is designed to reduce the cost of electricity distribution in 'Specified Areas' (currently only the north of Scotland). The ESO collects AAHEDC charges from suppliers and passes this on to Scottish Hydro Electric Power Distribution (SHEPD).</p> <p>There may be mismatches amounts collected from suppliers and paid to distributors under the AAHEDC scheme, driven by differences in forecast and actual demand.</p>
Supplier failure	<p>If a supplier fails, a working capital requirement can arise from accumulated charges (TNUoS, BSUoS etc.) from the point at which the supplier defaults, up to the point that Ofgem appoints a Supplier of Last Resort (SoLR).</p>
Expenditure incurred pre-approval	<p>The ESO may incur expenditure above its ex ante totex allowance if circumstances change after allowances are set. The delay in recovery is currently remunerated at the WACC.</p>

Figure 5.1 below presents available historical under- or over-collection of revenues for each of the cash flows the ESO manages. This represents the total under- or over-collection for each item in each year, so does not represent the ESO's peak working capital requirement in each year.

Figure 5.1: Historic over-/under-recovery



Source: CEPA analysis of data provided by Ofgem.

There are limitations on how we can use this information to understand the ESO's future capital requirements.³⁴ However, this data indicates the scale of potential cash flow volatility that the ESO must manage. In particular, it is clear that the recent cumulative peak under-recovery of c. £180m (2013/14-15/16) is on a different scale to the ESO's plausible equity return on the RAV.

Depending on the cash flow managed, there are different arrangements in place for the recovery of revenue collection shortfalls and the funding of the working capital the ESO has put in place to manage these shortfalls. The current arrangements are summarised in Table 5.2. The total lag before the ESO can recover cash shortfalls is comprised of two elements: the period between when a shortfall starts accruing and when it is recognised; and the period from when a shortfall is recognised to when it is fully recovered. As the ESO will incur costs associated with drawn working capital balances from the time a shortfall starts to accrue, both elements need to be considered when assessing the funding of this working capital.

Table 5.2: Recovery of revenue collection shortfalls

Cash flow	Recovery mechanism	Lag before recognition (A)	Lag between reconciliation and recovery (B)	Total recovery lag (A+B)
TNUoS charges (Billing & Collection)	The Connection and Use of System Code (CUSC) allows the ESO to recover an amount from suppliers and generators for interest charges incurred, if there is within-year under-recovery. ³⁵ This is set as the Barclays base rate, which typically reflects the official Bank of England (BOE) rate.	Up to 15 months ³⁶	1 month	Up to 16 months
TNUoS charges (K-term)	If actual TNUoS charges the ESO collects from generators and suppliers are more or less than the maximum allowed revenue, the difference will be reflected in allowed revenue two years later through the 'K term' adjustment. This includes an allowance for interest earned/paid by the ESO on the over-/under-recovery over the two-year lag period. The K term interest rate is comprised of the BoE rate, plus an interest rate adjustment that varies with the degree of over- or under-recovery (providing an incentive for accurate forecasting).	1 year	1 year	2 years

³⁴ For example, for some cash flow items, the historical data is not available or incomplete. For example, the data shown here for connection charges relates only to amounts collected on behalf of the Scottish TOs. Going forwards, the ESO will also be managing collection of connection charges for National Grid. Further, historical values may not always be a good guide to the future magnitude of revenue over- or under-recovery. For example, this is because the future treatment of certain items may change.

³⁵ Equally, the ESO is required to pay interest to market participants if it over-recovers.

³⁶ Generator TNUoS reconciliation invoices are issued 1 month after the end of the charging year, while demand TNUoS initial reconciliation invoices are issued 3 months after year end. In both cases payment is then required 1 month later. We note that for demand TNUoS, there is a further final reconciliation invoice issued 17 months after the end of the charging year, however our understanding is that these amounts would not be material.

Other transmission billing (connection charges)	The ESO can recover mismatches between collections from generators and payments to TOs with a one-year lag via the DIS term (Special Licence Condition 3A). The DIS term does not provide an allowance for interest charges.	1 year	-	1 year
Other transmission billing (pass-through)	The ESO's licence conditions allow pass-through costs to be recovered with a two-year lag. This includes an allowance for the ESO's cost of capital and RPI. Special Licence Condition 3B specifies that the cost of capital adjustment is the vanilla WACC derived in accordance with the Annual Iteration Process (AIP).	1 year	1 year	2 years
Termination charges	The ESO can recover mismatches between collections from generators and payments to TOs with a one-year lag via the TS term (Special Licence Condition 3A). The TS term does not provide an allowance for interest charges.	Up to 12 months	1 year	Up to 2 years
BSUoS charges	Mismatches are recovered through the reconciliation process set out in the CUSC. This enables the ESO to recover an amount for interest charges incurred on differences between Settlement Final and Reconciliation Final invoices. The recoverable interest rate is the Barclay's base rate.	14 months	5 days	14 months
AAHEDC charges	Mismatches, and an adjustment for interest incurred/earned on under-/over-recoveries, are reflected through the following year's charges. Standard Licence Condition C20 specifies that the recoverable interest rate is the Barclays base lending rate.	3 months	Up to 9 months	Up to 1 year
Supplier failure	<p>The CUSC sets out avenues for the ESO to recover outstanding charges and associated interest from suppliers in the event of default.</p> <p>We understand that the ESO was able to apply for unrecoverable supplier debts to be funded through TNUoS/BSUoS charges, with an allowance for interest costs incurred, at the end of RIIO-1 (i.e., a recovery lag of up to nine years). For RIIO-2, we understand that Ofgem is considering shorter-term recovery options (although the recovery lag, and the applicable interest adjustment, are still to be determined).</p>	To be determined	To be determined	To be determined

Expenditure incurred pre-approval	The SOMOD license term (Special Condition 4a) allows the ESO to recover such costs with a two-year lag. An allowance for the costs of financing is based on the vanilla WACC as determined through the AIP process.	1 year	1 year	2 years
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Ofgem is consulting on the option of changing the way TNUoS payments are made to the TOs, so as to reduce the ESO's exposure to any risks arising from its management of that particular cashflow.³⁷ As discussed in the introduction, in our analysis of the ESO's capital requirements, we therefore consider two scenarios:

- **Scenario 1:** Arrangements for TNUoS recovery remain as they are today (see Tables 5.1 and 5.2 above).
- **Scenario 2:** TNUoS charge recovery moves to a 'pay-as-invoiced' model, under which the ESO makes payments to the TOs when it invoices suppliers and generators.

Under Scenario 2 there would be no liquidity requirement for the ESO related to TNUoS charges.³⁸

5.2. SIZING THE CAPITAL BASE

In this section, we consider the total capital base that the notional ESO could require to manage the liquidity requirements described in Section 5.1. We first summarise the ESO's position, before presenting our assessment.

5.2.1. ESO view

The ESO has proposed a working capital provision of £550m over RIIO-2. A breakdown of this amount is shown in Table 5.3 below, along with the ESO's upper and lower bound estimates of its working capital requirements. The ESO's estimate reflects Scenario 1, as Ofgem is still to determine whether the treatment of TNUoS charges will change. As we discuss further in Section 5.3, the proposed working capital provision underpins some (but not all) of the ESO's estimates of additional remuneration for the revenue collection function.

Table 5.3: ESO estimated working capital requirements

Cash flow (£m)	Min.	Max.	RIIO-2 Provision
TNUoS charges (billing & collection)	20	275	150
TNUoS charges (K-term)	(140)	140	140
Other transmission billing (connection charges and pass-through)	16	47	32
Termination charges	(15)	67	67
Major supplier failure	0	100	100
Other (BSUoS, expenditure incurred pre-approval, smaller supplier failure)	5	113	61
Total	(114)	742	550

Source: ESO RIIO-2 Business Plan Annex 5 – Finance Report, page 15.

We note the ESO's observation that its estimated £550m requirement may not cover all conceivable working capital requirements. For example, the ESO cites the potential for a significant charge setting event, which would require it to reimburse generators or suppliers in the event that the TNUoS charges it sets are subject to a successful

³⁷ Ofgem, TNUoS Revenue Collection Risk: Consultation, December 2019.

³⁸ Except in relation to non-payment of TNUoS by suppliers or generators (i.e. bad debt), which is not covered in the changes that Ofgem is consulting on.

challenge. The ESO also highlights industry discussions on the possibility of fixing a portion of BSUoS charges are ongoing, which could potentially increase its working capital requirements if implemented.

It is in the nature of probabilistic variables that it is not possible to guarantee that no higher value will be seen. Further, the ESO expects some prior notice, should the events outlined above occur. While we acknowledge the potential for such outcomes to change the ESO's working capital requirements, we do not necessarily consider that it would be appropriate to reflect these items in our assessment of the required capital base.

