
NGESO financial price control parameters for RIIO-2

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Executive summary

National Grid Electricity System Operator (NGESO) has asked Oxera to estimate specific financial price control parameters that would be commensurate with the risks faced by the company in the RIIO-2 period.

This report sets out the estimate of the asset beta within the cost of equity allowance for NGESO and estimates an appropriate allowance for the industry revenue management function.

Cost of equity

In order to estimate the cost of equity for NGESO, we have assessed evidence to inform an asset beta estimate for NGESO, including comparator analysis and regulatory precedents. We have relied on the generic cost of equity parameters (i.e. risk-free rate and equity risk premium) as outlined by Ofgem in its RIIO-2 methodology for NGESO.¹

In calibrating a point estimate for the asset beta, we observe the following.

- **Comparator companies and utilities.** The allowed asset beta for NGESO could be informed with reference to (i) the asset beta derived from a comparator sample of asset light companies drawn from the FTSE 350 index by matching risk characteristics of individual business functions performed by NGESO. This implies an average asset beta of 0.91 and (ii) the asset beta for network utilities (i.e. a 0.38 asset beta proposed by Ofgem), recognising the limited competition NGESO faces in providing its activities. A midpoint of the comparator and RIIO-2 asset betas would imply an asset beta for NGESO of **0.65**.²
- **CMA operational gearing uplift.** An alternative approach to account for the specific characteristics of NGESO (in particular a higher level of operational gearing faced by NGESO) is to derive an uplift to the network utilities' asset beta following the methodology outlined by the CMA in its Bristol Water (2015) redetermination. Using the asset beta proposed by Ofgem for RIIO-2, this approach implies an asset beta for NGESO of **0.92**.
- **Regulatory precedent.** SONI precedent suggests an asset beta of **0.60** and NATS precedent suggests an asset beta of **0.46**.

On the basis of this evidence, we consider that an asset beta range of **0.60–0.65** would be appropriate for NGESO. The bottom end of the range is informed by regulatory precedent for SONI in line with the CMA's decision, while the top end of the range is informed by the comparator analysis.

Table 1.1 presents the final estimates for the allowed cost of equity.

¹ We do not comment on the appropriateness of the generic parameters proposed by Ofgem in this report. See—Oxera (2019), 'Review of RIIO-2 finance issues', 20 March and Ofgem (2019), 'RIIO-2 methodology for the Electricity System Operator', 28 August.

² This approach is conceptually similar to the SONI precedent, which was appealed to the Competition & Markets Authority (CMA), where the regulator equally weighted the asset beta for a market average firm and the recent regulatory decisions for regulated network companies.

Table 1.1 NGESO: cost of equity

Parameter	Min	Max
Risk-free rate (Ofgem assumption)	-0.75%	-0.75%
Total market return (Ofgem assumption)	6.50%	6.50%
Equity risk premium (Ofgem assumption)	7.25%	7.25%
Asset beta	0.60	0.65
Debt beta	0.05	0.05
Gearing	50%	55%
Equity beta	1.2	1.4
Cost of equity (CPIH-real)	7.6%	9.3%

Note: The debt beta is based on Oxera analysis prepared for the Energy Network Association.

Source: Oxera (2019), 'Review of RIIO-2 finance issues', 20 March and Ofgem (2019), 'RIIO-2 methodology for the Electricity System Operator', 28 August, Table 5.

We consider that a midpoint of **8.4%** from the range of 7.6–9.3% represents an appropriate estimate of the cost of equity for NGESO.

Allowance for the industry revenue management function

As part of NGESO's industry revenue management function, the company is responsible for collecting, managing and distributing over £4bn of TNUoS and BSUoS charges annually. Ofgem has indicated that the costs of handling these payments could be potentially met by providing a cost pass-through allowance for a working capital facility. Ofgem has also retained the possibility of an additional allowance for the industry revenue management function, if necessary.³ 'Additional allowance' in this context refers to a return component besides the WACC*RAV proportion of NGESO's total allowed revenues.

We consider that an allowance for a working capital facility may not sufficiently compensate NGESO for the revenue management function that it undertakes due to (i) any exposure to credit risk and (ii) a lack of allowance for an equity buffer to secure a working capital facility.

Our analysis of comparator companies suggests that an additional allowance could be calibrated with the reference to a margin on external costs (i.e. a margin applied to the value of TNUoS, BSUoS and Connections charges administered by NGESO) in the range of 20–75bp, which is supported by the regulatory precedents of 25–50bp.

In selecting this point estimate for a margin on external costs, we consider that there should be no double counting of allowances for the handling of the revenue management function.⁴ This means that any TOTEX allowances would be lower to the extent of any direct costs that are incurred solely in relation to the provision of the revenue management function. In practice, we understand that a large proportion of TOTEX in undertaking the revenue management function would be related to common costs shared across the business. We therefore 'aim down' in the range and assume a point estimate of the margin on external costs that is below the midpoint of the regulatory precedents and the comparator analysis. Within the range we assume that a point estimate of the margin on external costs is **35bp**.

³ Ofgem (2019), 'RIIO-2 methodology for the Electricity System Operator', 28 August, para 2.20 and para 3.50.

⁴ Also, the cost pass-through allowance for the working capital facility should be displaced by an 'all-in' margin on the industry revenues that are intermediated by NGESO.

Concluding remarks

Having identified relevant financing parameters for NGESO in RIIO-2, we have also cross-checked the adequacy of individual financing parameters with reference to an overall EBIT adequacy range. This is a 'top-down' check on our 'bottom-up' estimates. The EBIT adequacy range is calibrated at a level of 7–12% based on comparator analysis and regulatory precedents. We have assessed that on the basis of a WACC allowance alone, NGESO does not achieve a level of expected profitability within this range (i.e. its expected EBIT is around 5.4–6.0%). With the inclusion of a 35bp margin on external costs, the expected profitability is around the mid-point of the EBIT adequacy range. This highlights that NGESO's asset light business model does not allow for sufficient returns solely on the basis of a RAV-WACC allowance.

1 Introduction

National Grid Electricity System Operator (NGESO) has asked Oxera to estimate specific financial price control parameters that would be commensurate with the risks faced by the company in the RIIO-2 period. In particular, we examine the asset beta assumption within the cost of equity allowance for NGESO and estimate an appropriate allowance for the industry revenue management function.

To set out the context for this analysis, Ofgem is currently establishing a new regulatory regime for NGESO following the legal separation of the company from electricity transmission business activities in April 2019.⁵ As part of the RIIO-2 Sector Specific Methodology Decision (SSMD) in May 2019, Ofgem outlined a RAV-WACC model as an option for setting the allowed revenues for NGESO in the RIIO-2 period. Ofgem noted that the RAV-WACC model (i.e. an allowance for OPEX, depreciation and return) could be potentially supplemented by an additional margin on internal costs (i.e. additional margin on the operational and capital costs NGESO incurs in operating its business) or external costs (i.e. additional margin on the pass-through costs of revenue collection and settlement activity undertaken by NGESO).⁶ More recently, at the end of August 2019, Ofgem confirmed its intent to have a RAV-WACC model for NGESO, with a potential for additional allowance to account for any risks which cannot be appropriately remunerated through the WACC.⁷

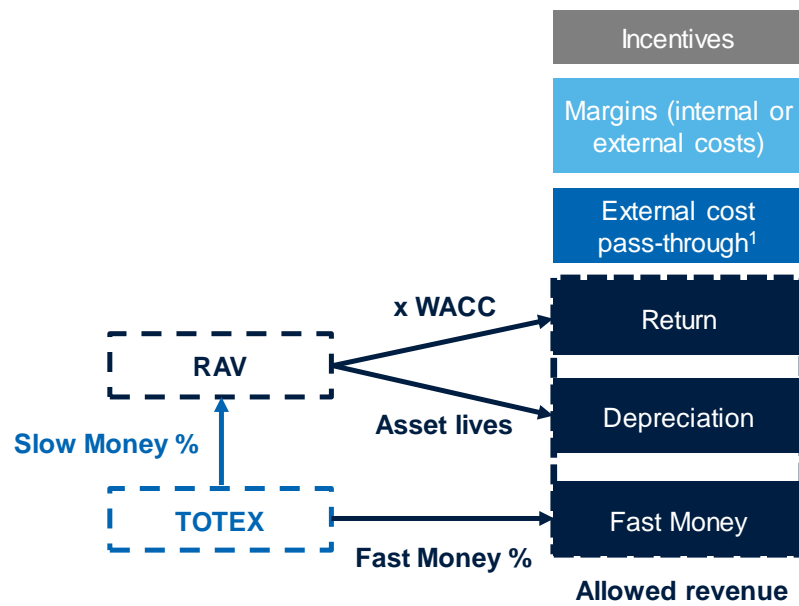
In its July 2019 submission to Ofgem, NGESO proposed the application of a RAV-WACC model with margins (i.e. additional margin on operating costs and external costs).⁸ This allowed for a weighted average cost of capital (WACC) estimate that was differentiated from the RIIO-2 network price control allowances to reflect specific NGESO characteristics. NGESO also explained its proposal for the inclusion of a margin on operating costs and external costs, as well as appropriately calibrated incentive allowances. This is summarised in Figure 1.1 below, as the potential regulatory framework to be applied to NGESO.

⁵ NGESO (online), <https://www.nationalgrideso.com/about-us/our-new-legally-separate-company>, accessed 3 September 2019.

⁶ Ofgem (2019), 'RIIO-2 Sector Specific Methodology Decision and further consultation - Electricity System Operator', 24 May, pp. 38–39 and Figure 4.

⁷ Ofgem (2019), 'RIIO-2 methodology for the Electricity System Operator', 28 August, pp. 16-17.

⁸ NGESO (2019), 'ESO funding model consultation response', 9 July, p. 2.

Figure 1.1 RAV-WACC model (including additional allowances)

Note: ¹ In particular, Ofgem has highlighted the provision of an allowance for a working capital facility. Both models honour the existing RAV.

Source: Ofgem (2019), 'RIIO-2 Sector Specific Methodology Decision and further consultation - Electricity System Operator', 24 May.

The scope of this report is to estimate the specific parameters within the cost of equity allowance that is part of the WACC for NGESO in RIIO-2 (i.e. the asset beta and the gearing), as well as to assess a fair allowance for the industry revenue management function.

The rest of the report is structured as follows.

- Section 2 estimates the specific parameters within the cost of equity allowance for NGESO.
- Section 3 estimates an appropriate allowance for the industry revenue management function.
- Section 4 cross-checks the individual financing parameters for NGESO's financing model relative to the overall profitability of the business.
- Section 5 concludes.

2 Cost of equity

2.1 Introduction

In this section, we assess an appropriate cost of equity allowance for NGESO for the RIIO-2 period.

There are many ways to estimate the cost of equity. By far the most common methodology used by regulators and practitioners in determination of network price controls is the capital asset pricing model (CAPM).⁹ Consistent with Ofgem's August 2019 publication,¹⁰ we apply the CAPM to estimate the allowed cost of equity for NGESO in RIIO-2.

The CAPM requires estimation of two generic parameters (i.e. parameters that are consistent for all companies in the market, namely the risk-free rate and the equity risk premium) and one company-specific parameter (i.e. the equity beta). As the CAPM is also used by Ofgem to estimate the cost of equity allowance for regulated network companies in RIIO-2, we focus on estimation of the equity beta for NGESO as the relevant company-specific parameter, to differentiate its WACC allowance from that of the networks in RIIO-2. To derive the overall cost of equity allowance, we therefore focus on the estimation of an appropriate asset beta and gearing assumption for NGESO as the specific parameters within the allowed cost of equity, and draw on the generic parameters indicated by Ofgem in the Sector Specific Methodology Consultation (SSMD) and in its RIIO-2 methodology for NGESO.¹¹ We do not comment on the appropriateness of the generic parameters proposed by Ofgem in this report.

This section considers the following evidence to derive a cost of equity allowance for NGESO in RIIO-2.

- Section 2.2 outlines the functions of NGESO, which determines its relevant risk characteristics.
- Section 2.3 presents comparator analysis for NGESO based on FTSE 350 companies.
- Section 2.4 examines regulatory precedents on betas and gearing.
- Section 2.5 presents an overall estimate of the cost of equity for NGESO.

