

Draft impact assessment

RIIO-2 Network Price Controls Draft Impact Assessment

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Team:	Network Price Controls	Type of IA:	Qualified under Section 5A Utilities Act 2000
Associated documents:	RIIO-2 Sector Specific Methodology Decision	Contact for enquiries:	RIIO2@ofgem.gov.uk
Coverage:	Partial coverage		

This document sets out analysis of the benefits and costs to consumers and network companies of different options related to our decisions for regulating gas and electricity transmission, and gas distribution networks in the next regulatory period from April 2021. These benefits and costs are compared to the counterfactual RIIO-1 regulatory framework. This is a draft impact assessment which will be updated at the determinations stage in 2020.

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Introduction

Purpose

This draft impact assessment (IA) aims to identify and assess the impacts of a number of options, including a preferred option, on consumers and network companies in the next regulatory period. Our analysis is limited to the gas and electricity transmission, and gas distribution sectors unless otherwise specified.

While most of the analysis supporting our regulatory options, including our decision, is set out within this document and appendices, we also rely on evidence and analysis published by Ofgem in a number of other documents.¹ Specifically, this document should be read alongside the suite of RIIO-2 Sector Specific Methodology Decision documents published on 24 May 2019.

In the May Decision documents, we made some decisions on the values we intend to apply to parts of the price controls starting in April 2021. In other areas the values we provide are our current working assumptions. Accordingly, the impact assessment is presented in draft at this stage.

The key focus of the draft impact assessment is to answer the question of whether the changes in methodologies/tools and parameters under the options considered for the next regulatory period starting in 2021, provide good value for consumers.

We note that the benefits and costs to consumers and companies identified in this draft impact assessment are relative to the RIIO-1 counterfactual (as defined through this document), and are based on a set of assumptions.

We will update this draft impact assessment at draft determination in 2020. This includes updating the analysis using actual proposed allowed revenues, as set in the price controls for gas and electricity transmission and gas distribution companies, relative to the values we would have set under the RIIO-1 counterfactual.

Structure and content

The remainder of this document sets out our analysis of the impact of the options we have considered for the next price control period. This is structured as follows:

- Chapter 1 describes the context for the impact assessment, including background to the next price control, and the policy objectives Ofgem is seeking to achieve.
- Chapter 2 describes the options that Ofgem has explored for regulating network companies in the next regulatory period.
- Chapter 3 explains the purpose and scope of the draft impact assessment and our approach to the analysis.
- Chapters 4 and 5 present our analysis of the impacts of our regulatory options on network companies and consumers in the next price control. In Chapter 4, we estimate the impact of some components of our options on network companies' revenues. In Chapter 5, we quantify the impact on consumers as well as considering wider impacts, including effects on the environment, and social outcomes.

¹ While not an exhaustive list, we refer to four documents in particular:

- Ofgem (March 2018), [RIIO-2 Framework Consultation](#)
- Ofgem (July 2018), [RIIO-2 Framework Decision](#)
- Ofgem (December 2018), [RIIO-2 Sector Specific Methodology Consultation](#)
- Ofgem (May 2019), [RIIO-2 Sector Specific Methodology Decision](#)

- Chapter 6 considers the impact of our regulatory options on companies and consumers beyond the next regulatory price control period.
- Chapter 7 presents an assessment of the main risks and uncertainties surrounding the options considered.
- Chapter 8 presents a summary of our assessment of the options and the corresponding conclusions.
- The appendices provide:
 - A summary of consultation responses in relation to the high-level impact assessment published in December
 - Additional evidence from relevant economic literature
 - Additional information and analysis around incentive rates and underspend in the RIIO-1 price control period to date
 - Analysis on the estimated consumer bill impact arising from changes to the cost of capital, including additional analysis around the cost of debt.

Summary: Intervention and options

What is the problem under consideration? Why is Ofgem intervention necessary?

The activities undertaken by energy network companies present the features of a 'natural monopoly', which means it is most efficient for a single firm to produce a number of outputs rather than two or more firms.² The presence of a natural monopoly leads to a market failure whereby the monopoly firm might exploit its 'market power' and charge consumers an excessively high price, or produce poor quality outputs.

Ofgem uses price controls to limit what companies can charge to use their networks³ and to encourage firms to produce outputs that consumers value. Ofgem is now required to determine the regulatory framework that will be in place from April 2021 onwards for the gas and electricity transmission, and gas distribution sectors.⁴ This should protect consumers from paying more for their energy than they need to. A stable and credible system of price control regulation can also help to encourage investment by firms, which should ultimately benefit consumers through improved network services.

What are the policy objectives and intended effects including the effect on Ofgem's Strategic Outcomes?

Ofgem's principal objective in carrying out its functions is to protect the interests of existing and future electricity and gas consumers.⁵ In pursuit of this objective, we must have regard to a number of factors, including:

- The need to secure that, so far as it is economical to meet them, all reasonable demands in Great Britain for gas conveyed through pipes are met;
- The need to secure that all reasonable demands for electricity are met;

² This situation arises due to the presence of economies of scale and scope when an industry comprises a large proportion of fixed costs. See Decker (2015), *Modern Economic Regulation*, for a definition of natural monopoly, pages 14-15.

³ For an overview of network regulation, see; <https://www.ofgem.gov.uk/network-regulation-riio-model>

⁴ The next price control for electricity Distribution Network Operators (DNOs) will begin in 2023. We will start the consultation process on our approach to setting this price control with an open letter in summer 2019.

⁵ S4AA Gas Act 1986 and s3A Electricity Act 1989

- The need to secure that licence holders are able to finance the activities which are the subject of obligations on them;
- The need to contribute to the achievement of sustainable development; and
- The interests of individuals who are disabled or chronically sick, of pensionable age, with low incomes, or residing in rural areas.

These duties are reflected in our objective for the next price control, which is to ensure that regulated network companies deliver the value for money services that both existing and future consumers need. This involves the delivery by network companies of the following outcomes:

- Improving the consumer and network user experience: network companies must deliver a high quality and reliable service to all network users and consumers, including those who are in vulnerable situations.
- Supporting the energy system transition: network companies must enable the transition to a low carbon, consumer-focused energy system.
- Improving the network and its operation: network companies must deliver a safe, sustainable and resilient network that is more responsive to change.

In this draft impact assessment, we set out a number of options to achieve these outcomes. In doing so we use the analysis presented in this draft impact assessment, alongside other analysis and evidence, to assess their impact and associated value for energy consumers.

What are the policy options that have been considered, including any alternatives to regulation?

In undertaking this draft impact assessment, we have considered four main options around the application of economic regulation over the next price control period:

- **Option 1 - Do nothing counterfactual:** Under this option, we would continue to apply the same tools and calibration as applied within RIIO-1.
- **Option 2 - Recalibrated RIIO-1:** We would retain similar mechanisms to RIIO-1 but revise certain areas of the regulatory package to reflect learning and evaluation.
- **Option 3 - Targeted changes (our decision):** We would continue to use incentives to drive consumer benefit but would make more significant changes to certain areas where we identify the potential for increased benefit.
- **Option 4 - Alternative regulatory framework:** Under this option we would move towards a regulatory framework which is closer to 'rate of return' regulation with limited upside incentive to match a low level of downside risk.

A number of factors have informed our choice of options. These include the evidence available to date on the effectiveness of the current RIIO-1 price controls; the role of networks within the broader energy system transition; the wider economic, policy and technological context; and theoretical and practical considerations.

We have not considered option 4 in detail, with most of our analysis focussed on comparing options 2 and 3 against the RIIO-1 counterfactual (option 1).

On balance, based on our assessment of quantified and non-quantified impacts, we think that the package of tools under option 3 is the most effective for the next regulatory period. We expect this option to incentivise network companies to deliver the network services required by consumers at lower cost. By lowering the cost of equity compared to

RIIO-1 (reflecting new information on cost of finance) and by retaining incentives for cost efficiency), we expect it to deliver net benefits to GB consumers of around £4 billion.⁶

Preferred option - Monetised Impacts (£m)

Business Impact Target Qualifying Provision	Non Qualifying
Business Impact Target	Not Applicable
Net Benefit to GB Consumers Direct consumer Net Present Value (NPV) figures represent the direct impact on energy consumers compared to counterfactual (under option 3, central case) over the next price control period	Direct benefits excluding switch to CPIH: £3,940m (£1,955m to £5,044m) Direct benefits including switch to CPIH: £1,854m (-£109m to £3,310m)
Wider Benefits/Costs for Society Direct wider impacts include the direct revenue impact on network companies and administrative costs for companies compared to counterfactual (under option 3, central case) over the next price control period	Direct only excluding switch to CPIH: -£4,497m (-£2,801m to -£5,705m) Direct only including switch to CPIH: -£2,411m (-£736m to -£3,611m)
Net impact The overall net effect includes the net impact on consumers and companies compared to counterfactual (under option 3, central case) over the next price control period	Excluding switch to CPIH: -£557m (-£846m to -£301m) Including switch to CPIH: -£557m (-£846m to -£301m)

⁶ This figure does not include the impact of a switch in indexation from RPI to CPIH, which is neutral to consumers over the long-term. If we add to the figure above the expected reduction in the cost of debt compared to current rates and across all sectors, including electricity distribution, the net benefit to consumers increases to approximately £6 billion. We explain how we calculated this figure in Appendix 4.

Explain how the Net Benefit was monetised, NPV or other

NPV is calculated over the next regulatory period (5 years), from 2021/22 to 2025/26, using a discount rate of 3.5% (as per HM Treasury Green Book guidance). Costs and benefits are in 2021/22 financial year prices and have been inflated using CPIH indexation.

Some costs and benefits are hard to monetise and would arise beyond the next regulatory period. These are considered qualitatively.

We note that the switch from the Retail Price Index (RPI) to Consumer Price Inflation including Owner Occupiers' Housing Costs (CPIH) for indexation of the regulated asset value and allowed returns should be value-neutral to both investors and consumers in the long-run (consumers will be neither worse off nor better off). However, it does affect the timing of repayment of the Regulatory Asset Value⁷ (RAV), meaning that it reduces consumer benefits within the next regulatory period.

Our estimates of costs and benefits are indicative and subject to significant uncertainty in particular in relation to how companies might respond to the incentives provided under our preferred option. We have undertaken scenario analysis to consider the impacts of different potential responses.

Preferred option - Hard to Monetise Impacts

We have performed a partial quantification for some of the components of our preferred option while others are considered qualitatively. In particular, we have not quantified impacts arising from changes to competition, companies' responses to some of the tools introduced, and innovation and administration costs.

We consider that a large proportion of the monetised and non-monetised impacts we have identified would take place in the next regulatory period (RIIO-2, between 2021 and 2026).

However, we have also considered impacts that may go beyond the next regulatory period. These arise from decisions undertaken by companies that have long-term impacts. In particular:

- Medium-term strategic impacts: these relate to asset resilience, competition, changes to the inflation rate and incentive rate.
- Long-term sustainability impacts: these relate to investment, innovation and impact on the environment.

We identify that in some areas existing consumers would fund companies to deliver benefits that would be realised beyond the next regulatory period (for example investment in innovation). In other areas, regulatory mechanisms might benefit consumers in the next regulatory period while future consumers might face some costs (for example support for vulnerable consumers).

⁷ The value ascribed by Ofgem to the capital employed in the licensee's regulated business (the 'regulated asset base'). The RAV is calculated by summing an estimate of the initial market value of each licensee's regulated asset base at privatisation and all subsequent allowed additions to it at historical cost, and deducting annual depreciation amounts calculated in accordance with established regulatory methods. These vary between classes of licensee. A deduction is also made in certain cases to reflect the value realised from the disposal of assets comprised in the regulatory asset base. The RAV is indexed to allow for the effects of inflation on the licensee's capital stock

Key assumptions / sensitivities / risks

Several impacts associated with the options we analyse are difficult to quantify given the stage of policy development and / or lack of appropriate data at this point. However, we have quantified the aspects that we expect to have the largest impact on companies and consumers.

We have applied a number of “working assumptions” in order to assess impacts, which means some of the input values we use to calculate impacts may vary at draft and final determination. Accordingly, any quantitative estimates are indicative at this stage.

Whilst some analysis can be completed using the information we currently have, there is uncertainty regarding how the network companies will respond in practice to the sector methodologies. Where appropriate, we have quantified a range of possible impacts and made use of sensitivity and ‘breaking point’ analysis.

Our analysis is also sensitive to many elements of the wider environment in which the price control will operate. For example, the pace of technological development will be a key facilitator or barrier to cost efficiencies being realised over the period.

We also identify implementation risk in those areas of option 3 where we are proposing significant change or the introduction of new methodologies.

Overall, we consider that the potential for significant consumer benefit resulting from our preferred option outweighs the risk associated with it.

Will the policy be reviewed? Yes	If applicable, set review date: From 2020
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Is this proposal in scope of the Public Sector Equality Duty?	No
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Option summary tables

The table on the next page provides a high-level summary of the expected impacts of our regulatory options. Further detail on the underlying analysis and evidence can be found in the relevant chapters throughout this document.

The monetised impacts presented below represent a partial quantification of some of the components of our options. The NPV presented for options 2 and 3 is an estimate of the impact on consumers over the next regulatory price control period (RIIO-2, between 2021/22 to 2025/26) compared against the RIIO-1 counterfactual as defined for this draft impact assessment. For option 3 (our preferred option) we present estimates under a range of scenarios. We also present net benefit to consumers including and excluding the switch from RPI to CPIH.

We note that most of the expected quantified impacts on consumers arise from transfers from companies to consumers due to changes to the allowed return on equity.

In terms of the effects from changes in incentives, we note that our central case estimate under option 3 may be an underestimate of expected consumer benefits. This reflects the use of conservative assumptions around network companies' responses to a reduction of the totex incentive rate (see Chapter 4 for further details).

The quantified impacts also exclude a number of methodologies for individual policy areas. In most cases, we consider that the impacts of these methodologies are likely to be consistent across both options 2 and 3. Accordingly, we do not believe they have a material bearing on the overall assessment.

Compared against the defined RIIO-1 counterfactual, both options 2 and 3 would result in a better risk allocation between consumers and companies. In particular, some element of both options would protect consumers against the risk of network companies earning additional returns, which are not due to performance improvements for example through efficiency or innovation. Under option 3, the introduction of Return Adjustment Mechanisms (RAMs) is expected to protect consumers and investors against ex post overall returns from network price controls deviating greatly from ex ante expectations.