While the ESO has provided some explanation of how the £550m provision was developed, the level of supporting evidence provided is generally not sufficient to permit a detailed review of the underlying assumptions and methodology. For example, the ESO states that it has *"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."*³⁹ It also states that the provision was sized *"to cover plausible rather than probable cash out flows, covering the higher end of our requirements"*.⁴⁰

The ESO's December 2019 business plan submission indicates that their estimate is underpinned by a probabilistic assessment of its liquidity requirements. For example, the ESO notes that *"[o]ur 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."*⁴¹ However, the business plan provides no further explanation of the ESO's revenue risk modelling. As we discuss in Section 5.2.2, it would be helpful if the ESO could clarify the basis for these estimates, as they are a critical input for assessing how the working capital provision impacts financeability.

The ESO proposes to meet the estimated £550m liquidity requirement through a working capital facility. In addition, they suggest that remuneration is required for further equity capital that a standalone notional ESO would need to obtain the working capital facility:⁴²

"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."

While the ESO does not directly state how much equity is required, KPMG's September 2019 report for the ESO reflects a contingent equity amount of [£<], bringing the total capital requirement associated with the revenue collection role to [£<]. [£<]⁴³

In the ESO's December 2019 business plan submission, KPMG further notes that if SONI's parent company guarantee (PCG) were scaled up for the ESO's activity levels, this would imply a contingent equity amount of c.£200m (how this scaling is applied is not described).⁴⁴ For either figure, no explanation is provided as to why equity would be needed in addition to the £550m working capital facility (i.e. rather than equity forming part of the capital base supporting the ESO's overall £550m liquidity requirement).

³⁹ ESO RIIO-2 Business Plan Annex 5 – Finance Report, page 38.

⁴⁰ ESO RIIO-2 Business Plan Annex 5 – Finance Report, page 15.

⁴¹ ESO RIIO-2 Business Plan Annex 5 – Finance Report, page 15.

⁴² ESO RIIO-2 Business Plan Annex 5 – Finance Report, page 19.

⁴³ KPMG National Grid ESO risk and capital requirements, 25 September 2019, page 13.

⁴⁴ KPMG NG ESO Remuneration requirement and financeability, 2 December 2019, page 15.

5.2.2. CEPA assessment

In this section, we set out our review of the evidence provided by the ESO in support of its £550m working capital provision. On the basis of the limited evidence available, we assess how much of the ESO's liquidity exposure under Scenario 1 and 2 may be covered by such a provision. We also consider the suggestion by the ESO and its advisers that an additional equity buffer may be required in addition to a working capital facility.

Scenario 1

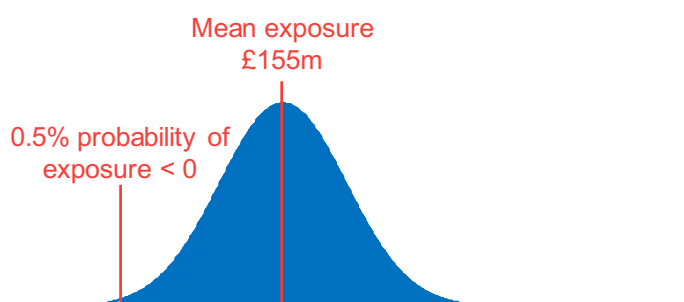
As noted above, the ESO's requested remuneration for a £550m working capital facility is predicated on Scenario 1, in which its revenue collection role is unchanged from current arrangements. In the summary of its March 2019 initial rating of the ESO Moody's states:

"NG ESO has mitigated [...] liquidity risks by putting in place a large revolving credit facility that [we believe] would be sufficient to support several years of plausible under-recoveries and other downside scenarios."

The ESO states that, based on its own modelling, it expects a 99.5% probability of a cash shortfall, with an expected mean negative cash exposure of around £155m. Based on a high-level 'stress test' outlined in Box 1, combining these two references indicates that a £550m facility may be sized to accommodate 99.99% of variation, supporting Moody's interpretation.

Box 1: Assessing the adequacy of the proposed WCF

We have used the points of reference provided by the ESO to stress test the magnitude of its proposed working capital facility. By assuming that revenue collection cash flows follow a normal distribution, the statistics presented by the ESO in relation to its mean exposure and the probability of a cash shortfall occurring can be used to construct a probability density function that describes its cash flow exposure. This is shown in the figure below.



Assuming that this function accurately reflects the ESO's true exposure, this indicates that a £550m provision for working capital may cover 99.99% of potential cash shortfalls. The table below provides the same analysis for a range of alternative working capital provisions.

P-value	£m (approximate)
99.99%	£550m
99.00%	£300m
97.50%	£280m
95.00%	£260m

As the information provided by the ESO on its revenue risk modelling is extremely limited, further clarification is required to confirm our understanding of the information they have provided. [36]⁴⁵ The above analysis also relies on a number of assumptions, which should be confirmed with the ESO. In particular:

⁴⁵ KPMG, National Grid ESO risk and capital requirements, 25 September 2019, page 12.

- It assumes that the range of potential cash flow outcomes are normally distributed. In an earlier submission to Ofgem's consultation on the ESO funding model⁴⁶, the ESO indicated that it had used a PERT distribution for its modelling of revenue collection risk. However, it is unclear whether the same approach has been adopted for the estimates presented in its business plan, and whether this would invalidate the ranges indicated above.
- It is unclear whether the statistics presented by the ESO relate to its expected year end position, as opposed to, for example, its average shortfall position across the year.
- It is unclear whether the statistics presented by the ESO relate to its expected cash shortfall in a given year, or rather its expected working capital requirement in a given year. The distinction is important, because – as described in section 5.1 – under-recovery of some cash flows managed by the ESO may not be recovered until up to two years later. This means that the expected cash shortfall in any given year may be an underestimate of the ESO's working capital requirement, as this would also need to fund shortfalls in prior years that are yet to be recovered.

We note that the last point could change the interpretation of the information provided by the ESO significantly. If this is the correct interpretation of the estimates presented by the ESO, we cannot reconstruct a probability density function of its working capital requirement from the information provided. This is because this would depend on the magnitude of the expected shortfall across consecutive years, which we would expect to differ from the single year estimate provided. For example, we would not expect the P99 shortfall over a 24-month period to be twice that for a discrete 12-month period (indeed, it may be lower if we expect some reversion to the mean).

The breakdown of the expected shortfall would also be an important factor, as this would affect how much of the shortfall would be carried by the ESO over multiple years or recovered over a shorter period. For example, if the £155m represents the ESO's expected cash shortfall, and the same shortfall is repeated in consecutive years, the associated working capital requirement for a given year could be up to £315m, if it was made up of cash flows that are recovered with a two-year lag. Based on the available information, this would likely be an upper bound estimate. For example, if the £155m expected shortfall has the same composition as the ESO's £550m facility, this would suggest a weighted average recovery lag of 14-18 months.⁴⁷ This indicates that, to estimate the expected shortfall position over consecutive years, it may be more appropriate to scale up the £155m by a factor of 20-40%.

In light of the analysis outlined in Box 1, it is possible that a £550m facility could be over-sized. For example, this might suggest that a working capital facility in the order of £300m could accommodate 99.00% of the ESO's exposure to negative revenue collection cash flows (or £350-420m, were we to scale this provision up by 20-40% to account for shortfalls in consecutive years, as outlined above). A provision of this magnitude would appear more consistent with the credit rating migration and default rates for a Baa1 rating as referenced in Section 0 (Figure 2.1). As noted, this depends substantially on the interpretation of the information provided by the ESO. However, on the basis of the limited information available, we therefore assume that a total capital base of between £350m and £550m could be required to manage the revenue collection role under Scenario 1.

As noted above, the ESO and its advisers KPMG have suggested that an additional equity buffer may be required in addition to the £550m working capital facility. We consider that it is not unreasonable to assume that a standalone notional ESO might need to provide some of its own risk capital to obtain a working capital facility (with an associated need for remuneration of this capital). However, in our view the ESO has not provided evidence that indicates an additional need for capital beyond the amounts discussed above. This is because, were a further provision to be made above this estimated capital base, this would increase the proportion of cash flow variation covered (which may already be above 99% for a £550m facility).

A decision is required, however, on the appropriate structure to assume for the total capital base (i.e. the combination of equity and debt in the form of the working capital facility). Under Scenario 1, the total amount of capital required is comparable to or even greater in size than the ESO's RAV. On a notional basis and without clear

⁴⁶ ESO response to Ofgem's consultation on the ESO's funding model in RIIO-2, 9th July 2019.