2.2 Functions of NGESO

In order to estimate the cost of equity for NGESO, it is helpful to examine the key functions performed by NGESO, which inform an understanding of the risks faced in provision of the relevant activities.

In its response to Ofgem on the ESO funding model consultation, NGESO identified three specific functions that it performs, i.e. real time balancing services, market and industry services and industry revenue management.¹² The key activities performed by the three functions are summarised below.

⁹ UKRN (2018), 'Cost of Capital – Annual Update Report', 4 June, para. 2.6.

¹⁰ Ofgem (2019), 'RIIO-2 methodology for the Electricity System Operator', 28 August, p. 28.

¹¹ Ofgem (2019), 'RIIO-2 Sector Specific Methodology Decision – Finance', 24 May and Ofgem (2019), 'RIIO-2 methodology for the Electricity System Operator', 28 August.

¹² NGESO (2019), 'ESO funding model consultation response', 9 July, pp. 5–6.

- **Balancing services.** NGESO is responsible for generation dispatch to meet demand and balance the system in real time. This function ensures that the lights stay on across GB in a safe and economically efficient manner.
- **Market and industry services.** NGESO performs a range of activities to support the wider system and industry, e.g. optimising long-term network planning and administering industry codes and standards
- **Industry revenue management.** NGESO is responsible for collecting, managing and distributing over £4bn of network charges annually (i.e. TNUoS, BSUoS and Connections charges).

Therefore, NGESO as a whole could be described as a combination of:

1. a specialised service provider that depends on advanced IT equipment and qualified staff to deliver continuous operation of the electricity network (i.e. the real time balancing services);
2. a consultancy and administration service (i.e. the market and industry services);
3. a cash intermediation service that acts as a trusted counterparty, managing the flows of payments within the electricity industry (i.e. the industry revenue management function).

In addition, we note that NGESO is a relatively asset-light business. For example, the value of its RAV is forecast to be approximately £230m at the beginning of RIIO-2. This is small, compared to its average annual TOTEX requirement in RIIO-2 of approximately £280m¹³ and an estimate of the aggregate management of transmission, balancing and connections charges that is in excess of £4bn per annum.

Table 2.1 summarises the key characteristics and risks faced by NGESO.

¹³ RAV figure reflects the opening position at 1 April 2021, indexed to 2021/22 prices. TOTEX figures are based on the five-year average for the years 2021/22 to 2025/26 from the NGESO Business Plan (1 July 2019). The TOTEX figures are quoted in 2018/19 prices and converted to 2021/22 prices assuming a 2% inflation assumption. NGESO (2019), 'ESO funding model consultation response', 9 July, Figure 11.

Table 2.1 NGESO characteristics and risks

NGESO function	Key characteristics and risks
Overall characteristics	limited competition risk focus on co-ordination of networked activities asset-light organisation
Overall risks	regulatory risks operational risks, e.g. IT risks and cybersecurity reputational risks
Balancing services function	focus on continuous system operation wider (i.e. systemic) market failure risk
Market and industry services function	human capital (focus on skills, expertise, know-how, procedural standards) quality of output risks intangible assets (IP, data rich)
Industry revenue management function	liquidity risk and exposure to the timing of cash flows credit risk

Source: Oxera analysis.

Most electricity system operation functions within Europe are vertically integrated within transmission asset ownership and operation. This limits the availability of market data on listed standalone system operators, to directly observe comparator asset beta and gearing parameters, in determining the allowed cost of equity for NGESO. Accordingly, in distilling a sample of potential comparators for NGESO, we focus on the range of activities that NGESO performs, and the diverse risk exposures that these activities imply, as summarised in the table above. In the next section, we focus on these characteristics in identifying an appropriate comparator set from a wide UK equity market index (i.e. FTSE 350) to derive an asset beta for NGESO.

2.3 FTSE 350 comparator analysis

In this section, we examine the companies included in FTSE 350 index to inform our cost of equity analysis, specifically the asset beta estimation.

- In section 2.3.1, we examine the relationship between the asset beta of listed companies and their asset intensity.
- In section 2.3.2, we identify a list of comparator companies to estimate an asset beta range for NGESO.

2.3.1 FTSE 350 study: asset-light companies

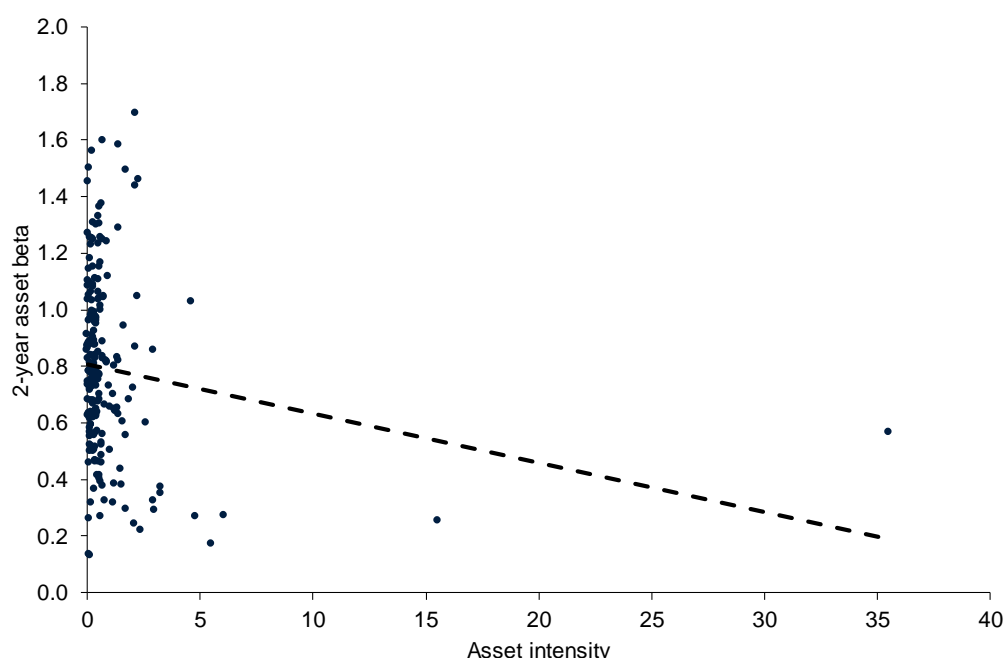
As the first step in our identification of a comparator set for NGESO, we explore the relationship between the asset beta and the asset intensity of FTSE 350 companies (excluding investment companies). Our rationale for focusing on asset intensity is that we have identified the asset-light characteristics of NGESO as a likely driver of systematic risk for the company, e.g. due to higher operational gearing. The relationship between asset intensity and asset beta has been recognised in the regulatory precedents, e.g. the asset beta for SONI (the electricity system operator in Northern Ireland) was assumed to be higher than the regulated network companies reflecting the increased risk associated with higher operational gearing.

In undertaking our analysis, we exclude illiquid companies and companies that have missing data. In addition, we drop 15 companies (largely in the financial services industry) that have outlier observations with respect to EBIT margins and gearing.¹⁴ As a result, we examine 219 companies out of 350 companies included in the FTSE350 index as part of our 'clean' sample. The details of the filtering process are presented in Appendix A1.1.

Asset intensity is typically measured as a ratio of assets to revenues. This ratio shows the value of assets required to generate £1 of revenue, e.g. an asset intensity of 2 implies that a company generates £1 of revenue with £2 of assets. Therefore, a higher level of asset intensity shows that a company requires more assets to support its revenues.

Figure 2.1 shows the relationship between the asset intensity and asset beta in our cleaned sample of 219 companies that are included in the FTSE 350 index.

Figure 2.1 Relationship between asset intensity and asset beta for FTSE 350 companies



Note: The figure shows two year daily asset betas. For the companies that have a value of cash and cash equivalents in excess of the value of total debt (i.e. the implied gearing ratio is negative), we floor the gearing ratio at 0% to estimate the asset beta. The analysis assumes a debt beta of 0.05, based on Oxera analysis prepared for the Energy Network Association, see Oxera (2019), 'Review of RIIO-2 finance issues', 20 March.

Source: Oxera analysis, based on data from Bloomberg.

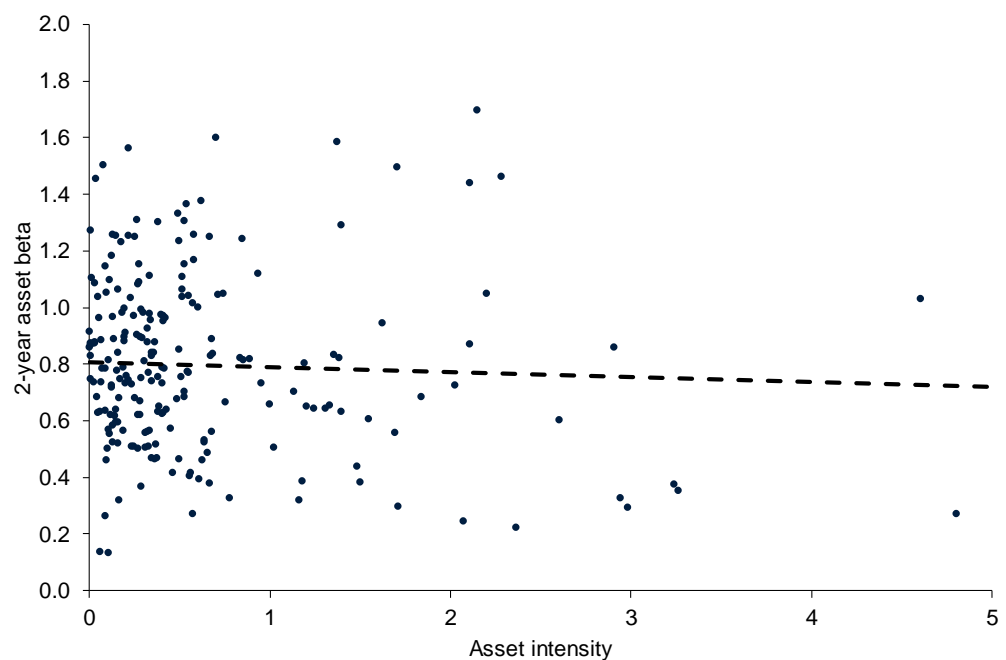
The analysis shows that there is a weak negative relationship between asset intensity and the asset beta. This finding suggests that companies that have relatively low levels of capital for a given level of revenue generation tend to

¹⁴ We drop observations where there are outliers, i.e. an EBIT margin higher than 50% or lower than -50%, and gearing in excess of 100% or lower than -100%. This filter removed 15 companies from the sample, most of which operate in the financial services industry. For example, Bloomberg reports a large net cash position for St James's Place, which results in a gearing level of 2454%. We understand that this is driven by the fact that the company holds a significant cash position to cover the liabilities arising from the provision of investment contracts to its clients. As the company provides asset management services, the standard definition of gearing does not imply a meaningful measure of the capital structure for comparison to an operating company.

exhibit higher asset betas (i.e. higher exposure to systematic risk). Since the asset beta is a measure of the ‘unlevered’ beta (i.e. sensitivity of stock returns to market returns) the intuition behind this finding is that companies with lower levels of asset intensity tend to have higher exposure to market-wide or macroeconomic fluctuations, i.e. are affected by good and bad states of the world.

However, the identified relationship is relatively weak at low levels of asset intensity, i.e. there is a significant spread of asset betas at low levels of asset intensity. This becomes more apparent if we truncate the analysis in the figure above to focus on companies with lower levels of capital, which is presented below.

Figure 2.2 Relationship between asset intensity and asset beta for FTSE 350 companies (lower asset intensity)



Source: Oxera analysis, based on data from Bloomberg.

We do not, therefore, consider that it would be appropriate to mechanically rely on the wide range of asset betas shown at low levels of capital intensity to infer a range for NGESO. Therefore, in the next section, we refine the cleaned sample of FTSE 350 companies to shortlist comparator companies, on the basis of similarity in business and risk characteristics of NGESO, in order to estimate a relevant asset beta range for the company.

2.3.2 FTSE 350 study: comparator analysis

In this section, we refine the FTSE 350 sample to shortlist comparator companies that have similar characteristics to that of NGESO. In order to identify the relevant companies, we follow a three-step process.

