Cost of Equity and the RIIO-2 Consultation

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Contents

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Executive summary

The GB energy networks have been in private ownership for around 30 years and during this time have achieved large efficiency gains, improvements in the quality of service and achieved significant investment from private capital markets at what has been probably the lowest cost of capital achieved by any industry. This has enabled delivery of key energy policy aims such as Electricity Market Reform and the mains replacement programme. Going forward, further significant investment, from both debt and equity investors, as well as market innovation is required to enable energy transition as decarbonisation of electricity, heat and transport continues.

The current RIIO-2 consultation contains a series of radically new proposals that, if implemented, will have negative consequences for equity investors. Firstly, the *level of shareholder baseline allowed return,* the cost of equity, has been significantly reduced through a variety of changes in the estimates and adjustments. Secondly, *the range of expected actual performance has been narrowed and skewed heavily downward* through a number of mechanisms, such as a reduction in the share of total expenditure (Totex) out/under performance retained by companies or multiple penalty-only outcome incentives. Thirdly, the *introduction of various new mechanisms,* such as Return Adjustment Mechanisms (RAMs) to cap upside, is likely to distribute gains across networks and has the potential to adjust equity returns ex-post based on the performance of the sector as a whole.

The cumulative effect of these changes is that, on the basis of probability, investors will likely expect the level of return for a well-run company to be at or slightly below the proposed allowed cost of equity (3-4% RPI real[1]) with a low probability of a very limited upside. This is an unprecedented change compared with the last price control—RIIO-1, where at the equivalent stage of the process, Ofgem communicated to equity investors "*double digit RoRE returns for good performers*".[2]

Regardless of the merits (or the lack thereof) of different arguments for adjustments, and even if some proposals for the evolution in the cost of capital are justified, the scale of the proposed change in the baseline return allowances and expectations is highly likely to undermine investor confidence in the predictability and stability of the underlying market framework.

It is very rare for any competitive market or sector as a whole to experience a change of this scale in expected returns over a period of just a few years, particularly in what has been argued by Ofgem to be a low risk sector, except when driven by catastrophic events, or major shifts in highly dynamic and high risk industries.

Where this level of change in expected returns is determined by a regulator, the regulator risks sending inconsistent messages to the market. The change must be perceived as a fundamental shift in regulatory risk, the costs of which appear designed to be borne by capital providers.

Ofgem sets out in the Finance Annex to the Sector Specific Methodology a number of data tables as 'cross-checks' designed to support and confirm the conclusions of its cost of equity calculations and justify both the absolute level of the Cost of Equity and the scale of change. These include, in particular, Table 10 - *Estimates of medium-term and long-term nominal UK TMR – asset managers and financial organisations*; Table 15 - *Listed infrastructure funds: discount rates and premia to Net Asset Value*; and Figure 14 - *Average nominal post-tax equity IRR by financial close year range* (weighted by project transfer value).

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[1] RIIO-2 Sector Specific Methodology Annex: Finance.

[2] https://www.ofgem.gov.uk/ofgem-publications/37118/riio-strategy-city-call-18mar11pdf
In its *Decision on strategy for the next gas distribution price control – RIIO-GD1* Ofgem's analysis showed expected variation in returns on equity in the range of around 5% to 11% for a gearing level of 60% on a baseline cost of equity range of 6-7.2% (post-tax real).

Examining the data and analysis used by Ofgem for the cross-checks on the cost of equity estimates highlighted a number of serious issues, undermining the robustness and reliability of the evidence. For example, there are a number of issues both in terms of comparability of data points for funds' expected returns and the way these points have subsequently been analysed to derive results:

— Firstly, the **selection of data points:** the sample population is not defined and there is no explanation of the sample survey methodology;

— Secondly, the **comparability of the underlying methodologies used to derive estimates:** a number of different methodologies are used to derive the total market return (TMR) values which are not comparable;

— Thirdly, the **consistency** of data sources: time horizons, geographies, the depth of the underlying analysis and assumptions are not aligned across the data points (at least in terms of the information that is publicly available);

— Fourthly, the **data interpretation:** a number of source estimates consist of ranges, but are presented as a point estimate in the table;

— Finally, the **arithmetical interpretation:** the use of a mean to determine the average, as opposed to a median, is distorted by outlying data points.

These factors taken together are significant and indicate, at best, a potentially different set of conclusions to those presented by Ofgem's overall estimates. At worst, they imply that the estimates are significantly biased and methodologically flawed. Either way, the estimates cannot be relied upon in their current form.

Ofgem also sets out that the OFTO IRRs for winning bidders have reduced by around 3% since 2010/11, and that this implies that the underlying cost of equity in energy networks has also reduced by a similar amount over the same period. However, there are a number of fundamental differences between OFTOs and regulated onshore networks, which render them not comparable, and undermine this argument:

— Firstly, **"first-of-a-kind" premium for OFTOs**: OFTOs are a relatively new asset class and the bids in the early rounds are likely to have been at least partially impacted by the "first-of-a-kind" risk premia, generally associated with new projects and regimes as well as reflective of a sector in its infancy with a lower number of O&M and insurance providers. Hence the reduction in required returns is a reflection of a reduction in the "first-of-a-kind" risk premium and the sector becoming more mature;

— Secondly, **different risk profiles:** OFTOs bear significantly less risk than networks since they face no construction risk, feature limited risk of operational cost overruns, and rely on a different supporting framework with limited regulatory risk and discretion;

— Thirdly, **impact of market evolution**: for simple, singular assets such as OFTOs, changes in interest rates, or base cost of capital, are expected to have a proportionally greater impact on returns than for networks where operational risk premia play a more pertinent role and do not change over time on such a scale (unless triggered by changes in the regulatory regime itself);

— Lastly, the **absence of periodic reviews** and resets means that the regulatory discretion for OFTOs is less than for onshore networks. The regime runs for the lifetime of the asset.

The difference in the *expected* equity return between RIIO-1 and RIIO-2 is also greater than 3%[3].

[3] The real CoE in the final proposals for GD1 was 6.7% RPI-deflated compared to a point estimate of 2.96% RPI-deflated per the Finance Annex, while scope for outperformance has been reduced in RIIO-2 compared to RIIO-1.

Ofgem also presents a number of fund discount rates which are used as a proxy for the expected level of equity return that a particular fund may target. However, the risk profile of the asset portfolios held by the funds selected by Ofgem differ materially from the risk profile of the UK energy networks. For example, the majority of the assets in the selected funds are in PPP/PFI style investments bear no/limited construction risk or comparable operational cost risk as RIIO regulated networks. These types of assets are generally accepted to be in a lower category of the risk/return space when compared with energy networks. It is also unclear how the funds were selected in the first instance. If more appropriate comparators were used, the implied level of expected IRRs would increase significantly. Notably, a simple addition of more appropriate funds to the data widens the current range of 7.2%-10.2% to 7%-12%, although due consideration must be given to how a single figure estimate is derived from the data.

The extent of the Regulator's reliance on this evidence would suggest a high degree of confidence in the robustness of the data. However, Ofgem's analysis and evidence from the different sources listed above on the face of it may not be in line with accepted statistical methodologies, including likely selection bias, estimates not being representative of the underlying data, wide dispersion of results, lack of consideration of appropriateness of using particular statistical estimators, interpretation of ranges of data, comparability of the underlying input data, etc.

Overall, the data and evidence set out in the consultation as 'cross checks' does not appear to support or justify the determination of the cost of equity. The implication of the above is that there is a significant misalignment between what equity investors' require and Ofgem's current return estimates.

This misalignment may be partly justified, if the level of risk in the future had materially shifted downward between RIIO-1 and RIIO-2, effectively implying a new market paradigm for networks and significant down-pricing of risk. Incidentally, a significant change in the level of risk itself within just five years would imply that the sector is more risky than assumed. It would be hard for anyone to argue that Ofgem's proposals reduce risks for investors.

In reality, internal business risks have only changed marginally between the periods, while external political and regulatory risks have increased. There is little evidence to suggest that there has been a dramatic change in risk factors, other than a change in the continuity of the regulatory regime. Therefore, it is difficult to explain the magnitude of the reduction in equity returns with a material change in risk.

If the misalignment cannot be justified and the expectations cannot align then this will likely trigger a market re-alignment and potential undermine investment in the sector and ultimately consumer outcomes. This could be manifest in a number of potential consequences: acceleration of cash returns (where possible), reduced investment, an increase in risk-taking to bridge the gap e.g. through business transformations, higher investor churn (with a potential shift towards more passive investors with limited value-add), and even potential challenges to liquidity and financeability.

Moreover, with a reduced upside, the theory of incentives suggests that there will be a relative reduction in both observable (providing it does not have immediate negative financial consequences) and, more importantly, unobservable effort that cannot be contracted for. This would adversely position the industry at a critical juncture in the transition of the energy sector.

In conclusion, the misalignment between investor expectations and the current proposals is real and is not justified by either the dataset presented or by any underlying movement in risk. If this situation remains at the end of the price control review process, there is potential for major consequences for the sector and its consumers.

1 Introduction

1.1 Cost of Equity and the RIIO-2 Consultation

In 2013, following the RPI-X @ 20 review of networks' regulation, Ofgem introduced the new RIIO regime for all gas distribution and gas and electricity transmission companies. While RIIO introduced a number of changes to the regulatory regime for networks, it was, in effect, an evolution of the existing regulatory framework that had been in place for the previous 20 years building on, in particular, a number of regulatory mechanisms and solutions developed as part of DPCR5 (Distribution Price Control Review 5).

In particular, RIIO was designed to provide a clear *ex ante* regulatory framework, giving networks greater scope to shape their plans and operations, with stronger incentives for companies to outperform.

On December 18, 2018, Ofgem published its consultation on the methodology for the next price control, RIIO-2, which is due to start in April 2021. The methodology set out in the RIIO-2 consultation followed on from the framework decision published in July 2018 and provided more detail on how the Regulator now proposes to apply this framework in each of the sectors.

The new methodology appears to be designed to quite fundamentally change the evolution of the regulatory framework for networks, introducing a large number of new mechanisms and changes as compared to RIIO-1 making the regime more prescriptive, limiting potential outperformance and, overall, reducing companies' returns.

KPMG was commissioned by Cadent Gas Limited to review the RIIO-2 framework consultation from an investor perspective. Specifically, the scope of analysis is focused on:

1. The scale of the changes to the regulatory framework implied by the proposals put forward by Ofgem in general, and to the cost of equity (CoE) in particular;
2. Whether the data and analysis supporting the CoE proposals in the Finance Annex are robust and can justify the changes;
3. Whether the changes can be justified by material shifts in underlying risks of networks' business; and
4. Potential implications of decreasing returns without a commensurate decrease in risk or other justification.

This Report presents the findings from this analysis focused on the changes to the CoE parameter that Ofgem is consulting on.

This Report is not intended to assess the appropriateness of the proposed changes *per se*, rather it aims to assess whether the specific evidence put forward by the Regulator is consistent and could be seen as sufficient (in terms of both depth and robustness of the evidence and analysis) to support the proposed *scale* of change to the regulatory regime.

Wherever possible, the analysis presented in this Report is substantiated with specific evidence and quantitative analysis. To this end, it relies on and assumes, without independent verification, the accuracy and completeness of information available from various public sources.

Given that the new price control methodology and its application is still under development and that companies have yet to produce business plans that forecast how their businesses are likely to evolve over the RIIO-GD2 period, the findings in the Report should be seen as preliminary. Given this stage in the process, the analysis of the potential impact of the proposed changes is

based on anticipated behaviours and market dynamics and is not a prediction or a forecast of future developments in the industry.