⁴⁷ Based on the recovery lags set out in Table 5.2.

contractual arrangements providing full security of recovery of cash shortfalls we consider it is highly unlikely that a commercial lender would be willing to provide a working capital facility to a standalone ESO to cover the full capital requirement. Any perceived discretion, uncertainty or mismatch between cost and remuneration would require the ESO to hold some contingent or risk capital in order to secure such a facility.

We have reviewed potential benchmarks (including EirGrid, network businesses, US system operators and the Low Carbon Contracts Company) that could inform whether it is feasible for a standalone ESO to obtain a working capital facility and if so the amount of contingent equity that might be required. There is, however, very little direct guidance given few if any standalone commercial entities face a similar set of circumstances.⁴⁸ We are not aware of evidence that would undermine the ESO's assumption that contingent equity of [\approx] might be required. Although the circumstances are quite different, the requirement for UK banks to hold capital at least equal to 8% of risk-weighted assets indicates that this assumption may be an appropriate order of magnitude for an upper bound estimate, given the credit risk associated with commercial and retail lending. Further, this suggests that the total contingent equity figure put forward by KPMG is likely to be an overestimate.

The proportion of equity required may be expected to vary with the sizing of the total capital base that Ofgem is willing to remunerate. At the lower end of our range the implied degree of risk to which the ESO's investors are exposed – i.e. the risk that the funded capital base (both equity and the working capital facility combined) is insufficient to manage cash flow volatility – will be greater, albeit still very low. We would expect that slightly greater risk to be associated with a slightly higher requirement for equity.

We have not identified a basis for quantifying this relationship. In the absence of a basis for reaching an alternative judgement we therefore assume that the proportion of equity required would be the same at the lower end of our range as at the upper end.

Scenario 2

The principles involved in sizing the capital base under Scenario 2 are the same as those for Scenario 1. Ofgem would need to ensure adequate funding for the capital that a notionally efficient ESO would require. The amount required would, however, be substantially lower.

As a starting point, we have assumed that the requirement would be adjusted pro-rata based on the components of revenue collection that are included in the Scenario 1 range. Based on the ESO's breakdown of the £550m provision, £290m (53%) of this amount relates to demand and generator TNUoS under-recovery. This suggests that the upper end of our range could fall from £550m to around £260m, consistent with the ESO's view expressed in its December Business Plan that *"we estimate that the transfer of TNUoS billing risk to the onshore TOs would reduce our WCF requirements by approximately £300 million"*.

We note that the range of cash flows managed by the ESO may provide a level of diversification, in that under-recovery for one item may be offset by over-recovery against another. Without the statistical benefit of this diversification across several independent categories of volatility, the potential provision may be higher than this pro-rated value. For example, we note that the ESO's estimates of minimum/maximum provisions for different items (Table 5.3) indicates that while it sees a balanced probability of over- or under-recovery for TNUoS (i.e. a range of +£140m to -£140m),⁴⁹ it expects the remaining items to tend towards either under-recovery or a neutral position at best. Therefore, on the basis of the available information, we would be inclined not to apply the same £300m reduction to the lower end of the range under Scenario 2, and instead assume the lower end of the range is in the

⁴⁸ EirGrid and SONI are the most obvious direct comparators. One possible sizing metric is the size of any revolving credit facilities relative to the RAB. Our calculations suggest that EirGrid's facility is €200m (as referenced in their latest accounts) and on average over the current price control period, this implied a ratio of c.3.4x RAB. This is broadly comparable to the ESO's own ratio, suggesting that a low additional level of equity may be needed.

⁴⁹ Specifically, TNUoS *after* within charging year over or under-recoveries have been taken into account.

same ratio to the upper end as for Scenario 1. We note that further details on the ESO's revenue risk modelling would be helpful to inform this position.

The required proportion of additional equity under Scenario 2 could plausibly be more limited than under Scenario 1. However, we note that under Scenario 2, the implied size of the working capital facility relative to the ESO's RAV is above that secured by other regulated businesses (i.e. in the order of 10-20% of RAV). We therefore continue to assume that the equity invested by the ESO to finance its RAV-based business alone may not be sufficient to secure a working capital facility. Across our range for Scenario 2, we therefore assume that a similar proportion of equity would be required as under Scenario 1 (i.e. c. £20-30m, based on an overall capital base of £165-260m).

5.3. REMUNERATION

5.3.1. ESO view

As described in Section 3.1.2, the ESO's business plan submission presents a range of estimates of the additional funding that it believes is required to secure appropriate remuneration for its activities, including the revenue collection role. These estimates fall with a range of £13-39m. The revenue collection component of the estimates included within this range is not always explicitly stated. However, the estimates that do relate to the revenue collection role appear to range between £15.6m and [<], as outlined in Table 5.4 below.

Table 5.4: ESO proposed ranges for additional funding (revenue collection only)

Approach	Description	Additional funding estimates
Return on capital at risk	<ul style="list-style-type: none"> The ESO references KPMG analysis in support of its October 2019 draft business plan submission. This analysis estimated a total capital requirement of £955m to £1,060m. Of this, [<] relates to working capital. Based on the assumption that this capital requirement would be fully drawn, this would imply an additional funding requirement of £34.2m for the revenue collection role, given an assumed company WACC of 5.7% nominal. 	[<]
Margin on external revenues (Oxera)	<ul style="list-style-type: none"> The ESO suggests that a margin on external revenues (i.e. TNUoS, BSUoS and connection charges administered by the ESO) could be used to set an <i>ex ante</i> additional funding allowance. The margin could be estimated from comparator evidence, as the CMA did for SONI. Based on Oxera's comparator analysis, the ESO has proposed a margin of 35 basis points on external revenues.⁵⁰ 	£15.6m
Extrapolation of the CMA SONI approach (KPMG)	<ul style="list-style-type: none"> KPMG extrapolate the CMA SONI parameters to the ESO case. We understand that this includes a £22.2m provision derived from a 50-basis point margin on external revenues. KPMG scales the parent company guarantee allowance provided by the CMA in the SONI case to £200m for the ESO and applies a cost of 1.75% to this to derive a further £3.5m allowance. 	£25.7m

Source: ESO December 2019 business plan submission, Finance Report; KPMG NG ESO Remuneration requirement & financeability (2 December 2019), Appendix 1. KPMG, National Grid ESO risk and capital requirements, 25 September 2019.

We consider that in principle, KPMG's approach of estimating the ESO's capital requirements and then determining an appropriate return on these is a valid approach (indeed, we propose a conceptually similar approach in this report). However, the way KPMG applies this approach is problematic. In particular, the additional funding requirement appears to be based on the assumption that identified capital requirements are fully drawn. The

⁵⁰ Oxera, NGESO financial price control parameters for RIIO-2, 20 September 2019, page 23.

justification for this is limited and ignores the need to differentiate between the cost of providing contingent as opposed to utilised capital. Further, there is no explicit recognition of how WCF interest fees and charges are remunerated through other mechanisms, such as the K term. These factors need to be accounted for to avoid double counting.

In relation to the margin-based approaches adopted by Oxera and KPMG, we note that there are considerable difficulties establishing appropriate comparators for the ESO's revenue collection role in order to establish an appropriate margin benchmark. The difficulty relates to both the level of risk exposure and comparability of what the margin is applied to. For example, there are challenges related to:

- establishing appropriate comparators;
- accurately identifying the margins charged by those comparators for the cash flows they manage;
- making appropriate adjustments to the estimated margins to account for differences in risk (recognising that there are unlikely to be very close comparators for the ESO); and
- making further adjustments to the margins to account for the fact that these may also cover the direct costs of the services provided by the comparators, while the ESO's internal costs are funded through its totex allowance. Alternatively, the ESO's totex allowance would require adjustment to remove double counting.

While we have not closely reviewed the comparators referenced by Oxera, these issues are evident in their analysis. For example, Oxera notes that if a margin on external revenues is provided *"a further allowance for NGESO's revenue management activities, i.e. the operational expenditure allowance for procuring the working capital facility should not be provided, to avoid double-counting"* and selects a margin from the lower end of its comparator range to avoid over-remunerating the ESO's internal costs. This approximate adjustment demonstrates the difficulty of applying a margin on external costs with much confidence, and that there is a risk of double remuneration under this approach.

5.3.2. Our view

The costs of managing liquidity in relation to the ESO's revenue collection role fall into two categories and may require two distinct sources of funding:

- Drawn balances attract various rates of return through the ESO's existing revenue correction mechanisms that provide compensation for the mismatch in timing between cash outflows and inflows.
- Undrawn balances may require additional funding in the form of an ex ante allowance:
 - A working capital facility fee will cover the direct cost of securing a facility of the appropriate size.
 - A further component will provide compensation for any contingent equity or risk capital required alongside the working capital facility.

We discuss the two categories separately.