- **Step 1: asset intensity filter.** We apply a quantitative filter that retains asset-light companies in the sample, i.e. the companies with relatively low levels of asset intensity.

- **Step 2: industry filter.** We perform a qualitative review of the industry descriptions that are retained after Step 1. This analysis identifies a list of relevant industries for further analysis.
- **Step 3: company filter.** We perform a qualitative review of the companies included in the relevant industries that are identified in Step 2. Specifically, we assess each company relative to the list of characteristics and risks that are relevant to NGESO.
- The asset beta is then estimated for the shortlisted companies.

The rest of the section applies this methodology to the ‘clean’ sample of FTSE 350 companies (i.e. after liquidity filtering and outlier filtering as described in Appendix A1.1).

Step 1: asset intensity filter

We apply a quantitative filter that retains asset-light companies in the sample, i.e. the companies with relatively low levels of asset intensity.

Box 2.1 summarises the definition of asset intensity and application of this quantitative filter.

Box 2.1 Asset intensity filter: definition and application

We define the assets intensity as follows:

$$Asset\ intensity = \frac{Assets}{Total\ revenue},\ where$$

$$Assets = Net\ fixed\ assets + total\ intangible\ assets - goodwill$$

In order to calibrate the asset intensity filter, we have examined the asset intensity for NGESO expected over the RIIO-1 period. We have used the value of the RAV as the proxy for NGESO’s assets used to provide the services. Our analysis suggests an average asset intensity for NGESO of around 0.8 over the RIIO-1 period (based on controllable revenues for NGESO and including forecasts for the remainder of RIIO-1).

We use an asset intensity ratio of 1.0 as the relevant cut-off value for the quantitative filter, i.e. our analysis excludes the industries with an average asset intensity in excess of 1.0.

Source: Oxera analysis based on revenue data received from NGESO and NGESO RAV values from the RIIO-1 financial model.

Table 2.2 summarises the list of industries excluded from the analysis.

Table 2.2 Asset intensity filter: list of excluded industries

Alternative Carriers	Gold	Pharmaceuticals	Tobacco
Application Software	Hotels, Resorts & Cruise Lines	Precious Metals & Minerals	Water Utilities
Copper	Integrated Telecommunication Services	Real Estate Development	Wireless Telecommunication Services
Distillers & Vintners	Leisure Facilities	Real Estate Operating Companies	
Diversified Metals & Mining	Multi-Utilities	Restaurants	
Financial Exchanges & Data	Oil & Gas Exploration & Production	Silver	

Source: Oxera analysis.

Having undertaken this filtering based on the asset intensity threshold, we have considered whether any industries would tend to be mechanically excluded where there are similar business characteristics that would otherwise support the inclusion of these companies in our sample. On this basis, we ‘add back’ the companies in the following industries for further checks (i.e. the industry filter in Step 2).

- **Financial Exchanges & Data.** The companies included in this industry are potentially relevant for inclusion in our sample, given that there may be analogies to the balancing services offered by NGESO, and/or its cash intermediation function. We have therefore included the Financial Exchanges & Data companies (only one company in our sample—London Stock Exchange Group).
- **Multi-Utilities.** This industry classification captures three companies—National Grid, Centrica and Telecom Plus. As both National Grid and Centrica operate in the energy value chain, we bring the companies included in this industry into the sample for further checks.

Step 2: industry filter

As the next step, we review the remaining industries to identify the most relevant industries for comparator analysis. In particular, we match the industry descriptions to potential similarities in the three functions of NGESO. Overall, we shortlist the following industries for an in-depth review.

Table 2.3 Asset intensity filter: shortlisted industries

Advertising	Independent Power Producers & Energy Traders
Construction & Engineering	Investment Banking & Brokerage
Consumer Finance	IT Consulting & Other Services
Electric Utilities	Multi-Utilities
Financial Exchanges & Data	Real Estate Services
Healthcare Services	Research & Consulting Services
Human Resource & Employment Services	Systems Software

Source: Oxera analysis.

Appendix A1 provides a detailed description and rationale for including these industries in the analysis.

Step 3: company filter

Finally, we review the company descriptions for each of the 23 companies included in the 14 industries identified above. In particular, we match the company descriptions to the list of NGESO characteristics and risks identified in Table 2.1. The analysis is presented in Table 2.4.

Table 2.4 Qualitative review of companies from the industries for an in-depth review

Company name	Risk characteristic (see the key in the note)	2-year asset beta	5-year asset beta
LONDON STOCK EXCHANGE GROUP	1, 2, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13	0.94	1.08
TP ICAP PLC	2, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13	0.75	0.80
CAPITA PLC	2, 4, 5, 6, 7, 8, 9, 10, 11, 12	0.88	0.77
BALFOUR BEATTY PLC	2, 4, 5, 6, 7, 8, 9, 10, 11, 12	0.96	1.03
EXPERIAN PLC	4, 5, 6, 7, 9, 10, 11	0.97	0.88
UDG HEALTHCARE PLC	2, 4, 5, 6, 9, 10, 11	0.98	0.65
SOPHOS GROUP PLC	4, 5, 6, 7, 9, 11	1.10	0.89
RELX PLC	5, 6, 9, 10, 11	0.68	0.66
NATIONAL GRID PLC	1, 4, 6, 8, 9	0.32	0.38
SSE PLC	4, 6, 8, 9, 12	0.39	0.54
INTERTEK GROUP PLC	4, 6, 9, 10, 11	0.97	0.90
IG GROUP HOLDINGS PLC	4, 5, 7, 12, 13	0.46	0.56
HAYS PLC	2, 6, 9, 10, 11	1.27	1.20
PAGEGROUP PLC	2, 6, 9, 10, 11	1.04	1.07
SAVILLS PLC	2, 4, 6, 9, 10	0.63	0.82
COMPUTACENTER PLC	5, 6, 9, 10, 11	0.87	0.71
PROVIDENT FINANCIAL PLC	4, 5, 6, 12, 13	0.26	0.59
TELECOM PLUS PLC	5, 6, 7, 9, 12	0.36	0.57
WPP PLC	6, 9, 10, 11	0.91	0.86
INFORMA PLC	6, 9, 10, 11	0.65	0.66
CENTRICA PLC	6, 8, 9, 12	0.51	0.68
GALLIFORD TRY PLC	12, 13	1.10	1.02
DRAX GROUP PLC	7	0.77	0.94

Note: 1—limited competition risk; 2—focus on co-ordination of networked activities; 3—asset-light organisation; 4—regulatory risks; 5—operational risks, e.g. IT risks and cybersecurity; 6—reputational risks; 7—focus on continuous system operation; 8—wider (i.e. systemic) market failure risk; 9—human capital (focus on skills, expertise, know-how, procedural standards); 10—quality of output risks; 11—intangible assets (IP, data rich); 12—liquidity risk and exposure to the timing of cash flows; 13—credit risk.

Source: Oxera analysis based on data from Bloomberg.

As a result of our analysis, we shortlist seven companies for comparison to NGESO. The relevant comparator companies are summarised in Table 2.5 below. We observe that none of the comparators are perfect; the three distinct roles that NGESO plays within the energy value chain have different risk characteristics, which makes it more difficult to identify operating companies that are similar. Our approach of basing the selection of comparators on disaggregated operating and business risk characteristics, and selecting a range of businesses whose varying characteristics are similar to one or more of NGESO's functions, should therefore provide a more robust range than seeking one 'perfect' comparator.

Table 2.5 NGESO—shortlist of comparator companies with reference to risk characteristics

Company name	Company description	2-year asset beta	5-year asset beta
LONDON STOCK EXCHANGE GROUP	London Stock Exchange Group plc is the United Kingdom's primary stock exchange. The LSE provides markets that facilitate the raising of capital and the trading of corporate securities, access to a trading environment, as well as real-time pricing and reference information services worldwide. Market coverage includes equities, derivatives and fixed-interest securities.	0.94	1.08
TP ICAP PLC	TP ICAP PLC seeks to provide brokering services to counterparties operating in major wholesale OTC and exchange traded financial and commodity markets. The Company offers brokering services in fixed income securities and their derivatives, interest rate derivatives, treasury products, equities, and energy.	0.75	0.80
CAPITA PLC	Capita PLC provides an integrated range of services across the United Kingdom's public and private sectors. The Company provides customer, human resource, software, systems and strategic support, and property services.	0.88	0.77
BALFOUR BEATTY PLC	Balfour Beatty plc operates an international engineering and construction group. The Group provides civil and specialist engineering, design and management services for businesses in the transport and energy sectors. Balfour Beatty plc also invests in a number of privately funded infrastructure projects and developments in the United Kingdom and overseas.	0.96	1.03
EXPERIAN PLC	Experian PLC offers credit and marketing services. The Company manages large databases that enable credit granting and monitoring, and help minimise fraud and credit risk, offers specialist analytical solutions for credit scoring, risk management, and processing applications, processes checks and credit cards, and offers consumers credit reports and scores.	0.97	0.88
UDG HEALTHCARE PLC	UDG Healthcare PLC provides commercialisation solutions for healthcare companies. The Company operates in the healthcare supply chain, sales, marketing and medical. UDG enables healthcare companies to outsource non-core, fixed-cost activities.	0.98	0.65
SOPHOS GROUP PLC	Sophos Group PLC provides information technology security and data protection products. The Company offers protection against viruses, known and unknown malware, spyware, intrusions, unwanted applications, spam, policy abuse, and data leakage. Sophos Group operates worldwide.	1.10	0.89

Source: Oxera analysis based on data from Bloomberg.

The most recent average equity and asset beta estimates for the comparator sample are presented in Table 2.6. Note that we present the ranges of the relevant parameters for comparator companies in brackets.

Table 2.6 Average equity and asset beta (range)

Parameter	Two-year	Five-year
Equity beta	1.01 (0.75–1.15)	0.95 (0.66–1.12)
Gearing ¹	7% (0–24%)	8% (0–24%)
Asset beta	0.94 (0.75–1.10)	0.87 (0.65–1.08)

Note: Equity betas are spot estimates, using two and five years of daily data as at 31 July 2019. Market capitalisation is observed annually as at 31 July 2019 for the past two or five years.

As gearing estimates are available on a quarterly basis, and companies have different financial year-ends, it has not been possible to obtain spot data on gearing as at 31 July 2019 for each company, in line with the spot beta estimates or market capitalisation values. Therefore, gearing is estimated on the basis of the latest available financial data on reported net debt.

We have also cross-checked the asset beta derived using different data frequencies (i.e. daily, monthly and weekly) and time horizons (i.e. two-, five- and ten-year asset betas). The data suggests that for this sample of companies, across the range of frequencies and periods examined, the asset beta range remains between 0.8 and 1.0. A point estimate of approximately 0.9 is therefore consistent with all of the estimates of asset beta that have been undertaken for this sample.

The analysis assumes a debt beta of 0.05, based on Oxera analysis prepared for the Energy Network Association, see Oxera (2019), 'Review of RIIO-2 finance issues', 20 March.

¹ For the companies that have a value of cash and cash equivalents in excess of the value of total debt (i.e. the implied gearing ratio is negative), we floor the gearing ratio at 0% to estimate the asset beta.

Source: Oxera analysis based on data from Bloomberg.

The analysis implies an asset beta average of the whole two-year and five-year comparator sample of **0.91**.

We note that the gearing ratios for these asset-light comparators is low, at an average of under 10%. We expect that NGESO will have a higher notional gearing ratio for RIIO-2 (see section 2.5). Given also that there is a wide range in the comparator beta estimates, we do not rely solely on the results of this comparator analysis in selecting an asset beta estimate for NGESO. In the next sections, we outline regulatory precedents and other relevant considerations that influence the calibration of the allowed asset beta for NGESO, before concluding on an appropriate cost of equity for RIIO-2.

2.4 Regulatory precedents

In this section, we outline the relevant regulatory precedents for estimating the cost of equity for NGESO. In particular, we consider that it is relevant to consider the following regulatory precedents:

- asset beta for SONI (the electricity system operator in Northern Ireland);
- CMA precedent in relation to an asset beta uplift on account of operational gearing differentials in its Bristol Water (2015) decision;
- other regulatory precedents, e.g. NATS (air traffic control).