Table 1: Impact on consumers of options 2 and 3 compared to counterfactual - quantified and non-quantified impacts, net present value of consumer benefit (£m 2021/22 (CPIH))

Area of package	Mechanism	Option 2	Option 3	Option 3 Range	
				Low	High
Changes to financial parameters	Return on equity	1,054	3,424	2,610	3,729
		Network companies will receive less remuneration for equity investment. Key credit ratios are expected to be broadly similar or slightly improved on a notional company basis.			
Changes to financial parameters	Switch to CPIH	-2,022	-2,086	-2,064	-2,094
		This change will be value-neutral to both investors and consumers in the long-term (consumers will be neither worse off nor better off), but does affect the timing of repayment of the RAV. This means the consumer benefit is negative within the next regulatory period, but will be positive after about twenty years.			
Changes to incentives	Totex Incentive Mechanism and informational tools	0	225	-676	1,032
		No change from counterfactual	A combination of lower incentive rates and the introduction of our new information tools may reduce information rents, benefitting consumers		
	Output Delivery Incentives	138	291	21	643
		Consumer benefits from more ambitious targets and minimum standards of performance. Benefits may reduce where companies reduce delivery of outputs as a result of removal of incentives.	Consumers are expected to benefit from more ambitious and dynamic output targets. However, consumer benefits may reduce where companies reduce delivery of outputs as a result of removal and re-calibration of incentives.		
	Price control deliverables	Consumers will benefit from tying network company expenditure (totex allowances) more closely to delivery. However, consumer benefits may reduce because network companies will have less flexibility to deliver cost efficiencies			
Changes to other elements	Return Adjustment Mechanisms (RAMs)	0	0	0	0
		RAMs are unlikely to be triggered under all scenarios considered and based on design that has previously been consulted on. Note that the final design of RAMs has not yet been determined and may be different to that considered within this draft IA.			
	Length of price control	Consumers will benefit from lower risk of forecasting inaccuracies. However, there could be some negative impact because companies focus on shorter-term results.			
	Innovation funding	Similar outcomes to RIIO-1, but more targeted on areas that add consumer value. We expect the extent of innovation funding to be broadly in line with that observed in RIIO-1.			
	Competition	Where opportunities are identified to introduce competition into projects, consumers may benefit from additional cost and service efficiencies within the price control period. Future consumers also stand to benefit from better information revealed by prices that are set competitively.			
Administration costs		Additional costs for the regulator and for companies to manage the new tools. These will be passed onto consumers and are likely to be marginally higher under option 3 given the introduction of additional tools.			
Total quantified impacts		-829	1,854	-109	3,310
Total, not including switch to CPIH		1,192	3,940	1,955	5,404

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1. Context

This chapter explains the strategic context for this draft impact assessment, including the background to the next price controls starting in 2021 and the policy objectives that Ofgem is seeking to achieve.

Background

- 1.1 Consumers rely on gas and electricity to heat, light and power their homes and businesses. This energy is transported from its place of generation, or point of injection, through vast networks of pipes and wires that span Great Britain (GB). Private companies own and operate these networks, while their costs, and profits, are paid for by consumers via their energy bills.
- 1.2 These network companies operate in regions where they largely have a monopoly on network services. The high costs of building and maintaining such large networks mean that having multiple duplicative networks with companies competing against each other for customers would deliver a less efficient outcome than having a single network. In other words, they are natural monopolies.
- 1.3 Economic regulation of these network companies was introduced in GB in the 1980s. The regulatory framework initially simply adjusted allowed revenues by the Retail Price Index less a high-level efficiency savings estimate (RPI-X), and was focused on lowering the cost of energy network services. Over time the regulatory framework has taken on additional aims, and new mechanisms were introduced in order to address perceived issues with the previous framework. For example, incentives related to service quality were introduced to balance the imperative under RPI-X controls for network companies to minimise costs whilst maintaining longer-term service quality.⁸
- 1.4 Ofgem reviewed the regulatory framework in its RPI-X@20 Review.⁹ The resulting Revenue = Incentives + Innovation + Outputs (RIIO) framework was introduced in 2010. Ofgem applied the RIIO framework for the first time to gas distribution (RIIO-GD1), and to electricity and gas transmission (RIIO-T1) from 1 April 2013. It then applied the framework to electricity distribution (RIIO-ED1) from 1 April 2015.
- 1.5 The new RIIO framework was designed to encourage energy networks to:
 - Play a full role in the delivery of a sustainable energy sector.
 - Deliver value for money network services for existing and future consumers.
- 1.6 The RIIO framework evolved from Ofgem's approach to prior price controls (particularly DPCR5).¹⁰ This included the use of total expenditure ('totex') and a focus on network companies' outputs.¹¹ It also introduced some new ideas – most notably a move to a longer price control period (eight years rather than five) and the

⁸ This description of the application of economic regulation to energy sector is taken from CEPA (2018), Review of the RIIO framework and RIIO-1 performance, page 14.

⁹ Ofgem (2010), [Regulating energy networks for the future: RPI-X@20, Impact Assessment](#).

¹⁰ CEPA (2018), Review of the RIIO framework and RIIO-1 performance.

¹¹ Ofgem (2010). RIIO: A new way to regulate energy networks. Final Decision.

option to agree a company's price control early if it submitted a strong Business Plan ('fast-tracking').

- 1.7 The RIIO framework also gave stakeholders a more prominent role in shaping companies' Business Plans.¹²

Problem under consideration

- 1.8 The current RIIO-1 network price controls for electricity and gas transmission, and gas distribution companies were set for an eight-year period, which will end in March 2021. A new set of price controls will need to be in place for the start of the next price control period on 1 April 2021 and Ofgem is required to determine the methodology that it will apply in setting these.
- 1.9 Ofgem needs to decide whether to continue using the existing RIIO framework, a variant of it, or develop a different regulatory approach in setting these future price controls.
- 1.10 In making this decision, Ofgem has considered a number of factors, including evidence of the performance of network companies during the RIIO-1 price controls. More broadly, we have considered the economic, technological and policy environment in which our decision will apply.

Network company performance under RIIO-1 price controls

- 1.11 The current regulatory framework to date has delivered well for consumers, especially in terms of some specific outputs, such as reliability and service quality. Energy networks are now more reliable and consumers are highly satisfied with the service provided by local network operators.¹³ There is also evidence that companies are increasingly deploying innovative solutions in managing their networks.
- 1.12 Ofgem has assessed the overall financial performance of network companies during the RIIO-1 price controls using a measure called the Return on Regulatory Equity (RoRE). RoRE is an estimate of the financial return achieved by regulated companies' shareholders during a price control period based on actual (and forecast) performance. It is a useful way to gain an overall picture of how regulated companies have been performing under the price control.
- 1.13 Measured in terms of operational RoRE (which excludes debt and tax performance), most of the network companies have been achieving double-digit, or close to double-digit returns in real terms throughout the RIIO-1 price control period.¹⁴ There are a number of factors driving this performance. Some of this performance is because of greater efficiency, good performance against targets, or companies innovating to cut costs.

¹² Please see page 16, Role of stakeholders in the price control review. Ofgem (2010). RIIO: A new way to regulate energy networks. Final Decision.

¹³ Please see Ofgem (2018). RIIO-2 Framework Consultation, page 15. In gas distribution, satisfaction has improved with some GDNs consistently achieving scores over 9/10 and the number of complaints has reduced by 20% since 2013-14. Since 2013, more than 64,000 consumers experiencing fuel poverty have been able to get a connection to the mains gas grids so they can get cheaper energy. The electricity network companies have reduced the carbon footprint of their networks in the past two years by 850,000 tCO₂e. The innovation stimulus has raised research and development spending and should result in significant benefits for consumers from nationwide rollout of successful schemes. Our framework has encouraged greater deployment of lower cost operational solutions and competition is starting to take shape in the onshore sector.

¹⁴ See Regulatory Financial Performance Annex to RIIO-1 Annual Reports, 2017-18.

Table 2: Forecast Operational RoRE under RIIO-1 (real RPI, based on 2017/18 performance data) for gas and electricity transmission and gas distribution sectors

		Operational RoRE
RIIO-GD1	Cadent	9.5%
	NGN	10.7%
	SGN	11.2%
	WWU	11.6%
RIIO-ET1	NGET (TO)	9.3%
	SPT	8.7%
	SHET	9.2%
RIIO-GT1	NGGT (TO)	6.4%
RIIO-ED1	ENWL	9.7%
	NPG	8.2%
	SPEN	7.0%
	SSE	8.2%
	UKPN	10.7%
	WPD	9.6%

Source: Ofgem (March 2019), Regulatory Financial Performance Annex to RIIO-1 Annual Reports, 2017-18

- 1.14 However, systematic outperformance may also indicate that companies have been set budgets and targets that were easier to outperform than anticipated. This may arise because the presence of 'information asymmetry' between the regulator and regulated companies can create incentives for companies to act strategically, for example by misrepresenting information, such as overstating costs.¹⁵
- 1.15 Companies' informational advantage in utility regulation has been widely acknowledged in the academic literature, especially in the case of ex ante price regulation regimes. This is emphasised in a paper by Joskow,¹⁶ and also in a recent paper¹⁷ published by the UK Regulators Network (UKRN) on cost of capital. The paper suggests that regulators should consider the impact of information asymmetry when determining companies' cost of capital.
- 1.16 Returns received by network companies have been higher than Ofgem expected when the RIIO-1 price controls were set. Beyond potential efficiency improvements, two broad underlying factors that have contributed to higher than expected returns include:
- we need to estimate the cost of financing these companies, which is the returns that they pay to investors. Observed market evidence shows that these costs have decreased and remained low since the parameters for RIIO-1 were set, and supports our view that the cost of capital for the next regulatory period should be lower.
 - we face significant uncertainty and are at an informational disadvantage relative to the companies when estimating the cost of implementing their Business Plan,

¹⁵ See C. Decker (2015), Modern Economic Regulation, An introduction to theory and practise, page 86, section 4.4.

¹⁶ <http://www.nber.org/chapters/c12566>

¹⁷ <http://www.ukrn.org.uk/wp-content/uploads/2018/03/2018-CoE-Study.pdf>.

and the effort required to achieve delivery targets. This creates a tendency towards allowed costs being over-inflated, with incentive mechanisms being set too high. Our analysis suggests that information asymmetry is a contributor to the high level of returns seen in RIIO-1.

- 1.17 A review of RIIO-1, conducted by CEPA for Ofgem¹⁸ supports our view that the returns the companies earned did not reflect their overall risk exposure.¹⁹ This suggests we need to re-balance the risk/reward profile, ensuring that customers continue to benefit from high levels of service quality but at lower cost.
- 1.18 The review conducted by CEPA, coupled with Ofgem's own internal analysis, has identified a number of issues and possible changes that could be made to improve the price control framework for the next period. These issues fall broadly within the following four areas as identified by CEPA in its report:
- application of the RIIO principles and objectives of the RIIO-framework
 - risk allocation
 - skew of expected return
 - information revealing devices.
- 1.19 In the next paragraphs we describe the issues identified in each of the four areas mentioned above. The options that we have considered to address issues in each of these areas are set out in Chapter 2.

Application of the RIIO principles and objectives of the RIIO-framework

- 1.20 The RIIO framework was intended to be high-powered (eg those companies delivering high quality services at lower costs earning attractive rates of return) and created execution risk for Ofgem. If not implemented correctly the RIIO regulatory framework would lead to consequences that are more significant for network companies and/or customers than under a lower-powered regime. CEPA²⁰ noted that:
- some allowances were not adequately linked to outputs.
 - some cost allowances were based on outdated information and some companies may have been double-rewarded as activities funded under baseline revenues were also rewarded through output incentives.

Risk allocation

- 1.21 According to CEPA the RIIO-1 price controls have exposed network companies to some risks that are likely to be outside their control.²¹ CEPA considered that so far in

¹⁸ CEPA (2018), [Review of the RIIO framework and RIIO-1 performance](#), (p.26) We note that the evaluation is based on four years of actual costs and four years of forecasted costs on GD-1, GT-1 & ET-1, and two years of actual costs and six years of forecasted costs in ED-1. We acknowledge that actual cost for the remaining of the price control might change by the end of the price controls and that the close-out process might also impact those numbers. Nevertheless, we consider this the most relevant information available at this point of time.

¹⁹ See CEPA (2018), [Review of the RIIO framework and RIIO-1 performance](#), executive summary, page 3.

²⁰ See CEPA (2018), [Review of the RIIO framework and RIIO-1 performance](#), page 18.

²¹ See CEPA (2018), [Review of the RIIO framework and RIIO-1 performance](#), page 19.

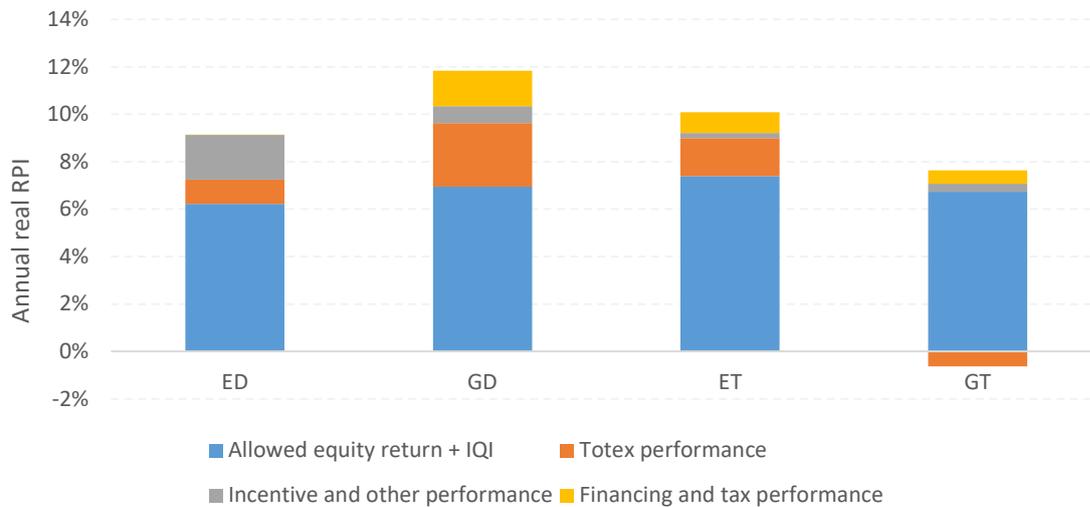
RIIO-1 these risks have been favourable to network companies, resulting in added returns that are not due to their performance. For example²²:

- it estimated that during the first four years of RIIO-T1 and GD1, Real Price Effects²³ have resulted in additional RoRE of 80 basis points for National Grid Electricity Transmission (NGET), 40 basis points for National Grid Gas Transmission (NGGT) and 70 basis points for gas distribution networks (GDNs).
- GDNs have been rewarded through the national transmission system exit capacity incentive partly because gas volumes have been lower than Ofgem's forecast.
- the fast-track settlements for the Scottish transmission operators (TOs) included baseline allowances for transmission projects that depended on new generation coming online. Delays or cancellation of the generation projects resulted in underspends and additional returns for the TOs.