Ex ante allowance

We have assumed a single ex ante annual fee benchmarked on the actual commitment fees faced by the ESO on its existing working capital facility. Our understanding is that an annual allowance of 0.3% of the facility size would be sufficient to capture these fees.

The rate of return on contingent equity or risk capital is particularly challenging to benchmark. One option would be to provide a return on equity. Suitable comparators or benchmarks to set such a return are not readily available, however, given the specific nature of the ESO's revenue collection role.

We have considered two possibilities:

- Based on KPMG's advice to the ESO it may be appropriate to apply the WACC. This effectively assumes that the ESO would take a view on required finance at a business level. While in practice it is unlikely that different sources of finance would be hypothecated for different purposes, we consider that differences in risk between the ESO's different activities make this an unsuitable guide for a bottom-up calculation of required remuneration for equity capital.
- The cost of contingent capital might best be reflected by the ESO's marginal cost of equity. However, in the case of the revenue collection role, where the recovery of cash shortfalls is not in material doubt, the risk exposure is arguably low and not equity-like.

In the absence of clear guidance on an appropriate return we consider that the most defensible and conservative approach here is to allow the same return on equity as for the ESO's RAV-based business. This represents the overall opportunity cost of equity from the point of view of the ESO.

We make two adjustments to the real allowed cost of equity applicable in the case of the ESO's RAV-backed business. First, we assume investors would be able to earn a risk-free return on any equity capital required through one of two mechanisms. Where capital is undrawn it could be invested at a risk-free rate until called. Where it is called on to meet a working capital need, it will be (partly) remunerated through the various mechanisms used by Ofgem to reflect the time value of money (see section on 'Drawn balances' below). We assume for simplicity that these remuneration mechanisms broadly correspond to the risk-free rate adopted in the allowed return on equity.

Second, given that there is no indexation mechanism in place to remunerate investors for inflation we assume that a nominal cost of equity would be required.

Drawn balances

The use of the 'K factor', alongside the other elements of the ESO's licence and the CUSC provides remuneration for mismatches in the timing of cash flows, implies that Ofgem's commitment to provide funding for liquidity is not practically limited by any decision it makes on the appropriate size of the capital base. Investors are not fully exposed to the unlikely event of a cash flow deficit in excess of the size of the capital base. In that scenario, the residual risk exposure would be limited to the basis risk between the marginal cost of additional capital required and the remuneration provided by the recovery mechanism available to the ESO. The limited nature of this residual risk should be factored into the remuneration of any additional equity required in relation to the revenue collection role. We discuss the extent of any potential residual risk in Section 0.

5.4. ASSESSMENT OF RESIDUAL RISKS

As noted above, provided that the RIIO-2 allowances appropriately recognise the capital required to support the ESO's revenue collection role, we would expect the residual risk associated with this role would be limited to any funding gap that arises due to mismatches between the marginal cost of additional capital required and the remuneration provided by the various recovery mechanisms. That is, the residual risk is effectively basis risk.⁵¹

To assess the extent of this risk, we have developed a simple Excel-based model that sets out, at a monthly level, the assumed working capital requirements arising from the collection agent cash inflows and outflows managed by the ESO. From this, we calculate the associated working capital facility costs incurred (interest charges, utilisation fees, as well as arrangement, extension and commitment fees) and compare this to the costs that would be recovered through the different mechanisms available to the ESO. The assumptions applied in this exercise are set out in Appendix A.

The output of the model is an indication of the potential magnitude of the ESO's exposure to unremunerated working capital facility charges associated with its collection agent role. As noted in Table 5.2, there are variety of different mechanisms for the ESO to recover cash shortfalls, with different allowances for financing costs. Therefore, the ESO's overall exposure to basis risk through these arrangements will depend to a large extent on the composition of any cash shortfall.

To illustrate the potential magnitude of this risk, assuming the current arrangements remain in place, we have assessed the extent to which the ESO would be able to recover incurred interest costs under both Scenario 1 and 2, assuming that in both cases the assumed working capital facility is fully utilised. For this, we have adopted the high-end estimate of the ESO's working capital requirements (i.e., assuming that the peak requirement in each year is approximately £550m in Scenario 1 and £260m in Scenario 2). Based on the modelling assumptions applied, this analysis indicates that under Scenario 1, the ESO would experience an interest cost recovery surplus of £4.9m p.a. This means that, as a result of the £542m working capital requirement (assumed to hold across the entire RIIO-2 period), overall the ESO would incur interest charges of £7.4m p.a. on average from the use of its working capital facility until these amounts are recovered. However, the various interest cost recovery mechanisms outlined above allow it to recover £12.3m p.a. on average, resulting in the £4.9m p.a. surplus.

The impact of under-recovery varies across each of the working capital requirements, as outlined in Table 5.5 below. Depending on how the assumed recoverable interest rate for each item compares to the assumed WCF interest rate, there is either an interest recovery shortfall or surplus. This indicates that, given the diversity of recoverable interest rates, the ESO's overall exposure to unrecognised interest charges is highly dependent on the combination of items that contribute to an under-recovery.

⁵¹ This assumes that there is no material unrecognised lag between the period during which the ESO must manage a cash shortfall and the period for which it is recognised as having managed that shortfall.

Table 5.5: Residual risk – illustrative interest costs and recovery (Scenario 1)

Working capital requirement	Annual peak working capital requirement (£m)	Interest charges (annual avg., £m)	Interest recovered (annual avg., £m)	Shortfall / (Surplus) (annual avg., £m)
TNUoS Billing & Collection (Demand)	(125.0)	1.7	0.7	(1.0)
TNUoS Billing & Collection (Generation)	-	-	-	-
TNUoS Recovery (K Term)	(165.0) ⁵²	3.2	5.5	2.4
Other Transmission Billing (Pass-Through)	(17.0)	0.3	1.2	0.9
Other Transmission Billing (Connection Charges)	(15.0)	0.3	-	(0.3)
Termination Charges	(67.0)	0.4	-	(0.4)
Customer Failure	(120.0)	0.9	4.4	3.5
BSUoS Billing	(30.0)	0.6	0.3	(0.3)
Expenditure Incurred Pre-Approval	(3.0)	0.1	0.2	0.2
AAHEDC	-	-	-	-
Total	(542.0)	7.4	12.3	4.9

Source: CEPA analysis

Under Scenario 2, which excludes basis risk associated with TNUoS, the illustrative surplus would reduce to £3.9m p.a. on average (based on average annual interest costs of £2.2m and average annual interest cost recovery of £6.1m).

This analysis indicates that for most of the cash flows that the ESO manages, there are existing mechanisms which allow the ESO to recover an amount for the interest costs it incurs as a result of under-recovery. However, there are differences between the interest rates the ESO incurs through its working capital facility and the amounts it can currently recover via the K term, other licence conditions and the CUSC. Depending on the circumstances, these discrepancies could potentially either over- or under-remunerate the ESO relative to working capital facility interest charges.⁵³ Further, there are some items – notably, termination charges and site-specific connection charges – where there appears to be no interest cost recovery mechanism available under the current arrangements.

Given that the magnitude and direction of the risk depends substantially on the underlying sources of any cash flow shortfall, setting an ex ante allowance for this aspect of the ESO's risk is likely to be challenging. However, we note that Ofgem is currently investigating potential changes to the time value of money allowances set out in the ESO's licence conditions. If this results in changes that more closely match the recovery mechanisms with the ESO's marginal working capital costs, the magnitude of the risk faced by the ESO may change. Therefore, our analysis of how this risk should be treated in RIIO-2 allowances remains indicative, pending the outcome of Ofgem's decision on time value of money issues.

⁵² £70m for demand-related under-recovery plus £25m for generator-related under-recovery.

⁵³ As noted above, this is based on WCF interest rate assumptions that we understand to reflect the ESO's current facility. The terms available to the notional ESO could be different from these.

6. TREATMENT OF ADDITIONAL CONTINGENT CAPITAL

In Sections 4 and 5 we considered, respectively, the ESO's exposure to systematic risk relating to its RAV-based business and the working capital it might require in order to manage its revenue collection role. The ESO and its advisors have also argued that it may be necessary to make additional provisions for contingent capital to represent plausible (downside) scenarios that are not fully captured through either a RAV-based allowance or revenue collection working capital.

In this section we consider two possible reasons for making such a provision:

- A regulator may seek to sculpt cost efficiency incentives by applying a downside-only ex post review regime. In this context, the ability (and indeed expectation) of the regulator to disallow costs would extend beyond the backstop powers to disallow 'demonstrably wasteful and inefficient expenditure' (DIWE). An additional ex ante allowance would be necessary in this case to enable the regulated company to earn its cost of capital in expectation.
- A regulated company may be exposed to sufficient downside risks – whether relating to incentive outcomes, cost disallowances or penalties – that a prudent notional entity would need to hold contingent capital in reserve in order to maintain financeability. This will depend on the scale of the downside risks relative to the size of the company's capital base: an asset-heavy network may be comfortable managing a larger exposure in cash terms than an asset-light company with limited capital.