2.4.1 SONI

In its most recent determination for SONI,¹⁵ the Northern Ireland Authority for Utility Regulation (NIAUR) determined that, on the one hand, SONI faces greater risk than regulated network companies on account of its higher

¹⁵ NIAUR (2016), 'Final Determination to the Price Control 2015-2020 for the Electricity System Operator for Northern Ireland (SONI)', 22 February, paras 358–359.

operational gearing, while on the other hand, the company faces less risk than other companies that are exposed to significant volume risk in a competitive market. NIAUR considered that regulated network companies had allowed asset betas in a range of approximately 0.3–0.4 in recent regulatory decisions, whereas a market average firm in the stock market would have an asset beta range of approximately 0.7–0.8.

On the basis of this reasoning, NIAUR set the asset beta for SONI at **0.60**, thus addressing the increased risk associated with operational gearing.

The SONI price control determination was appealed to the CMA. The CMA noted that the asset beta of 0.6 is a plausible estimate for the beta to be used for SONI and concluded that NIAUR's choice of asset beta is consistent with the relevant evidence.¹⁶

Ofgem used the SONI precedent to inform its working assumption on the asset beta in the August 2019 NGESO methodology consultation document.¹⁷

2.4.2 CMA operational gearing uplift: Bristol Water

In its price control redetermination for Bristol Water (2015), the CMA allowed an uplift in beta estimation due to differences in operational leverage. Specifically, the CMA proportionately increased the asset beta for Bristol Water by around 13% relative to larger water companies by comparing the relative difference in the proportion of revenue accounted for by depreciation and return.¹⁸

We have replicated the CMA's methodology using the allowed revenues for NGET Transmission Operator (NGET) and NGESO.

The ratio of revenues accounted for by slow money (i.e. annual depreciation and return allowance) for NGET is expected to be around 77%, on average, during the RIIO-1 period (based on RIIO-1 financial models).¹⁹ On the other hand, the ratio of revenues accounted for by slow money for NGESO is expected to be around 22% during the RIIO-1 period (based on RIIO-1 financial models) and around 32% during the RIIO-2 period (based on ESO RIIO-2 illustrative model).²⁰ A higher ratio of revenues accounted for by slow money implies a higher level of asset intensity and a lower level of operational gearing. In this case, the analysis shows that NGESO has a higher level of operational gearing than NGET.

Accordingly, we have derived the asset beta uplifts using the RIIO-1 financial models and ESO RIIO-2 illustrative model as follows.

- **RIIO-1 financial models** imply a 3.47x uplift relative to the asset beta of NGET (i.e. a ratio of 77% to 22%).

¹⁶ CMA (2017), 'SONI Limited v Northern Ireland Authority for Utility Regulation', 10 November, paras 7.199 and 7.203.

¹⁷ Ofgem (2019), 'RIIO-2 methodology for the Electricity System Operator', 28 August, p. 28.

¹⁸ CMA (2015), 'A reference under section 12(3)(a) of the Water Industry Act 1991', Report, para. 10.152.

¹⁹ Slow money refers to the costs that are added to the RAV and, therefore, generate revenue allowances from the return of capital (or depreciation) and the return on capital, over time.

²⁰ Scenario 'Ofgem RIIO-2 WACC; no margin', see section 4.2.4 for the model assumptions. This analysis is based on the cost projections received from NGESO. Data on NGET's forward-looking expenditure for RIIO-2 has not been incorporated as this is subject to change as NGET iterates its business plan for RIIO-2. NGESO (2019), 'ESO funding model consultation response', 9 July.

- **The ESO RIIO-2 illustrative forward-looking model** and average operational leverage for NGET in RIIO-1 imply a 2.43x uplift relative to the asset beta of NGET (i.e. a ratio of 77% to 32%).

The sensitivity of the asset beta uplifts highlights a significant investment need for NGESO in RIIO-2, which expects a doubling of the RAV over the RIIO-2 period. Combined with its relatively short asset life assumption (c. 6–8 years, rather than the network asset lives of 20–40 years or more), the proportion of allowed revenues represented by slow money for NGESO is increasing over the RIIO-2 period.

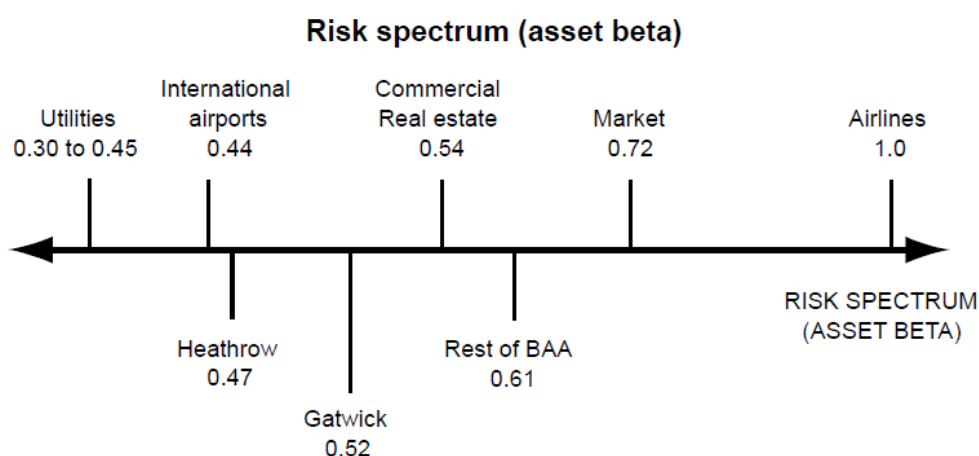
We note that the beta uplift approach used by the CMA for Bristol Water may not be mechanically relevant for NGESO where the differences in operational gearing between NGESO and NGET are much higher than between Bristol Water and Water and Sewerage Companies (WaSCs). In particular, the CMA precedent assumed a linear relationship between the ratio of proportion of revenue accounted for by depreciation and return between WaSCs and Bristol Water. While this linear relationship may not hold for companies with significantly different levels of operational gearing like NGET and NGESO, we consider that it is useful to illustrate a potential scale of the uplift implied by the CMA methodology.

Ofgem’s current assumption on the network asset beta is approximately 0.38, which would apply to NGET in RIIO-2 (i.e. the midpoint of the range).²¹ As an illustration, an uplift of 2.43x would imply an asset beta of **0.92** for NGESO (based on the results from the ESO RIIO-2 illustrative forward-looking model).

2.4.3 Other regulatory precedents

Finally, we consider that it is useful to contextualise NGESO’s beta within an asset beta spectrum for different companies in the market. In its previous investigations, the CMA has presented a stylised asset risk spectrum across UK industries, as shown in Figure 2.3.

Figure 2.3 Asset risk spectrum (asset beta)



Source: Competition Commission (2010), ‘A reference under section 12(3)(a) of the Water Industry Act 1991’, Appendix N, p. N31.

Utilities are typically associated with low levels of asset betas of around 0.30 to 0.45 compared to the asset beta for the average market company of around

²¹ Mid estimate for the working assumption on the notional equity beta. Ofgem (2019), ‘RIIO-2 Sector Specific Methodology Decision – Finance’, 24 May, Table 8.

0.7. This stylised asset beta range remains relevant in the context of recent regulatory publications, which are summarised in the table below.

Table 2.7 Asset beta: other regulatory precedents

Regulator	Asset beta
Ofgem RIIO-2 (SSMD)	0.38
Ofwat PR19	0.36
CAA NATS (2020–2024)	0.46

Source: Ofgem (2019), 'RIIO-2 Sector Specific Methodology Decision – Finance', 24 May, p. 57, Table 8; Ofwat (2019), 'PR19 draft determinations: Cost of capital technical appendix', July, p. 5; Civil Aviation Authority (2019), 'UK RP3 CAA Decision Document: Appendices', August, para. E140.

It is notable that the CAA beta for NATS, at 0.46, is higher than the water and energy network betas. NATS provides a role that is arguably similar to the system coordination function of NGESO, by coordinating air traffic control in the UK. Overall, CAA used an asset beta of 0.46, or equity beta of 1.0 in its final determination, concluding that this reflected the regulatory framework faced by NATS.²²

2.5 Gearing

The level of notional gearing refers to the proportion of debt in the overall capital structure of the company. In terms of the cost of equity estimation, the assumed level of gearing affects the equity beta through re-levering the asset beta to the target financial structure of the regulated company. We consider the following data points as relevant in calibrating a notional gearing assumption for NGESO in the RIIO-2 period.

- NGESO's current level of gearing is around 60%.²³
- Ofgem's working assumption for NGESO's gearing in the RIIO-2 period is 55%.²⁴
- A notional gearing ratio of 55% was also assumed by NIAUR in deriving a WACC allowance for SONI.²⁵
- The gearing ratio within regulatory decisions including NATS and energy or water networks, tends to be approximately 55–65%. An upper-bound estimate of the notional gearing for NGESO could be inferred as 55%, as informed by the bottom end of the Ofgem RIIO-1 notional gearing range for networks.²⁶
- A debt/capitalisation ratio of 40–50% and 50–59% is consistent with an A and Baa rating, respectively, in Moody's Rating Methodology for Regulated Electric and Gas Utilities.²⁷ Moody's has specified that this includes a wide

²² Civil Aviation Authority (2019), 'UK RP3 CAA Decision Document', August, para. 7.44.

²³ Based on the value of RAV for NGESO at the end of 2018/19 financial year and the £120m intercompany loan that was raised on 1 April 2019 to complete the legal separation of the business. Ofgem (2018), 'RIIO-ET1 Financial Model following the Annual Iteration Process 2018', 30 November; National Grid Electricity System Operator Limited (2019), 'Directors' Report and Unaudited Financial Statement For the year ended 31 March 2019', Note 1.

²⁴ Ofgem (2019), 'RIIO-2 methodology for the Electricity System Operator', 28 August, para. 3.52.

²⁵ NIAUR (2016), 'Final Determination to the Price Control 2015-2020 for the Electricity System Operator for Northern Ireland (SONI)', 22 February, p. 67.

²⁶ Ofgem (2012), 'RIIO-T1: Final Proposals for SP Transmission Ltd and Scottish Hydro Electric Transmission Ltd', Overview document, 23 April, p. 55.

²⁷ We consider net debt/RAV to be a more relevant measure of gearing for NGESO. This is in the context of its regulated price control, since its asset base is valued by Ofgem with reference to the RAV, rather than an estimate of market capitalisation, in deriving RAV-WACC-based allowed revenues.

variety of companies including independent system operators.²⁸ An alternative gearing estimate for networks (rather than utilities, as above) based on Net Debt/RAV of 45–60% or 60–75% is consistent with threshold guidance for A or Baa credit ratings by Moody's.²⁹

- As noted earlier, we have observed that the gearing of asset-light comparators within the FTSE 350 study is much lower than the gearing for the regulated network companies, at an average of under 10%.

With reference to this evidence, we assume a notional gearing range of 50–55% for NGESO in the RIIO-2 period. This is consistent with most of the evidence examined, except for the market evidence on asset light companies. Specifically, the top end of the range is informed by the regulatory precedents, Ofgem's working assumptions for RIIO-2 and NGESO's actual capital structure, while the bottom end of the range is calibrated with reference to the range of financial thresholds set out by Moody's. We have not put weight on the market gearing ratios of the asset light companies in calibrating the notional gearing ratio of NGESO because in contrast with the comparator companies that operate in competitive markets, NGESO faces limited competition in providing its activities and is subject to economic regulation. This should imply higher market perception of its ability to bear debt, as confirmed by the credit rating threshold guidance. We will also take NGESO's limited competition characteristics into account in calibration of the asset beta range, in the next sub-section.

2.6 Conclusion

Table 2.8 summarises the evidence examined in this section.

Table 2.8 Asset beta: summary of evidence

Source of evidence	Asset beta
CMA operational gearing uplift	0.92
Comparator analysis	0.91
SONI precedent (also the anchor for Ofgem's working assumption in August 2019)	0.60
Ofgem RIIO-2	0.38

Source: Oxera analysis.

In calibrating a point estimate for the asset beta, we observe the following.