Skew of expected returns

- 1.22 In its review, CEPA considered that ex ante mechanisms can be a powerful incentive on network companies to become more efficient and deliver service improvements, but that they carry an inherent risk that the regulator sets the wrong allowances and/or targets (for example, because the information available at the time was incorrect). In practice, it considered that the upside potential for network companies is likely to exceed the downside risk because the companies have an information advantage over Ofgem.
- 1.23 CEPA concluded that the intended high-risk/high-reward framework envisaged for RIIO-1 might not have been realistically achievable. It added that Ofgem did not include a mechanism in RIIO-1 to protect customers against the residual risk of network companies earning "added returns" that are not due to performance improvements.
- 1.24 The figure below presents totex, financing and tax and incentives as specific sources of these additional returns for each sector expressed in terms of RoRE.

²³ This an input cost risk related to specific inputs network companies use in delivering their services.

Figure 1: RoRE performance– RIIO-1 price controls (annual real RPI %)

Source: Ofgem analysis, supporting data file to Regulatory financial performance annex to RIIO-1 Annual Reports, 2017/18.

Information revealing devices

1.25 In RIIO-1 Ofgem used two tools to incentivise companies to submit accurate expenditure projections and better quality Business Plans: the Information Quality Incentive (IQI) and fast-tracking.

Information Quality Incentive

1.26 Ofgem has used the IQI to set cost allowances in previous price controls.

1.27 The presence of information asymmetry between the regulator and the regulated firm can create incentives for a firm to act strategically, for example by misrepresenting information, such as overstating costs.²⁴

1.28 The IQI aims to address this asymmetry between Ofgem and the network companies by making it theoretically optimal for companies to propose their true expected costs (not to over- or under-bid).²⁵

1.29 The IQI provides a financial incentive for companies not to inflate their cost forecasts. This works by basing certain parameters within the price control on the ratio of the 'company view' of efficient costs (as set out in their Business Plan) to the 'Ofgem view' of efficient costs (as set out ultimately in our final determination of allowed costs). Companies that achieved low IQI ratios were rewarded (through additional income and higher incentive rates) and those with high IQI ratios penalised (through penalties and lower incentive rates).²⁶

1.30 However, the theory which underpins the IQI is based on some important conditions²⁷:

²⁴ See C. Decker (2015), *Modern Economic Regulation, An introduction to theory and practise*, page 86, section 4.

²⁵ See CEPA (2018), *Review of the RIIO framework and RIIO-1 performance*, page 76.

²⁶ See Ofgem (March 2018), *RIIO-2 Framework consultation*, page 66.

²⁷ See CEPA (2018), *Review of the RIIO framework and RIIO-1 performance*, page 76.

- Network companies are risk-neutral (they view the possibility of an £1m reward equally to the same risk of a £1m penalty).
- Ofgem is able to set its baseline view of efficient costs independently of companies' own forecasts (or more accurately, companies must not think that their proposals could influence the baseline).
- The allowed rate of return is equal to network companies' actual cost of capital.

1.31 These conditions may not hold true for some, or even all, applications of the IQI in practice. For example, companies are generally assumed to be risk averse and this is validated by insights derived from behavioural economics studies. Loss aversion means companies may favour minimising downside risk over maximising returns.

1.32 Similarly, present bias can exacerbate preferences for short-term wins over optimising longer-term returns. Ofgem's approach to cost assessment means that the baseline is unlikely to be completely independent of companies' forecasts, particularly for transmission companies, where Ofgem does a bottom-up assessment of companies' proposed projects and the ability to benchmark costs is more limited.²⁸ Even if a company incurs an up-front penalty under the IQI, it is possible that the benefit from placing upwards pressure on Ofgem's cost allowances may result in additional underspending which outweighs this.

1.33 We identified a number of other potential shortcomings of the IQI in our Framework Consultation. For example, we observed that even a stronger version of the IQI may not be sufficiently effective at penalising relatively low levels of company forecasting inaccuracy. Additionally, we observed that the IQI has been seen to be a complex and often misunderstood incentive mechanism.

1.34 Our analysis of the operation of the IQI mechanism during the RIIO-1 price control suggests that the conditions listed above are unlikely to hold. There is limited evidence that the IQI sufficiently influenced companies' behaviour to submit cost projections that reflect the best estimates of their likely efficient expenditure.²⁹

Fast-tracking

1.35 In addition to the IQI, 'fast-tracking' (or early settlement) encouraged companies to submit well-justified Business Plans. In RIIO-1, fast-tracked companies received additional upfront income as well as higher incentive rates, compared to slow-tracked companies.

1.36 Ofgem raised the following concerns with fast-tracking³⁰ based on the evidence available from RIIO-1:

- It may not be appropriate (and may be unduly costly for consumers) to use two separate mechanisms to provide incentives for the same outcome (a well-justified Business Plan).
- Fast-tracking has the potential to incentivise improved Business Plans, but only in sectors where there is adequate diversity of ownership and comparability between the companies. Early settlement also has other costs not previously

²⁸ CEPA, (2018) Review of the RIIO framework and RIIO-1 performance, page 76.

²⁹ Ofgem, RIIO-2 Framework Consultation (March 2018), page 65.

³⁰ Ofgem, RIIO-2 Framework Consultation (March 2018), pages 69-70.

appreciated, including the risk of making process errors and providing insufficient scrutiny of Business Plans.

Economic, technological and policy context

1.37 In addition to the evidence from the current price controls, we also need to take into account the broader economic, technological and policy context in deciding how to regulate network companies in the future. In particular, the next suite of price controls will need to take into account three major forces shaping the transformation of the energy sector:

- **Decarbonisation:** increasing amounts of renewable generation are being connected to transmission and distribution electricity networks and as a result the network has to accommodate more distributed and variable generation. Further, the decarbonisation of the transport sector through electric vehicles require additional network capacity.
- **Digitalisation and smart demand:** smart meters and the provision of new energy services will allow consumers to shift consumption. These demand-side measures will reduce the need to build new generating and network capacity.
- **Decentralisation:** increasing amounts of renewable generation are being connected to energy distribution networks. Further, more flexible solutions, including smart grid technologies and increasing use of flexible contractual arrangements between demand and generation, would reduce the need for building additional network capacity.

1.38 The realisation and timing of these changes is uncertain and presents a number of challenges for the regulator. In particular, it makes it difficult to establish ex ante revenues and costs allowances for a multi-year regulatory period and exacerbates the risk of forecasting errors, which are discussed above.

Price control objectives

1.39 Our objective for the next price control is to ensure that regulated network companies deliver the value for money services that both existing and future consumers need.³¹ This involves achieving the following outcomes:

- **Meet the needs of consumers and network users:** network companies must deliver a high quality and reliable service to all network users and consumers, including those who are in vulnerable situations.
- **Maintain a safe and resilient network:** network companies must deliver a safe, sustainable and resilient network that is efficient and responsive to change.
- **Deliver an environmentally sustainable network:** network companies must enable the transition to a smart, flexible, low cost and low carbon energy system for all consumers and network users.

1.40 There will be potential trade-offs to consider between these outcomes. There may, for instance, be trade-offs between delivering better value for existing consumers, and higher quality services for future consumers. Ofgem has to strike the right balance between these aims in order to best achieve the objective and outcomes for the next price control, and some regulatory judgement will necessarily be required.

³¹ Ofgem (May 2019), RIIO-2 Sector Specific Methodology Decision – Core Document, page 9.

- 1.41 The analysis presented in this draft impact assessment has been used by Ofgem to judge how well the options deliver against each of these aims and in comparison to the RII0-1 counterfactual.

2. Options considered

This chapter describes the options that Ofgem has explored for regulating gas and electricity transmission, and gas distribution network companies in the next price controls starting in April 2021.

Regulatory tools

- 2.1 Ofgem has several 'tools'³² available to help it to achieve its price control objectives. Most of these tools are commonly applied in ex ante regulatory regimes in other sectors and countries. At a high level, these tools can help to deliver better outcomes for consumers, by mitigating information asymmetries and helping to reduce the risk and impact of benchmarking and forecasting errors.³³
- 2.2 We can group these tools into four main categories³⁴ of the regulatory framework:
- financial tools
 - incentives
 - other tools, for example, including price control length, extent of stakeholder engagement, and use of competition and innovation
 - tools to manage risk and uncertainty.
- 2.3 In the table below we provide some examples of the main tools available to Ofgem in each of these four categories. Some of these tools have been used by Ofgem in previous price controls and might contribute to the achievement of more than one policy objective.

Table 3: Types of tools available to Ofgem as part of the regulatory framework

Categories	Purpose	Examples
Financial tools	<ul style="list-style-type: none"> • To have regard to the need to ensure that network companies can finance their activities at a price that is fair for the consumer 	<ul style="list-style-type: none"> • Cost of equity • Notional gearing • Cost of debt • Indexation
Incentives - Informational	<ul style="list-style-type: none"> • To incentivise companies to reveal information on cost, risk and uncertainty and to mitigate information asymmetries • To limit opportunities for companies to act strategically by overstating their cost estimates 	<ul style="list-style-type: none"> • Menu of contracts/IQI • Business Plan Incentive

³² These can be defined as instruments, mechanisms, policies used by Ofgem as part of the regulatory framework.

³³ This results from uncertainty about future network use and future cost saving technologies.

³⁴ We acknowledge that any categorisation of the tools available to us is arbitrary. So our description should be taken as illustrative only. It aims at facilitating discussion and presentation of the impacts arising from the options presented in this draft impact assessment.

Incentives – Operational	<ul style="list-style-type: none"> To create incentives and arrangements so that network services are delivered at the most efficient cost To limit benchmarking errors 	<ul style="list-style-type: none"> Benchmarking or bottom-up approaches to set totex allowances Totex – assigning equal weight to capital and operational expenditure Incentive rate
Incentives - Outputs	<ul style="list-style-type: none"> To maintain a safe and resilient network To meet the needs of consumers and network users To deliver an environmentally sustainable network 	<ul style="list-style-type: none"> Customer Interruption Shrinkage Customer satisfaction New connections
Other – Competition and innovation	<ul style="list-style-type: none"> To encourage greater efficiency over time 	<ul style="list-style-type: none"> Competition (late/early models) Funding for Innovation
Other - length of price control	<ul style="list-style-type: none"> To strengthen incentives available in the regulatory period Reduce forecasting and benchmarking errors 	<ul style="list-style-type: none"> 5 or 8 years
Other – external engagement	<ul style="list-style-type: none"> To identify 'outputs' valued by consumers To help Ofgem to scrutinise companies' Business Plan submissions 	<ul style="list-style-type: none"> RIIO-2 Challenge Group Companies' User/Customer Engagement Groups Open Hearings
Risk allocation and uncertainty tools.	<ul style="list-style-type: none"> To allocate risk optimally between consumers and network companies To protect consumers and investors against the risk of unaddressed information asymmetries, forecast and benchmark errors resulting in higher or lower returns than are acceptable 	<ul style="list-style-type: none"> Uncertainty mechanisms Volume driver mechanisms Reopeners RPE Indexation RAMs Indexation of RAV Inflation Indices Mid-period reviews

Long list of options considered

Changes to the regulatory framework

- 2.4 In light of the problems identified in Chapter 1, Ofgem has considered whether changes to the RIIO framework and the tools it is using for regulating network companies are needed and what alternative approaches could be used to solve the problems identified.
- 2.5 These alternatives have also been discussed in a number of documents published by Ofgem prior to the publication of the May 2019 Sector Specific Methodology Decision. We refer the reader to these documents for more details.³⁵
- 2.6 We have considered the following factors when developing a number of plausible regulatory options for the next regulatory period:
- Theoretical considerations of alternative regulatory regimes on a spectrum from the RIIO framework of ex ante incentive based regulation as applied in the existing price controls (such as RIIO-1) to ex post rate of return regulation.³⁶
 - Accepted best regulatory practices, in particular:
 - Targeted incentives: incentives should apply only to factors that are under the network companies' control, otherwise there is risk of windfall gains or losses that are not due to company performance.
 - Risk allocation: risks should be allocated to the parties best placed to manage them.
 - Proportionate risk/reward balance: the price control package should be calibrated so that baseline returns are consistent with the level of risk that network companies are exposed to.
 - Considerations of what policy choices, where we have more than one, are mutually exclusive and where they would fit along the spectrum from no change to major changes presented in the four options.
 - Evidence of the effectiveness of various mechanisms used by Ofgem and other regulators in previous price controls.
 - The wider economic, technological and policy context.
- 2.7 This allowed us to develop four options that range from no change to major overhaul and from ex ante regulation to ex post rate of return regulation. We describe these four options and their main components below. We also explain Ofgem's reasoning in considering those options.

³⁵ In particular, we refer to four documents:

- Ofgem (2018), [RIIO-2 Framework Consultation](#)
- Ofgem (2018), [RIIO-2 Framework Decision](#)
- Ofgem (2018), [RIIO-2 Sector Specific Methodology Consultation](#)
- Ofgem (2019), [RIIO-2 Sector Specific Methodology Decision](#)

³⁶ As part of this exercise, we have not explored some other regulatory options such as a system operator model or negotiated settlement. Nor have we explored in depth all possible variants of ex ante incentive regulation.

Table 4: Long list of options considered by Ofgem

Category	Existing instrument in RIIO-1
1. Do nothing: "counterfactual"	This option would involve Ofgem using the same mechanisms used in RIIO-1, set at the same level. We would re-apply the RIIO-1 framework and sector methodologies and reset allowances and output targets based on updated data.
2. Recalibrated RIIO-1: "Do minimum"	This option is a revised version of RIIO-1 that considers findings from CEPA's evaluation of RIIO-1, in particular those on risk allocation. As part of this option, Ofgem would make better use of existing mechanisms (for example IQI), introduce new mechanisms to reduce risk (for example Index RPEs) and remove other elements (for example early settlement).
3. Targeted changes	Under this option, Ofgem would still use incentives to drive consumer benefit, but we would make more significant changes. We would reduce the power of the incentives available (for example reduction in the incentive rate), reduce the benefits gained by companies through the business planning process (confidence-dependent incentive rate, Business Plan Incentive (BPI)) and share the cost of outperformance currently borne by consumers (relative incentives, return adjustment mechanisms).
4. Alternative regulatory framework	This option would involve Ofgem moving towards an alternative regulatory framework, which is closer to rate of return regulation. As part of this option, there would be less emphasis on 'upside' incentives. Efficiencies would be driven through ex post assessment and greater use of competition in all sectors.

Short list of options

- 2.8 Although we have not previously explicitly set out the options described above in our previous publications, the different tools used under each of the four options were subject to extensive consultation in March 2018 (RIIO-2 Framework) and December 2018 (RIIO-2 Sector Specific Methodology). Given the feedback received from network companies and other parties, we have refined or ruled out some of the mechanisms considered.
- 2.9 In particular, feedback received from network companies through these consultation exercises and analysis conducted by Ofgem means that we have not considered option 4 in detail within this draft impact assessment. We consider that a regulatory framework close to rate of return regulation would represent a fundamental change that is not currently in the best interests of existing and future consumers, particularly given the scale and pace of the energy system transition. The evidence

from the literature on rate of return regulation is mixed³⁷ and not compelling enough to justify such a major shift in approach.