Ofgem's proposed policy towards ESO costs has, in some areas, changed significantly in relation to the first reason. Ofgem has also clarified and set out more details in other areas. While we present the ESO's proposals in this section, these are now based on an out of date view of Ofgem policy. Our own view reflects our understanding of Ofgem's current policy proposals.

In principle a range of approaches could be considered in order to reflect any need for contingent capital. We focus our analysis on estimating and remunerating the capital that a prudent investor in a notional ESO may set aside in order to manage the potential financeability implications of low probability but high magnitude scenarios. Approaches based on applying a percentage of costs have been considered in other contexts but relate primarily to the calibration of asymmetric ex post cost disallowance regimes. Under Ofgem's current policy proposals these are no longer directly relevant. Approaches based on applying an overall margin may be useful as a higher-level cross-check but do not relate directly to the issue discussed in this section.

6.1. SIZING THE CAPITAL BASE

In Section 6.1.1 we summarise the evidence provided by the ESO and its advisors that most directly relates to the provision for contingent capital (other than that required for the revenue collection role). In Section 6.1.2 we provide our own view, updated in particular based on our understanding of Ofgem's current policy proposals.

6.1.1. ESO view

KPMG produced a matrix categorising the various risks the ESO faces, based on its understanding of Ofgem's policy towards ESO costs and incentives in September 2019. A simplified version of this is produced and summarised below (note that this does not include revenue collection/liquidity risk, which is covered in Section 5).⁵⁴

While KPMG identified several risk categories for the ESO, the outcomes of these risks fall into three categories:

- [✂]

⁵⁴ KPMG, National Grid ESO risk and capital requirements, 25 September 2019, pages 6-13

- [X]
- [X]

These are summarised in Table 6.1. Note that particular risks may have more than one outcome within the same category – these are explained below, by risk type. By distribution, KPMG means the degree of symmetry associated with a given risk, with some having significantly more downside potential for the ESO.

Table 6.1: KPMG risk identification and assessment matrix

Risk	Outcome	Description	Financial impact	Distribution	Probability
[X]	[X]	[X]	[X]	[X]	[X]
[X]	[X]	[X]	[X]	[X]	[X]
	[X]	[X]	[X]	[X]	[X]
[X]	[X]	[X]	[X]	[X]	[X]
	[X]	[X]	[X]	[X]	[X]
	[X]	[X]	[X]	[X]	[X]
[X]	[X]	[X]	[X]	[X]	[X]
[X]	[X]	[X]	[X]	[X]	[X]
	[X]	[X]	[X]	[X]	[X]

Source: KPMG, National Grid ESO risk and capital requirements, 25 September 2019, pages 7-11.

In Table 6.1:

- [X]
- [X]
- [X]
- [X]
- [X]

It is unclear from KPMG's description whether there is any overlap between these categories or whether the risk of double counting has been considered. The next step in the analysis is presenting two scenarios which produce higher and lower plausible impacts of downside risk. Although KPMG provide some general guidance on how these are produced – e.g. why the risks are treated cumulatively instead of taking correlations into account – it is unclear what parameters are used to calculate the scenarios. Later in the same document it mentions that this risk capital estimate is 'probability-adjusted' but it is unclear precisely how this was done. The scenarios are presented in Table 6.2 below.

Table 6.2: Downside risk scenarios

Risk category	Lower end scenario	Higher end scenario
[✕]	[✕]	[✕]
[✕]	[✕]	[✕]
[✕]	[✕]	[✕]
[✕]	[✕]	[✕]
[✕]	[✕]	[✕]
[✕]	[✕]	[✕]

Source: KPMG, *National Grid ESO risk and capital requirements*, 25 September 2019, page 13

We assume that this estimate of the contingent capital required in relation to asymmetric risk has informed the ESO's assessment of the revenue required. However, we note that in its December Business Plan the ESO appears to emphasise high level benchmarks applied as a percentage of costs rather than a detailed bottom-up consideration of the sources of asymmetric risk. The range in Table 6.2 does not directly feed into its proposals.

6.1.2. Our view

The estimates of contingent capital requirements summarised above were predicated on the ESO and its advisors' understanding at the time of Ofgem's policy to costs and incentives. Ofgem's stated policy at the time was to align the ESO with other RIIO sectors in relation to conditions around cost disallowance and to provide greater clarity on the description of this mechanism at a later date. Ofgem also stated it would maintain a cost disallowance mechanism for system restoration ('Black Start') costs.⁵⁵ At the time the ESO may have considered it was potentially exposed to the threat of ex post cost disallowance as part of a framework designed to ensure it faced appropriate cost incentives, and that this would be the only incentive on costs.

In principle, such regimes can offer benefits to consumers through the effect on the incentives faced by the regulated company. In such scenarios we would generally consider it appropriate to make a provision to remunerate the resulting asymmetric risk. In its SONI determination the CMA concluded:

"Where employing [such] an asymmetric framework is beneficial to consumers, a regulator could compensate the company for the downside risk by making an additional allowance in the company's returns to reflect this asymmetric risk profile."

Provided then that the regulator's ability to impose downside only costs (such as penalties or cost disallowances) is exercised appropriately and the regulated company compensated in advance such that it is not made worse off in expected value terms, a provision for asymmetric risk can be appropriate.

Ofgem has, however, since updated its policy in the following important respects:

- Costs are now considered as part of a broader incentives regime in which downside risk has been constrained to be closer in scale to that faced by regulated networks at up to 2% of RAV. Within this, value for money is one consideration, allowing the ESO to be rewarded for strong performance on costs as well as penalised for poor performance. Previously, the ESO's exposure under its incentive regime alone could have accounted for up to 10% of RAV, with the potential for further cost disallowances.
- Cost disallowance is limited to the DIWE backstop powers with new proposed guidance on the situations in which these powers would be used. Ofgem has proposed a limit of 10% of RAV for such disallowances –

⁵⁵ Ofgem, 'RIIO-2 Sector Specific Methodology Decision', May 2019.

which is comparable in scale to the equivalent backstop powers applicable to regulated networks – and no cost disallowance process for black start.

The cost regime faced by the ESO is no longer explicitly asymmetric except in ways that mirror the cost treatment for regulated networks (which do not attract any provision). There may, however, be two perceived sources of remaining uncertainty that could give risk to a contingent capital provision. Having transitioned from a regime of cost disallowances investors may view the threat of a downside cost penalty to be more likely than the prospect of a reward – whether this materialises through the incentive regime or through application of disallowance powers. Given that the scale of the ESO's totex is very large relative to its RAV investors may also view extreme outcomes (such as those at the limit of the capped incentive or DIWE range) to be more likely than in the case of energy networks. We account for these considerations in our assessment of the upper end of the plausible capital provision below.

We have also considered a second reason that an investor in the ESO may make a provision for contingent capital. The ESO may be unable to self-insure itself against severe downside outcomes (such as enforcement penalties) on the basis of the capital required to finance its RAV. We focus our attention here on downside risks that are greater in scale (relative to RAV) than those faced by regulated network investors, which are expected to manage such risks within their RAV-backed capital base.

The range proposed by KPMG risks overstating the ESO's exposure – particularly given our understanding of Ofgem's current policy stance. We have assumed the following adjustments to the range:

- It is not clear that the ESO's exposure to **performance risk** is negatively asymmetric in nature. Indeed, our understanding of the proposed incentive regime is that it combines £6m potential downside with £15m potential upside rewards. We assume that no provision is required either at the low or the high end.
- We disagree with the inclusion of any provision for **asymmetric financing cost risk**. Our analysis is broadly supportive of the ESO's proposed cost of debt indexation approach, which appears neither upwardly nor downwardly biased. Our analysis of basis risk in relation to remuneration for the ESO's revenue collection shortfall indicates that, if anything, the current arrangements risk over-compensating the ESO.
- Ofgem's current policy towards **cost disallowance** arguably eliminates the need for any provision for additional contingent capital. The low end of our proposed range reflects this. However, we reflect potential perceptions around asymmetric risk in adopting a provision between [£] and [£] at the upper end of our range, based on the KPMG's assessment of perceived cost disallowance risk.
- KPMG's assessment reflected a range of **financial penalties** that are at least in principle linked in scale to the ESO's turnover (including both allowed revenue from its RAV-based business and BSUoS charges). It also included a provision for appeal costs. Given that Ofgem's enforcement powers require it to take into consideration a company's financial standing in determining the scale of enforcement penalties, arguably no provision is needed. The low end of our proposed range reflects this. At the high end of our range we take into consideration KPMG's proposed provision of between [£] and [£].
- KPMG argues that there may be a **regulatory risk** that not all of the various layers of ESO capital are adequately captured. Having considered in detail the ESO's separate capital remuneration requirements for the RAV-based business, revenue collection role and additional contingent capital, we consider that this potential risk has been adequately addressed.