- **Comparator companies and utilities.** The allowed asset beta for NGESO could be derived with reference to (i) the asset beta derived from the comparator sample, (i.e. 0.91) recognising the asset-light nature of the business as well as its different functions and (ii) the asset beta for network utilities (i.e. a 0.38 asset beta proposed by Ofgem), recognising the limited competition NGESO faces in providing its activities. A midpoint of the comparator and RIIO-2 asset beta would imply an asset beta for NGESO of **0.65**. This approach is conceptually similar to the SONI precedent, where

²⁸ The Moody's thresholds are for issuers in the Low Business Risk (LBR) Grid as defined within the Regulated Electric and Gas Utilities methodology. Issuers in the Standard Grid generally include generation utilities and vertically integrated utilities who generally have higher business risk than utilities in the LBR Grid. Moody's sets more conservative thresholds for utilities in the Standard Grid to reflect the relatively higher business risk. Moody's Investors Service (2017), 'Regulated Electric and Gas Utilities', Rating Methodology, p. 3 and p. 22, June 23.

²⁹ Moody's Investors Service (2017), 'Regulated Electric and Gas Networks, Rating Methodology, p. 19, March 16.

the regulator equally weighted the asset beta for a market average firm and the recent regulatory decisions for regulated network companies.

- **CMA operational gearing uplift.** An alternative approach to account for the specific characteristics of NGESO (in particular a higher level of operational gearing faced by NGESO) is to derive an uplift to the network utilities' asset beta following the methodology outlined by the CMA in Bristol Water (2015). Using the asset beta proposed by Ofgem for RIIO-2, this approach implies an asset beta for NGESO of **0.92**.
- **Regulatory precedent.** SONI precedent suggests an asset beta of **0.60** and NATS precedent suggests an asset beta of **0.46**.

On the basis of this evidence, we consider that an asset beta range of **0.60–0.65** would be appropriate for NGESO. The bottom end of the range is informed by regulatory precedent for SONI, in line with the CMA's decision, while the top end of the range is informed by the comparator analysis.

We have not mechanically relied on the beta implied by applying the CMA's operational gearing uplift for Water Only Companies (WOCs) relative to WASCs because as shown in our analysis, the uplift is highly sensitive to the rate of RAV growth for NGESO. However, we consider that this illustration of the impact of the CMA's methodology is helpful in demonstrating the scale of the operational gearing differential for NGESO relative to the network business. We note also that this is conceptually aligned with Ofgem's citation of OPEX/revenues as a 'measure of operational gearing for comparability to other precedents'.³⁰

Finally, we estimate an allowed cost of equity, using this asset beta range, in combination with the generic cost of equity parameters (i.e. risk-free rate and equity risk premium) as outlined by Ofgem in its RIIO-2 methodology for NGESO. This analysis is presented in Table 2.9.

Table 2.9 NGESO: cost of equity

Parameter	Min	Max
Risk-free rate (Ofgem assumption)	-0.75%	-0.75%
Total market return (Ofgem assumption)	6.50%	6.50%
Equity risk premium (Ofgem assumption)	7.25%	7.25%
Asset beta	0.60	0.65
Debt beta	0.05	0.05
Gearing	50%	55%
Equity beta	1.2	1.4
Cost of equity (CPIH-real)	7.6%	9.3%

Note: The debt beta is based on Oxera analysis prepared for the Energy Network Association.

Source: Oxera (2019), 'Review of RIIO-2 finance issues', 20 March and Ofgem (2019), 'RIIO-2 methodology for the Electricity System Operator', 28 August, Table 5.

Overall, we consider that a midpoint of **8.4%** from the range of 7.6–9.3% represents an appropriate estimate of the cost of equity for NGESO.³¹

³⁰ This is because the ratio of slow money-to-revenues is conceptually the same as $1 - (\text{opex-to-revenues})$. Ofgem (2019), 'RIIO-2 methodology for the Electricity System Operator', 28 August, p. 28.

³¹ Using Ofgem's working assumption on the cost of debt of 0.25%, these cost of equity estimates imply a vanilla WACC of 3.9–4.3%, with a midpoint of 4.1%.

3 Allowance for the industry revenue management function

3.1 Why is an additional allowance for the industry revenue management required?

As part of NGESO's industry revenue management function, the company is responsible for collecting, managing and distributing over £4bn of TNUoS and BSUoS charges annually. Ofgem has proposed to account for the costs of handling these payments by providing a cost pass-through allowance for a working capital facility. In addition, Ofgem retained the possibility of an additional allowance for the industry revenue management function, if necessary.³²

A working capital facility is generally utilised to deal with short-term fluctuations in cash flows, where timing differences may arise between outgoing payments and incoming receipts, for everyday operations. In the case of NGESO, its working capital requirements relate primarily to its external revenue management function. The rationale for NGESO's working capital facility differs from other businesses that use such facilities to manage relatively small-scale fluctuations in relation to the timing of cash flows, because its cash flow mismatches will be driven by the scale of the whole energy system (i.e. £4bn+ in network charges) relative to its own asset base of approximately £230m (opening RIIO-2 estimate) or its own total expenditure requirements of approximately £280m per annum (average RIIO-2 estimate in NGESO's July submission).³³ This leads to NGESO's procurement of working capital facilities that are considerably in excess of the value of its assets, or total revenues, of approximately £550m per annum—with an expectation of drawing down approximately £150m of this facility each year.³⁴ We consider that an allowance for a working capital facility is one potential option to deal with liquidity risk faced by NGESO as a result of the revenue management function. However, this may not sufficiently compensate NGESO for the revenue management function that it undertakes due to (i) any exposure to the credit risk and (ii) a lack of allowance for an equity buffer to secure a working capital facility.

First, besides the use of a working capital facility to smooth out fluctuations in relation to the timing of cash payments and receipts, NGESO faces short-term credit risk in relation to the risk of generators or suppliers failing to make payments that are due in relation to TNUoS and BSUoS charges. We understand that in relation to this risk, NGESO currently maintains a provision against bad debt of approximately £30m.³⁵

Second, conceptually, securing a working capital facility would require that it is underpinned by invested capital, including a sufficient equity buffer, in order for such a facility to be procured in external markets. In particular, the providers of the working capital facility would require an equity buffer, the size of which would depend on the extent of credit risk and a cushion for cash-flow uncertainty and other unknown risks. Ofgem's current minded-to position does not account for remuneration of the equity buffer that supports the working capital facility. Without this, there is an implicit cross-subsidy from other parts of NGESO's business. This is because NGESO has assessed that the majority

³² Ofgem (2019), 'RIIO-2 methodology for the Electricity System Operator', 28 August, para 2.20.

³³ Oxera analysis of NGESO (2019), 'ESO funding model consultation response', 9 July, Figure 11. Figures are stated in 2021/22 prices assuming inflation of 2% per annum.

³⁴ Information received from NGESO.

³⁵ Information received from NGESO.

of tangible assets that comprise the RAV of the company relate largely to the provision of the system balancing function. In the analogy of a RAV-WACC building blocks model, by only allowing the OPEX for securing a working capital facility, Ofgem is not allowing for any other building blocks (i.e. return of capital and return on capital) that are associated with the revenue management function.

As an example, consider the revenue management function of NGENSO as a standalone company. The cost structure of this standalone company would primarily consist of the operating costs (e.g. staff costs), while the assets of the company are likely to be relatively low (e.g. the necessary IT equipment). We assume that this company is allowed to recover its operating costs and the cost of the working capital facility. In this context, it is likely that the company would find it difficult to procure a working capital facility as the levels of tangible assets to support the working capital facility is likely to be low.³⁶

Another way of contextualising the additional allowance for the revenue management function is to consider whether there is contingent capital that supports the securing of the working capital facility, over and above the tangible assets that comprise its RAV. Indeed, as noted by NGENSO, the revenue management function does not have significant tangible assets underpinning this business activity.³⁷ One relevant precedent to note in this regard is that SONI, as a standalone system operator, was assessed by the CMA to have access to contingent capital in the form of a parent company guarantee, which committed to provide financial support to ensure that SONI can meet its obligations, as a licence condition. The CMA determined that the parent company guarantee should be remunerated as part of the price control.

We note that the specific circumstances of the SONI parent company guarantee do not apply in the case of NGENSO, e.g. (i) licence condition to provide support to SONI and (ii) the SONI parent company guarantee was not specified to cover obligations that arose only in relation to the revenue management function. However, this example does demonstrate that the systemic importance of the SO within the energy value chain can imply bad states of the world, where considerable contingent financial support could be required, including in relation to its revenue management activities

In particular, the maximum financial commitment as part of this parent company guarantee was 1.3x SONI's RAV, at the time of the CMA's assessment. This parent company guarantee was treated as contingent capital that should earn a return of 1.75% in the CMA's decision.³⁸ To put this in NGENSO's context, as a stylised illustration based on the SONI ratios: if a similar ratio of contingent capital/RAV were inferred for NGENSO's opening RIIO-2 RAV, this would be more than £300m, attracting a return of approximately £5m per annum—at the same rate as the CMA decision for SONI, of 1.75%.

³⁶ Even against the combined NGENSO RIIO-2 opening RAV of £230m, which NGENSO has assessed primarily relates to its system balancing activities, the working capital facility appears disproportionately high, being 2.4x as large (i.e. £550m/£230m = 2.4x). If the RAV that is attributable to the revenue management function is considerably smaller than the aggregate £230m RAV, then this would imply an even larger disparity between the assets of the hypothetical standalone revenue management business, and its credit facility requirement. This would tend to increase the cost of arranging the facility, even if the facility were able to be procured.

³⁷ Based on the information received from NGENSO, we understand that the RAV associated with the revenue management function represents less than 5% of the total RAV for the company.

³⁸ CMA (2017), 'SONI Limited v Northern Ireland Authority for Utility Regulation', 10 November, paras 2.25, 7.263, 12.73.

We consider that the financing model for NGESO could be adjusted in the following two ways to avoid a cross-subsidy between the business functions and provide an appropriate allowance for the industry revenue management function.

- **Option 1: RAV-WACC model with an uplift.** Under this option, the financing model would provide an explicit allowance for NGESO's costs in relation to the provision of the revenue management function, including the working capital facility (i.e. the financing model currently proposed by Ofgem). However, the explicit allowances would then be increased to account for an additional uplift that recognises the capital required to support the working capital facility and remunerate residual risks. The uplift could be operationalised as an increase in the RAV, increase in the WACC or an additional uplift to the pass-through allowance for the working capital facility. The detailed analysis of this option is not in the scope of this report.
- **Option 2: margin on external costs.** Under this option, an additional allowance could be calibrated with the reference to a margin on external costs (i.e. a margin applied to the value of TNUoS, BSUoS and Connections charges administered by NGESO). Note that in this case, 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.

In this section we examine Option 2, with a focus on estimating an appropriate margin on external costs. In particular, we consider the following sources of evidence.

- **Regulatory precedents (section 3.2).** We examine regulatory precedents in relation to the margin on external costs.
- **Comparator analysis (section 3.3).** We benchmark the margin on external costs with reference to a number of comparator companies that undertake financial intermediation activities.

At the outset, we acknowledge that it is difficult to find a good comparator for the revenue function of NGESO, which is driven by its unique position and systemic importance within the energy value chain. Therefore, we will also cross-check the allowance for the industry revenue management function derived in this section relative to the overall profitability of the company in section 4.

3.2 Regulatory precedents

Table 3.1 below summarises the relevant regulatory precedents in relation to allowing for a margin on external costs. In particular, we examine the re-determined regulatory parameters following the SONI CMA appeal, the relevant price control parameters for EirGrid as well as the final determination for SEMO (Single Electricity Market Operator), which operates a single wholesale market for Ireland and Northern Ireland.

Table 3.1 Regulatory precedents: Northern Ireland and the Republic of Ireland

Parameter	SEMO I-SEM (2018)	SONI (2017 CMA)	EirGrid (2015 CER)
Margin on external costs (revenue management function)	25bp ¹	50bp ²	50bp (25bp for TUoS charges and 25bp uplift for higher operational gearing) ³
Allowance for parent Company Guarantee.	2.5% return on PCG ⁴	1.75% return on PCG ⁵	n/a

Note: ¹ 25bps on estimated total revenues of €355m would provide €887,500 per annum to SEMO. This amount will be reviewed in the next price control.