1.2 Context

Sector characteristics that attracted significant private capital, delivered secured investments and performance improvements

For almost 30 years, regulated utilities in the UK have attracted global private capital to invest in, construct and operate essential infrastructure. Independent economic regulation has been a key feature of the overall regime for networks attracting investors and capital to the UK on a long-term basis. Regulation was designed to protect consumer interests while ensuring that license holders are able to attract capital on a long-term basis and efficiently finance their licenced activities.

In particular, the existing regulatory framework includes a number of features that attracted significant private capital. Firstly, revenue mechanisms and allowances set ex-ante have covered price control periods of 5 to 8 years, using a building block approach to approximate competitive market outcomes and balancing business and other risks with rewards for outperformance.

The ex-ante determinations took account of the views from all stakeholders including the investor community to ensure financeability.

The ex-ante setting of revenue allowances has simulated market pressures to secure economic efficiency for customers. Regulators have also ensured that utilities deliver sufficient quality of infrastructure and services. Revenues set for a fixed period (i.e. are not determined ex-post) allowed for the recovery of capital invested, earning a return on that capital and the recovery of costs.

Secondly, long-term general predictability and continuity of regulatory policy supported the underlying economic characteristics of utilities, which have to finance assets with economic lives of 40 years or more. The nature of the revenue building blocks and the methodology for their calculation naturally evolved over time reflecting the interests of customers, while ensuring companies' financeability, based on the underlying principle of financial capital maintenance across price controls.

Sufficient levels of investment are required for an asset base to deliver services to current and future consumers. Continuity also maintains a predictable profile of customer bills. Adhering to key economic principles that roll over from one price control period to the next encourages long-term investment. This gives networks and investors the confidence that a well-run company can recover its capital and earn a reasonable return.

Incentive-based regulation encourages outcomes in the interest of both investors and customers. The approach allows companies to keep some outperformance in areas which are beneficial to customers, such as expenditure efficiency or financing costs. It encourages companies to adopt behaviours which maximise benefits to customers by meeting service levels in an economically efficient manner.

Of course, throughout the years the existing framework has prompted extensive discussions on areas such as cost of capital and symmetry of incentives and whether the calibration of mechanisms in general struck the correct balance between return to investors and protecting customer interests, however, these past disagreements have been of a much smaller scale than the current misalignment of investors' expectations and Ofgem's signalled intent (discussed in more detail in section 5).

Overview of current and historical energy sector access to capital markets

During the 30 years since privatization, the GB energy networks have attracted investments of over £100bn (real) of private capital to the sector. Investors have deployed this amount of capital

since the regulatory regime was perceived as relatively stable, with any changes broadly preserving a balance between risk and return.

As a result, networks companies have generally enjoyed continuous access to capital markets (as evidenced, for example, by corporate bond issuance by networks continuing through the 2007-2009 global financial crisis), had access to financial instruments with long tenors (companies issued corporate bonds with tenors of between 10 and 30 years[4]) and were able to secure debt financing at exceptionally low cost compared with other industries.

In the more recent period, there has been circa £12bn (at current market prices) of investment in gas transmission and distribution between 2008 and 2017, and circa £24bn of investment in electricity transmission and distribution between 2012 and 2017.[5]

This substantial amount of financing and investment has enabled, alongside various other activities, the iron mains replacement programme in the gas sector[6] and enabled the electricity sector to deliver Electricity Market Reform (EMR) to incentivise investment in secure and low-carbon electricity.

The gas transmission sector has laid 700km of network over the past decade and electricity distribution and transmission sector has laid 7,000km of network between 2012 and 2017.[7] There have also been significant operational improvements, for example, over RIIO-1 customer satisfaction metrics have generally improved and companies have regularly delivered annual cost reductions and efficiencies, which have been shared with customers.

Going forward, the energy networks sector will require high quantum of further investment over the RIIO-2 period and beyond. The National Infrastructure and Construction Pipeline by the UK Government estimates that there is more than circa £52bn of investments required for energy and utilities sectors between 2019 and 2021 and circa £137.5bn beyond 2021.[8] In the energy sector, these investment requirements are largely driven by the three D's of the energy transition: decarbonisation, decentralisation and digitisation.

Cost reduction and efficiency

RIIO regulatory framework has been designed as an incentive-based model of regulation meaning that the regulatory performance incentive mechanisms, which allow companies to retain a share of efficiency outperformance, incentivise companies to reduce costs for the benefit of customers. This happens in two ways:

— Firstly, via the Totex incentive mechanism (TIM) – mechanism under which any under- or overspend compared with the allowance is shared between the network company and consumers intra-period;

— Secondly, at the start of the next price control, cost allowances are typically reset to a level reflecting the new level of efficient cost and corresponding efficiency challenge going forward.

The table below presents the Totex efficiency gains on an annual incremental basis across different regulatory regimes. RIIO-GD1 demonstrated the highest median improvements and a maximum improvement of 2.8%.[9]

Table 1: Annual real Totex efficiency gains for regulated utilities

Price control	Min	Lower quartile	Median	Upper quartile	Max	Standard deviation

[4] National Grid debt structure (2019) Eikon – Thomas Reuters
[5] https://www.ofgem.gov.uk/publications-and-updates/riio-2-sector-specific-methodology-consultation productivity reports
[6] http://www.hse.gov.uk/gas/supply/mainsreplacement/index.htm
[7] https://www.ofgem.gov.uk/publications-and-updates/riio-2-sector-specific-methodology-consultation productivity reports
[8] National Infrastructure and Construction Pipeline (2018) IPA and HMT
[9] Innovation and efficiency gains from the Totex and outcomes framework (Ofwat) 2019

PR14	-2.4%	0.0%	1.2%	2.7%	6.3%	2.3%
DPCR5	-4.1%	0.7%	1.6%	2.6%	4.8%	2.5%
RIIO-GD1	0.6%	1.5%	2.0%	2.6%	2.8%	0.7%
All energy	-4.1%	0.6%	1.7%	2.4%	4.8%	2.1%

Source: OFWAT, Innovation and efficiency gains from the totex and outcomes framework, KPMG LLP and Aqua Consultants LTD, June 2018

The energy sector has also seen significant unit cost efficiencies (average annual reduction in real unit operating costs) driven by significant regulatory and structural changes to the industry.[10] Table below shows the average change in unit costs in the five years prior to the shock (T-5 to T), the first five years following the shock (T – T+5) and the second five years following the shock (T+5 to T+10). Where there was not enough data to cover the entire period, the number in brackets indicates the number of years included in the calculation.

Table 2: Annual unit cost efficiencies realised in electricity distribution and generation, and in gas distribution

All of the operating cost data is inflated to 2016-17 prices.

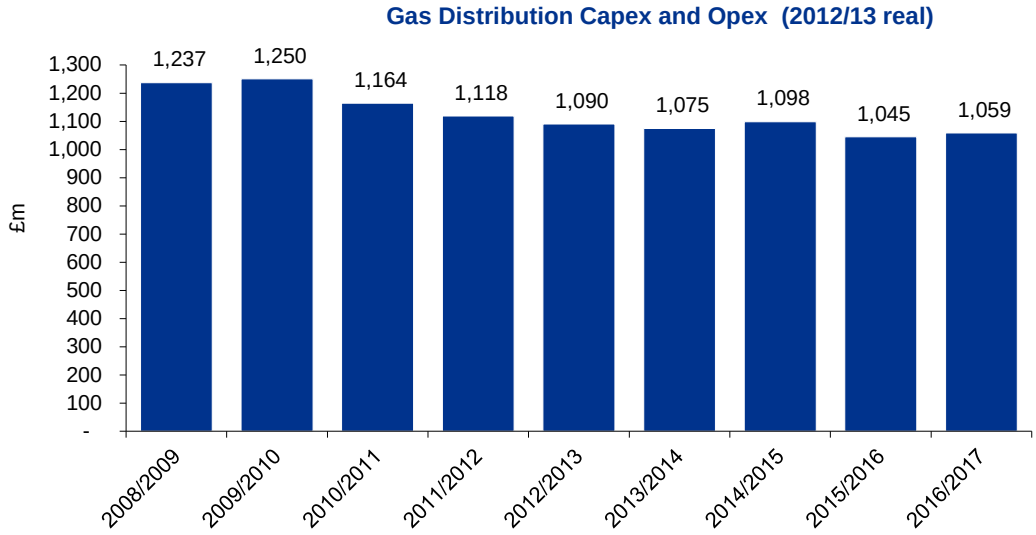
Event	T-5 to T	T to T+5	T+5 to T+10
Privatisation of electricity distribution (T = 1990)	-0.4%(3)	-0.3%	9.9%(4)
Competition in electricity generation (T = 1990)	-4.0%(4)	8.6%	NA
New gas distribution networks (T = 2003)	-1.2%(4)	-0.8%	0.4%(2)

Source: OFWAT, Innovation and efficiency gains from the totex and outcomes framework, KPMG LLP and Aqua Consultants LTD, June 2018

Gas distribution companies have also reported a substantial decrease in costs in real terms by circa 15%, as illustrated in the chart below based on the productivity analysis undertaken for Ofgem by the Energy Policy Research Group (EPRG).[11] The study concluded that over the period from 2008/09 to 2020/21 the gas distribution industry is expected to show an annual productivity growth rate of 1.6% with technological change being the main driver of productivity growth.

[10] This analysis is based on accounting data for the 13 Areas Boards and their successors the Central Electricity Generating Board (CEGB) and the statutory accounts of Transco and the acquirers of the four GDNs.
[11] https://www.ofgem.gov.uk/publications-and-updates/riio-2-sector-specific-methodology-consultation productivity reports

Figure 1: Evolution of GDNs Capex and Opex (i.e. Totex excluding Repex)



Source: Ofgem (2018) RIIO-2 productivity report Capex and Opex figures in 2012/13 real prices

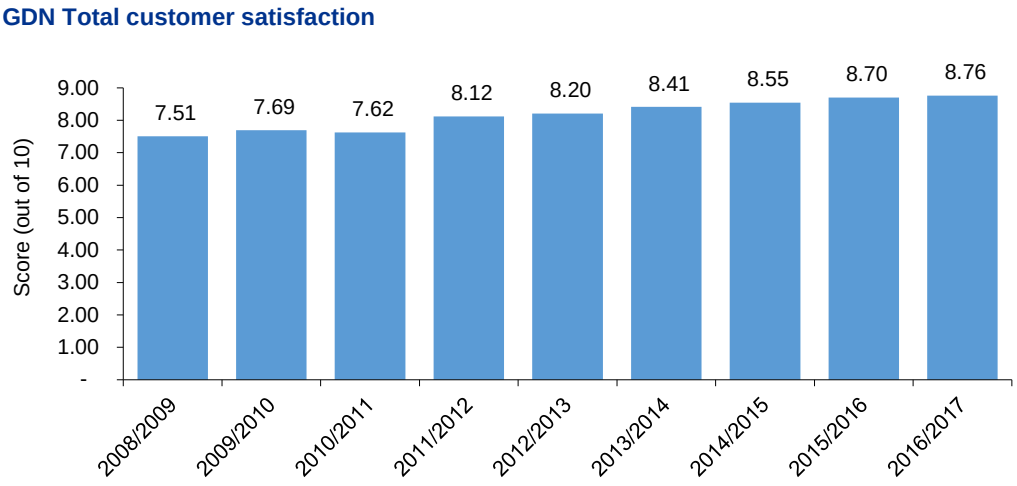
Quality of service

The improvements in efficiency combined with high levels of investment in the industry have been accompanied by improvements in quality of service over time.