On each individual category we consider it plausible that no provision would be required. In aggregate, therefore, the low end of our proposed range includes no provision. Overall, we judge that £25m would represent a prudent contingent capital assumption for the upper end of our range, consistent with the above issues. We consider it unlikely that a higher provision than this would be considered necessary although we accept there is uncertainty around this provision and our assumptions are primarily judgement based.

6.2. REMUNERATION

We present in this section analysis of the required remuneration for additional contingent capital. Based on Ofgem's policy position at the time the analysis was carried out, the ESO and its advisors considered a range of different approaches to remuneration. We present the evidence that specifically relates to asymmetric risk in Section 6.2.1.

As noted in the introduction to this section, however, we judge that an approach grounded in an assessment of the ESO's likely contingent capital needs is more consistent with Ofgem's current proposed policy. We therefore focus on this approach in Section 6.2.2.

6.2.1. ESO view

In order to estimate its required remuneration, the ESO used a 'triangulation' approach consisting of three methods: regulatory precedent, margin benchmarks and analysis of capital requirements. Two of these methods – regulatory precedent and analysis of capital requirements – inform its view of required remuneration for asymmetric risk.

Regulatory precedent

The regulatory precedent cited by the ESO is the SONI/CMA determination. SONI argued that the regulator "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 this ground through a fixed annual amount based on a 3% uplift to costs subject to disallowances.

KPMG carried out an analysis on the ESO's returns in order to come up with a range of additional remunerations under various scenarios. KPMG used the CMA/SONI determination as a starting point noting that, although they were awarded a 3% uplift on costs "*it is evident that it estimated the expectation of loss (absent an additional allowance) at about 2%.*"⁵⁶ KPMG conclude that "it could be assessed" that 2% is a reasonable loss under a disciplined disallowance framework, this "would have to increase, perhaps to 4%" under the other scenario where the regulator is less objective.

The specific costs are those which could be disallowed in an ex post review i.e. totex and black start and are calculated as in Table 6.3. We are not aware of the source for KPMG's base figures.

⁵⁶ KPMG, National Grid ESO remuneration requirement and financeability, 12 December 2019, page 23

Table 6.3: KPMG estimate of required asymmetric risk remuneration

	Base	Disciplined (2%)	Less objective (4%)
Black start	£50m	£1.0m	£2.0m
Totex	£234m	£4.7m	£9.4m
Total asymmetric risk remuneration		£5.7m	£11.4m

Source: KPMG, *National Grid ESO remuneration requirement and financeability*, 12 December 2019, page 29

This provides a range for additional remuneration of £5.7 – 11.4m.

Remuneration of capital

In Section 6.1.1 we summarised KPMG’s advice to the ESO on the capital required to manage its exposure to various categories of asymmetric risk. KPMG proposed a range of [£5.7m – £11.4m]. This amount is also incorporated in Table 3.2 which summarises KPMG’s overall assessment of required capital remuneration.

All capital incorporated in the ESO’s business is assumed to be remunerated at the WACC. Given the different risk exposure for capital employed to finance the RAV, capital employed to manage liquidity for the ESO’s revenue collection role, and contingent capital set aside to manage asymmetric risk, we do not necessarily agree it is appropriate to apply the same WACC. However, for the purpose of summarising KPMG’s advice to the ESO, applying the WACC to the capital requirement of [£5.7m – £11.4m] implies a provision of [£5.7m – £11.4m] for asymmetric risk.

Despite KPMG’s detailed review of potential sources of asymmetric risk this is lower than the range based on application of a percentage uplift to costs.

6.2.2. Our view

Based on the analysis in Section 6.1.2 we consider that a prudent investor in the ESO may expect to make up to £25m additional contingent capital available; this is in addition to any capital required for the ESO’s revenue collection role. This section considers the appropriate benchmark for the opportunity cost of holding this capital.

There are no direct benchmarks for the return on equity required to remunerate exposure to asymmetric risk. We have considered three possibilities:

- Based on KPMG’s advice to the ESO it may be appropriate to apply the WACC. This effectively assumes that the ESO would take a view on required finance at a business level. While in practice it is unlikely that different sources of finance would be hypothecated for different purposes, we consider that differences in risk between the ESO’s different activities make this an unsuitable guide for a bottom-up calculation of required remuneration for contingent equity capital.
- The cost of contingent capital might best be reflected by the ESO’s marginal cost of equity. The associated risks are more equity-like than debt-like in nature, with the entire amount of capital at risk, at least in principle. The risk is regulatory in nature and may therefore be informed by the same benchmarks that apply to our assessment of RAV-related risk.
- If the capital requirement is treated as a separable quantity from the rest of the ESO business, it may be appropriate to remunerate it at an unlevered cost of equity. This would reflect an assumption that no debt capital is used.

In the absence of clear guidance on an appropriate return we consider that the most defensible approach here is to reflect the ESO’s marginal cost of equity. This represents the overall opportunity cost of equity from the point of view of the ESO.

We make two adjustments to the real allowed cost of equity applicable in the case of the ESO’s RAV-backed business. First, we assume that an investor holding contingent capital against potential future liabilities would be able to earn a risk-free return on that capital. We assume for simplicity that this return broadly corresponds to the

risk-free rate adopted in the allowed return on equity. We therefore subtract the risk-free rate component of the cost of equity. Second, given that there is no indexation mechanism in place to remunerate investors for inflation we assume that a nominal cost of equity would be required.

7. SUMMARY

This section briefly summarises the implications of our analysis for the ESO's required total remuneration (Section 7.1) and the 'additional' ex allowance over and above the return on the RAV.

7.1. TOTAL REMUNERATION

The analysis in Sections 4-6 above sets out our proposed approach to ensuring the ESO is remunerated for the risks it faces in relation to its RAV-based business activities (both equity-finance and debt-financed), its revenue collection role and the various potential sources of asymmetric risk. This section summarises our implied total remuneration of the ESO's capital. Given the different exposure to liquidity risk in relation to its revenue collection role under Scenarios 1 and 2 we present the two breakdowns separately.

In each case the total revenue includes:

- ex ante allowances for the return on the RAV, the fees associated with securing a working capital facility and the contingent equity capital that would be required to be committed to underpin the revenue collection role and manage asymmetric risk; and
- ex post remuneration for delays to revenue recovery that would be linked to actual cash imbalances.

We define an 'additional' revenue, excluding the RAV-based return, for comparison with the ESO's concept of 'additional' revenue.

We have sought to calculate the ex-ante sources of remuneration on a cash basis. The allowance for the RAV-based return reflects the real allowed cost of capital, which effectively represents the cash allowance in each year (with inflation compensated separately through RAV indexation). The additional ex ante remuneration provisions for the revenue collection role and contingent capital are effectively nominal cash allowances, with no further provision for inflation indexation.

Scenario 1

Table 7.1 below illustrates the implied potential cash returns under the approach set out in this paper, based on the following assumptions:

- Three distinct uses of capital would be remunerated:
 - the £303m RAV;
 - between £350m and £550m total capital to provide sufficient liquidity for the ESO's revenue collection role; and
 - up to £25m total capital to compensate the ESO for its exposure to asymmetric risk.
- The RAV attracts an ex ante allowance of a CPIH real rate of return (with inflation compensated through RAV inflation rather than cash) based on:
 - an illustrative assumption of 0.48% for the opening real cost of debt based on our own analysis in Section 4.2;
 - our proposed range of 0.45-0.50 for the ESO's asset beta;
 - Ofgem's proposed Draft Determination market cost of equity parameters (which currently indicate a CPIH-stripped risk-free rate of -1.58% and a total market return of 6.25-6.75%); and
 - the ESO's proposed gearing assumption of 55%.
- The revenue collection role attracts an ex ante allowance of a nominal rate of return (since there is no associated RAV through which to compensate for inflation through indexation) based on:

- for the debt-financed portion, working capital facility fees of 0.3%; and
- for the equity-financed portion, the RAV-based cost of equity less the nominal risk-free rate, which we assume the ESO would be able to earn on unused funds.

This component of the total return is assumed to vary only in proportion to our assessment of the capital required for the revenue collection role – not in proportion to the amount actually utilised.