² The relevant revenues include Imperfection Charges, TUoS and Other System Services charges as well as an uplift for higher operational gearing.

³ In the price control appeal for SONI, the CMA noted that it is challenging to compare the point estimates for the revenue management margins between SONI and EirGrid as there are a number of different elements of EirGrid's price control package that provided remuneration for the revenue management function. The CMA concluded that a point estimate in the range of 0.25–0.50% may be more directly comparable to SONI, with a point estimate closer to the top of the range. See CMA (2017), 'SONI Limited v Northern Ireland Authority for Utility Regulation', 10 November, para. 12.147.

⁴ The final determination provided a €300,000 annual allowance based on a Parent Company Guarantee (PCG) of £12m.

⁵ This is equivalent to £175,000 per annum in nominal terms, provided that the PCG remains at £10m.

Source: CER (2015), 'Decision on TSO and TAO Transmission Revenue for 2016 to 2020', 23 December; CMA (2017), 'SONI Limited v Northern Ireland Authority for Utility Regulation', 10 November; Single Electricity Market Committee (2018), 'SEMO Price Control: Final Determination Paper', 13 February.

Overall, the regulatory precedents support a margin on external costs in the range of **25–50bp**.

We note that the CMA's precedent for SONI weighed up multiple arguments in relation to the appropriate remuneration for the SO, including the Irish precedents. The multiple sources of return which the CMA observed and allowed for SONI included (i) an asset beta of 0.6, allowing for higher operational leverage than networks, (ii) a LIBOR+2% return for under-recovered balances at year-end in relation to the revenue management function, (iii) a £10m parent company guarantee remunerated at 1.75%, and (iv) a margin on cash intermediation of 0.5%. Rather than a single measure, the CMA proposed a suite of measures which generated allowances, including in relation to its revenue management function.

3.3 Comparator analysis

In order to benchmark an appropriate range for the margin on external costs, Oxera has identified a number of relevant comparable industries in Table 3.2. The analysis identifies companies that share some of the relevant characteristics with the industry revenue management function of NGESO that we identified in the previous section (see Table 2.1).

Table 3.2 Margin on external costs: comparator selection

Comparator	Description of activities	Comparability to NGESO
Credit card associations	Credit card associations, such as Visa and Mastercard, provide the network infrastructure and payment processing services to enable transactions between banks and purchasers.	Comparable risks/characteristics: <ul style="list-style-type: none"> • focus on co-ordination; • operational risks, e.g. IT risks and cybersecurity; • reputational risks; • focus on continuous system operation; • human capital (focus on skills, expertise, know-how, procedural standards); • significant intangible assets (IP, data rich); • short-term liquidity and credit risk.
Central counterparties (CCPs)	CCPs play a fundamental role in clearing and settling market transactions. They interpose themselves, directly or indirectly, between the transacting counterparties in order to assume their rights and obligations, acting as the direct or indirect buyer to every seller and direct or indirect seller to every buyer.	Comparable risks/characteristics: <ul style="list-style-type: none"> • focus on co-ordination; • operational risks, e.g. IT risks and cybersecurity; • regulatory risks; • focus on continuous system operation; • reputational risks; • wider market failure risk • intangible assets (IP, data rich); • credit risk and liquidity risk in the case of a default.
Invoice factoring companies	Invoice factoring companies provide financing for companies through purchase of company receivables (e.g. invoices). Factoring companies also earn fees for cash-flow management and administration services.	Comparable risks/characteristics: <ul style="list-style-type: none"> • regulatory risks; • operational risks, e.g. IT risks and cybersecurity; • liquidity risk; • credit risk.
Remittance services	Remittances are funds sent from one party to another, usually in the context of individuals making cross-border transactions.	Comparable risks/characteristics: <ul style="list-style-type: none"> • asset-light organisation; • regulatory risks; • operational risks, e.g. IT risks and cybersecurity; • reputational risks; • liquidity risk.
Custodian banks	Custodian banks services include the settlement, safekeeping, and reporting of customers' marketable securities and cash. The custodian banks would also provide asset services, e.g. collection of dividends and interest; participation in corporate actions; payment and/or reclaim of tax; voting at shareholders' meetings by proxy.	Comparable risks/characteristics: <ul style="list-style-type: none"> • focus on co-ordination; • regulatory risks; • operational risks, e.g. IT risks and cybersecurity; • reputational risks; • intangible assets (IP, data rich); • liquidity risk.

Source: Oxera analysis based on the following documents. **Credit card associations:** VISA (2013), 'VisaNet The technology behind Visa'. **Central counterparties (CCPs):** Oxera (2011), 'Monitoring prices, costs and volumes of trading and post-trading services', May. **Invoice factoring companies:** British Business Bank (2018), 'Small business finance markets 2017/18', February. **Remittance services:** Silva (2016), 'Migrant Remittances to and from the UK', 24 March. **Custodian banks:** ECB (2007), 'The Securities Custody Industry', Occasional Paper Series No 68, August.

We have identified typical charges levied by these comparator industries. While there is no perfect comparator to the functions provided by NGESO, these typical charges provide data points in inferring a reasonable range for the margin on external costs, or the cash intermediation function, undertaken by NGESO.

Table 3.3 Margin on external costs: typical charges

Comparator	Typical charges (bps)
Remittance services (global average) ¹	512
Remittance services (Smart Remitter Target) ²	444
Invoice factoring companies ³	75–250
Credit card associations ⁴	20–150
Custodian banks ⁵	20–45
Central counterparties (CCPs) ⁶	0.24

Source: ¹ This is a weighted average total costs of remittance services, which accounts for the relative size of the flows in each remittance sector. The World Bank (2019), 'Remittance Prices Worldwide: An analysis of trends in cost of remittance services', Issue 30, June, p. 2.

² The world bank provides a Smart Remitter Target indicator, which aims to reflect the cost that a savvy consumer with access to sufficiently complete information could pay to transfer remittances. The World Bank (2019), 'Remittance Prices Worldwide: An analysis of trends in cost of remittance services', Issue 30, June, p. 4.

³ This figure represents the average charges for the credit management and administration associated with invoice factoring. It does not include discounting, credit protection and other charges, which primarily relate to the credit risk. Based on the analysis prepared by Company Debt, available at <https://www.companydebt.com/invoice-factoring/fees-and-charges/>.

⁴ The range represents interchange fees charged by VISA and Mastercard in the UK. The bottom end of the range is informed by the debit card interchange fee for retail customers (capped at 20bp), while the top end of the range is informed by the interchange fee charged by Mastercard for its corporate customers (i.e. 150bp charged for Chip & PIN payments for the Mastercard Corporate cards). VISA (2018), 'United Kingdom 1 | Domestic Multi-lateral Interchange Fees', 13 October. Mastercard (2015), 'UK - Domestic Interchange Fees', valid from 9 December 2015.

⁵ Low-risk custodian services submitted in the SONI appeal to the CMA. CMA (2017), 'SONI Limited v Northern Ireland Authority for Utility Regulation', 10 November, p. 285–6.

⁶ The average clearing cost is based on average transactions sizes of €25,000 in 2006 and €10,000 in 2009 for CCPs in 18 European countries. Oxera (2011), 'Monitoring prices, costs and volumes of trading and post-trading services', May, p. 136.

Overall, the analysis suggests a wide range of margins charged by companies providing cash intermediation services in the comparator industries, ranging from 0.24bp to 512bp. The key differential factors in the size of the margin are the extent of credit and liquidity risk taken on by the business (higher credit and liquidity risks imply a higher margin) and the value of transactions served by the business (a higher aggregate value of the transaction would imply that any fixed costs of providing the service would be spread over a larger base).

We consider that the higher levels of charges identified above are less relevant for NGESO as these comparators would typically involve a compensation for relatively high credit risk (i.e. the invoice factoring companies) or the exchange rate risk (i.e. the remittance services companies), where these are not high risk factors for NGESO. NGESO faces no exchange rate risk and relatively low levels of credit risk in the medium- to long- term. We therefore do not consider the higher level of charges in the comparator sample as relevant for NGESO. We also consider that the lowest end of the range in comparator charges, i.e. typical charges for the central counterparties (CCPs) do not serve as a good comparator for NGESO due to significant differences in economies of scale.

These companies are typically coordinating a much larger value of transactions relative to their assets.³⁹

In calibrating a margin for the revenue management function for NGESO, we therefore exclude the higher estimates for invoice factoring companies and for remittance services as well as the central counterparties at the upper and lower end of the range in Table 3.3. Focusing on the lower end of the range for each of the remaining cash handling intermediary comparators, implies a range of 20bp to 75bp.

3.4 Conclusion

Our analysis of the comparator companies suggests that a reasonable margin on external costs would be in the range of 20–75bp. This range is supported by the regulatory precedent of 25–50bp.

Within the range, for the calculation of EBIT adequacy for NGESO as a whole (see section 4), we assume that a point estimate of the margin on external costs is 35bp.

In selecting this point estimate for the margin on external costs, we consider that there should be no double counting of allowances for the handling of the revenue management function.⁴⁰ This means that any TOTEX allowances would be lower to the extent of any direct costs that are incurred solely in relation to the provision of the revenue management function. In practice, we understand that a large proportion of TOTEX in undertaking the revenue management function would be related to common costs shared across the business and, therefore, assume a point estimate of the margin on external costs that is below the midpoint of the both the regulatory precedents and the comparator analysis.

Accordingly, we aim down, in the selection of a point estimate of the margin for external costs, at **35bp** within the identified 20–75bp and 25–50bp ranges.

In the next section, we explore the implications of our estimated parameters for the cost of capital and the additional allowance for the industry revenue management function on the overall profitability of NGESO.

³⁹ For example, in 2017 Euroclear (a global provider of Financial Market Infrastructure) netted €733 trillion of transaction relative to the total assets of €22 billion. See Euroclear (2018), 'Euroclear plc Investor Day 2018', 6 March.

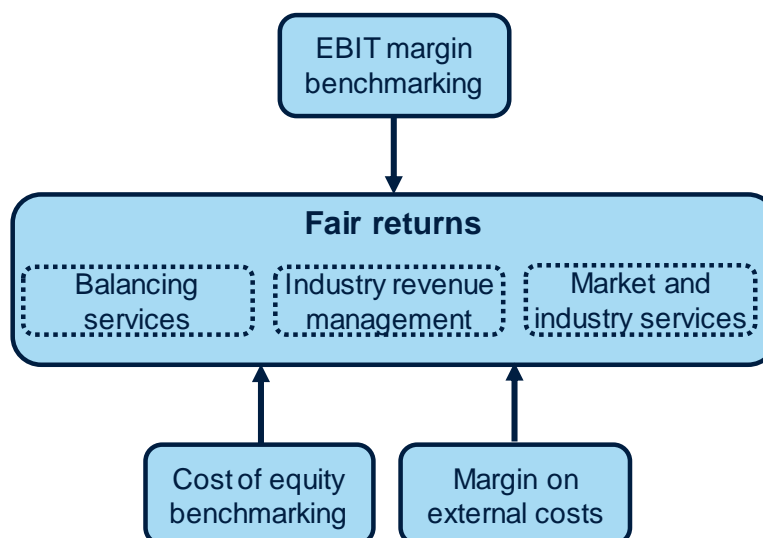
⁴⁰ Also, the cost pass-through allowance for the working capital facility should be displaced by an 'all-in' margin on the industry revenues that are intermediated by NGESO.

4 Overall margin adequacy cross-check

4.1 Introduction

In this section, we cross-check the individual financing parameters that have been estimated for NGESO's financing model, relative to the overall profitability of the business. Our approach is presented in Figure 4.1.

Figure 4.1 Top-down margin adequacy cross-check



Source: Oxera analysis.

We note that while there are differences between the business models of different companies, an overall margin adequacy analysis is useful for cross-checking the individual parameters of NGESO—in particular, the cost of equity and the margin on external costs that we identified in the previous sections.

We focus our benchmarking analysis on EBIT margins across a number of comparator companies. EBIT margin is an established financial measure of a firm's profitability. In the context of the financing of the NGESO with a RAV-WACC model, checking overall EBIT adequacy has an intuitive appeal. This is because the RAV-WACC calculation of allowed return within a standard RAV-WACC building blocks model would theoretically yield an EBIT estimate, if all regulatory inputs were appropriately and accurately calibrated.⁴¹ Also, there are regulatory precedents (as evaluated in this section) that support the usage of margins-based revenue setting, especially in asset-light industries—including for Smart DCC by Ofgem—where the relevant measure of margin is EBIT.