- 2.10 Accordingly, most of the analysis has focussed on comparing options 2 and 3 against the RIIO-1 counterfactual (option 1). Both options retain an ex ante, incentive-led framework that can stimulate progressive behaviours and drive improvements in efficiency.
- 2.11 We describe in Table 5 and subsequent text the alternatives that Ofgem has considered under options 2 and 3 and the reasoning behind them.

³⁷ See for example [Newbery \(1997\) for a comparison between the two.](#)

Table 5: Key features of the options considered by Ofgem

Area of regulatory framework	Option 1: Do nothing ('counterfactual')	Option 2: Recalibrated RIIO-1 ('do minimum')	Option 3: Targeted changes
Enhanced Stakeholder engagement	Effective stakeholder engagement underpinning Business Plans incorporated in fast-track incentive. No prescriptive description what we mean by "effective".	Effective stakeholder engagement underpinning the Business Plans , with clear explanation of what "effective" means assessed as part of fast-tracking incentive.	Effective stakeholder engagement underpinning the Business Plans, with clear explanation of what "effective" means assessed as part of the BPI <ul style="list-style-type: none"> • RIIO-2 Challenge Group • Companies' User/Customer Engagement Groups • Open Hearings
Financial tools and parameters	RIIO-1 values for: <ul style="list-style-type: none"> • Cost of equity • Notional gearing • Indexing RAV and allowed returns to RPI 	<ul style="list-style-type: none"> • Adjustment to RIIO-1 cost of equity determinations reflecting ED1 decisions and change in risk free rates • RIIO-1 notional gearing • Indexing RAV and allowed returns to CPIH 	Allowed return on equity methodology as published in the May Decision Finance Annex, including: <ul style="list-style-type: none"> • 3 step process (Capital Asset Pricing Model (CAPM) methodology, cross checks, and distinguishing between allowed and expected returns) • 60% notional gearing assumption • Indexing RAV and allowed returns to CPIH
Informational Incentives	<ul style="list-style-type: none"> • Early settlement • Fast tracking reward • IQI 	<ul style="list-style-type: none"> • No early settlement • Fast tracking reward • Revised IQI 	<ul style="list-style-type: none"> • No early settlement • BPI with rewards and penalties

			<ul style="list-style-type: none"> Confidence-dependent Incentive Rate approach
Operational Incentives	Totex approach	Totex approach with defined use of price control deliverables	Totex approach with defined use of price control deliverables
	Higher incentive rate on totex set using the IQI	Higher incentive rate on totex set using the IQI Defined use of price control deliverables	Moderate incentive rate on totex set using the confidence-dependent incentive rate approach Defined use of price control deliverables
Output incentives	Output categories as per RIIO-1 Output targets reset to reflect improvements in performance	Output categories largely as in RIIO-1 Output targets reset to reflect improvements in performance Licence conditions / guaranteed standards to reflect minimum levels of performance required Bespoke outputs where supported by enhanced engagement	Output categories largely as in RIIO-1 Output targets reset to reflect improvements in performance Licence conditions / guaranteed standards to reflect minimum levels of performance required Dynamic or relative targets for Output Delivery Incentives (ODIs), where appropriate Bespoke outputs where supported by enhanced engagement
Other – Innovation	Network Innovation Allowance Network Innovation Competition Innovation Roll-Out Mechanism	Opportunity for Network Innovation Allowance, depending on justification New innovation funding pot for strategic challenges	Opportunity for Network Innovation Allowance New innovation funding pot for strategic challenges

Other – Competition	Late competition for large projects in electricity transmission only	Early/late competition in electricity transmission and gas sectors (where appropriate)	Early/late competition in electricity transmission and gas sectors (where appropriate)
Other - length	8 years	5 years	5 years
Risk allocation and uncertainty tools	Uncertainty mechanisms used in RIIO-1	Uncertainty mechanisms used in RIIO-1 Indexation of RPEs	Uncertainty mechanisms used in RIIO-1 Indexation of RPEs RAMs – sculpted sharing

Financial

Allowed return on equity

- 2.12 The cost of equity is an estimation of the return that equity investors expect. The allowed return is the rate set by the regulator at the start of each price control period. It is a significant part of the price control settlement. It is important because the energy sector requires investors that are willing to invest in utility infrastructure to meet consumer needs. We estimated that each 10 basis points (0.1 percentage point) movement in the allowed return on equity is worth approximately £172m on consumer bills over a five-year period.³⁸
- 2.13 In the Sector Specific Methodology Consultation (December 2018) we proposed a three-step methodology to set the allowed return on equity. Step 1 involves estimating the cost of equity using the Capital Asset Pricing Model (CAPM)³⁹ in light of market evidence; Step 2 involves cross-checking the CAPM results against various sources in the equity investor markets; and Step 3 involves making an explicit distinction between expected and allowed returns.
- 2.14 We also proposed to index the allowed return on equity to annual movements in the risk-free rate.
- 2.15 Chapters 4 and 5 assess the impact of changes to the allowed return on equity on companies and consumers.

Switch from RPI to CPIH

- 2.16 Ofgem provides network companies a real (rather than nominal) return and allowance. This provides network companies and consumers with protection from inflation risk.
- 2.17 Chapters 4, 5 and 6 assess the impact of changing indexation from inflation measures from RPI to CPIH.

Informational incentives

- 2.18 The asymmetry of information between the regulator and the regulated companies might result in companies trying to exploit their information advantage by submitting generous cost forecasts and softer targets to increase their prospect of high returns.

³⁸ Ofgem, RIIO-2 Framework Consultation (March 2018), pages 69-70.

Figure is calculated with £93,000m RAV, 63% gearing (RAV weighted average across sectors for RIIO-1), and a five-year period: $0.1\% * (1-63\%) * £93,000 * 5 \text{ years} = £172\text{m}$. We assume a RAV value of £93,000m (nominal) for illustration purposes. This is obtained by summing the 17/18 NPV neutral RAV return bases across sectors and converting to nominal (£66,113m) and growing by 5% a year to FYE 24/25 ($£66,113 * (1+5\%)^7$). This is approximately the same result as growing each individual sector by their compound average growth rate until FYE 24/25. To convert to nominal, we use average RPI for financial years, where available, and assume 3% growth thereafter. In March 2018, we referred to a RAV of £100,000m, whereas here we use more recent data and lower growth assumptions. Notional gearing of 63% is used, to be consistent with RIIO-1 average. A lower notional gearing working assumption is made below, but the RIIO-1 gearing is used here to isolate the effect of changing allowed equity returns. This does not apply to RIIO-ED2, but represents our latest thinking on the cost of capital for networks.

Ofgem, RIIO-2 Framework Consultation (March 2018), pages 69-70.

³⁹ The CAPM estimates investor expectations as the weighted average of a risk-free rate (such as government bonds) and the returns from the average firm on the stock market. The weight placed on stock market returns (also called total market returns or TMR) is called beta. The higher the beta, the higher the estimated return on equity. We confirmed the use of the CAPM in our Framework Decision in July 2018.

- 2.19 In RIIO-1, Ofgem used two tools to incentivise companies to submit accurate expenditure projections and better quality Business Plans: the IQI and fast-tracking.⁴⁰
- 2.20 As explained in Chapter 1, Ofgem expressed some concerns about the effectiveness of these tools based on its experience of RIIO-1.⁴¹ Ofgem decided in July 2018 to rule out early settlement for electricity transmission, gas transmission and gas distribution and has been considering alternative mechanisms to the IQI and fast-tracking.⁴² In December 2018, we consulted on a number of new/revised tools: the Business Plan Incentive (BPI), confidence-dependent incentive rate, and Ofwat's menu of options.⁴³
- 2.21 Under option 2, we consider that in light of the decision made in July 2018, Ofgem would apply an 'intensified and simplified IQI' as described in Chapter 4 and fast-tracking without early settlement. Under option 3, we would use the BPI with penalties and rewards⁴⁴ and the confidence-dependent incentive rate approach.

Operational incentives

Totex approach

- 2.22 For all three options we will retain the totex approach where Ofgem does not distinguish between operational and capital expenditures. Under options 2 and 3 these would be complemented by defined price control deliverables.⁴⁵ As discussed in Chapter 4, price control deliverables will capture outputs that are directly funded through baseline revenues in the price control and protect customers from delay in delivery or failure to deliver.⁴⁶

Incentive rate

- 2.23 In the December consultation document, Ofgem set out its preference for removing the IQI and instead setting incentive rates via an approach, which is now called the 'confidence-dependent incentive rate'. We considered that this approach had more advantages over the current approach where the incentive rate is determined under the IQI mechanism.⁴⁷
- 2.24 We have assumed that under option 2 Ofgem would retain an 'intensified and simplified IQI' as discussed above and the incentive rate would be determined by the IQI. Under option 3, Ofgem would instead apply the confidence-dependent incentive rate approach.
- 2.25 Under the confidence-dependent incentive rate approach costs included within companies' Business Plans to form totex allowances would either be determined by Ofgem to be high-confidence or lower-confidence baseline costs. Under our current working assumptions, high-confidence baseline costs would be assigned a 50%

⁴⁰ Ofgem (March 2018), RIIO-2 Framework consultation, page 66.

⁴¹ Ofgem (March 2018), RIIO-2 Framework Consultation, Chapter 6

⁴² Ofgem (July 2018), RIIO-2 Framework Decision, Chapter 5

⁴³ Ofgem (December 2018), RIIO-2 Sector Specific Methodology Consultation, Chapter 9

⁴⁴ Reward and penalties would also take into account the engagement process followed by companies in preparing their Business Plans.

⁴⁵ In RIIO-2, we will use PCDs to capture those outputs that are directly funded through the price control and where the funding provided is not transferrable to a different output or project. The purpose of a PCD will be to ensure the conditions attached to the funding are clear up-front.

⁴⁶ Ofgem (December 2018), RIIO-2 Sector Specific Methodology consultation, page 26

⁴⁷ Ofgem (December 2018), RIIO-2 Sector Specific Methodology consultation, Chapter 6

incentive rate and lower-confidence baseline costs would be assigned a 15% incentive rate.⁴⁸ A single, weighted average sharing factor will then be calculated based on the balance of high-confidence and lower-confidence baseline costs.⁴⁹

Output incentives

- 2.26 As discussed in Chapter 1, the RIIO framework evolved from Ofgem's approach to prior price controls and has a stronger focus on outputs. In RIIO-1, Ofgem incentivised the delivery of six categories of outputs across all different sectors.
- 2.27 Under option 1, Ofgem would retain the same outputs as in RIIO-1 and use information obtained from the companies to reset some of the targets to reflect improvement in performance.
- 2.28 Under option 2, in addition to resetting targets (as under option 1) Ofgem would also remove some outputs, introduce bespoke targets and introduce price control deliverables.
- 2.29 Under option 3, Ofgem would reset targets, remove some of the output incentives, use more stretching targets and make use of dynamic targets and introduce bespoke outputs. It would also introduce price control deliverables.
- 2.30 We described these approaches in further detail in Chapter 4 of the May 2019 Sector Specific Methodology Decision Core document.

Other tools

Other - Innovation

- 2.31 In the July 2018 Framework Decision, Ofgem decided to retain an innovation stimulus package for the next regulatory period, limited to projects that might not otherwise be delivered.⁵⁰ In the December Sector Specific Methodology document, Ofgem set out its expectation that lower-risk operational and maintenance innovation projects should be funded as BAU by companies, and proposed⁵¹:
- to reward companies with ambitious Business Plans using the BPI
 - that the enhanced engagement groups (Customer Engagement Groups, User Groups and the independent RIIO-2 Challenge Group) would challenge the level of ambition within companies' innovation strategies
 - to remove the Innovation Roll-out Mechanism.
- 2.32 We also proposed introducing a new funding pot to replace the Network Innovation Allowance, which would focus on big strategic innovation challenges within networks and system operation.
- 2.33 The decision to retain an innovation stimulus was informed by our experience of innovation in the current and previous regulatory periods.
- 2.34 We consider that an innovation stimulus package would be needed given the scale of challenges associated with the energy system transition. In the context of a shorter five-year price control period, there is a risk that these innovations may not be

⁴⁸ These incentive rates are expressed on a post-tax basis.

⁴⁹ Ofgem (May 2019), RIIO-2 Sector Specific Methodology Decision, page 108

⁵⁰ Ofgem (July 2018), RIIO-2 Framework Decision, Chapter 4

⁵¹ Ofgem (December 2018), RIIO-2 Sector Specific Methodology Consultation, pages 68-69

delivered without additional funding on top of companies' allowed revenues.⁵² This is particularly the case where payback periods from investment were longer than a five-year price control would allow

- 2.35 We consider that additional innovation funding would therefore be required under options 2 and 3, in the form of a Network Innovation Allowance and a strategic innovation fund for large-scale transformational innovation projects targeted at key energy system transition challenges.

Other - Competition

- 2.36 In the December Consultation, Ofgem consulted on making late competition available in the electricity transmission and gas sectors for projects that meet the relevant criteria, and consulted on using early competition⁵³ to deliver more efficient costs and ideas. Ofgem consulted on a competition framework which included:

- late competition through specific competition models⁵⁴ and criteria for electricity transmission and gas sectors;
- high level design options for approaches to early competition; and
- more explicit requirements for networks to utilise competition to deliver projects under the totex incentive mechanism (what we termed 'native competition').

- 2.37 Under option 1 we consider that late competition models would be applied to electricity transmission only. Under options 2 and 3, we would apply late and early models of competition to suitable projects in electricity transmission and gas sectors.

Other - length of the price control

- 2.38 The length of the existing RIIO-1 regulatory period is eight years. Given the evidence described in Chapter 1, Ofgem considered whether such a length was appropriate given the uncertainty and the considerable information asymmetries it faces in setting allowances and outputs up-front. As explained in more detail in the July 2018 Framework Decision, we decided to set the default length of the price control to five years. We therefore apply a five-year price control under options 2 and 3.

Other - Enhanced stakeholder engagement

- 2.39 Involving stakeholders in the price control review process could help the regulator scrutinise network companies' Business Plans and also ensure that the services delivered by network companies appropriately reflect consumers' preferences. For example network companies could propose bespoke outputs informed by this engagement process.
- 2.40 Ofgem implemented 'enhanced stakeholder engagement' in the preparation of their RIIO-1 Business Plan and during the price control period. However, we did not specify what represented 'effective engagement' with stakeholders. We have

⁵² Review of the RIIO framework and RIIO-1 performance, CEPA, March 2018; https://www.ofgem.gov.uk/system/files/docs/2018/03/cepa_review_of_the_riio_framework_and_riio-1_performance.pdf

⁵³ Network competitions can be run at different stages of a typical project development cycle. For example, a competition could be used to facilitate system planning, ie run prior to the project design process to reveal the best idea to meet a system need (early competition). Alternatively, once an idea for meeting a system need is specified and sufficiently developed (for example secured planning consent), there can be competition for the delivery of that project (late competition) See Ofgem, (December 2018) Sector Specific Methodology Consultation core document, Chapter 8.