Two indicators have been used to monitor service quality: customer service and total minutes lost.

In the customer service satisfaction survey collected by the GDNs on a monthly basis on planned work, emergency response and repairs and connections, customers score their satisfaction with GDNs on a scale from 1 to 10. The chart below presents an average of the customer scores across all the GDNs on an annual basis showing a steady improvement, cumulatively by over 15%, over the past decade.

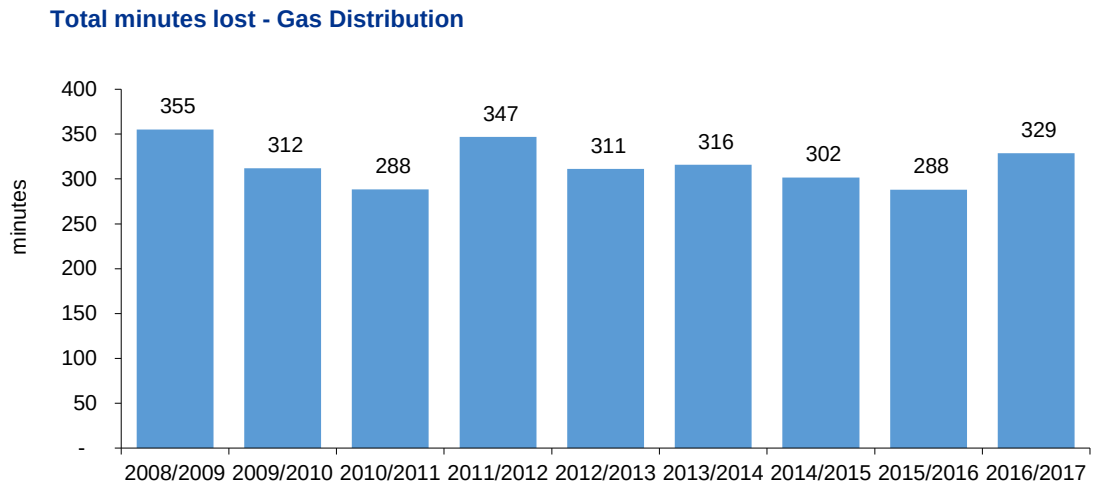
Figure 2: Evolution of total customer satisfaction with GDNs



Source: Ofgem (2018) RIIO-2 productivity report. Average customer satisfaction surveys based on planned work, emergency response and repair and connections for all the GDNs

Total minutes lost reflect the average minutes lost per customer each year where an interruption of supply to customer lasts 3 minutes or longer. As shown in the figure below, total minutes lost has remained largely stable (between 288 and 355) at around 300 minutes per annum (equating to around 99.95% reliability).

Figure 3: Evolution of total minutes lost in gas distribution



Source: Ofgem (2018) RIIO-2 productivity report total minutes lost across all Gas Distribution customers

Overall, this evidence indicates that over the last decade gas distribution networks have generally improved quality of service, reduced costs and continued their investments while managing to keep or improve a very high level of system reliability (in terms of minutes lost) at circa 99.95%.

2 Changes to returns at RIIO-2

Ofgem is now consulting on a significant number of material changes to the regulatory framework for RIIO-2, which could be seen as reversing the regulatory design and philosophy reflected in RIIO and earlier controls. In particular, a number of the proposed changes relate to the introduction of, or changes to, mechanisms which will directly or indirectly negatively affect the level of expected equity return with a very significant step change.

In the methodology documents issued in December 2018, Ofgem has set out changes to 25 different existing or new regulatory mechanisms, most of which are expected to have significant negative impact on returns, either directly or indirectly. The proposed changes are such that they are skewed downward and generally increase the risk of earning returns for companies.

In particular, all **the components of the allowed return**, except for the **gearing** assumption, have resulted in a lower WACC. Apart from the updates to risk free rate, market return and the cost of debt to reflect the latest market data, the Regulator has put forward proposals to introduce a **debt beta** (in conjunction with the general reduction in equity beta) and the unprecedented **allowed vs expected return wedge** of 0.5%. The calibration of the allowed WACC along with the **tougher cost** and **output targets**, as well as the **business plan incentive** are expected to reduce returns unconditionally. The latter is an asymmetric mechanism whereby the Totex based (+/- 2%) reward companies earn for presenting high quality, cost efficient plans is diluted depending on how other companies deliver against these criteria and the penalty is not. Further implications of replacing the existing Information Quality Incentive are the **removal of interpolation**[12] and **adjustment for workflow** that was used by Ofgem to calculate cost allowances.

Ofgem is also consulting on introducing several indexation-related changes as part of RIIO-2.

— First, there is the **switch to CPIH** for the purposes of calculating RAV indexation and allowed returns reflecting the fact that RPI is no longer seen as a credible measure of inflation.

— Second, the introduction of the **CoE indexation**, an inherently symmetric mechanism that allows to customers to benefit when costs of equity are lower, while offering investors the benefit of increased allowances if market rates increase.

— Finally, Ofgem is proposing options for **RPE indexation**, having recognized that RIIIO-1 allowances were too generous. These mechanisms are symmetric and for each, the outcome is dependent on external variables.

On the cost side, the new calculation methodology will result in a reduction in the **sharing factor** (from 63% to between 15 and 50%), which will weaken incentives to outperform, and might at the same time limit potential downside (as a symmetric mechanism). A potential impact of the lower sharing factor is lower discretionary investment as a result of less projects being NPV-positive as the benefits reflected in the cash flows become lower.

Another mechanism whose effect is conditional on outturn level of costs is the **enhanced competition** which is likely to drive down cost allowances due to competitive procurement.

Ofgem has also put forward proposals to introduce new and different types of outcomes—**price control deliverables**—for outputs directly funded through the price settlement, **licence obligations**—to address minimum standards of performance, and **output delivery incentives**—for quality improvements above and beyond the minimum standard. This latter category is dynamic and sometimes depends on the performance of other companies in the sector with a number of downside only outcome incentive mechanisms, such as the average restoration time incentive for total unplanned interruptions for gas distribution networks.

[12] Allowed expenditure under IQI was based on both Ofgem's view of costs (weighted 75%) and company forecasts (weighted 25%).

While not classified as specific outputs, companies are also expected to deliver **innovation** and **whole systems solutions**, although the mechanics have not been finalised by Ofgem yet.

Finally, the conditional **cash flow floor** and **return adjustment mechanisms** (RAMs) are being introduced, whose operation is largely contingent on the impact of the rest of the price control being contingent on certain outturn scenarios. RAMs limit both the upside and downside by effectively placing a collar around RoRE and as such are by design symmetrical (can be triggered on both upside and downside). The cash flow floor is meant to protect companies' financeability in case of a downside of a sufficient magnitude and is associated with complex calculations and additional provisions should it be triggered. The necessity of introducing such a mechanism raises the question as to whether the package is financeable in the round.

The table below summarises some of the key proposed changes at RIIO-2 which impact companies returns that have altered from RIIO-1.

Table 3: Selected proposed changes to regulatory mechanisms for RIIO-2 price control

Regulatory arrangement	RIIO-GD1	RIIO-2	Comment
Cost of Equity	6.7% RPI real	3-4% RPI real (with 3% modelling assumption) Includes an adjustment for difference between expected vs allowed return of 50bps.	The proposed return on equity is halved vs RIIO-GD1. Ofgem has not justified this as a result of a reduction in risk faced by companies. Risk free rates have not fallen by 3-4% since 2012 when RIIO-1 was set (conventional 30-year Gilt yields have fallen from 3.13% in December 2012 to 1.79% in January 2019).
Totex sharing	Approximately 63% of out-/under-performance is retained by companies during regulatory period	15-50% of out-/under-performance is retained by companies	A reduction in the sharing rate is likely to weaken the incentive to outperform, although it could equally limit the downside as it is a symmetric mechanism.
License conditions	Minimum acceptable service levels compatible with a well-functioning and safe network	Proposals to raise the minimum service level to work as a quasi-incentive with a negative-only remuneration	A new approach to license conditions with an increase in the minimum service levels may create additional downside risk exposure.
Incentives - balance	Largely two-directional (i.e. rewards and penalties) or reputational	Multiple penalty-only incentives	Penalty only incentives create additional downside risk and may negatively skew the risk reward balance.
Incentive targets	Based on absolute targets	Proposals to introduce competitive pots, dynamic incentives based on others' performance re-set during the period	Introduction of dynamic/relative outcome incentives introduces complexity And discourages collaboration.
Business Plan Incentive	Information Quality Incentive and Fast Tracking	Business Planning Incentive of +/-2% Totex equivalent but reward can be diluted.	A cliff edge asymmetric incentive based on a subjective assessment of plans creates additional uncertainty.
Ex-post adjustments of returns	None	Return Adjustment Mechanism (RAM) adjusting network's performance based on the performance of peers (outside of the acceptable deadband)	Ex-post adjustments may weaken companies' incentives to outperform beyond a certain threshold. Where the adjustments depend on the performance of the sector as a whole, companies are likely to face

			additional uncertainty with regards to their returns.
Financeability	Onus on Ofgem and companies	Assessment on notional and actual basis. Introduction of a cash flow floor	At first glance, the mechanism may increase risk to shareholders as flexibility to seek efficient solutions is reduced and is justified on the grounds of the low CoE environment. On closer inspection there are multiple other factors that require due consideration such as the impact on management incentives, the transfer of risk from debt to equity, etc.
Indexation	RPI	Transition free switch to CPI	Absence of CPI bonds and a significant exposure to RPI debt – both increasing the risk profile. Unclear mechanism to maintain value neutrality.

Source: Ofgem's consultation, KPMG analysis

While the calibration of the mechanisms is still to be determined, and the mechanisms themselves are being consulted upon, there are several preliminary conclusions that can be drawn regarding the direction of travel the Regulator is proposing to undertake.

— Firstly, there is an unprecedented change in the level of allowed returns, particularly the CoE from 6.7% real RPI at RIIO-1 to 2.96-3.95% RPI real at RIIO-2, i.e. a reduction in the overall allowed return (before any other adjustments) by over 50%. This change represents an unconditional reduction in the base returns. The proposed calibration of the mechanisms that affect return indirectly similarly implies an asymmetric reduction downward.

— Secondly, there is an explicit intention to significantly reduce, if not largely to eliminate, the potential to outperform base allowed returns. This will necessarily diminish the power of incentives and discourage risk and innovation as companies will be less incentivised to deliver particular outcomes if the benefits they receive from it can be capped, for example, through RAMs and lower Totex sharing factors.