- The additional contingent capital attracts an ex ante allowance of a nominal cost of equity (since there is no associated RAV through which to compensate for inflation through indexation) based on the RAV-based cost of equity less the nominal risk-free rate, which we assume the ESO would be able to earn on unused funds.
- The annual revenue recovery adjustment has been illustrated based on our own model.⁵⁷ The amount of this adjustment will depend on the degree of revenue over- or under-recovery, and if cash inflows and outflows were in balance this figure would be zero. The provision could be negative in the event that the ESO over-recovers revenue. The ESO's analysis generally indicates that an under-recovery is more likely, and its benchmarks (particularly those based on a return on capital) appear to be based on an assumption that the capital requirement is drawn down in full. We therefore focus on two scenarios illustrating different degrees of draw-down.
 - The low-end is based on a representative draw-down equivalent to the ESO's expected mean annual drawdown of £155m.
 - The high-end assumes that the estimated maximum capital requirement is drawn down in full (though in principle the remuneration provided through this mechanism is not limited).

These figures represent the amounts that we estimate the ESO would be able to recover through the mechanisms described in Section 5.1, as they currently operate. If these mechanisms were to change (for example, if Ofgem were to adjust its approach to remunerating the time value of money), the amount that the ESO would be able to recover would be different.

Table 7.1: Illustration of total potential annual cash return range for ESO (£m)

	Capital base	Debt capital	Return	Equity capital	Return	Total return
RAV	303	167	0.8	136	6.9-8.7	7.7-9.5
Revenue collection role	350-550	322-500	1.0-1.5	28-50	1.9-4.0	2.8-5.5
Contingent capital	0-25			0-25	0.0-2.0	0.0-2.0
Sub-total: Ex ante allowance	653-878	489-667	1.8-2.3	164-211	8.7-14.7	10.5-17.0
Revenue recovery adjustments	N/A					3.5-12.3
Total						14.0-29.3
Total 'additional' revenue						6.3-19.8
'Additional' ex ante allowance						2.8-7.5

Source: CEPA analysis

The range shown in Table 7.1, which reflects our proposed approach, can in principle be compared with the top-down benchmarks proposed by the ESO and KPMG. However, such a comparison should be treated as illustrative. The top-down benchmarks arguably have limited direct relevance since Ofgem's approach to remunerating liquidity costs closely resembles a pass-through. The combination of fully funded working capital facility fees, revenue

⁵⁷ This is before consideration of any changes Ofgem may make to the return provided to reflect the time value of money.

recovery allowances directly linked to cash shortfalls and a return on risk capital means that the risk of a mismatch between revenue and cost is very limited. We would therefore expect total remuneration as a proportion of revenue to be at the low end of or even below the benchmarked range in the vast majority of outturn scenarios.

For comparison to the ESO's analysis, Table 7.1 includes an implied 'additional' revenue figure of between £6.3m and £19.8m, of which between £2.8m and £7.5m would be in the form of an ex ante allowance over and above the return on the RAV. This represents the return provided for its roles and responsibilities over and above its RAV-based activities. Taking into consideration a wide range of benchmarks the ESO considered that additional revenue of between £13m and £39m per annum might be required. The figures in Table 7.1 imply that the ESO would be able to count on a return within this range if required, but that if the ESO's expected annual deficit figure is correct it would earn a lower return. Given the very limited residual risk associated with the revenue collection role we do not necessarily see this as problematic.

Scenario 2

Table 7.2 below illustrates the implied potential cash returns under the approach set out in this paper, based on the alternative 'Scenario 2' for the ESO's exposure to revenue collection risk set out in Section 1 of this report. The provisions for the RAV and asymmetric risk are unchanged under Scenario 2. However, the assumptions for the revenue collection role are changed as follows:

- The amount of capital required is assumed to be between £165m and £260m, based on a pro-rata adjustment to our range for Scenario 1. The proportion of equity required is assumed to be the same as for Scenario 1.
- The revenue recovery allowance is assumed to be reduced pro-rata to the reduction in capital required.

Table 7.2: Illustration of total potential annual cash return range for ESO (£m)

	Capital base	Debt capital	Return	Equity capital	Return	Total return
RAV	303	167	0.8	136	6.9-8.7	7.7-9.5
Revenue collection role	165-260	152-236	0.5-0.7	13-24	0.9-1.9	1.3-2.6
Contingent capital	0-25			0-25	0.0-2.0	0.0-2.0
Sub-total: Ex ante allowance	468-588	318-403	1.3-1.5	150-185	7.8-12.6	9.0-14.1
Revenue recovery adjustments	N/A					1.1-6.1
Total						10.1-20.2
Total 'additional' revenue						2.4-10.7
'Additional' ex ante allowance						1.3-4.6

Source: CEPA analysis

The figures in Table 7.2 are less directly comparable to those proposed by the ESO as the Business Plan reflects Ofgem's status quo allocation of revenue collection risk.

7.2. FINANCEABILITY ASSESSMENT

In this final section of our report we return to the issue of the ESO's financeability. In Section 2 we concluded that the key financeability issue, based on the relevant Moody's credit rating methodology, would be the provision of sufficient liquidity, particularly in relation to the ESO's revenue collection role.

While there is no formal, quantitative definition of "sufficient" liquidity, the total remuneration proposed in this report and summarised in Section 7.1 above has been calibrated to accommodate a very wide range of scenarios. Our interpretation of the ESO's probabilistic modelling indicates that the proposed capital allowance for the revenue

collection role could plausibly accommodate over 99% of scenarios. We also draw comfort from Moody's assessment that the existing working capital facility (comparable in scale to the upper end of our ranges) is "adequate to support several years of plausible under-recoveries and other downside scenarios".

Relative to the regulatory framework in place when Moody's made its initial assessment, Ofgem has developed policy proposals that mitigate some sources of potential cashflow volatility for the ESO. The applicable incentive regime entails more limited exposure and the scale of potential cost disallowances has been reduced. Combined with the remuneration proposed in this report for additional contingent capital that may be set aside against potential low probability, high magnitude risks, this should further strengthen the ESO's liquidity position.

The ESO's credit rating and financeability is also judged with respect to quantitative credit metrics. As noted in Section 2 the key metrics under Moody's methodology are:

- $(\text{CFO pre-WC} + \text{Interest}) / \text{Interest}$.
- $\text{CFO pre-WC} / \text{Debt}$.
- $(\text{CFO pre-WC} - \text{Dividends}) / \text{Debt}$ (3-year average).
- $\text{Debt} / \text{Capitalization}$ (3-year average).

We have reviewed Ofgem's ESO Licence Model outputs based the remuneration ranges proposed in this report, combined with its other price control proposals. Table 7.3 below summarises the key metrics over the course of the price control.

Table 7.3: Overview of key credit metrics

Metric	2021/22	2022/23	2023/24	2024/25	2025/26
$(\text{CFO pre-WC} + \text{Interest}) / \text{Interest}$	23.8	21.5	19.8	21.3	21.5
$\text{CFO pre-WC} / \text{Debt}$	33.0%	35.9%	34.3%	39.2%	42.3%
$(\text{CFO pre-WC} - \text{Dividends}) / \text{Debt}$	30.8%	33.6%	32.1%	36.8%	39.8%
$\text{Debt} / \text{Capitalisation}$	27.4%	25.9%	27.2%	24.9%	24.6%

Source: Ofgem ESO Licence Model.

Table 7.4 below summarises the average of each metric over the first three years of the price control relative to the range consistent with A and Baa ratings for each metric. These metrics together comprise 40% of the overall indicated rating (before adjustments).

Table 7.4: Overview of key credit metrics

Metric	2021/22-2023/24 avg.	A rating range	Baa rating range
$(\text{CFO pre-WC} + \text{Interest}) / \text{Interest}$	21.7	4.5-6.0x	3.0-4.5x
$\text{CFO pre-WC} / \text{Debt}$	34.4%	19-27%	11-19%
$(\text{CFO pre-WC} - \text{Dividends}) / \text{Debt}$	32.2%	15-23%	7-15%
$\text{Debt} / \text{Capitalisation}$	26.8%	40-50%	50-59%

Source: Ofgem ESO Licence Model.

All metrics are above the range consistent with an A or Baa rating, in some cases by a considerable margin. There is no evidence that any metric is on a problematic downward trend during the price control. Given that the regime is in the early stages of development – which has been reflected by Moody's in its score for the 'Consistency and Predictability of Regulation' rating factor – these strong credit metrics are helpful in underpinning an overall positive assessment of the ESO's financeability.