⁵⁴ Competitively Appointed Transmission Owner (CATO), Special Purpose Vehicle (SPV), Competition Proxy Model (CPM).

considered improvements to enhanced engagement based on recommendations from CEPA and our own analysis.

- 2.41 Under option 2, following recommendations from CEPA, we would issue further guidance to explain what we mean by effective engagement.
- 2.42 Under option 3, we would aim not only to keep stakeholders at the heart of the decision making by companies but also to strengthen the voice of consumers in the price control settlement processes. In addition to requiring Business Plans to be underpinned by good quality stakeholder engagement, we would implement an enhanced stakeholder engagement model with the following key additional features over and above option 2⁵⁵:
- The establishment of User Groups in transmission sector (including the ESO) and Customer Engagement Groups in distribution sector. Companies are required to set up these independently Chaired groups;
 - The establishment of an Independent RIIO-2 Challenge Group by Ofgem;
 - Open Hearings prior to our draft determination for the next price control to focus on areas of disagreement raised by the groups.

Managing risks and uncertainty

- 2.43 The RIIO-1 framework (and previously the RPI-X model) made use of tools, primarily uncertainty mechanisms, to manage risk and uncertainty during the price control. As described in Chapter 1, CEPA identified that in RIIO-1 network companies were exposed to some risks that were likely to be outside of their control.
- 2.44 In the December 2018 Sector Specific Methodology consultation Ofgem proposed changes to improve the allocation of risk between companies and consumers. This included the indexation of RPEs rather than forecasting these. We consider that indexation of RPEs would apply under options 2 and 3 in line with best regulatory practice. Additional uncertainty mechanisms, such as income adjusting events, would continue to be implemented under options 2 and 3.
- 2.45 In addition to better risk allocation, in the December 2018 consultation Ofgem also proposed to introduce arrangements that would adjust company returns if they were found to be significantly outside of a range that might be expected. These included discretionary or mechanistic mechanisms, and a spectrum of different approaches including sculpted sharing. This mechanism would apply only under option 3.

Summary of options considered

- 2.46 We have described the main regulatory tools Ofgem has at its disposal and derived a long list of four regulatory options for the next regulatory period. Our choice of options has been informed by a number of factors. This includes the evidence available to date on the effectiveness of the current RIIO-1 price controls, regulatory best practice, the wider economic, policy and technological context; and theoretical and practical considerations.
- **Option 1** - Do nothing counterfactual: Under this option, we would continue to apply the same tools and calibration as applied within RIIO-1.

⁵⁵ Ofgem (2018), RIIO-2 Framework Decision, Chapter 2

- **Option 2** - Recalibrated RIIO-1: We would retain similar mechanisms to RIIO-1 but revise certain areas of the regulatory package to reflect learning and evaluation.
- **Option 3** - Targeted changes (our decision): We would continue to use incentives to drive consumer benefit but would make more significant changes to certain areas where we identify the potential for increased benefit.
- **Option 4** - Alternative regulatory framework: Under this option we would move towards a regulatory framework which is closer to 'rate of return' regulation with limited upside incentive to match a low level of downside risk.

2.47 We have derived a short list of options (2 and 3) and then described the tools that would be utilised under each.

3. Approach to draft impact assessment

This chapter explains the purpose and scope of this draft impact assessment and our approach to the analysis in it.

Overarching approach to draft impact assessment

Purpose and scope of the draft impact assessment

- 3.1 The analysis in this draft impact assessment is intended to support our decision making process on the most appropriate regulatory option for the next price control period. In particular in this draft impact assessment we:
- consider how the main changes proposed under options 2 and 3 discussed in Chapter 2 can affect incentives, conduct and the output delivery of the network companies
 - consider the interactions between the different tools used under the three regulatory options and identify areas where trade-offs between different objectives are being made
 - quantify some impacts and, based on this partial quantification, estimate benefits for consumers
 - take into account intended impacts and, as far as possible, any potential risks, unintended consequences and wider implications of the options considered;
 - reflect information and evidence provided to us in responses to Ofgem's consultations⁵⁶
- 3.2 We note that this is a draft impact assessment, centred around the information we currently have in support of our decisions. The nature of some of our methodologies means that some elements can only be assessed qualitatively. Additionally, for those areas where we provide quantification, the values presented are subject to some uncertainty at this stage. This reflects that a number of values are currently presented as 'working assumptions' and will not be fixed until the determinations stage in 2020.
- 3.3 Uncertainty also exists where the anticipated impact may depend on financial or economic conditions at a future point in time, the composition and value of Business Plans (that we have not yet received), and the nature of behavioural response to incentives that cannot be directly observed at this time. We explain this further in Chapters 4-6.

Impacted stakeholders and key impacts

- 3.4 We have identified the expected impacts of our regulatory options and those stakeholders that will be impacted based on a combination of economic theory and evidence from previous price controls.

⁵⁶ In particular, information and evidence provided to us in response to Ofgem (2018), [RIIO-2 Framework Consultation](#) and Ofgem (2018), [RIIO-2 Sector Specific Methodology Consultation](#)

Impacted stakeholders

- 3.5 We consider that the following stakeholder groups will be impacted by our decisions for the next price controls (we recognise that there may be other stakeholders that are also affected by certain decisions):
- Existing and future consumers (including vulnerable consumers) – directly impacted
 - Network companies and their investors shareholders – directly impacted
 - Generators, suppliers, and flexibility service providers such as demand response aggregators – indirectly impacted through network charges
 - Government and regulators, including Ofgem, BEIS and HMRC – indirectly impacted through licence fees, administration costs, and taxes
- 3.6 Our assessment of impacts has largely focused on direct impacts on existing and future consumers, but has also taken into account the direct impacts on regulated companies and their investors that our methodologies may have. This is because some of the impacts on consumers we have identified result from absolute cost reductions or increases on companies, whereas others are a direct transfer from companies to consumers.
- 3.7 We are not considering indirect and distributional impacts on the stakeholders listed under bullets 3 and 4 at para 3.5. The combination of charging methodologies, which define the distribution of network charges, and the price control, which determines allowed revenues to be recovered, can have a distributional impact on different types of network user facing different proportions of costs dependent on the nature of their use of the system.⁵⁷

Key impacts

- 3.8 The impacts that we have considered in this draft impact assessment have been informed by Ofgem's principal objective and general duties as described in Chapter 1, and the objectives and outcomes that Ofgem has defined for the next regulatory period.⁵⁸ Those impacts can be categorised in the following broad categories:
- Impacts during the next price control (Chapters 4 and 5)
 - Impacts beyond the next price control (Chapter 6)
 - Implementation (administration costs and practicalities) (Chapters 4 and 5)
- 3.9 The short/longer-term impacts have been captured in terms of the immediate impact on company revenues/profits, benefits to consumers, and the range and quality of network services the companies deliver. We have distinguished, where possible, between those impacts that may be immediately apparent, and those that may not be discernible until future price controls. Specifically, we have considered:
- Impact on network companies' revenues (Chapter 4) from
 - Changes to financial parameters and methodology
 - Changes to incentives

⁵⁷ Network companies' allowed revenues are recovered through charges on users of the network. The way in which revenues are distributed between different users is set out in charging methodologies which apply in each sector.

⁵⁸ Ofgem (2019), Sector Specific Methodology Decision, page 9

- Changes to other elements
- Impact on network companies' financeability (Chapter 4)
- Impact on consumers (Chapters 5 and 6)
- Wider impacts, including the environment (Chapters 5 and 6)
- Distributional impacts (Chapter 5)

Determining the counterfactual for assessing impacts

3.10 Our draft impact assessment assesses the relative impact of our regulatory options (2 and 3) for the next price controls against a counterfactual.

3.11 We make some assumptions about the counterfactual in order to measure the impact of the options considered relative to what otherwise would have happened. This allows us to compare the relative impacts associated with different options.

3.12 We have assumed that the relevant counterfactual would be the continuation of the RIIO-1 framework, whereby there would be no material changes to the tools used or overall decisions made.

Monetised and non-monetised impacts

3.13 Our assessment of impacts has been conducted in accordance with Ofgem's Impact Assessment Guidance.⁵⁹ In developing the draft impact assessment, we have also drawn on the HM Treasury Green Book and Business case model.⁶⁰

3.14 We have carried out partial quantification of impacts. We have, where data and evidence are sufficient, sought to assess impacts quantitatively, assigning monetary value where appropriate. For a number of the tools within our options, we have not sought to carry out quantitative analysis but have considered impacts qualitatively. We set out in Chapters 4 and 5 which tools we have assessed quantitatively and qualitatively.

3.15 We have focussed quantification on the following two types of impacts on network companies and consumers:

- Impacts arising from changes to financial tools and parameters under the options under consideration
- Impacts arising from changes to the totex incentive rate and output delivery incentives

3.16 Our quantitative estimations are indicative. They are subject to uncertainty and based upon a number of assumptions.

3.17 For example, in the absence of data on which to base totex allowances:

- we consider a number of the impacts under the scenario in which totex allowances and company performance are assumed to be equivalent to that observed and forecast under RIIO-1

⁵⁹ Ofgem (2016), Impact Assessment Guidance; <https://www.ofgem.gov.uk/publications-and-updates/impact-assessment-guidance>

⁶⁰ HM Treasury (2018), The Green Book: appraisal and evaluation in central government; <https://www.gov.uk/government/publications/the-green-book-appraisal-and-evaluation-in-central-government>

- There are a number of factors which may apply both upwards and downwards pressure on totex allowances in the different sectors within the next regulatory period
 - Under certain scenarios the challenges of the energy transition and the need for replacement of certain assets may place upwards pressure on totex, but at the same time realised efficiencies and our learning over time from the application of price controls should result in downwards pressure
- 3.18 At this time, we therefore consider the assumptions of RIIO-1 totex and performance levels to be reasonable. However, we intend to refresh our analysis and publish a full impact assessment as more data becomes available at the determination stage in 2020.
- 3.19 A number of the quantified and non-quantified impacts are subject to uncertainty arising from the response by network companies to the combination of tools and parameters employed under each option, and on the demand for network services.
- 3.20 We consider that uncertainty is greatest under option 3 where the extent of change relative to the counterfactual is larger than under option 2. To allow for this uncertainty in relation to option 3 we provide a range of estimates of impacts. We present a 'low case' in which the impacts are at the lower end of our expectations for company revenues and consumer benefits, a 'high case' which represents the upper end of the range and a 'central case' which sits between these. We discuss further in Chapter 7 specific uncertainties associated with our quantified impacts.

Summary of approach to draft impact assessment

- 3.21 In this chapter we have described the approach to the analysis, identified directly impacted stakeholders (network companies and their investor and consumers) and key impacts such as short-term impacts in the next price control, long-term impacts beyond the next price control and implementation.
- 3.22 Specifically, we identified:
- impact on network companies' revenues and financeability (Chapter 4) from
 - Changes to financial parameters and methodology
 - Changes to incentives
 - Changes to other elements
 - Impact on consumer costs
 - Other consumer impacts, including the environment
 - Distributional impacts
- 3.23 We note that only some of the impacts identified are quantified given the information available at this time, in particular impacts arising from changes to financial tools and parameters under the options under consideration; and impacts arising from changes to the totex incentive rate and output delivery incentives. We also note some of the uncertainty surrounding some of our quantified impacts and present a 'low case', a 'high case' and 'central case'.

4. Impacts on companies in the next regulatory period

In this chapter we present our analysis of the direct impacts arising from options 2 and 3 on network companies compared to the counterfactual. Where possible, we present quantified or partially quantified impacts. In other areas we consider the impacts using qualitative analysis.

Summary

- 4.1 In this chapter we assess the impacts of options 2 and 3 on companies' revenues and financeability arising from:
 - changes to financial parameters
 - changes to incentives
 - changes to other elements of the regulatory framework
 - administration and resource costs
- 4.2 We find that company revenues would increase by approximately £0.84 billion under option 2 and decrease by £2.4 billion under option 3 (central case) compared to the counterfactual, over a five-year period.
- 4.3 We have performed a partial quantification in some key areas of the options. Our analysis makes use of a number of assumptions, which are explained throughout the chapter. This partial quantification does not include all of the components of the regulatory options. Many of these components are constant across options 2 and 3. Accordingly, we would not expect a significant variation in impacts between the options for these elements that have not been quantified.

Table 6: Impacts on network companies resulting from options 2 and 3 across all sectors (excluding electricity distribution) over a five-year price control – quantified and non-quantified impacts (£m 2021/22 (CPIH), discounted

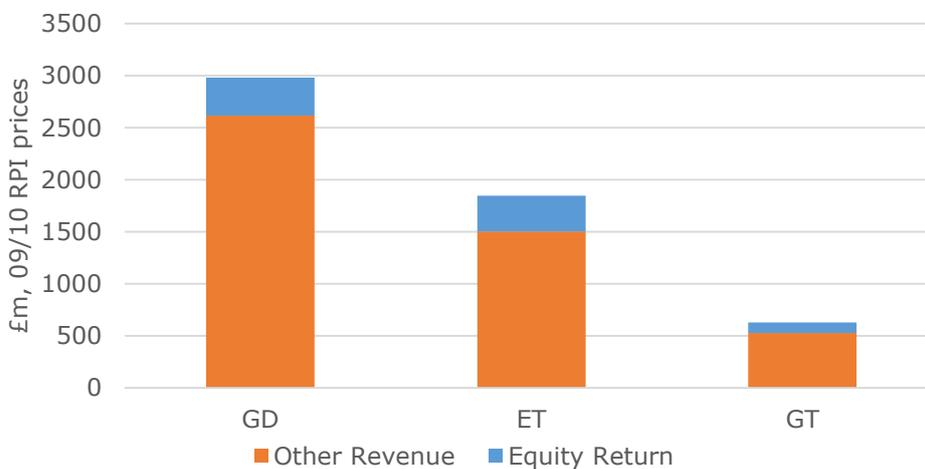
Area of package	Mechanism	Option 2	Option 3	Option 3 Range	
				Low	High
Changes to financial parameters	Return on equity	-1,054	-3,424	-2,610	-3,729
	Network companies will receive less remuneration for equity investment. Key credit ratios are expected to be broadly similar or slightly improved on a notional company basis.				
	Switch to CPIH	2,022	2,086	2,064	2,094
	This change will be value-neutral to both investors and consumers in the long-term (consumers will be neither worse off nor better off), but does affect the timing of repayment of the RAV. This means the consumer benefit is negative within the next regulatory period, but will be positive after about twenty years.				
Changes to incentives	Totex Incentive Mechanism and informational tools	0	-782	-170	-1,334
	No change from counterfactual		A combination of lower incentive rates and the introduction of our new information tools may reduce information rents, benefitting consumers		
	Output Delivery Incentives	-138	-291	-21	-643
	Consumer benefits may reduce where companies reduce delivery of outputs as a result of removal of incentives.		In addition to the removal of some individual incentives, re-calibration may change risk/reward balance potentially reducing delivery of outputs in some areas		
	Price control deliverables	Tying totex allowances more closely to delivery may reduce some scope for company underspends relative to the counterfactual.			
Changes to other elements	Return Adjustment Mechanisms	0	0	0	0
	RAMs are unlikely to be triggered under all scenarios considered and based on design that has previously been consulted on. Note that the final design of RAMs has not yet been determined and may be different from that considered within this draft IA.				
	Length of price control	Five-year price control length may reduce exposure of companies to risk but also reduces the extent to which they can benefit from delivery of efficiency gains			
	Innovation funding	Small reduction in potential revenues as a result of removal of the innovation roll-out mechanism. We do not anticipate significant changes to company revenues, but final design is still to be determined.			
	Competition	Introduction of competition may drive down company allowed revenues, though extent of effect will depend on the number of projects that are found suitable for competition models			
Administration costs		Some additional costs for companies to manage new and revised tools. These are likely to be higher under option 3 given introduction of additional tools. However, materiality is expected to be of a lower order of magnitude than many of the other impacts considered in this draft IA.			
Total quantified impacts		829	-2,411	-736	-3,611
Total, not including switch to CPIH		-1,192	-4,497	-2,801	-5,705

- 4.4 As we discuss in Chapter 5, the majority of the consumer benefits relevant to options 2 and 3 arise from direct transfers from companies to consumers.
- 4.5 In the rest of this chapter we discuss in more detail the quantified and unquantified impacts on network companies.