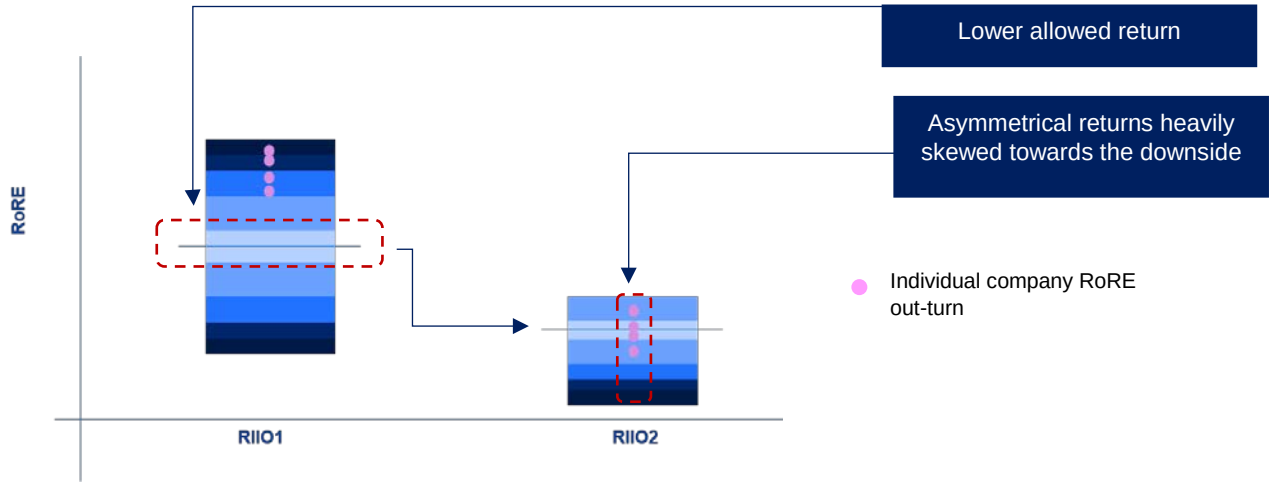
— Lastly, the mechanisms can be considered in three tranches:

- Those which affect the *allowed* levels of equity return, such as the components of cost of capital;
- Those which affect the range of likely *expected* equity returns ex-ante such as the business plan incentive; and
- Those which adjust the *actual* level of equity return ex-post such as (RAMs).

The distinction between these different types of return – expected, allowed and actual ex-post has come to the forefront of the discussion as an additional risk factor for companies. Overall, Ofgem's approach demonstrates an intention to alter the expected equity returns in three different ways in line with the categorisation above. Firstly, to reduce the allowed returns by lowering the allowed cost of capital. Secondly, to narrow the range of returns companies can achieve in terms of out and underperformance and to skew the potential returns companies can earn in terms of out and underperformance to the downside. Thirdly, to ensure a greater distribution of outturn results above and below the allowed cost of equity to avoid universal outperformance.

The graphical illustration below is of the cumulative effects of the three tranches mechanisms discussed above. The impact of the other mechanisms and the entire RIIO-2 package on the risk-return balance are not taken into account in this diagram.

Figure 4: Cumulative effect of the three tranches of regulatory mechanisms



Source: KPMG analysis

Overall the impact is significant. While the investors of a well-run company at this stage in the RIIO-1 process might have been expecting actual equity returns of around 10%[13], due to a baseline allowed return of 6.7% in combination with strong incentive mechanisms, in particular the Totex incentive mechanism and no ex-post adjustment based on the performance of the sector as a whole. By contrast under RIIO-2 this has reduced down to 3-4% due to a lower allowed baseline return, a reduced RoRE range due to less powerful incentives, but weighted towards the downside and the potential for an ex-post adjustment depending on the wider sector performance.

This major reduction in expected returns from around 10% to 3-4% should be justified either through a change in underlying investor expectations driven by market conditions, or by a corresponding reduction in risk. In the next two sections, both of these potential justifications will be tested to determine their applicability in this case.

The fact that a significant regulatory change is being proposed is quite evident. Such a fundamental shift requires very strong justification and robust evidence to support it. This can be a combination of the market data, investors' perceptions, and concrete evidence on changes in risk exposure. We challenge each of these areas in the later sections of the Report.

[13] https://www.ofgem.gov.uk/ofgem-publications/37118/riio-strategy-city-call-18mar11pdf

3 Does Ofgem's market evidence support its cost of equity estimate?

In the RIIO-2 Finance Annex, Ofgem presents evidence of equity investors' expectations in order to support their cost of equity estimates based on the application of CAPM. This evidence is referred to as 'cross checks' on the required returns. The cross-checks are generally not Ofgem's primary tool for estimating the cost of equity, but the Regulator uses them as additional evidence supporting the estimated cost of equity. This evidence from cross-checks is also used by Ofgem as justification to narrow the cost of equity range from 3.87-5.08% to 4-5% (CPI real).

Ofgem employs four cross-checks: (1) forecasts from investment managers and advisors; (2) infrastructure fund discount rates; (3) bids for offshore electricity transmission assets (OFTOs); and (4) Market-to-Asset Ratios.

This section considers the robustness of the evidence that Ofgem uses as cross-checks to support and justify their implied cost of capital against the following criteria:

— Whether the data sample used is representative or is it characterised by any potential sampling error or bias?

— Whether the sources of data compiled by Ofgem are comparable specifically in regards to: the time horizons that the data points are based on; the underlying levels of risk in different return estimates; and the methodological approaches to how they are calculated.

— Whether the method for selecting or calculating a point estimate within a range is well justified and robust?

— Whether there is sufficient evidence that the chosen cross-check is reflective of future market expectations?

3.1 Forecasts from investment manager and advisors

Ofgem uses forecasts from investment managers and investors as forward-looking measures to support the cost of equity derived using CAPM. In Table 10 of the Finance Annex, *'Estimates of medium-term and long-term nominal UK TMR – asset managers and financial organisations'* Ofgem presents the data used to evidence its position on TMR.

Ofgem believes that these forecasts support their CAPM-based estimates in two ways:

— Firstly, that if the TMR value used in the CAPM calculation is substituted by the average of the value from Table 10 then the implied value for the cost of equity is 2.3%[14], which is below the CAPM implied range.

— Secondly, that if the CAPM-derived implied equity beta is substituted with an assumption of 1 then the cost of equity would be around 3.6%[15], which is within the range of the cost of equity estimates based on CAPM.

Ofgem notes that if the values presented in Table 10 are reliable sources of investors' expectations, then the high-point of the range implied by the CAPM-based estimates, even with an equity beta assumption of one, is potentially too high.

The section below evaluates whether the forecasts from investment managers and advisors that Ofgem uses are reliable sources of investor expectations. The robustness of the evidence presented is assessed against the four criteria: (1) sample error or bias; (2) data comparability; (3) robustness of point estimate approach; and (4) averaging across different data sets.

[14] RIIO-2 Sector Specific Methodology Annex: Finance 3.131
[15] Ibid.

3.1.1 Is the sample of data used representative and free of potential selection bias?

Table 10 presents nominal estimates of recent forecasts by ten different asset managers and financial organisations. The table specifies that the estimates are medium-term to long-term nominal UK TMR. This provides an indication of the scope of the population of data points which has been sampled, but does not clearly define the population parameters. For example, the time horizons of medium-term and long-term and the types of financial organisations and asset managers are not defined in any detail.

With regards to the sources of data, Ofgem mentions investment managers and advisors, portfolio managers, pension consultants and asset managers. Investment professionals, such as portfolio managers and pension consultants, are very broad categories which could include investors with wide ranging expected returns from venture capitalists to pension funds, and it is unclear how Ofgem arrives at the selection they use.

To highlight the scale of the issue of a potential selection bias, it is worth noting that the Financial Conduct Authority (FCA) regulates the conduct of over 58,000 firms in the UK which provide financial products and services to companies.[16] It is not clear whether data presented in Table 10 reflects all of the 58,000 firms, or even extends beyond that.

Additionally, it is not clear from Ofgem's commentary what criteria were used to select the ten specific forecasts used, or what survey methodology was adopted to ensure an unbiased sample. For example, it is unclear whether Ofgem randomly sampled financial advisors or used a stratified approach.

The consultation documentation does not explain whether the selected funds are representative of the population that Ofgem has targeted.

These considerations lead to the conclusion that, based on the information available in the consultation documentation, the sample presented in Table 10 could be subject to a very large sampling error, or a potential bias, and may not be representative of the underlying population of potential investors and advisors.

The population that the sample is drawn from is not defined and there is no explanation of the sample survey methodology. Selection bias can lead to over or under estimation of the parameter of the population. This means that Table 10 could be either significantly over- or under- estimating the estimated expected returns of the investment managers and advisors and, therefore, cannot be considered robust evidence without clear, additional explanation of the approach clearly addressing the issue.

The fact that this analysis is used as a cross check, i.e. it is derived to be compared against estimates derived from another source rather than starting from a 'blank sheet of paper' highlights the risk of the selection bias.

3.1.2 Are the data sources used comparable?

For a robust statistical analysis it is important to examine the population of data that the sample used is drawn from and, in particular, to consider different parameters of the underlying data population to ensure that the underlying data set contains generally comparable data points.

At least two parameters are important to consider to ensure that data points in the sample drawn from the population are comparable:

— the consistency of the underlying methods used for recording and/or forecasting the data; and

— the time horizon which the return estimates data points relate to.

[16] https://www.fca.org.uk/about/the-fca

The group of asset managers and financial organisations selected by Ofgem and presented in Table 10 employs a wide range of methodologies for estimating investor expectations. There are a number of different return estimation models employed, e.g. Gordon's growth model, adjusted DCF (discount cash flow models), adjusted Fed model[17], etc., as well as a combination of forward-looking estimates of investor expectations and historical equity returns.

In addition, the Willis Towers Watson data represents actual hedged returns for 2016 USD-denominated investments rather than a forward-looking estimate, as well as covering all developed markets while other sources are UK market specific.

The consultation does not explain or comment on the appropriateness or not of comparing forecasts employing fundamentally different approaches and in some cases covering different markets. The variety of approaches used to derive the underlying data points and inconsistencies in the underlying estimates are likely to pose a significant problem for estimation, which is not addressed. No analysis is presented to suggest that any potential differences in approaches or estimation methods would be expected to average out. In fact, the underlying sources suggest that the return estimates in the underlying population are not comparable.

Furthermore, for 3 out of 10 estimates in the presented sources of data there is no information about the methodology used to arrive at the expected returns and very limited information in further 1 of the 10 data points. This makes it difficult to understand or interpret the data points used or to conclude that a robust analysis to ensure comparability of these data points has been actually undertaken.

The table below presents specific points on the methodologies applied by different financial institutions listed in Table 10 from the underlying data sources highlighting different nature and basis for estimates, likely biases, potential adjustments required, lack of information for some sources and other comments highlighting the issues described above and below the table. The quotes in the table are taken directly from the source documents referenced in the Ofgem table.

Table 4: Comparator funds selected by Ofgem and their methodology

Name source	Estimate (nominal)	Summary of the methodology and comments
Blackrock	7.1%	- The return estimates is a median figure, with a symmetric spread from 0.3% to 14.6% made up from three components: valuation; dividend yield; and earnings growth. It is not clear how these components interact or how they were calculated. - DCF assumption results in margin reversion, which could understate equity returns. - This builds a "least-worst" portfolio, which produces a portfolio robust to small changes, which, again, may understate true returns.
Old Mutual	6.8%	- No information is provided on how the equity returns are estimated.
Nutmeg	6.8%	- These estimates use normalised, average long-term expected returns, with a wide spread of likely outcomes on either side of the point estimate. - The return is based on a specific methodology of using three different elements: a historic return volatility; an estimate of unit volatility; and an estimate of RFR. - The estimate of unit volatility is conservative, and it is therefore likely to understate the overall return.
Aberdeen AM	5.9%	- Key element of equity forecast methodology here is valuation mean reversion; this means that the return forecast may include a negative return contribution if equities seem expensive. - The reversion may not happen immediately, therefore, as indicated, *"equity returns may well be higher than our 5-year average forecast".* - Fed model is used, which by design ignores growth altogether, therefore requiring an adjustment to make it comparable.

[17] The Fed model is intended to provide an indication of the size of the equity risk premium by subtracting the 10Y government-bond yield from the equity earnings yield (E/P). The model is adjusted to give ERP.