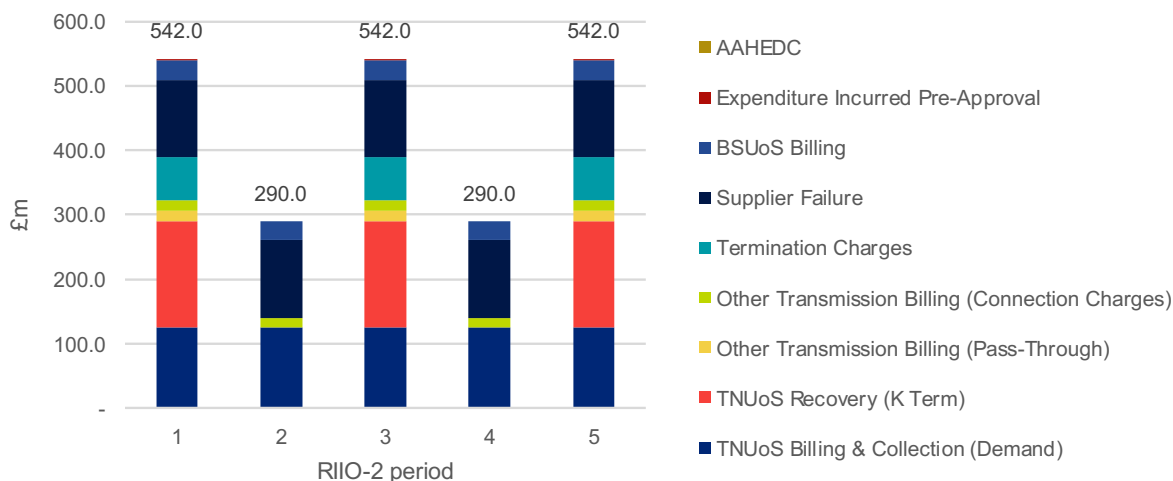
Appendix A REVENUE COLLECTION – RESIDUAL RISK ANALYSIS

This appendix sets out the assumptions applied in our illustrative assessment of the residual risk (if any) associated with the ESO's revenue collection role. The assessment of residual risk depends substantially on the relative contribution of different cash flows to any over- or under-recovery experienced by the ESO. Further information would be required from the ESO to develop an estimate that represents a 'most likely' outcome over the RIIO-2 period.

A.1. UNDER-RECOVERY ASSUMPTIONS

Figure A.1 below sets out the assumed under-recovery position for each cash flow managed by the ESO, in each year of the RIIO-2 period. The under-recovery in each year has been sized to result in a working capital requirement in each year that is approximately consistent with the breakdown of the ESO's proposed £550m working capital provision. For example, TNUoS under-collection that is recovered through the K-term is not recovered by the ESO until 2 years after the shortfall occurs. Therefore, the assumed under-recovery for this item repeats at 2-year intervals, to maintain the overall working capital requirement associated with this item at the ESO's peak estimate of £165m.

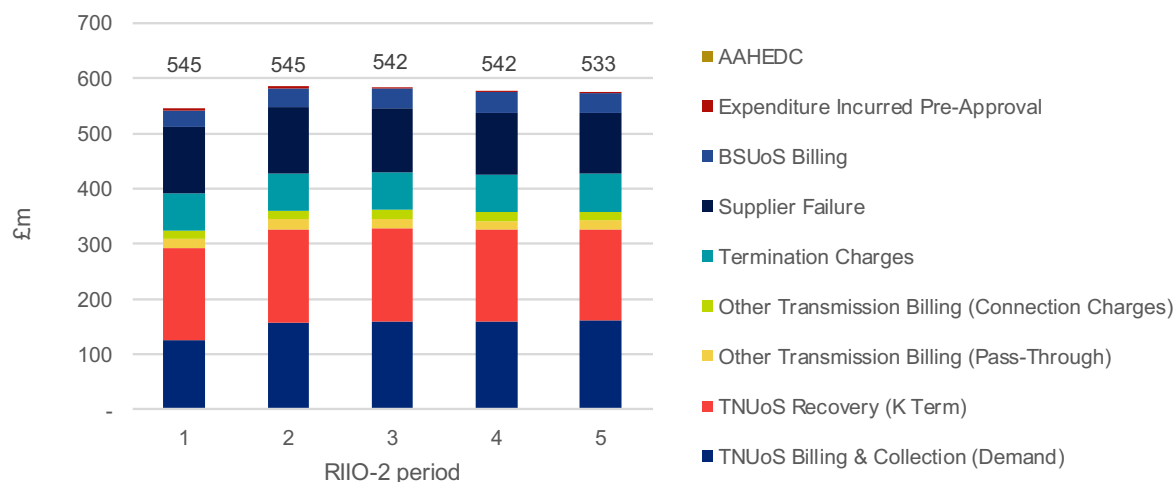
Figure A.1: Assumed annual under-recovery



Source: CEPA analysis

Figure A.2 shows the resulting peak working capital requirement in each year, for each cash flow item. Note, the peak working capital requirement for each item does not sum to the total shown above each column, as the peaks for individual times occur at different times throughout the year.

Figure A.2: Working capital requirement



Source: CEPA analysis

The model calculates interest charges at a monthly level. Therefore, the underlying profile of under-recovery during the year impacts the analysis. For most cash flows, we have assumed that the under-recovery builds up gradually over the course of the year. While the actual distribution of cash flows could differ from this, we do not expect that this would materially affect the indicative analysis presented in this report.

A.2. WORKING CAPITAL FACILITY COSTS AND INTEREST COST RECOVERY

This section sets out the assumed interest charges associated with the ESO's working capital facility, and the assumed rates that it can recover through the various mechanisms available to it. The assumptions currently applied in the model reflect conditions prior to the COVID-19 pandemic, and we have not recalibrated the model to reflect current conditions. This will not necessarily have changed the *relativity* between the interest rates associated with the ESO's working capital facility and the recovery rates provided through the mechanisms outlined above. Nonetheless, this may need to be considered for future iterations of this analysis.

The ESO's working capital facility interest charges are based on the business plan financial model. We understand that these reflect the terms of the ESO's existing revolving credit facility, which may be different from the terms available to the notional ESO. These assumptions are outlined in Table A.1 below.

Table A.1: Assumed working capital facility interest costs

Interest charges	Assumption
LIBOR	[X]
Interest margin	[X]
Utilisation fee	[X]

Table A.2 provides the assumed recoverable rate of interest for each cash flow item.

Table A.2: Assumed recoverable rates of interest

Working Capital Requirement	Recoverable rate of interest
TNUoS Recovery	<ul style="list-style-type: none"> The K term interest rate is comprised of the average specified rate (official Bank of England (BoE) rate), plus an interest rate adjustment that varies with the degree of over- or under-recovery (i.e., as an incentive for accurate forecasting). Assumed BoE rate: 0.75% Premium T-1/T-2: 2.0% Compounded interest rate (2-year lag): 5.58%
TNUoS Collection & Billing (Demand and Generation)	<ul style="list-style-type: none"> The CUSC allows the ESO to recover an amount from suppliers for interest charges incurred, if they have under-forecast their actual demand for the charging year. This is set as the Barclays base rate, which typically reflects the official BOE rate. Assumed Barclay's base rate: 0.75%
Other transmission billing (pass-through)	<ul style="list-style-type: none"> The ESO's licence conditions allow pass-through costs to be recovered with a two-year lag. This includes an allowance for the ESO's cost of capital and RPI (CPIH for RIIO-2). Special Licence Condition 3B specifies that the cost of capital adjustment is the vanilla WACC derived in accordance with the Annual Iteration Process (AIP). Vanilla WACC: 3.7% CPIH: 2.0%
Other transmission billing (connection charges)	<ul style="list-style-type: none"> The ESO can recover mismatches between collections from generators and payments to TOs with a one-year lag via the DIS term (Special Licence Condition 3A). The DIS term does not provide an allowance for interest charges.
Termination charges	<ul style="list-style-type: none"> The ESO can recover mismatches between collections from generators and payments to TOs with a one-year lag via the TS term (Special Licence Condition 3A). The TS term does not provide an allowance for interest charges.
Supplier Failure	<ul style="list-style-type: none"> Ofgem is still considering the approach to bad debt for RIIO-2. For this version of the analysis, we have agreed with Ofgem an assumed recoverable interest rate at the vanilla WACC derived in accordance with the AIP (assumed to be 3.7%).
BSUoS Billing	<ul style="list-style-type: none"> The CUSC enables the ESO to recover an amount for interest charges incurred on differences between Settlement Final and Reconciliation Final invoices. As above, the recoverable interest rate is the Barclay's base rate (assumed to be 0.75%).
Expenditure pre-approval	<ul style="list-style-type: none"> The SOMOD license term (Special Condition 4a) allows the ESO to recover such costs with a two-year lag. An allowance for the costs of financing is based on the vanilla WACC as determined through the AIP process (assumed to be 3.7%) plus CPIH (2.0%).
AAHEDC	<ul style="list-style-type: none"> Interest charges on AAHEDC under- or over- recovery would be reflected through the following year's charges. Standard Licence Condition C20 specifies that the recoverable interest rate is the Barclays base lending rate (assumed to be 0.75%).



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