Impacts from changes to financial parameters

- 4.6 In this section, we consider the impacts of changes to the allowed return on equity, and indexation of the Regulated Asset Value (RAV).
- 4.7 Returns on equity constitute a material part of the revenues of a network company as shown in the figure below. Equity returns (post tax) are 12% to 19% of base revenues so far in RIIO-1.

Figure 2: Post tax equity return and other base revenue (financial years ending 2014-2018, 09/10 RPI)



Source: Ofgem analysis using 17/18 regulatory financial reporting pack and price control financial model data

- 4.8 The allowed return is a 'real' return, meaning companies also receive the value of outturn inflation. Therefore, when Ofgem sets the real allowed return, expectations of inflation are taken into account. This in turn depends on the measure of inflation used.
- 4.9 The return on equity values used for this analysis are working assumptions, as set out in our published methodology using current data. The values will not be finalised until Final Determinations.
- 4.10 We have not yet assessed the impacts from the cost of debt because the appropriate indexation method needs to be calibrated. This will be possible only following full scrutiny of the information available at determinations. We have not yet taken a decision on the calibration relating to the trailing average period. Further discussion on the cost of debt is provided in Appendix 4.

Summary of assumptions under different options

- 4.11 The table below summarises the assumptions for finance parameters related to the cost of equity and indexation by option:

- Option 1 (“counterfactual”): the finance decisions for RIIO-1. Therefore, the allowed return on equity is the same as RIIO-1, and the RAV and allowed returns remain indexed to RPI.
- Option 2: is equivalent to the ED1 slow track allowed return on equity adjusted for gilt rates (described in the following section), RIIO-1 notional gearing, and CPIH indexation.
- Option 3: parameters from the May 2019 Sector Specific Methodology Decision Finance Annex.

Table 7: Assumptions for finance related impacts

	Option 1 (CF)	Option 2	Option 3		
			Low	Central	High
Allowed return on equity (real)	6-7% (7.1 - 8.1% CPIH)	6.90%	5.10%	4.30%	4.00%
Notional gearing	55-65%	55-65%	60%	60%	60%
Indexation	RPI	CPIH	CPIH	CPIH	CPIH

Impacts from changing the allowed return on equity

- 4.12 The cost of equity is an estimation of the return that equity investors expect. It is a material element of the price control settlement.
- 4.13 Our current working assumption for the allowed return on equity is 4.3% real CPIH for all sectors and companies. This figure includes an assumption that companies would earn an additional 0.5% return on equity through incentives (distinction between allowed and expected returns).
- 4.14 The RIIO-1 values for the allowed return on equity, as well as the assumptions for options 1, 2, and 3 are presented in the table below. The highlighting indicates the inflation measure used for the original estimation, presented alongside the equivalent RPI or CPIH measure by using the current expected difference (‘inflation wedge’) between RPI and CPIH: 1.049%.⁶¹

⁶¹ See section on CPIH impact for sources.

Table 8: Returns in RPI and current CPIH equivalents

	RPI	CPIH
ET1	7.00%	8.12%
GT1	6.80%	7.92%
GD1	6.70%	7.82%
ED1 Fast Track	6.40%	7.52%
ED1 Slow Track	6.00%	7.11%
Option 2	5.79%	6.90%
Option 3 (High)	4.01%	5.10%
Option 3 (Central)	3.22%	4.30%
Option 3 (Low) ⁶²	2.92%	4.00%

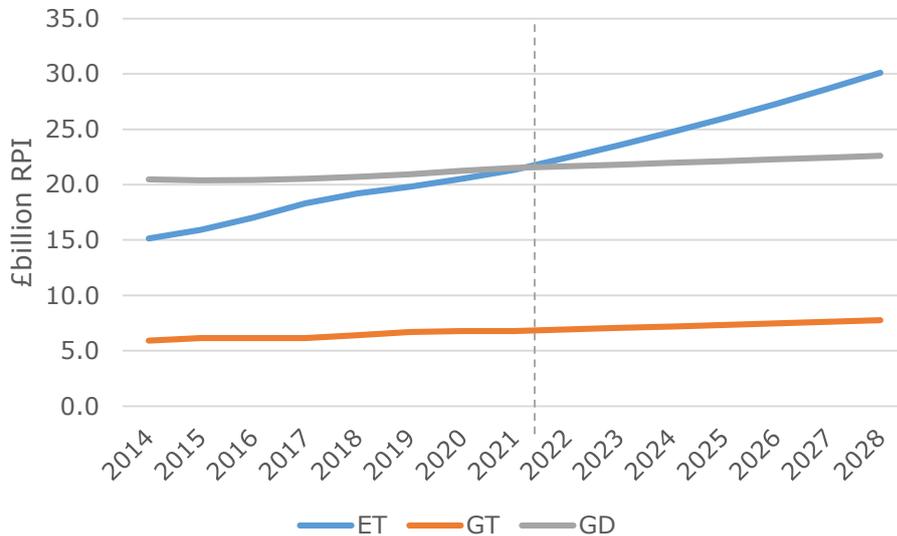
Methodology

- 4.15 We calculated the impacts on companies (change in revenues) by multiplying a forecast RAV by different cost of capital values.
- $WACC \text{ allowance} = RAV * WACC$
- 4.16 The cost of capital is the combined cost of debt (pre-tax) and cost of equity (post-tax), weighted by notional gearing (proportion of net debt relative to RAV). It is also referred to as weighted average cost of capital, or WACC, and is defined as:
- $WACC = \text{gearing} * \text{cost of debt} + (1 - \text{gearing}) * \text{allowed return on equity}$
- 4.17 The cost of capital allowance is calculated using notional gearing, rather than actual. The May 2019 Sector Specific Methodology Finance Annex does not decide on notional gearing, but asks for well-justified proposals in Business Plans. However, as a working assumption, we have used 60% in modelling option 3. For all sectors except electricity transmission, 60% is lower than the current notional gearing.
- 4.18 The impact of the 60% notional gearing assumption is not presented separately. We present 'return on equity' impacts including the impacts the new gearing would have on revenues. Given that 60% notional gearing is lower than most licensees' RIIO-1 gearing, our assumption would generally increase equity allowances and decrease debt allowances. This means that in total our 60% notional gearing assumption increases company revenues relative to RIIO-1 notional gearing.
- 4.19 The impact of a return on equity change is the difference between:
- $RAV * (1 - \text{current notional gearing}) * \text{current return on equity}$, and
 - $RAV * (1 - 60\%) * \text{new return on equity}$
- 4.20 At this time, we do not have detailed information about expected expenditures for the next regulatory period. Therefore, we used the public 17/18 regulatory financial performance reporting pack (RFPR) submissions and the price control financial model (PCFM) in order to forecast RAV over the next regulatory period. These values are to be considered indicative.

⁶² As noted later, no expected outperformance wedge is applied, as this would take returns below the bottom end of the May cost of equity range

4.21 To forecast future RAV, we extrapolate RAV values (in real terms) from RIIO-1 by the compound average growth rate over RIIO-1, as shown in the figure below.

Figure 3: RAV assumptions in real RPI (21/22)



4.22 This methodology only includes the impact of the reduced return, and does not include a corresponding reduction in the tax allowances associated with the lower return. For example, a return of £100 would also provide about £25 in corresponding tax allowance, if the tax rate was 20%:

$$\text{Return plus tax allowance} = £100 * \frac{0.20}{1 - 0.20} = £125$$

4.23 Because the tax allowance is estimating⁶³ a pass-through cost of earning the return, it is excluded from the impact on companies.

Changes under option 2

4.24 Option 2 is calculated by looking at the most recent RIIO-1 cost of equity determination (ED1 slow track), and adjusting the parameter that evaluates risk-free rate conditions between then and now.

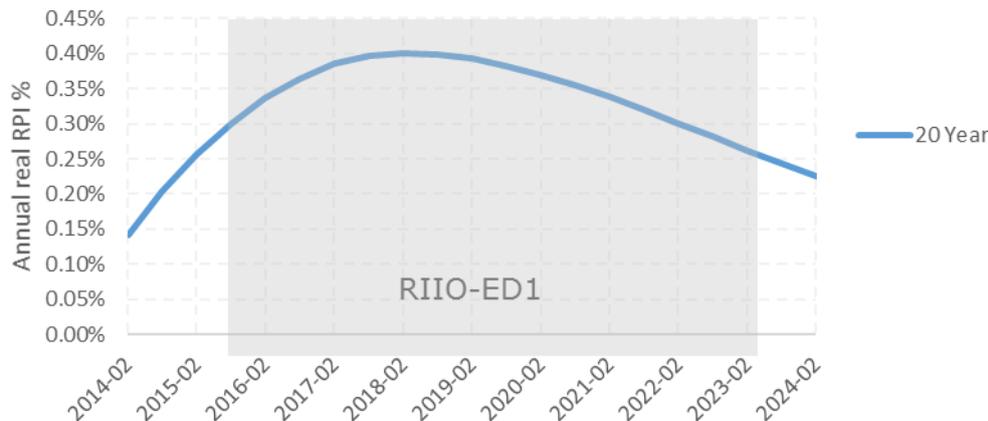
4.25 This calculation is not meant to reflect specific CAPM parameters in ED1 or examine how the cost of equity was set at the time, but provide a simple and transparent adjustment to the ED1 value for the purposes of a 'do minimum' update option.

4.26 The risk free rate in the May 2019 Sector Specific Methodology Decision Finance Annex is derived from 20-year gilt rates, with the forward implied rate for RIIO-2 being -1.78% real RPI.

4.27 The graph below shows risk-free forward rates as of 11 February 2014, which was used as evidence for the ED1 slow track return on equity decision.⁶⁴ This figure shows that the equivalent average (20-year gilt) rate for RIIO-ED1 was 0.35%, a change from 2014 to present of -2.13%.

⁶³ We assume that the estimated tax allowance is not over or under compensating

⁶⁴ "[Decision on methodology for assessing the equity market returns for the purpose of setting RIIO-ED1 price controls](#)", 17 February 2014.

Figure 4: UK real implied gilt rate forward curves, 11 February 2014

- 4.28 As stated in the ED1 decision⁶⁵, the “allowances for the cost of equity proposed in the DNO Business Plans implied an equity beta of about 0.9.” Therefore, using an equity beta value of 0.9, from the CAPM we know that:

$$\text{Change in cost of equity} = \text{Change in risk free rate} * (1 - \beta)$$

- 4.29 Therefore, the return on equity for option 2 is equivalent to the RIIO-ED1 value, minus the change:

$$\text{Option 2} = 6.0\% + (1 - 0.9) * -2.13\% = 6.0\% - 0.21\% = 5.79\% \text{ real RPI}$$

- 4.30 Expressed in CPIH, this is equivalent to an annual real return of 6.90%.

Changes under option 3

- 4.31 The option 3 working assumption on the allowed return on equity comes from the methodology as described in the May 2019 Sector Specific Methodology Decision Finance Annex. This follows a three-step process using the CAPM.
- 4.32 As presented in the Sector Specific Methodology Decision Finance Annex (table below), the ‘step 2’ cost of equity range of 4.0 – 5.6% real CPIH, with a working assumption of 4.3% after applying the 50 basis point (bps) decrease for expected outperformance.

⁶⁵ Paragraph 1.15, page 8 of “[Decision on methodology for assessing the equity market returns for the purpose of setting RIIO-ED1 price controls](#)”, 17 February 2014

Table 9: Equity methodology, working assumptions May 2019, CPIH-real, (May Decision Finance Annex Table 12)

Component	Low	Mid	High
Notional equity beta	0.660		0.850
Total Market Return (CPIH)	6.25%		6.75%
29 March risk free rate	-0.96%		-0.96%
Forward curve uplift	0.22%		0.22%
Risk Free Rate	-0.75%		-0.75%
Cost of equity (step 1)	3.87%		5.63%
Cost of equity (step 2)	4.00%	4.80%	5.60%
Expected outperformance		0.50%	
Allowed return on equity		4.30%	

4.33 For purposes of this draft impact assessment, option 3 presents 3 cases:

- High: the lowest cost of equity (4.0% CPIH). Note that no expected outperformance wedge is applied, as this would take returns on equity below the bottom end of the range.
- Central: The working assumption for RIIO-2 (4.3% CPIH).
- Low: The high end of the cost of equity range, minus the 50 basis points of expected outperformance. 'low impact COE' = 5.6% - 0.5% = 5.1%. Note that this assumption is for the purposes of the impact assessment and is not a part of the finance methodology. The cost of equity methodology sets a range from 4.0%-5.6% real CPIH, with a central working assumption of 4.3%.

Estimates of effects

4.34 Table 10 presents the expected change in allowances following the application of the new values for the allowed return on equity to the ET, GT and GD sectors. This is calculated by applying the four described allowed returns on equity to the forecast RAV, with values presented CPIH 2021/22 real, discounted.