		- The table with risk and return for UK investors shows e.g. a return of 6.1% for UK infra renewables.
Vanguard	4.5%	- No information is provided on how the equity return measure is estimated so it is difficult to understand what this estimate actually represents. - According to the source: *"a 60% equity and **40% bond portfolio** is most likely to provide a return between 2.2% and 7.5% for the 10 years to December 2026*", which indicates a wide range around the estimate used. - Begs a question whether the inclusion of this benchmark is appropriate given the reliance on bonds in the composition.
Schroders	7.3%	- The nominal equity return is broken down by: Inflation; Small-cap premium; Income; Capital growth; and Discrepancy, and is subject to rounding. - Equity return assumptions use a Gordon's growth model approach: *"downgrade to equity return forecast due to downward revisions to long run productivity, and higher valuations generating weaker dividend yields"*.
JP Morgan	7.75%	- No information is provided on how the return is estimated so it is difficult to understand what this estimate actually represents.
Aon Hewitt	6.4%	- Equity return assumptions are driven by current market valuations, earnings growth expectations; and assumed pay-outs to investors. - The estimates are built using DCF analysis. - *"The UK market surged over 8% higher in the three months to June 2018. This revaluation primarily led to downward pressure on our 10-year expectations for UK equities. As a result, the expected return on UK equities is now 0.3% lower at 6.4%"*.
FCA	6%-7%	- This uses a weighting of ex-post and ex-ante approaches. - in this case, long run historic equity returns, historical EMRP relative to bonds, forward-looking EMRP based on surveys and forward-looking EMRP based on dividend models are taken into account. - Estimates based on historical market data focus on the long run and incorporate a degree of mean reversion.
Willis Towers Watson	6.8%	- This estimate uses the 2016 returns data. - 6.8% is a hedged figure, therefore likely to be biased downwards.

Source: Ofgem, KPMG analysis

In addition to the issues discussed above, the time horizons of the data sources vary significantly across different estimates rendering them non-comparable.

To illustrate this point: six of the figures presented are for ten year returns, one for a five year return estimate, one for a thirty year investment horizon, and two simply state that the estimated return is 'long-term' without any further information. Ofgem does not comment on the implications of this variation.

The evaluation of market risk requires careful consideration of time horizons as different investment horizons are based on different investment and risk profiles. Ofgem also provides no comments on whether adjustments are required to allow for comparability of estimates based on different time horizons.

Based on the available information it is not possible to determine whether it is appropriate to compare the sample data presented in Table 10, but indicative information available suggests that these estimates are not comparable.

The analysis of the underlying data sources also suggests that the estimates are likely to be biased (as explicitly indicated in some cases), subject to error, or require significant adjustments to make the data comparable across different estimates considered.

3.1.3 Is the approach used for selecting/calculating a point from a range appropriate and robust?

Where a particular set of data is presented in a range and one seeks to derive a point estimate, a robust statistical analysis requires that appropriate consideration is given to the approach for arriving at the point estimate. In its analysis Ofgem uses two different approaches to identify a

point estimate within a range: (1) a midpoint estimate for the ranges that investment managers/advisors report, and (2) an arithmetic average to calculate a single overall figure for Table 10.

A number of the advisors and investment managers estimate TMR as a range rather than a single point estimate. The implication of this is typically that no single point within the estimated range can be assumed to be the best estimate. A range does not imply that the mid-point of the range is the most likely estimate.

Ofgem has mis-represented the underlying estimates and presented ranges simply as mid-points. This approach ignores all the data points in a given range. For example, if the underlying distribution of estimates is uniform (which is a reasonable expectation where a range is presented in the context of return estimates where no further assumptions about the range are provided) the midpoint is just as likely as the maximum. This means that the underlying analysis cannot conclude whether the best estimator is the maximum, mid-point or the minimum.

In other words, a midpoint of a range in this case has a breakdown point of zero. The breakdown point of an estimation technique is the proportion of incorrect observations a methodology can be exposed to before it gives an incorrect result. The higher the breakdown point of an estimator the more robust it can be considered.[18] In addition, midpoints are highly sensitive to outlier: increasing the sample maximum or minimum by x results in a change in the mid-point by x/2.

Selecting a midpoint within a range is not a meaningful or robust technique to select a point estimate unless specific further information about the range is available, especially when outliers are not considered or adjusted for.

Ofgem does not explain how outliers are addressed in this analysis. The point estimates presented in Table 10 could be significantly over- or under- estimating the expected returns for each of the sampled sources.

Ofgem also uses an arithmetic average to calculate a single figure for Table 10. The consultation does not discuss why this is an appropriate approach or whether any consideration has been given to alternatives, such as e.g. a median or another estimator.

The use of an arithmetic average is more sensitive to outliers than other approaches. For example, using a median would result in an average of 6.80%, an increase of 21bps. A noteworthy outlier is the Vanguard Long Term 10yr with expected equity returns of 4.5% which is 1.4% less than the next lowest estimate. This is actually due to the fact that the basis of the figure is a 60% equity and 40% bond portfolio and the latter class usually has lower returns, however, this fact is not mentioned in the analysis nor is there any adjustment to account for it. Removing just this one outlier from Table 10 without making any other changes or correcting for any other issues mentioned in this context already results in a significant increase of an arithmetic average to 6.82%, an increase of 23bps.

Ofgem does not comment on the outliers or the rationale for using an arithmetic average to derive their overall estimate. Without further information it is not possible to determine how appropriate it is to use an arithmetic average of different estimates presented in Table 10, but issues discussed above suggest that it is likely to suffer from significant imprecision and could be subject to a large bias.

3.1.4 How robust is the evidence from investors and finance advisors?

Ofgem relies heavily on the estimated expected returns of investment managers and advisors. The regulator set out that their analysis supports its estimates as it results in a return estimate below the TMR estimated using CAPM and a lower cost of equity estimate than implied by CAPM even when assuming a beta of 1.

[18] Velleman, P. F.; Hoaglin, D. C. (1981). *Applications, Basics and Computing of Exploratory Data Analysis*

However, there are a number of issues with the selection and estimation methods that Ofgem employed to estimate the forecasts from investment managers and advisors, which undermine the robustness of the evidence, in particular:

— Ofgem does not clearly define the parameters of the population they are sampling from;

— They do not explain their approach for selecting the sample used;

— There is no explanation or analysis whether the time horizons and the underlying methodological approaches are appropriate;

— There is no consideration of whether adjustments to make the data comparable are required;

— Ofgem do not explore the potential bias and/or imprecision of using midpoints when ranges rather than point estimates are reported by sources; and

— They do not provide a rationale or discuss potential issues with using the arithmetic average over other averaging approaches to produce an overall estimate from Table 10.

Overall, this means that the estimates in Table 10 simply cannot be considered robust to be relied upon. This also means that, as presented, this evidence cannot be said to support Ofgem's cost of equity estimates.

3.2 Cross-check with selected infrastructure fund return data

Another source of evidence presented by Ofgem in support of their cost of equity estimates are return estimates from six London-listed, closed end funds which invest in private finance initiatives, infrastructure, and also in some private utility assets, such as OFTOs.

The Consultation presents the average nominal discount rate (cost of equity) disclosed by the funds that is used to value their equity investments in these portfolio companies and claims it can be compared with the cost of equity.

In Table 15 of the Finance Annex, '*Listed infrastructure funds: discount rates and premia to Net Asset Value*', Ofgem presents a number of discount rates (based on the data from the funds) that it uses as a cross-check and a justification for the implied cost of equity derived using CAPM.

In this context, it is not clear whether Ofgem has considered how the risks faced by the funds and regulated utility investors, and investors' required returns differ from one another.

The Regulator's analysis assumes that networks' performance and the return are only affected by the regulatory framework. It also assumes that there are no additional external risks that investors would need to be compensated on. In contrast, in reality, the target IRRs *do* include an expected level of remuneration for external risks.

Ofgem does not comment on whether this affects comparability of the reported figures with the implied cost of equity estimates from CAPM.

Ofgem also does not present its rationale for selecting these particular funds. And the Consultation provides limited guidance regarding the comparability of the underlying risks to those faced by the networks investors.

The table below presents a high-level analysis of the data from funds as presented by Ofgem and provides additional data from the underlying sources and commentary.

Investment strategies considered are taken from investment policy statements of these funds and used to determine their apparent risk profile. The strategies are then assessed based on their comparability to regulated energy networks and their current investors.

A summary of the funds that make up Table 10 in the consultation document are set out below:

Table 5: Analysis of funds used by Ofgem a comparators for investments in networks

Fund	Discount rate (nominal)	Investment portfolio	Comparable to networks?	Comments and rationale
BBGI SICAV	7.2%	- 45 PPP/PFI infra assets (in transport, health, education, justice and emergency service sectors) - 100% availability-based PPP (no exposure to demand or regulatory risk assets) - 35% UK assets - 31% 10-20 years; 38% 20-25 years; 31% 25+ years http://www.bb-gi.com/portfolio.aspx	No	Primarily PPP/PFI focus. No investments in regulated utilities.
John Laing Infrastructure	7.3%	- 65 assets in portfolio (as at 30 June 2018) - Transport, health, education, regeneration & social housing, justice & emergency services, Government buildings, street lighting - 11.3% <10 years; 35.4% 10-20 years; 53.3% 20-30 years - 91.5% availability-based; 8.5% demand-based http://jlif.com/portfolio/asset-breakdown/	No	Primarily PPP/PFI focus. No investments in regulated utilities.
HICL Infrastructure	7.2%	- >100 investments (accommodation, education, energy, fire, law & order, health, transport, water) - hold investments in Affinity Water (33.2%); and Burbo Bank (50%) with project Capex £194m - 100 investments in UK projects https://www.hicl.com/portfolio/geographies/united-kingdom	No	Primarily PPP/PFI focus. The only comparable asset is minority stake in Affinity Water, but there is no investment in networks.
GCP Infrastructure	7.8%	- 50 holdings, with average life of 15 years - 21% PFIs, 14% social housing, 65% renewable energy https://www.graviscapital.com/funds/gcp-infra/portfolio	No	Primarily renewables focus. No investment in regulated utilities.
International Public Partnerships	7.9%	- 130 projects in UK, Europe, North America and Australia - 71% of investments in UK - Sectors: education, energy transmission (19%), gas distribution (14%), health, judicial, military housing, other, transport, waste water (11%) - weighted average portfolio life of 36 years: 44% <20 years; 28% 20-30 years; 28% >30 years https://www.internationalpublicpartnerships.com/our-portfolio/	Partially	Primarily PPP/PFI focus with an investment in a GDN (Cadent 4.4%) and water (through TTT – project with a significantly distinct risk profile).
3i Infrastructure	10.2%	- 27 assets - as at 31 March 2018, economic infrastructure businesses made up 87% of portfolio - Sold stake in AWG in December 2017 to Dalmore and GLIL https://www.3i-infrastructure.com/portfolio/	Partially	Brownfield economic infrastructure comprises 87% of portfolio. No investment in regulated utilities.

Source: Ofgem, KPMG analysis

3.2.1 Are the risk profiles of PPP/PFI based funds comparable to the investors in network companies?

Four of the included funds – BBGI SICAV, John Laing Infrastructure ('JFI'), HICL[19] Infrastructure and International Public Partnerships[20] ('INPP') – all focus on PPPs/PFIs (circa 75% of the portfolio by value). These funds' investments are typically in projects that are operational with 'availability-based'[21] revenue streams and backed by HM Government.