The rest of the section is structured as follows.

- In section 4.2, we estimate the EBIT margin with reference to a number of comparator companies in relevant industries.
- In section 4.3, we undertake a high-level check of whether the return estimates, i.e. cost of equity and margin on external costs imply a sufficient EBIT margin, taking into account NGESO's projected average expenditure in the RIIO-2 period.

⁴¹ This is unlikely to hold in practice, because it would require alignment between actual operational expenditure and the fast money allowance (i.e. no out- or under- performance) as well as the same treatment and calculation of statutory depreciation costs and regulatory depreciation allowances.

4.2 EBIT margin benchmarking

4.2.1 'Big Six' energy companies

First, we consider that it is useful to examine the typical EBIT margins earned by the Big Six energy suppliers in the UK.⁴²

The Big Six energy suppliers are responsible for customer service, billing and the collection of charges from the final customers. Compared to the regulated network infrastructure companies, the energy suppliers are asset-light organisations and are, therefore, closer to NGESO in terms of asset intensity. In terms of the risk profile, the energy suppliers face similar exposure to the reputational risks, rely on human capital (e.g. focus on expertise of staff and procedural standards), are exposed to the IT and cybersecurity risks, and also face credit and liquidity risks in relation to customer billing.

While the 'Big Six' energy suppliers also provide other energy activities (i.e. Scottish Power, EDF and SSE operate across the energy value chain, e.g. generation and networks), these comparators are useful for setting the overall context for the EBIT margins earned in the industry.

Table 4.1 summarises the average EBIT margins earned by the 'Big Six' energy companies over the past five years.

Table 4.1 EBIT margin: 'Big Six' energy companies

Company	Activities	Average EBIT margin
Scottish Power	Networks business, generation and energy retail.	13.4
EDF	Generation and retail business.	12.7
SSE	Wholesale business, networks business, retail business.	6.4
E.ON	Energy retail.	3.0
Centrica	Energy retail and related services.	2.2
Npower	Energy retail.	0.9
Average		6.5

Source: Oxera analysis based on EBIT margin data from Orbis, and the annual accounts of the companies.

The average EBIT margins earned by the 'Big Six' energy suppliers covered a wide range of 1–13%, with an average of 6.5%.

We note that Scottish Power, EDF and SSE are providing additional energy services across the energy value chain on top of the supply activities, e.g. generation and network activities. A priori, we would expect that these business activities are likely to generate higher EBIT margins compared to 'pure play' energy suppliers, i.e. E.ON, Centrica and npower. This is because EBIT margins tend to increase with asset intensity.⁴³

In addition, the observed EBIT margins of energy retailers cannot be directly read-across, as comparator data points, to assess overall EBIT adequacy for NGESO. This is because the total revenues of 'pure play' energy suppliers are based on the final bills issued to the clients, which would in turn recover all

⁴² British Gas (a wholly-owned subsidiary of Centrica Plc.), EDF Energy Holdings Ltd., E.ON Energy Solutions Ltd., npower Ltd., Scottish Power UK Plc., and SSE Plc.

⁴³ For example, see Oxera (2014), 'Something for nothing? Returns in low-asset industries', March.

costs incurred across the energy value chain, including the wholesale costs and network costs. Therefore, we expect that the EBIT margins for the supply activities expressed as a proportion of total (industry) revenues would be under-stated, compared to margins as a proportion of the company's own costs, in observing the profitability of these companies.

In order to proxy the EBIT margins that represent the profitability of the Big Six energy companies specifically in relation to energy supply activities in the UK, we have observed a breakdown of an average domestic dual fuel bill (i.e. electricity and gas) published by Ofgem. Ofgem's analysis disaggregates the different elements of costs that the energy suppliers recover. Ofgem's analysis suggests that over the past five years the Big Six energy suppliers earned an average pre-tax (or EBIT) margin in the range of 3–5%, which is broadly consistent with the analysis presented in Table 4.1.

We note that the EBIT margin of 3–5% is expressed relative to the total dual fuel bill (or, equivalently, suppliers' total (industry) revenues), which covers all costs of the energy value chain, e.g. wholesale and network cost in addition to suppliers own costs.⁴⁴ Alternatively, the EBIT margin could be expressed relative to suppliers' controllable revenues (i.e. total revenue less wholesale and network costs). This measure would be more comparable to the controllable revenues of NGESO, where the regulatory regime would provide an allowance for efficient costs incurred by the company. This analysis is presented in Table 4.2.

Table 4.2 Domestic dual fuel bill breakdown over time

	2014	2015	2016	2017	2018
Reported profit per customer (EBIT, £)	51	49	54	49	33
Total revenue per customer (£)	1,190	1,165	1,123	1,117	1,184
Controllable revenue per customer (i.e. total revenue less wholesale and network costs, £)	380	380	406	429	458
EBIT margin (% total revenue)	4%	4%	5%	4%	3%
EBIT margin (% controllable revenue)	13%	13%	13%	11%	7%

Source: Ofgem (2019), 'Infographic: Bills, prices and profits', 29 August.

The analysis suggests a proxy for an average EBIT margin estimate expressed relative to controllable revenues, for energy retail in the UK of 7–13% over the past five years.

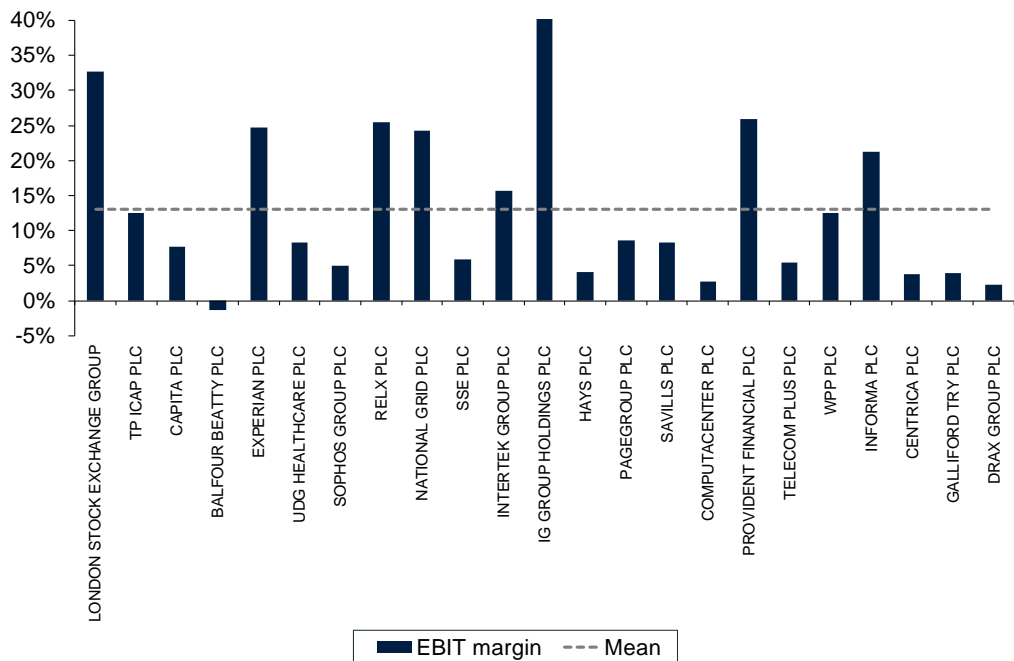
4.2.2 Top-down comparator analysis: FTSE 350 cross-check

It is also relevant to cross-check the results of the bottom-up comparator analysis with the FTSE 350 study used for beta estimation in section 2.3 of this report.

The table below presents the average EBIT margins for the industries that we identified as potentially relevant for the analysis—i.e. the list of industries identified in Step 2 of the filtering process.

⁴⁴ The total bill split between wholesale costs, network costs, environmental and social obligation costs, other direct costs, suppliers operating costs, VAT and EBIT.

Figure 4.2 FTSE 350 study: EBIT margins



Note: the analysis presents five-year average EBIT margins.

Source: Oxera analysis based on data from Bloomberg.

The figure above shows the distribution of the average EBIT margins earned by comparator companies. Overall, the companies included in the sample have earned an average EBIT margin of around 13%.

4.2.3 Regulatory precedents

In the UK, there are some regulated companies where allowed revenues and regulated prices are set with the reference to allowed profit margins. Similar to NGESO, these companies would typically be asset-light and, therefore, the regulators may decide to use a margin-based model rather than a RAV-WACC model for determining the allowed returns.

Table 4.3 presents the relevant regulatory precedents alongside the rationale used for the margins.

Table 4.3 EBIT margin: regulatory precedents

Sector	Regulator	Year	Margin	Rationale
Smart DCC	Ofgem	2017	12%	Based on comparators
Scottish Water	Water Industry Commission for Scotland (WICS)	2005	10%	Based on a 10% gross profit margin ¹
Royal Mail	Ofcom	2017	5–10%	High demand risk and precedent of significant profit volatility
Non-household England & Wales water	Ofwat	2016	2.5% ²	Benchmarking with return on capital cross-check, with additional benchmarking against unregulated sectors
Northern Ireland retail electricity	NIAUR	2016	2.2%	Sufficient to cover retail risks; wholesale risks largely passed through to customers
Household England & Wales water	Ofwat	2016	1%	Benchmarking with return on capital cross-check

Note: ¹ WICS did not explicitly design the profit margin as a share of relevant retail activities. However, the retail margin as a share of total costs and the retail profit as a share of relevant retail costs are both of the order of 10%. ² Note that Ofwat has recently set out its proposals for the next price control review, and the proposed margins for household UK water and non-household UK water are the same as those it determined in 2014.

Source: Utility Regulator (2016), 'Power NI: Supply Price Control 2017 (SPC17), Decision Paper', November. Ofcom (2017), 'Review of the Regulation of Royal Mail', 1 March; Ofgem (2017), 'Decision on margin and incentives for DCC's role within the Transitional Phase of the Switching Programme', 9 March. Ofwat (2016), 'Business retail price review 2016: final determinations', December. WICS (2005), 'The Strategic Review of Charges 2006–10: the final determination', November.

The range of EBIT margins for the identified regulatory precedents is from 1% to 12%. As identified earlier in the context of our analysis of the Big Six energy retail margins, we note that the lower end of the range is driven by the regulated margins in water and energy retail businesses, where the margin is calibrated as a proportion of total industry revenues including recovery of wholesale costs, which are significantly higher than the costs of the retail business activity. This is arguably analogous to calibrating NGESO's margin on revenue management with reference to the costs of the wider energy system, rather than with reference to its own much smaller regulated expenditure (that drives its allowed revenues). Therefore, we consider that the reported regulated margins for these comparators are not directly applicable in informing the EBIT adequacy cross-check for NGESO.

The remaining precedents would point towards a higher range for EBIT margins of around 5–12%, where the top end of the range is driven by Ofgem's determination for Smart DCC.

4.2.4 EBIT margin analysis: reasonable range

Table 4.4 summarises the evidence examined in this section.

Table 4.4 EBIT margins: summary of evidence

Source of evidence	EBIT margin (%)
'Big six' energy companies	7–13%
Comparable industries	13%
Regulatory precedent	5–12%

Source: Oxera analysis.

On the basis of the evidence presented in this section, we consider that a reasonable EBIT margin for NGESO would be in the range of **7–12%**.⁴⁵ The bottom end of the range is informed by the average EBIT margins earned by the 'Big Six' energy companies, while the top end of the range is based on the allowed EBIT margin of Smart DCC, as determined by Ofgem.

In the next section, we consider whether the cost of equity and the margin on external costs parameters estimated in this report are consistent with the overall EBIT margins.

4.3 EBIT adequacy cross-check

In this section, we cross-check the individual financing parameters of NGESO's financing model relative to the overall profitability of the business based on the EBIT margin range identified in the preceding section.