Table 10: Impact on network companies' revenues of lower allowed return on equity under central/low/high cases over RIIO-2 (£m 2021/22 (CPIH), discounted)

	Option 2	Option 3 (low)	Option 3 (central)	Option 3 (high)
Electricity Transmission	-589	-1,508	-1,882	-2,022
Gas Transmission	-130	-325	-433	-474
Gas Distribution	-335	-777	-1,108	-1,233
Total	-1,054	-2,610	-3,424	-3,729

Impact resulting from indexation of the RAV and allowed returns to CPIH

4.35 In this section we compare the impact of indexing the RAV and allowed returns to CPIH, rather than RPI. The RPI inflation measure is expected to be 1.049% higher than CPIH on an annual basis (the 'inflation wedge'). As stated in the May 2019 Sector Specific Methodology Decision Finance Annex, we expect the change to be

NPV neutral. However, over the next regulatory period this change results in an increase in revenues for network companies.

4.36 In our July 2018 Framework Decision document, Appendix 2 considered how the switch to CPIH affects a hypothetical asset over a 45-year life. We described two primary effects of the switch:

- a reduction in the rate at which the RAV grows, which reduces depreciation allowances over time
- an increase in return allowances in the short term (as the real return is higher than an RPI-indexed WACC, and the RAV starts at the same value). These allowances will progressively reduce in the longer term because the CPIH-indexed RAV is inflated at a lower rate

CPIH under different options

4.37 The change in index is to avoid the use of the RPI, which is no longer designated a national statistic. Accordingly, we would have switched inflation indices even if we opted for minimal changes to RIIO, and therefore we assume that the impact is the same under option 2 and option 3.

Methodology

4.38 The switch to CPIH is assessed in three parts:

- Increasing the cost of capital by the amount of the RPI/CPIH wedge
- Reduction in depreciation allowances due to a smaller RAV growth
- Reduction in the cost of capital allowances due to a smaller RAV growth

4.39 The switch to CPIH has the effect of accelerating the repayment of the RAV. The longer-term impacts of the switch to CPIH are discussed further in Chapter 6.

4.40 The move to CPIH inflates the estimate of the real WACC by the size of the RPI/CPIH wedge.⁶⁶

4.41 The methodology we have used to calculate the wedge is provided in the following table.

Table 11: Assumptions used for CPIH and RPI inflation rates

Measure	Rate	Source
RPI	3.070%	Office for Budget Responsibility
CPIH	2.000%	forecasts for T + 5 ⁶⁷
Wedge	1.049%	$(1+RPI)/(1+CPIH) - 1$

4.42 To calculate the 'CPIH RAV', we used the same assumed nominal additions over RIIO-2 and starting point, but with one RAV in CPIH terms and the other in RPI.

⁶⁶ In practice, Ofgem is attempting to estimate elements of the CAPM in CPIH directly (for example, deflating iBoxx indices by OBR inflation forecasts), therefore inflating WACC by the wedge is a simplifying assumption. See the Sector Specific Methodology Decision.

⁶⁷ See CPI and RPI worksheets here: <https://obr.uk/download/public-finances-databank/>

Because CPIH values are growing at a lower rate, the CPIH RAV is lower than the RPI RAV.

- 4.43 The smaller RAV reduces depreciation allowances, estimated by multiplying the difference between the CPIH and RPI RAVs by an assumed rate of RAV depreciation.⁶⁸
- 4.44 The smaller RAV also slightly reduces cost of capital returns, estimated by multiplying the difference between the CPIH and RPI RAVs by the assumed cost of capital⁶⁹ for the next regulatory period.
- 4.45 The largest impact within the next regulatory period is the 'uplift' to the cost of capital by changing to CPIH. This is estimated by multiplying the CPIH RAV by the inflation wedge (1.049%).

Estimates of effects

- 4.46 The following table shows the expected increase in allowances due to changing the indexation of the RAV to CPIH, in 2021/22 real terms CPIH (discounted).
- 4.47 In this case, the 'low' and 'high' cases are a product of the corresponding cost of capital assumptions. For both, we use the same wedge (1.049%).

Table 12: Impacts over RIIO-2 on company revenues of indexing RAV to CPIH cases (£m 2021/22 (CPIH), discounted)

	Option 2	Option 3 (low)	Option 3 (central)	Option 3 (high)
Electricity Transmission	922	946	956	959
Gas Transmission	286	292	295	296
Gas Distribution	813	827	836	839
Total	2,022	2,064	2,086	2,094

Impacts on financeability

- 4.48 Ofgem has a duty to have regard to the need to secure that network companies are able to finance the activities which are the subject of obligations imposed by or under the relevant legislation.
- 4.49 A financeability assessment typically involves considering qualitative and quantitative factors that impact the creditworthiness of an entity and its ability to raise finance to fund its activities. The quantitative factors generally assessed include credit ratios typically used by the market and rating agencies.
- 4.50 Credit ratios aim to assess a company's revenues, funds from operations and/or funds available for servicing debt compared to their debt service obligations and/or their volume of net debt. One key component of a network company's revenues is that provided by the cost of capital allowances.

⁶⁸ For the next regulatory period it is assumed to be the same as the last year of RIIO-1.

⁶⁹ Uses the cost of debt working assumption from the May Decision Finance Annex for options 2 and 3.

- 4.51 To this end, reductions in the cost of equity and debt allowances can impact revenues, credit ratios and could have an impact on financeability.
- 4.52 Our analysis⁷⁰, which is based on a notional company with a gearing level of 60%, and assumed cost of equity and cost of debt for each year equal to the working assumptions set out in the May 2019 Sector Specific Methodology Decision Finance Annex, illustrates that credit metrics for the notional company are mainly similar or slightly improved compared to RIIO-1. Despite the lower equity allowance and lower expected equity return. This is due to the following factors:
- Gradually decreasing cost of debt as historical debt is refinanced at lower interest rates
 - Lower notional gearing (in GD and GT) contributing to lower interest expense and cash interest costs
 - Reducing 'inflation gap' between the real cost of debt allowance and interest expense which includes inflation (or cash interest costs which are based on 75% nominal debt). This reducing inflation gap is due to the switch to CPIH-based allowances and RAV inflation.
- 4.53 Accordingly, we are currently of the view that the price control parameters will be adequate to support financeability of the notional company in each sector. This analysis applies to both options 2 and 3.
- 4.54 The May 2019 Sector Specific Methodology Decision Finance Annex contains a notional financeability impact analysis for the central case, to which the reader is referred. This work will be refined with the submission of Business Plans and modelling efforts going forward.

Summary of impacts from changes to financial parameters

- 4.55 A summary of the finance impacts is presented in the following table. Under option 2, we would expect companies' revenues to increase as the switch to CPIH would outweigh the decrease in the allowed return on equity (all else equal). Under option 3, company revenues would be decrease.

Table 13: Impact on network companies' revenues of changes to financial parameters over the next five-year price control (£m 2021/22 (CPIH), discounted

	Option 2	Option 3 (low)	Option 3 (central)	Option 3 (high)
Return on equity	-1,054	-2,610	-3,424	-3,729
Switch to CPIH	2,022	2,064	2,086	2,094
Finance impacts	967	-546	-1,338	-1,635

Impacts from changes to incentives

- 4.56 At the start of each price control period, we set cost allowances and, in turn, allowed revenues based on our evaluation of company Business Plans and our assessment of efficient costs. Over the course of the price control period, companies then decide how to manage their networks and deliver against the set outputs, incentives, and

⁷⁰ Set out in Chapter 4 of the Finance Annex: https://www.ofgem.gov.uk/system/files/docs/2019/05/riio-2_sector_specific_methodology_decision_-_finance.pdf

wider Business Plan commitments in the context of their cost allowances. Within the price control, a number of mechanisms allow for companies' revenues to flex upwards and downwards relative to their baseline allowance.

4.57 In the following sections, we explore the potential impacts of options 2 and 3 in relation to the revenues associated with these mechanisms.

Impacts from changes to the totex incentive mechanism

4.58 Companies can earn rewards or suffer penalties depending on their efficiency in delivering required outputs relative to their cost allowances. Under the totex incentive mechanism (TIM), any underspend (or overspend) in comparison to the set totex allowance is shared between the network company and its customers. The proportion that companies keep is determined by the totex incentive rate.

4.59 Changes to the approach used to set the totex incentive rate and its level would affect network companies' incentives, conduct and behaviour. Companies have an incentive to underspend their totex allowance because they earn additional revenues according to their totex incentive rate. Through our approach to setting the level of the totex incentive rate, we are seeking to achieve the following:

- Reduce the extent to which consumers pay for company underspends which are not reflective of genuine cost efficiencies, but instead result from information rents
- Maintain an incentive for companies to identify and deliver legitimate cost efficiencies where possible

4.60 In setting an appropriate range of totex incentive rates our intention is to maximise the benefits to consumers resulting from both of the objectives set out above. However, we acknowledge that there is likely to be a trade-off between transferring the benefits of underspends to consumers and retaining incentives on companies to find cost efficiencies.

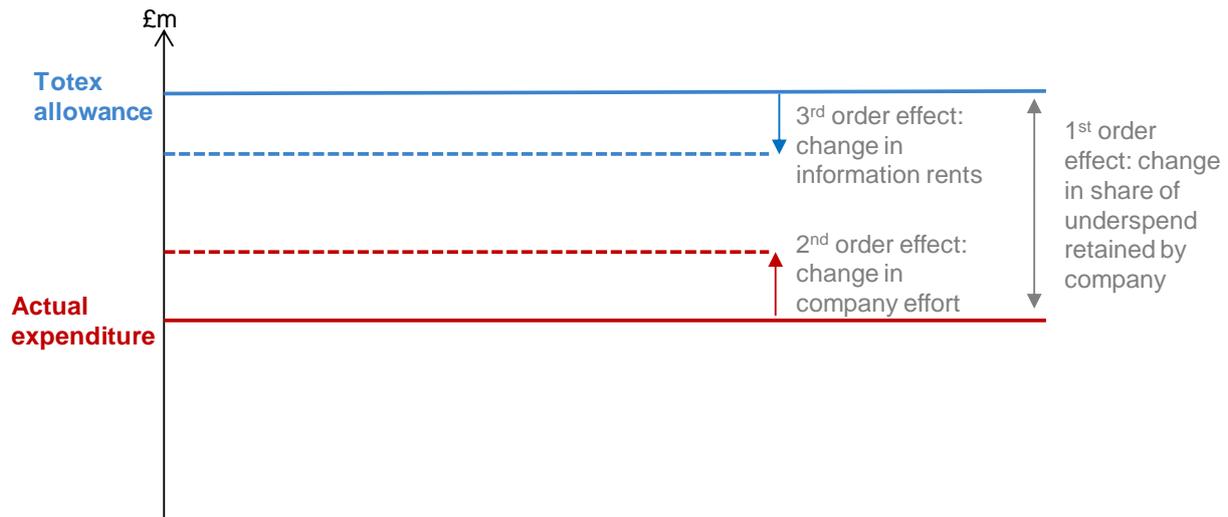
4.61 To help consider these trade-offs, we identify three 'orders' of effects resulting from a change to totex incentive rates which we use to structure analysis.

- The **first order effect** is the direct effect of a reduction in the totex incentive rate, which allows a greater proportion of underspends (or overspends) against totex allowances to be passed through to consumers. Company revenues resulting from their share of underspends will be reduced as a result of the equal and opposite effect of the totex incentive rate change. As a first order approximation, we assume that there is no behavioural response of companies to a lower totex incentive rate – which is the level of underspend against totex allowances remains the same regardless of the totex incentive rate.
- As a **second order effect**, we consider the behavioural response of companies arising from a reduction in the totex incentive rate. We acknowledge that a reduction in the totex incentive rate may result in companies investing lower levels of effort in achieving underspends. As an approximation, we assume that all of this reduced underspend reflects a loss of genuine cost efficiencies. We do not consider the potential for a reduction in information rents. Under the second order effect, the initial totex allowance would be the same as under the counterfactual but underspends against this allowance would be reduced.
- The **third order effect** relates to the proportion of underspends which reflects genuine cost efficiencies and the proportion which reflects information rents.

While the second order effect assumes that 100% of the reduction in underspends is lost cost efficiencies, in practice, a reduction in totex incentive rates may also reduce the extent to which companies benefit from information rents,⁷¹ thus reducing incentives to report higher spending forecasts for totex⁷².

4.62 The figure below illustrates the three effects in terms of the cost allowances that Ofgem sets, the actual costs incurred by a company, and the share of the difference that is retained / borne by the company:

Figure 5: Illustration of the three orders of effect under the TIM



Changes to the ranges of totex incentive rates under option 2 and option 3

4.63 In RIIO-1, we used the IQI to set the incentive rate and would continue to do so under option 2.

4.64 Under option 2, we would have a range of totex incentive rates similar to those observed in RIIO-1. As there would be no change to the totex incentive rates relative to the counterfactual, we estimate no impact on company revenues.

4.65 Under option 3, we would replace the IQI with a confidence-dependent incentive rate approach in which the totex incentive rate applied to each company is dependent on our assessment of the extent to which costs set out within the Business Plan are 'high-confidence' or 'lower-confidence'.⁷³

4.66 Option 3 is based on our May 2019 Sector Specific Methodology Decision and related working assumptions, which has a range of totex incentive rates that, on average, is lower than that set for RIIO-1. In line with this working assumption, option 3 uses a

⁷¹ We assume that companies benefit equally from underspend arising from information rents or underspend from achieving cost efficiencies.

⁷² It could be argued that companies could also respond to the risk of lower revenues through reduced incentive rates by attempting to inflate costs further in order to replace lost revenue. However, we note that, at least in theory, a reduction in the incentive rate would reduce the marginal benefit of increased information rents as well as cost efficiencies. In addition, our confidence dependent incentive rate mechanism is designed to reflect our confidence in cost submissions within the strength of the incentive, providing us with further confidence that this form of response would be unlikely.

⁷³ Please see RIIO-2 Sector Specific Methodology – Core document (May 2019), Chapter 8 for a description of Confidence Dependent Incentive Rate approach.

range of 15-50%.⁷⁴ For comparison, observed totex incentive rates for the existing RIIO-1 price control are between 44.4% for NGGT (Gas Transmission) and 64% for NGN (Gas Distribution).⁷⁵

- 4.67 We expect totex incentive rates to be higher than the minimum of 15% under option 3 in practice. This is because a weighted average totex incentive rate of 15% would only be applied if a Business Plan contained no costs assessed to be high-confidence baseline costs. Nevertheless, our analysis covers the full range of plausible outcomes by considering a 15% totex incentive rate (low case), a 32.5% (central case) and 50% (high case).