HICL may invest up to 35% of its portfolio value in project companies which have not yet completed the construction phases of their concessions, which is higher than BBGI and JFI. This means that it is exposed to more construction risk than the other two funds. The primary focus of their investment strategies are PPP/PFI and the only asset comparable to regulated networks is a minority stake in Affinity Water.

While INPP has other types of investments as well, the risk characteristics are similar to this category as the majority of the investments are in PPP/PFIs. One particular investment, Thames Tideway Tunnel ('TTT'), has a different risk profile compared to the rest of the portfolio and to the networks due to being an 'in-construction' project with a unique government support package put in place to make it financeable as a stand-alone asset, which without the package would have significant construction risk.

Relative to the other funds presented by Ofgem, INPP is more exposed to the risks of the regulated utility sector due to a 4.4% ownership in Cadent.

The following risks will be fundamentally different between the investors in energy networks and funds investing in PPP-type assets:

— **Construction risk**: PPP-type assets, being held by such funds, typically represent brownfield assets in the operational phase. Therefore, in these cases, there is no exposure to construction risk - overrun, delay or delivery risk is low. On the other hand, networks are typically exposed to all of these risks. Notably, even when the assets are in the construction phase the contracts usually utilised for these type of projects result in limited construction risk.

— **Regulatory framework vs contracts**: regulated networks are subject to regulatory risk which is fundamentally different from contract-based support. Regulatory reviews and regulatory discretion, potential changes in a regulatory framework create different risk exposure to PFIs/PPPs, which are based on a contractual framework.

— **Financing risks:** Exposure also differs materially between PPP-type assets and networks. PPP/PFI assets face more limited financing risk once set and operational, due to the capital structures being put in place at the point of financial close, typically for the duration of the project (hence limited refinancing). For networks the financing risk is materially higher during operations due to the perpetual nature of assets and continuous refinancing.

For availability-based projects there is no demand risk as revenue is not affected by reduction in market prices. Instead there is availability risk since projects may face financial penalties if underlying asset is not available.

All of these factors mean that the funds used by Ofgem to benchmark the returns offer limited or no comparability with the funds that own and operate network utilities. They invest in different assets with fundamentally different risk profiles.

[19] HSBC Infrastructure Company Limited
[20] INPP will hold 7.25% of Cadent gas distribution business by the end of June 2019, following National Grid's decision to sell its remaining 39% stake in Cadent Gas Ltd to Quadgas Consortium, of which INPP is a member.
[21] Projects are characterised as having an "availability-based" revenue stream if, on average, 75% or more of payments received by the relevant project entity do not depend on the level of use of the project asset.

3.2.2 Are the risk profiles other two funds comparable to the investors of network companies?

The remaining two comparator funds that Ofgem uses are GCP Infrastructure and 3i, which are presented here separately because they do not primarily focus on PPPs/PFIs.

For GCP Infrastructure the projects in the core portfolio (i.e. 75% of the total investments) must have pre-determined, long-term, government backed revenues, no construction or property risks and benefit from contracts where revenues are availability based. The actual portfolio is 22% PFIs, 15% social housing and 63% renewable energy. Due to its focus on renewable energy, GCP can benefit from the Renewables Obligation Scheme and the Feed-in Tariffs.[22]

As most of GCP portfolio is invested in operational assets with availability-based revenues, GCP shares the characteristics of PFIs/PPPs funds. In addition, due to the way Renewable Obligation Scheme operates they are not exposed to demand risk.[23] Therefore the risk profile is different to that of the network companies.

3i Infrastructure invests in both economic infrastructure[24] businesses and greenfield projects. However, the investments in the former category comprise 87% of the portfolio so this fund is the most comparable to network companies. 3i is exposed to largely the same risks as a mature infrastructure company in terms of demand, operations, financing and Capex risks. However, the fund does not have any investments in UK regulated utilities, rather the focus is on social infrastructure and some PFI water and energy projects.

3.2.3 How robust is the evidence from infrastructure return data?

The majority of the comparators presented by Ofgem do not hold any investments in regulated UK utilities, and their investment strategies also expose them to different risks than the investors in network companies. INPP and 3i compare relatively better than others due to current investments in Cadent and brownfield infrastructure, respectively, but the primary focus on PPPs/PFIs for the former and the lack of investment in the UK market for the latter undermines their comparability.

3.3 Bids for offshore electricity transmission assets

Ofgem's cost of equity methodology includes estimating the change in equity investor expectations over the RIIO-1 period based on a cross-check to winning bids for offshore electricity transmission assets ("OFTOs").

In Figure 14 of the Finance Annex, '*Average nominal post-tax equity IRR by financial close year range (weighted by project transfer value)*', Ofgem uses the weighted average nominal post-tax equity IRR for multiple winning bidders in the OFTO tenders to cross-check the CoE.

Specifically, Ofgem refers to the 3% decrease in the IRRs from 2011/12 bids to 2017/18 bids to justify the decrease between the RIIO-1 allowance and that implied by RIIO-2.

[22] The equivalent of ROC for smaller companies.

[23] Instead the energy generators are issued certificates by Ofgem based on the quantity of renewable energy produced which they then sell to suppliers, allowing them to receive a premium as well as the wholesale electricity price.

[24] According to 3i this category includes companies that provide essential services, own their asset base in perpetuity or have long-term concessions backed by robust regulatory frameworks, provide essential services, have a strong market position and generate stable cash flows.

3.3.1 Are the risk profiles of OFTOs comparable to the investors of network companies?

Ofgem acknowledges the differing OFTO/network risk profiles. However, it concludes that the check supports a nominal CoE of 7% on account of networks offering greater outperformance potential. The factors giving rise to different risk profiles are as follows:

— The quality of service requirements are more stringent for onshore networks. Networks have a number of outputs, license obligations, Net Asset Risk Metric (NARM) and others. For OFTOs there is an availability based regime which has penalties associated with lack of availability, but this risk can mostly be managed through insurance, the cost of which is recovered through the allowed revenue.

— The absence of periodic reviews and resets means that the regulatory discretion for OFTOs is less than for onshore networks. The regime runs for the lifetime of the asset.

— The revenues reflect the costs submitted by the bidder as part of the tendering process at bidder's discretion without any amendments from Ofgem, whereas for onshore networks the cost allowances are set based entirely on Ofgem's view of efficient costs.

— While both of these parties face the risk of Opex overspend, for OFTOs, operations & maintenance costs are relatively small and can be contracted out.

— OFTOs face no construction/Capex risk since their assets are operational on transfer, which constitutes a fundamental difference in risk profile.

— OFTOs and networks also face different risks due to different levels of asset concentrations i.e. an OFTO has a single asset whereas networks have a multitude of geographically dispersed assets. Depending on the portfolio this could have significant implications of risk.

— There is also a considerable difference in the scale of operations.

3.3.2 Is there sufficient evidence that the OFTO regime is reflective of future market expectations for the investors in network companies?

There are factors that significantly limit the comparability of OFTOs investors' expectations of returns with the investors of network companies.

Overall, the level of risk for OFTOs is considerably lower than for onshore networks, projects or portfolios. It is not clear how Ofgem has reflected these differences when performing the analysis.

Ofgem has also not taken into account the comparability of OFTOs with networks when considering whether they supported the implied cost of equity from the CAPM.

In addition, Ofgem does not seem to take into account the fact that during the initial rounds of OFTOs bids, these projects were novel in nature. Such first-of-a-kind projects have significantly different risk exposure and are likely to include risk premia unlike the current projects. The risk profile of OFTOs in the early years was that of a sector in its infancy with a significantly lower number of O&M providers and insurance offerings. The decline in IRRs could reflect the decline in risk from a level appropriate to a new venture to a level appropriate for established industry model. Conversely, no such decline (or change) in risk has occurred for regulated networks over the equivalent period due to them already being well-established mature companies. If anything, the scale of recent changes in the regulatory framework represents in itself a risk associated with the introduction of a significantly different regime.

3.4 Market-to-Asset Ratios

Ofgem uses market-to-asset ratios (MAR) to demonstrate that the prevailing net asset value (NAV) premia justifies the implied cost of equity from the CAPM. There are many factors that reduce the comparability and the extent to which inferences can be made regarding the returns to regulated networks.

This is a complex subject but, at a high level, there are a number of reasons for why investors bid prices that infer a premium to RAV including: the need to deploy capital; demand for having certain types of assets in the portfolio; assumptions about future business performance; assumptions about regulation; historical valuations; scarcity of opportunities; assumptions around terminal value of assets; financing assumptions; and others.

Importantly, Ofgem do not explicitly explain exactly how the relationship between the NAV and the cost of equity broadly support the CAPM-implied cost of equity.

This evidence is not well justified or explained. Ofgem themselves discuss that share prices, especially in the short run, could be influenced heavily by wider market noise. Secondly, as set out, for example, in the UKRN cost of capital report, any premium on corporate transactions could reflect a control premium or a winner's curse. Finally, the history of UK listed regulated assets indicates that during each price control since privatisation there was a period of time when assets traded below 1x RAV. Indeed, there are UK regulated utilities, which currently trade below 1x RAV according to present market valuations.

This topic has been explored extensively before and various studies have questioned the usefulness of MARs to inform determinations of the allowed return so without a new, robust analysis that can clearly address the issues highlighted before, simple inferences from MARs cannot be used reliably to inform estimates of required returns.

3.5 Is the evidence presented by Ofgem's cross check robust?

While the cross-checks employed by the Regulator are not the primary tool for estimating the cost of equity, Ofgem does narrow the range from 3.87-5.08% to 4-5% (CPIH real) based on this evidence suggesting that they place some weight on their conclusions or the broad support they provide.

The extent of the Regulator's reliance on this evidence would suggest a high degree of confidence in the robustness of the data, the calculation methodology and the analysis. Ofgem also proposes repeating these steps at the initial and final determination and, therefore, it is important that the approach is examined and tested.

The key issue with Ofgem's approach is the lack of information and clarity regarding the data and methodology for the analysis undertaken by the Regulator as well as explicit and appropriate consideration of different factors limiting robustness of the estimates. These factors limit the ability to draw conclusions regarding the quality of the support provided.

Overall, Ofgem's analysis and evidence discussed in this section appears to suffer from a wide range of methodological and estimation issues, including likely selection bias, estimates not being representative of the underlying data, wide dispersion of results, lack of consideration of appropriateness of using particular statistical estimators, interpretation of ranges of data, comparability of the underlying input data, etc.

While it is important to recognise limitations of any potential analysis or data that might suffer from some deficiencies, the large number of significant analytical problems highlighted above, lack of detailed analysis, and lack of regard for a variety of factors that are likely to affect the results and have to be controlled for suggests that Ofgem's estimates cannot be fully relied upon. This undermines the support that these results can offer for Ofgem's conclusions leaving the Regulator with evidence that seems to be deficient in terms of both quality and quantity.

4 Alternative fund IRR analysis

The analysis of the fund data used by Ofgem as evidence for investors' required rates of return discussed in the previous section indicates that the funds chosen for comparison mostly did not hold investments in regulated utilities and in fact had a different risk profile (and consequently different return requirements) from GDN investors.

By its very nature, any analysis as attempted by the Regulator is very sensitive to the choice of funds, which further increases the importance of selecting comparators that are most representative of the actual investor profile. This section presents an illustrative example of a similar exercise but based on, first, a careful examination of the ownership of energy network companies (gas and electricity distribution and transmission) to select comparable funds.