In particular, we consider three different scenarios:

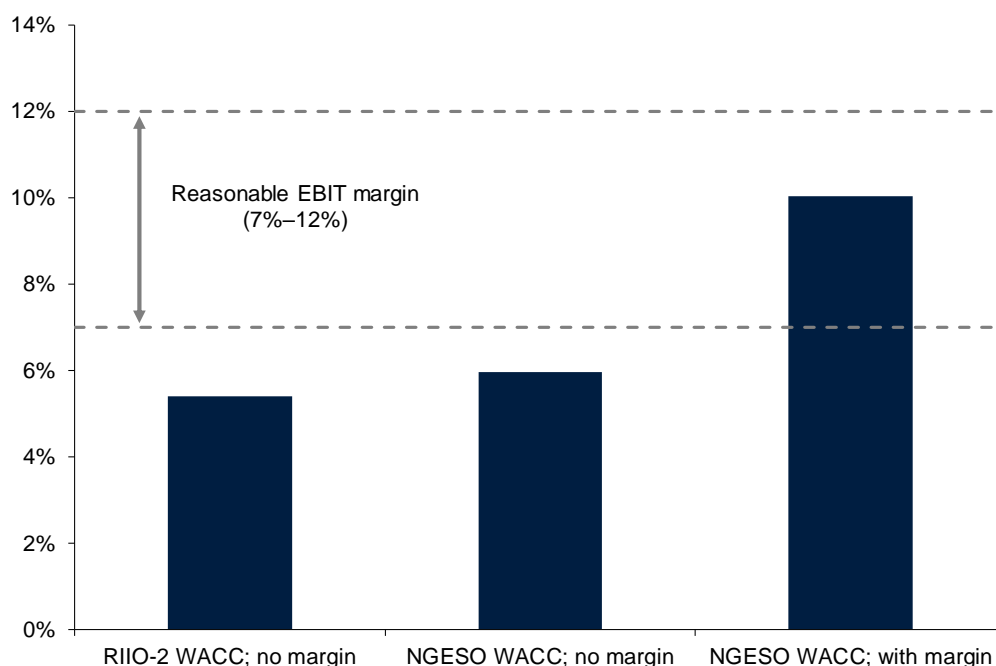
1. **Ofgem RIIO-2 WACC; no margin.** Under this scenario, we assume that NGESO is remunerated using the RAV-WACC model with no additional allowance for the industry revenue management function. We use the working assumptions of the WACC proposed by Ofgem for NGESO (i.e. 3.65%).⁴⁶
2. **NGESO WACC; no margin.** Under this scenario, we assume that NGESO is remunerated using the RAV-WACC model with no additional margin on external costs. However, we use the cost of equity estimated with reference to the identified asset beta and gearing range in section 1 of this report (i.e. a point estimate of the cost of equity of 8.4%) and the working assumptions for NGESO's cost of debt in the RIIO-2 period proposed by Ofgem (i.e. 0.25%). These parameters imply a WACC of 4.1% (assuming a gearing of 52.5%).
3. **NGESO WACC; with margin.** Under this scenario, we assume an input estimate of the WACC based on our 8.4% point estimate of the cost of equity and the working assumptions for NGESO's cost of debt in the RIIO-2 period, i.e. 0.25% (consistent with the above scenario). In addition, we apply a margin on external costs as estimated in section 3 (i.e. 35bp).

The results of our analysis are presented in Figure 4.3 below.

⁴⁵ Expressed with the reference to NGESO's controllable revenues, i.e. excluding the external costs.

⁴⁶ Ofgem (2019), 'RIIO-2 methodology for the Electricity System Operator', 28 August, Tables 2, 5 and 6.

Figure 4.3 EBIT adequacy cross-check: illustrative forward-looking model



Note: The EBIT margin is expressed with the reference to NGESO's controllable revenues, i.e. excluding the external costs. The analysis is based on the RAV and TOTEX projections for RIIO-2, as forecast by NGESO, and the aggregate volume of external costs administered of £4.2bn (i.e. c. £2.7bn for TNUoS charges, £1.3bn for BSUoS charges and £0.2bn for Connections charges). The 'no margin' scenarios include a cost pass-through allowance for the working capital facility, which is excluded from the 'with margin' scenario. The analysis does not model tax allowances, which are assumed to be provided separately as a tax allowance within the revenue building blocks; this is consistent with the RIIO-2 methodology for networks where a separate tax allowance is provided alongside a 'vanilla' allowed return. For the illustrative analysis, no out- or under- performance is assumed, and regulatory allowances are assumed to be the same as statutory costs for the purpose of estimating EBIT; in practice, deviations in inputs like depreciation would affect accounting measures of profitability.

Source: Oxera analysis based on NGESO (2019), 'ESO funding model consultation response', 9 July, p. 6 and data received from NGESO.

The illustrative analysis suggests that the working assumption on the WACC proposed by Ofgem for NGESO and Oxera's estimate of the WACC for NGESO (based on the cost of equity analysis in section 2) would result in similar levels of EBIT. This is primarily because Ofgem's working assumption on asset beta (i.e. 0.6) is close to the midpoint of the asset beta range identified by Oxera (i.e. 0.625). However, the expected EBIT margins for both scenarios are below the bottom end of the EBIT adequacy range of 7–12%.

This suggests that there is potentially a missing remuneration for NGESO's activities. As a potential remedy, if the RAV-WACC model (with the cost of capital calibrated to NGESO) is supplemented by an additional allowance for the industry revenue management function, then the overall profitability of NGESO would be within the reasonable EBIT adequacy range. For example, a margin on external costs of 35bp (as estimated in section 3) would imply an EBIT margin around the mid-point of the range of the EBIT adequacy cross-check.

5 Conclusion

This report assessed the cost of equity allowance for NGESO and estimated an appropriate allowance for the industry revenue management function. Our main conclusions are summarised below.

- We consider that a midpoint of **8.4%** from the range of 7.6–9.3% represents an appropriate estimate of the cost of equity for NGESO.
- Our analysis of comparator companies suggests that a reasonable margin on external costs would be in the range of 20–75bp, which is supported by the regulatory precedents of 25–50bp. Within the range we assume that a point estimate of the on external costs is **35bp**.

Having identified relevant financing parameters for NGESO in RIIO-2, we have also cross-checked the adequacy of individual financing parameters with reference to an overall EBIT adequacy range. This is a 'top-down' check on our 'bottom-up' estimates. The EBIT adequacy range is calibrated at a level of 7–12% based on comparator analysis and regulatory precedents. We have assessed that on the basis of a WACC allowance alone, NGESO does not achieve a level of expected profitability within this range (i.e. its expected EBIT is around 5.4–6.0%). With the inclusion of a 35bp margin on external costs, the expected profitability is around the mid-point of the EBIT adequacy range. This highlights that NGESO's asset light business model does not allow for sufficient returns solely on the basis of a RAV-WACC allowance.

A1 FTSE 350 study

A1.1 FTSE 350 study: measure of asset intensity, liquidity filtering and outlier filtering

Data cleaning

In order to prepare the FTSE 350 data sample for the comparator analysis, we apply the following filters.

- First, we drop the companies that are classified as 'investment companies' (i.e. mutual funds, closed-end funds and investment trusts). This removes 78 companies from the sample.
- Second, we drop the companies that have missing observations for the following categories of data on Bloomberg: Revenue, Adjusted EBIT, Net fixed assets. This removes one company from the sample (i.e. SIRIUS MINERALS PLC)
- Third, we apply a liquidity filter that excludes the companies, which had no trading volume on more that 20% of the trading days and had a bid-ask spread in excess of 1%. This removed 37 companies from the sample.
- Finally, we removed the companies that have outlier observations on the EBIT margin (i.e. an EBIT margin higher than 50% or lower than -50%), and gearing in excess of 100% or lower than -100%. This filter removed 15 companies from the sample, most of which operate in the financial services industry (i.e. companies removed due to outlier gearing observations: STANDARD CHARTERED PLC, AVIVA PLC, LEGAL & GENERAL GROUP PLC, MELROSE INDUSTRIES PLC, ST JAMES'S PLACE PLC, PHOENIX GROUP HOLDINGS PLC, RATHBONE BROTHERS PLC, CAIRN ENERGY PLC; companies removed due to outlier EBIT observations: 3I GROUP PLC (84%), HARGREAVES LANSDOWN PLC (60%), AUTO TRADER GROUP PLC (62%), RIGHTMOVE PLC (73%), ASHMORE GROUP PLC (57%), JOHN LAING GROUP PLC (74%), PLUS500 LTD (60%)).
- The final sample used in our analysis consists of 219 companies.

Asset intensity

For the companies included in our FTSE350 sample, we define asset intensity as follows:

$$\text{Asset intensity} = \frac{\text{Assets}}{\text{Total revenue}}, \text{ where}$$

$$\text{Assets} = \text{Net fixed assets} + \text{total intangible assets} - \text{goodwill}$$

We capture the net fixed and intangible assets less goodwill in the definition of the assets. This approach ensures that only the long-term assets of the company are captured in the analysis (e.g. any current assets such as cash and receivables are excluded).

A1.2 FTSE 350 study: industry comparator selection

Table A.1 FTSE 350 study: industry comparator selection

Industry name	Industry description	Relevant NGESO functions
Advertising	Companies providing advertising, marketing or public relations services.	Market and industry services function
Construction & Engineering	Companies engaged in primarily non-residential construction. Includes civil engineering companies and large-scale contractors. Excludes companies classified in the Homebuilding Sub-Industry.	Market and industry services function, system operation function
Consumer Finance	Providers of consumer finance services, including personal credit, credit cards, lease financing, travel-related money services and pawn shops. Excludes mortgage lenders classified in the Thrifts & Mortgage Finance Sub-Industry.	Revenue management function
Electric Utilities	Companies that produce or distribute electricity. Includes both nuclear and non-nuclear facilities.	Notwithstanding differences in business activities, we include these companies for further research, as they are also in the energy value chain
Financial Exchanges & Data	Financial exchanges for securities, commodities, derivatives and other financial instruments, and providers of financial decision support tools and products, including ratings agencies.	Revenue management function, system operation function
Healthcare Services	Providers of patient healthcare services not classified elsewhere. Includes dialysis centres, lab testing services, and pharmacy management services. Also includes companies providing business support services to healthcare providers, such as clerical support services, collection agency services, staffing services and outsourced sales & marketing services.	Market and industry services function
Human Resource & Employment Services	Companies providing business support services relating to human capital management. Includes employment agencies, employee training, payroll & benefit support services, retirement support services and temporary agencies.	Market and industry services function

Industry name	Industry description	Relevant NGESO functions
Independent Power Producers & Energy Traders	Companies that operate as Independent Power Producers (IPPs), Gas & Power Marketing & Trading Specialists and/or Integrated Energy Merchants. Excludes producers of electricity using renewable sources, such as solar power, hydropower, and wind power. Also excludes electric transmission companies and utility distribution companies classified in the Electric Utilities Sub-Industry.	Notwithstanding differences in business activities, we include these companies for further research, as they are also in the energy value chain
Investment Banking & Brokerage	Financial institutions primarily engaged in investment banking & brokerage services, including equity and debt underwriting, mergers and acquisitions, securities lending and advisory services. Excludes banks and other financial institutions primarily involved in commercial lending, asset management and specialised financial activities.	Market and industry services function, industry revenue management function
IT Consulting & Other Services	Providers of information technology and systems integration services not classified in the Data Processing & Outsourced Services Sub-Industry. Includes information technology consulting and information management services.	Market and industry services function
Multi-Utilities	Utility companies with significantly diversified activities in addition to core Electric Utility, Gas Utility and/or Water Utility operations.	Notwithstanding differences in business activities, we include these companies for further research, as they are also in the energy value chain.
Real Estate Services	Real estate service providers such as real estate agents, brokers & real estate appraisers.	Market and industry services function

Industry name	Industry description	Relevant NGESO functions
Research & Consulting Services	Companies primarily providing research and consulting services to businesses and governments not classified elsewhere. Includes companies involved in management consulting services, architectural design, business information or scientific research, marketing, and testing & certification services. Excludes companies providing information technology consulting services classified in the IT Consulting & Other Services Sub-Industry.	Market and industry services function
Systems Software	Companies engaged in developing and producing systems and database management software.	Market and industry services function, system operation

Source: Oxera analysis based on data from Bloomberg.

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