The energy network sectors are characterised by private sector ownership with models ranging from publicly listed utilities to infrastructure funds, pension funds, sovereign wealth funds and insurance companies. The underlying sources of capital for these investors are the savings and retirement vehicles which typically seek out stable and predictable income streams with moderate to low levels of risk.

The table below lists shareholders in networks, their stakes and shareholder profiles.

Table 6: Fund shareholders in networks and their profiles

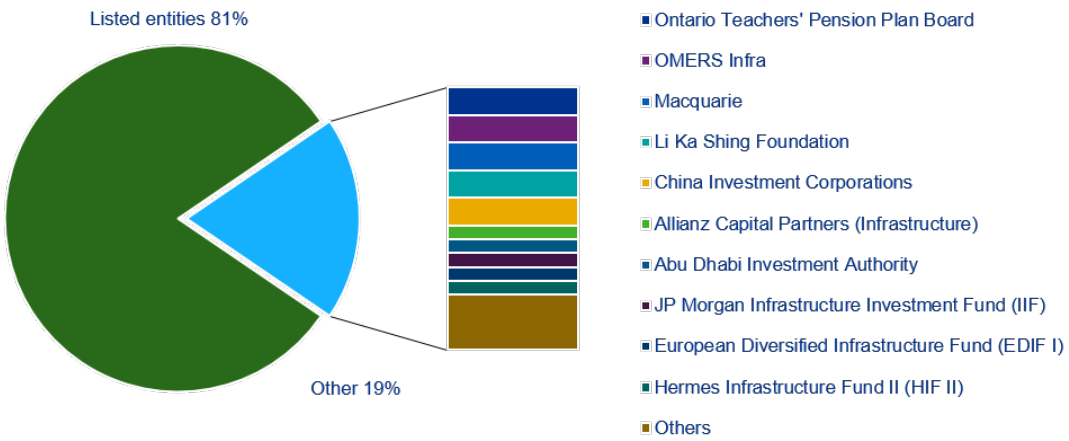
Networks and shareholders		Stake	Examples of shareholder LP profile
Cadent	Dalmore Capital Fund 3 (DCF 3)	4.4%	Pension funds incl. UK Mineworker Pension Scheme and Greater Manchester Pension Fund
	Hermes Infrastructure Fund II (HIF II)	8.5%	Pension funds incl. North East Scotland Pension Fund & Strathclyde Pension Fund
	Macquarie Super Core Infrastructure Fund	14.5%	Pensions plans such as South Carolina Retirement System Plans, South Korean Scientists and Engineers Mutual Aid Association and South Korea's Public Officials Benefit Association
	International Public Partnerships	4.4%	Pension funds incl. London Borough of Enfield Pension Fund and Derbyshire County Council Pension Fund
	Allianz Capital Partners (Infrastructure)	10.2%	Insurance company
	Qatar Investment Authority	8.5%	Sovereign Wealth Fund
	China Investment Corporations (CIC)	10.5%	Sovereign Wealth Fund
	National Grid Plc	39.0%	Publicly listed company
SGN	Ontario Teachers' Pension Plan Board (25%) - Public Pension Fund	25.0%	Pension fund
	OMERS Infrastructure Management Inc. (25%)	25.0%	Pension fund
	Abu Dhabi Investment Authority (16.7%) - Sovereign Wealth Fund	16.7%	Sovereign Wealth Fund
	Scottish and Southern Energy (SSE)	33.3%	Publicly listed company
Northern Gas Networks	CK Infrastructure Holdings	47.1%	A global infrastructure investor
	Power Assets Holdings	41.3%	N/A
	SAS Trustee Corporation	11.6%	N/A
Wales & West Utilities	Cheung Kong (Holdings)	30.0%	Part of the CK Infrastructure Group, a listed company
	CK Infrastructure Holdings (CKI)	30.0%	See above, a listed company
	Power Assets Holdings	30.0%	N/A

	Li Ka Shing Foundation	10.0%	N/A
National Grid Gas and NGET	National Grid Plc (Parent)	100.0%	Publicly listed company
Electricity North West Limited	JP Morgan Infrastructure Investment Fund (IIF)	50.0%	Several Pension Funds like Strathclyde Pension Fund, Chicago Teachers Pension Fund
	European Diversified Infrastructure Fund (EDIF I)	50.0%	Several Pension Funds incl. Devon County Council Pension Fund, State Pension Fund of Finland, Eurocontrol Pension Fund
Northern Powergrid	Berkshire Hathaway Inc. (Parent)	100.0%	Multinational conglomerate holding company, a listed company
Scottish and Southern Energy and SP Energy Networks	SSE Plc (Parent)	100.0%	Publicly listed company
UK Power Networks	CK Infrastructure Holdings (CKI)	40.0%	CKI is a global infrastructure company with infrastructure investments in the UK, Australia, New Zealand, the Netherlands, Portugal, Canada and China, a listed company
	Power Assets Holdings	40.0%	CK Infrastructure Holdings (CKI) holds a 38.87% interest in the company
	Li Ka Shing Foundation	20.0%	N/A
Western Power Distribution	PPL Corp (Parent)	100.0%	Publicly listed company
Scottish Power Transmission Limited	Iberdrola S.A (parent)	100.0%	Publicly listed company
Scottish Hydro Electric Transmission	SSE Plc (Parent)	100.0%	Publicly listed company

Source: KPMG analysis

The figure below presents the illustrative merit order of the owners of energy networks.

Figure 5: Illustrative merit order of funds based on energy network ownership



Note: The proportion of energy network ownership is calculated based on 2016/17 RAV values.

Source: KPMG analysis

We have performed an analysis similar to Ofgem's for the funds identified as currently holding investment in the energy networks.

Table 7: Comparator funds with exposure to energy networks not considered by Ofgem

The IRRs indicated are Net IRRs (i.e. IRRs post the impact of asset management fees). The actual bid IRRs would be gross of fees, which are typically 1.0-1.5%. For example, a Net IRR of 8.0%, would typically equate to 9.0-9.5% gross IRR, used to evaluate an investment opportunity.

Fund	Benchmarks	Profile and comments
Ontario Teachers' Pension Plan	Operates via direct investments; target Net IRR not disclosed	- The plan's infrastructure assets include investments in toll roads, airports, seaports, conventional and renewable energy, water distribution and wastewater plants. The majority of infrastructure assets are in the U.K., Europe, Chile, the U.S. and Australia - 26% of the infrastructure portfolio is invested in energy and 15% in water and wastewater - 25% stake in SGN
OMERS Infrastructure	Target Net IRR circa 7 - 11% (source = OMERS site)	- Invests globally in infrastructure and private equity assets on behalf of OMERS, the defined benefit pension plan for Ontario's municipal employees - Diversified portfolio of large-scale infrastructure assets exhibits stability and strong cash flows, in sectors including energy, transportation and government-regulated services - UK regulated utility investments include: SGN (25%) and Thames Water (32%)
Macquarie Infrastructure and Real Assets (MIRA)	Macquarie European Infrastructure Funds (MEIFs) (1 – 2): target Net IRR 11 – 15%; MEIFs (3 – 5): target Net IRR 10 – 12%; Macquarie Super Core Infra Fund: target Net IRR 7-8% (source = Inframation)	- Manages over 70 funds, all of which benefit from deep industry knowledge across regions and regulatory regimes - Diverse portfolio of sectors, including: Energy (5%); Waste (1%); Renewable energy (6%); and other utilities (37%) - 52% of assets are in Europe - 14.5% ownership of Cadent
JP Morgan Infrastructure Investment Fund	Target Net IRR 8 – 12% (source = Inframation)	- The fund seeks to invest in a broad range of infrastructure and infrastructure-related assets located primarily in the U.S. and Canada, Western Europe and Australia, and secondarily in other OECD countries - IIF focuses primarily on the GDP-sensitive (e.g. transportation), regulated utilities and contracted power sectors, targeting deals in the mid-cap space - 50% stake in ENWL and 29.3% in Southern Water
First State European Diversified Infrastructure Fund I (EDIF I)	Target Net IRR 10-12% (source = Inframation)	- The fund has direct investments in transport, power, energy, renewable and water sectors across Europe and Australia - 28.5% equity investment in Anglian Water Group (as a part of a consortium) and 50% in Electricity North West Limited
Hermes infrastructure	Target Net IRR circa 10% (source = Inframation)	- An infrastructure specialist operating a well-established UK-focused shared investment platform - Investments in Cadent (8.5%), Thames Water (8.7%), Southern Water (21%)
Dalmore Capital Limited	Target Net IRR 8 – 10% (source = Inframation)	- Focus is on lower volatility infrastructure assets, particularly in the UK (i.e. those without significant exposure to GDP, traffic/usage or market price risk) - Typically buy and hold strategy, of 15-25 years - Investments include Cadent (4.4% ownership), Anglian Water (7.5%) as well as Thames Tideway (33.76%)

Source: KPMG analysis

It is not clear why these funds have not been included in Ofgem's analysis, or whether they were considered for inclusion at all.

Notably, a simple addition of these funds to the data widens the current range of 7.2%-10.2% as per Table 10 to 7%-12% (on a net basis) and 8.0-13.5% (on a more comparable gross basis), although due consideration must be given to how a single figure estimate is derived from the data in order to avoid issues similar to those set out in Section 3.1.

In addition to the bottom-up examination of the current ownership structure in order to identify relevant funds, it is also useful to take a top-down approach by considering the largest infrastructure investment managers (e.g. in terms of funds raised in recent years) and whether their investments and exposure would make them comparable to energy network investors.

This approach suggests two funds that do not currently hold investments in GB energy infrastructure, but have exposure to regulated utilities.

Table 8: Additional comparator funds

Pan-European Infrastructure Fund (PEIF)	Target Net IRR 10% (source = Inframation)	- Invests largely in operational infrastructure assets across the transport, power, environment and renewable energy sectors in western Europe. - Pension funds and insurance (40% each) represent the largest category of investor; the remainder comprises banks, asset managers and funds of funds. - 23.37% investment in Kelda Water
Archmore International Infrastructure Fund II (UBS-IIF II)	Target Net IRR 10-12% (source = Inframation)	- The 15-year closed-ended fund targets direct equity investments across OECD member states, primarily in brownfield assets with 30% exposure to greenfield assets. - 6.3% investment in Southern Water

Source: KPMG analysis

For transparency, the details of other funds examined but not included in the analysis can be found in the Appendix.

These funds were excluded from the analysis set out above due to the lack of investments in regulated utilities. However, it should be noted that these funds have target Net IRRs of 10-15% and their inclusion would have widened the illustrative range by increasing the upper bound of the range to 15% and, depending on the estimation technique, could also impact the lower bound of the estimated range.

This also serves as a good illustration of the point made earlier regarding the sensitivity of the analysis to the choice of funds.

5 Risk and misalignment of returns

5.1 The changes in risk between RIIO-1 and RIIO-2

The analysis in the previous sections implies that there is likely to be a misalignment between the return that investors require and the potential allowed and expected return in RIIO-2. This could be ultimately justified and bridged over time with adjusted expectations if the underlying level of risk for networks under RIIO-2 was to decrease substantially.

The level of returns that regulators allow investors to earn are intended to reflect the returns that an investor would have earned if they had invested in a firm with a comparable risk profile. Therefore, the reduction in the allowed returns that networks could earn according to Ofgem implies a proportionate reduction in all risks facing the sector (and the underlying price of capital), including both systematic risks as well as any asymmetric risks affecting expected return.

This section examines at a high level whether there has been any material shift in the level of risk in the regulated energy networks in GB.

Operational and delivery risks such as disruptions by industrial action by employees and risk of not being involved in discussions surrounding development of energy landscape which could impact business have remained broadly unchanged during the time from RIIO-1 to the current period.

Companies have maintained a low appetite for operational risks and the nature of the business activities carried out by the companies has not changed materially (although, arguably, energy sector transition might in fact imply higher risks in the future). The range of low probability, high impact risks has not materially changed either, possibly with the exception of the increased downside-only risk of a cyber-attack. With the passage of time and further advancement of technology, the cyber threat is becoming more prominent across different industries. This has been recognised by Ofgem as well, with extensive discussion in the methodology and expectation that companies will deliver outcomes to this end.

The **political risks** that existed at RIIO-1 were primarily driven by pollution and the debate on affordability with the coalition government in its second year of the term. The coalition Government endorsed renewable penetration and a commitment to the introduction of a carbon floor.[25] In 2019 the utilities sector is still facing the risks of decarbonisation and fuel poverty.

In addition to these persistent *systemic* risks, new risks have emerged via the economic uncertainty posed by Brexit, a minority government and a manifesto pledge for nationalisation of utilities by the Labour party. Whilst Brexit is unlikely to affect the energy industry to the same extent as industries which rely more heavily on trade, the potential impact of Brexit to labour and supply chains is undoubtedly a risk to energy networks.

Furthermore, the introduction of a price cap in the retail market in recent years and the challenge that utilities face more generally on distributions to shareholders, capital and tax structures demonstrates a greater willingness of the Government to influence independent economic regulation.[26]

The **risks posed by energy transition** at RIIO-1 were largely in relation to uncertainty of the future of gas networks and the potential for asset stranding. The Energy Bill legislated the closure of coal power stations, aimed to reduce fossil fuel dependence and created financial incentives for a decentralised and decarbonised energy system. The uncertainty of the future of investments in the energy sector created by the transition of the energy system is a risk which has persisted to 2019. The penetration of renewable energy sources has increased, the roll out of smart meters

[25] http://www.dieterhelm.co.uk/energy/energy/stranded-assets-a-deceptively-simple-and-flawed-idea-4/
[26] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/700648/water-companies-letter-SofS-to-Ofwat-180418.PDF

has continued and decentralised energy generation/demand side response technology has grown. However, the future of the energy system in the UK has still not crystallised and therefore the risk to investors of this uncertainty is not known.[27]

The start of the RIIO-1 period closely followed the global financial crisis, which was reflected in the macro-economic conditions such as 12 month LIBOR rates at 1.85%, GDP growth 2% and 3.2% RPI inflation. Confidence in markets was low and the UK's credit rating was downgraded.

Despite the optimism that these conditions would recover significantly in the years following the recession, in 2019 the macro-economic conditions are similar to those at RIIO-1, interest rates aside which have unexpectedly persisted lower for longer. The level of **macro risks** may, on balance, be less or similar to that at RIIO-1 as 2019. But the political and economic uncertainty created by Brexit is at least equal to the scale of risk as there is no meaningful basis for predicting the post-Brexit relationship which can be used for forecasts.[28]

The '**internal' risks faced by the industry** at RIIO-2 have not materially changed from RIIO-1 in terms of industrial action, planning issues, influencing the policy of energy and risk of failure of critical national infrastructure. The only internal risk which has significantly developed over the past 5 years is cyber security breach as the volume and intensity of cyber-attacks on critical national infrastructure in the UK is growing and the shortage of cyber skills.[29]

On balance the political, energy transition, macro-economic and internal risks that energy networks were exposed to at the beginning of RIIO-1 appear to have largely persisted. A number of new risks, specifically in relation to Brexit, have arisen while the overall economic outlook is less risky or similar now to the situation *after* the global financial crisis.

Overall, new regulatory risks and changes to the regime aside, the level of underlying business and market risk appears to be broadly similar as at RIIO-1, and potentially greater due to some factors mentioned above. There appears no basis to suggest that there has been a significant reduction in risk that could justify the significant level of reduction in risk premia in returns (nor has Ofgem put forward any evidence to that effect) over and beyond changes in the 'base' cost of capital as reflected in the interest rates. Therefore, the misalignment between the expectations of equity investors and the RIIO-2 proposals might persist.

5.2 The potential impact of the perceived misalignment

Where a decrease in the allowed cost of equity is not accompanied by a commensurate reduction in risk, the resulting misalignment can have a significant negative impact.

In the short-term, the apparent misalignment could result in new investors favouring other sectors, thus reducing the pool of funds for companies to draw from and in an increase in the investors' churn. For existing investors, while immediate exit is unlikely, a reduction in discretionary investment, reduction in unobservable effort, or a delay in deployment of capital could ensue. Over time there may be changes to the investor type whose more passive asset management approach does not align as closely with the needs of networks as described below.

In accordance with corporate finance theory projects that are NPV negative generally should not be undertaken. Where the cost of equity is set at a low level (or even below) compared to the investor's required returns, the quantity of projects that do not meet this hurdle rate will have to increase. This means that the investors, and hence the companies, would be less willing to undertake discretionary projects beyond the minimum required to satisfy licence obligations. This could lead to unrealised investment opportunities and upsides for customers, which could have been beneficial to customers such as innovation.

[27] https://www.centrica.com/sites/default/files/future_of_our_energy_market_november_2018.pdf
[28] https://obr.uk/forecasts-in-depth/the-economy-forecast/brexit-analysis/
[29] Ibid.

The lack of discretionary investment in such a transformative time for energy, could lead to non-delivery of government policy aims, particularly those which require immediate investment such as the Paris agreement, the UK fifth carbon budget,[30] clean air targets or the decarbonisation of transport.

The misalignment can also result in companies being less incentivised to deliver day-to-day outcomes (levels of service) above and beyond the level obligated. If investor perception is that such discretionary activities will not be rewarded due to the calibration of the regulatory package, these will not be undertaken, ultimately to the detriment of the customer.

In general, due consideration has to be given to the impact of persisting misalignment on customers in terms of as a result of the reduction in innovation and a reduction in investor willingness to take on risks, challenge and transition.

An important justification for adopting incentive regulation in the first place is that in complex markets like utilities the outcomes described above cannot be all contracted for. A focus might shift to short term outputs at the cost of outcomes and investment needs in the longer term; many behaviours are likely be unobservable and might lead to reduced value add in the future.

This negative conclusion is aligned with expected outcomes in the sectors of the economy that offer less attractive or NPV-negative investment opportunities.

The decrease in returns may also impact capital markets confidence in the sector and lead to increased actual costs of capital and declines in liquidity. Increased actual costs of capital combined with a decrease in allowed costs of capital and a lack of liquidity may further impact companies' capability to deliver investment plans, increase refinancing risks, and increase the risk of failure and financial difficulty.

The potential impact of the above will be exacerbated by the fact that the UK energy sector is entering a transformative period, driven by decarbonisation, decentralisation and digitisation, which will require significant inflows of capital and business transformation. It will have to compete for private capital firstly with other UK infrastructure sectors and secondly with infrastructure investment requirements in other jurisdictions globally. Therefore the sector transition might be delayed.

Over the longer term an additional point to consider is the clear and well recognised correlation between risk and expected return and how it affects the types of funds that invest in a particular sector. The graph below is an illustration of the risk and reward parameters targeted by different investor classes.

[30] Carbon budget is a five-yearly statutory target that the UK must achieve as established by the Climate Change Act 2008.

Figure 6: Indicative target returns by different investor classes

Source: KPMG analysis

Different investor classes have different risk appetites and return expectations. They also differ in their approach to asset management (ranging from long term stewardship to short term cash extraction), and their investment horizon (ranging from 1-5 years to effectively open-ended).

Infrastructure and pension funds investors will generally fall between savings funds and PE funds in terms of the returns they expect to make and their investment horizon is likely to more closely resemble the profile of the regulated network companies.

If the allowed returns drop below the expected returns of infrastructure and pension funds, the ownership of companies in the sector may instead shift to lower risk investors such as savings funds. However, due to the size and scope of such funds, they might not have capacity to deploy material amount of capital, required to fund long-term projects in the energy networks. Moreover, as the size of such funds is typically limited, they might not have relevant resources and expertise required to manage the energy networks.

Thought must therefore be given to whether the expected return is likely to attract investors whose approach and horizon align with the needs of the energy system as well as ensuring that the risk and reward are in balance.

Overall, should the perceived misalignment persist, there could be a negative impact on discretionary investment spending and operational delivery improvements, which is likely to have long-term implications for customers as well as the energy transformation, both of which need careful consideration. Furthermore, over time there could be a shift in investor profile that might not be in the best interest of the companies and the society.

Appendix 1 Other comparator funds

This appendix presents other funds considered but not used in the analysis in Section 4.The IRRs indicated are Net IRRs (i.e. IRRs post impact of fees). The actual bid IRRs are estimated to be higher.

Table 9: Selected funds considered for benchmarking IRRs

Fund	Target IRR	Investment portfolio	Comparable to networks?	Rationale
Brookfield Infrastructure Fund III	Target IRR 10% (source = Inframation)	Targets investments across the transport, renewable energy, utilities and power sectors in North America, Europe, South America and Australasia	No	European energy investments in renewables with no regulated networks
Global Infrastructure Partners III	Target IRR 15% (source = Inframation)	Targets brownfield investments globally in the energy, transport and waste sectors across the OECD with a target gross internal rate of return (IRR) of 15 - 20%	No	One investment in a Spanish regulated gas company. Other investments mostly in renewable sector. No investments in UK regulated utilities
KKR Global Infrastructure Investors II	Target IRR 10 – 13% (source = Inframation)	Unlisted fund predominately targets investments in brownfield infrastructure; restructuring and developing assets across the transport, power, renewables and telecoms sectors	No	No investments in European regulated utilities
Stonepeak Infrastructure Fund II	Target IRR 12% (source = Inframation)	Targets middle market transactions between USD 75m to USD 300m in midstream oil & gas, renewables, regulated utilities, transport and water sectors across North America		No investments in European regulated utilities
ISQ Global Infrastructure Fund II	Target IRR 13 -14% (source = Inframation)	The fund's strategy is to invest approximately two-thirds of its capital in the United States (50%), Europe (20%), and select high-growth economies in Asia and Latin America (30%). The investments are targeted across middle market assets with a core risk profile across the energy (30%), utilities/telecom (30%), transportation (20%) and midstream (20%) sectors. No more than 25% in greenfield projects	No	No investments in UK regulated utilities. Energy investments concentrated around oil & gas transportation and renewables
Ardian Infrastructure Fund V	Target IRR 10 – 13% (source = Inframation)	The strategy is to invest in the full range of regulated and unregulated core infrastructure assets. These include gas and electricity grids, transport infrastructures such as toll roads, railways, airports and renewable energy assets	No	Current investments mostly comprise transport companies
Antin Infrastructure Partners III	Target IRR 12% (source = Inframation)	The fund strives to acquire controlling equity positions in infrastructure companies across the communications, energy, environment, healthcare and transportation sectors in Western Europe	No	The majority of current investments is in telecommunications and social infrastructure
EQT Infrastructure Fund III	Target IRR 13% (source = Inframation)	The fund primarily focuses on mid-sized operating infrastructure companies and/or assets with limited development and construction risk across North America, Continental Europe, and Nordic region. The fund invests in energy (mid-stream, power, and utilities), transportation and logistics (ports, rails, airports, and parking), environmental (waste, water, and industrial), telecom (towers, fibre, and datacentres), and social infrastructure (public services and facilities) sectors	No	The majority of current investments is in telecommunications

Source: KPMG analysis

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