Methodology

- 4.68 We compare the expected impacts of option 3 against the counterfactual RIIO-1– which is based on the totex incentive rates and level of underspends observed under RIIO-1.
- 4.69 We estimate the first order effect by applying three totex incentive rates (15%, 32.5% and 50%) to the levels of totex underspend which companies are forecast to achieve under RIIO-1.
- 4.70 We then expand this analysis to estimate the combined first and second order effects. We do this by introducing a ‘mapping factor’ which reflects the reduction in effort levels that companies may make in response to a reduction in totex incentive rates.
- 4.71 The magnitude of this response is difficult to estimate as the level of effort of network companies might be affected by other factors, such as the accuracy with which we set cost allowances. Companies may also balance upside earning potential in relation to totex underspends against the strength of other incentives available in the price control, including incorporation of additional investment into the RAV.
- 4.72 We have analysed data on underspends and totex incentive rates within RIIO-1 to explore whether it is possible to identify a relationship between the two (see Appendix 3). Based on this analysis, there appears to be no evidence of such a relationship though we note the limited number of data points and the additional factors which can impact on underspends as mentioned above.
- 4.73 Therefore, in the absence of evidence of a particular relationship between incentive rates and underspends, we consider a range of possible ‘mapping factors’.
- 4.74 While taking the first order effect (no behavioural response) as a lower bound, we define the upper bound of company response as the case in which a one per cent reduction in the totex incentive rate leads to a one per cent reduction in underspend. As a central case, we consider a 2:1 ratio of the totex incentive rate to underspend, where a one per cent reduction in the totex incentive rate reduces the level of underspend by 0.5 per cent.
- 4.75 As an illustrative example, with a 2:1 mapping, an observed level of underspend of £10 million at an incentive rate of 50% would lead to an underspend of £7.5 million at an incentive rate of 25%.

⁷⁴ Please see RIIO-2 Sector Specific Methodology – Core document (May 2019), Chapter 8.

⁷⁵ Throughout this section we refer to the totex incentive rates that may be applied under option 3. For simplicity of analysis and presentation, we consider totex incentive rates on a consistent basis as has been applied under RIIO-1, ie on a post-tax basis. We note that we are considering our policy in relation to the basis of totex incentive rates and will set out our intended approach within our Draft Determination.

- 4.76 The table below sets out our assumptions on the relationship between a one per cent reduction in the totex incentive rate on underspend.

Table 14: Reduction in underspend that would result from a one per cent reduction in the totex incentive rate at each assumed mapping factor

Mapping factor	Reduction in totex incentive rate (per cent)	Reduction in underspend (per cent)
1:0	1	0
2:1	1	0.5
1:1	1	1

- 4.77 In the absence of evidence which may suggest otherwise, we have implicitly assumed that the mapping factor is linear. In practice, the behavioural response of companies to a change in the totex incentive rate may be complex.⁷⁶ It might depend on the distance of the company from an 'efficiency cost frontier' but companies may also take into consideration a number of other factors such as risk appetite and reputational drivers.
- 4.78 Under the first and second order effects, we assume that 100% of company underspends reflect genuine cost efficiencies. However, in practice, a reduction in the totex incentive rate would reduce the incentive for information rents as well as genuine cost efficiencies. We may therefore assume that reduced underspends reflect some combination of the two. We qualitatively consider the third order effect and assume that a proportion of lost underspend reflects a reduction in information rents as opposed to lost cost efficiencies.
- 4.79 Our analysis makes use of several assumptions. As mentioned in Chapter 3, in the absence of company Business Plans, we assume that annual totex allowances for the next regulatory period are equal to those applied in RIIO-1.^{77,78} We make similar assumptions for levels of underspend, dependent on the totex incentive rate. We assume that levels of underspend (or overspend) would be equivalent to RIIO-1 in the case that an identical totex incentive rate was retained.⁷⁹
- 4.80 In addition, only part of the full impact expected from option 3 is quantified (the first and second order effects). This analysis is intended to draw out the possible effects of option 3 relative to option 1 and estimate an order of magnitude of the potential combined impacts. In practice, we identify a trade-off between productive or

⁷⁶ One particular driver of the behavioural response would be the cost and risk profile of companies in relation to the delivery of underspends. Companies would only deliver cost efficiencies when the incentive rate is sufficient to outweigh the marginal cost (and risk) of delivery. This may result in a non-linear 'mapping factor', ie a greater change in the incentive rate may have a greater impact on the level of underspends or vice versa. However, in the absence of information on these cost and risk profiles, the non-linear profile is not possible to estimate and may be quite different for each company, or in each sector.

⁷⁷ We correct total totex allowances to reflect the five-year length of the price control.

⁷⁸ The RIIO-1 period for transmission and gas distribution companies runs until 2021. Therefore, some of the assumptions used reflect forecast data for the RIIO-1 period.

⁷⁹ Note that we do not expect the levels of underspends or overspends for each company to be similar to that observed under RIIO-1 in practice, in part because of the changes to tools such as the incentive rate which may impact on company performance. This assumption is used only to assess the potential order of magnitude of the impacts of our methodologies.

dynamic efficiency and information rents.⁸⁰ This has important implications for the consumer benefits that we consider in Chapter 5.

Estimate of first order effect

4.81 In the table below we present the impact of option 3 as a result of the first order effect only. All values reflect the reduction in company revenues over a five-year price control period.

Table 15: Impact on network companies' revenues under a range of totex incentive rates for option 3, over a five-year price control (£m 2021/22 (CPIH), discounted)

	Totex incentive rate = 15%	Totex incentive rate = 32.5%	Totex incentive rate = 50%
Gas Transmission	46.1	18.6	-8.9
Gas Distribution	-693.1	-442.6	-192.1
Electricity Transmission	-385.2	-176.9	31.3
Total impact on revenues	-1,032.2	-601.0	-169.6

4.82 In interpreting the results, it is important to note two things:

- In the gas transmission sector, NGGT is forecast to overspend against its totex allowance in RIIO-1. As a result of our methodology which takes RIIO-1 performance as a baseline, a reduced totex incentive rate would expose NGGT to a lower percentage of overspend, thus generating a positive impact on company revenues.⁸¹ We therefore observe a positive relationship between company revenues for totex incentive rates of 15% and 32.5%. Because NGGT is forecast to overspend, the magnitude of this positive impact increases as totex incentive rates are reduced.
- Two companies (NGGT and NGET) have totex incentive rates which are lower than 50% in RIIO-1. Therefore, where totex incentive rates of 50% are assumed, these companies would actually take on a greater share of over and underspends relative to the counterfactual.

4.83 After taking these factors into account, we observe an overall reduction in company revenues across sectors. As we would expect, a greater reduction in the totex incentive rate would result in a greater reduction in company revenues. With a 15% totex incentive rate, we estimate a reduction in company revenues of just over £1 billion based on the first order effect.

⁸⁰ This arises from the firm having an 'informational monopoly' and earning rents due to this private information. This trade-off is recognised in the economic literature which analyses monopoly regulation in the context of imperfect information. See Decker (2015), *Modern Economic Regulation*, page 86.

⁸¹ This is a result of the methodology we have applied for this analysis which takes RIIO-1 company performance as a baseline for the analysis. We do not expect that company performance in the next regulatory period would necessarily reflect RIIO-1 performance in practice.

Estimate of second order effect

4.84 We present estimates of the reduction in company revenues across all sectors as a result of the combined first and second order effects in the table below.

Table 16: Impact on company revenues resulting from first and second order effects for all sectors (electricity transmission, gas transmission and gas distribution), over a five-year price control (£m 2021/22 (CPIH), discounted)

	Totex incentive rate = 15%	Totex incentive rate = 32.5%	Totex incentive rate = 50%
Mapping 1:0	-1,032.2	-601.0	-169.6
Mapping 2:1	-1,182.9	-781.8	-223.7
Mapping 1:1	-1,333.7	-962.7	-277.7

Note: The green cell represents our central estimate.

- 4.85 As a result of the combined first and second order effects, company revenues reduce with a lower totex incentive rate and as the mapping between the totex incentive rate and underspend becomes stronger. In combination, companies receive a lower proportion (due to the lower totex incentive rate) of a smaller total underspend (due to the behavioural response).
- 4.86 At the lower end of the range, the collective reduction in company revenues would be £169.6 million (2021/22 CPIH) across sectors. This represents the scenario in which totex incentive rates remain at the upper bound (50%) and companies do not reduce levels of underspend in response to a reduction in the totex incentive rate.
- 4.87 At the opposite end of the range, totex incentive rates of 15% coupled with a 1:1 ratio between the reduction in totex incentive rates and the level of underspends could result in a reduction of company revenues of over £1.3 billion (2021/22 CPIH) across all sectors.
- 4.88 Under our central case (with a totex incentive rate of 32.5% and a mapping factor of 2:1), company revenues would reduce by around £780 million (2021/22 CPIH).
- 4.89 We present the results by sector in the tables below. We can observe that the greatest impact on company revenues is observed in the gas distribution sector where higher totex incentive rates are in place in RIIO-1.
- 4.90 We observe similar trends for NGGT (due to the fact it is overspending) and in the electricity transmission sector (due to the fact that their current totex incentive rate is lower than 50%) as was described in relation to the first order effect.

Table 17 Impact on NGGT revenues (gas transmission) resulting from first and second order effects, over a five-year price control (£m 2021/22 (CPIH), discounted)

	Totex incentive rate = 15%	Totex incentive rate = 32.5%	Totex incentive rate = 50%
Mapping 1:0	46.1	18.6	-8.9
Mapping 2:1	38.3	11.8	-3.8
Mapping 1:1	30.5	5.0	1.1

Note: The green cell represents our central estimate.

Table 18: Impact on company revenues (gas distribution) resulting from first and second order effects over a five-year price control (£m 2021/22 (CPIH), discounted)

	Totex incentive rate = 15%	Totex incentive rate = 32.5%	Totex incentive rate = 50%
Mapping 1:0	-693.1	-442.6	-192.1
Mapping 2:1	-775.2	-556.0	-267.9
Mapping 1:1	-857.1	-669.5	-343.6

Note: The green cell represents our central estimate.

Table 19: Impact on company revenues (electricity transmission) resulting from first and second order effects (green cell represents our central estimate), over a five-year price control (£m 2021/22 (CPIH), discounted)

	Totex incentive rate = 15%	Totex incentive rate = 32.5%	Totex incentive rate = 50%
Mapping 1:0	-385.2	-176.9	31.3
Mapping 2:1	-446.1	-237.5	48.0
Mapping 1:1	-507.0	-298.1	64.7

Note: The green cell represents our central estimate.

Analysis of third order effect under option 3

- 4.91 Under the second order effect, we have assumed that all of the reduction in underspends reflects lost cost efficiencies. However, a lower totex incentive rate might reduce companies' incentives to overstate their cost forecasts as the revenues arising from overstated costs would be lower. Therefore, a reduction in underspends may represent a combination of reduced information rents and lost cost efficiencies.
- 4.92 Under the third order effect, a proportion of reduced underspends would result from totex allowances which are lower than under the counterfactual as well as from a reduction in cost efficiencies relative to the counterfactual.
- 4.93 The implications for companies would be relatively small. The reduction in underspends would have a similar effect whether it reflects a reduction in totex allowances due to lower information rents or lost cost efficiencies. However, we will observe more significant implications when we consider consumer benefit in Chapter 5. This is because consumers benefit from the removal of information rents but lose out from a reduction in cost efficiencies.

Impacts from changes to informational tools

- 4.94 In RII0-1, Ofgem used two tools to incentivise companies to submit accurate expenditure projections and better quality Business Plans: the IQI and fast-tracking.
- 4.95 Through the IQI mechanism, Ofgem set the totex incentive rate and also provided the opportunity for an upfront reward based on a comparison of company's totex forecasts against our view of efficient costs.

- 4.96 In addition to the IQI, 'fast-tracking' (or 'early settlement') encouraged companies to submit well-justified and good quality Business Plans. In RIIO-1, fast-tracked companies received additional upfront income as well as higher totex incentive rates, compared to slow-tracked companies.
- 4.97 As discussed in Chapters 1 and 2, we have considered making significant changes to these tools (option 2) and replacing them with new instruments (option 3).
- 4.98 The most direct impact from the use of these tools will result from the rewards and penalties which companies face which will lead to higher or lower revenues under the price control. Consumers will, in turn, face a direct impact on bills as a result of paying for any rewards and receiving a bill reduction to reflect any penalties.
- 4.99 We have not attempted to quantify the size of the reward/penalty that companies might face in this draft impact assessment as this would require making assumptions about the content and quality of company Business Plans. Neither have we attempted to quantify the behavioural impact on companies arising from these revised / new tools nor their effectiveness in countering companies' incentives to overstate totex allowances compared to the counterfactual.
- 4.100 However, we provide below a qualitative assessment of the tools that would be employed under options 2 and 3 against the counterfactual.

Option 2

- 4.101 Under option 2, we would apply a modified IQI and remove the early settlement element of fast-tracking.
- 4.102 We would make changes to IQI parameters to:
- Sharpen the differentiation in penalties and rewards between companies that submit accurate and inaccurate cost forecasts; and
 - Introduce a sharper reduction in the absolute level of the IQI additional payment, the more a company's forecast diverges from our own.
- 4.103 In addition, we would also publish the IQI matrix in advance for all sectors as this could provide a strong indication of potential reward and penalties to companies. This should allow companies to optimise their totex submissions, while internalising the penalties that they may face for totex submissions which are likely to exceed our own.
- 4.104 Under option 2, we would also remove the early settlement element of fast-tracking but retain an upfront reward/penalty based on the quality of Business Plan submitted.
- 4.105 The revised IQI might reduce companies' incentives to overstate their costs as penalties would be sharper. However, we continue to consider that there would be issues which would undermine its effectiveness:
- It is likely that the cost forecasts submitted by companies will continue to influence our own cost assessments, especially where there is more limited scope for benchmarking. This makes invalid one of the key assumptions required for the IQI to work under any calibration and therefore introduces incentives for strategic submissions.
 - In a sector such as electricity transmission, where the companies are asymmetric in size and there is a lack of comparators, our ability to benchmark

costs is more limited and this would limit our ability to design an appropriate menu of contracts.

- There is uncertainty about future costs as all sectors are exposed to technological and policy changes. Since the IQI does not distinguish between lower-confidence and high-confidence costs, it is not possible for the determination of the totex incentive rate to take into account the varying degree of uncertainty in setting baselines for different cost categories.

4.106 Therefore, we consider that under option 2 the relative proportion of information rents to cost efficiencies would be reduced to some extent though potentially significant information asymmetry challenges would remain.

Option 3

4.107 Under option 3, we would remove the IQI and set totex incentive rates via the confidence-dependent incentive rate. Under this approach, we would determine the proportion of a company's proposed totex that we consider to be 'high-confidence baseline' costs - these are the costs where we have a high confidence in our ability to independently set a baseline cost allowance. The remaining elements of totex would be considered 'lower-confidence baseline' costs. A higher totex incentive rate would apply to the high-confidence costs and a lower totex incentive rate to the lower-confidence costs. A single totex incentive rate would then be determined for each company on a weighted average basis.

4.108 We would also introduce a Business Plan Incentive (BPI) to encourage companies to submit ambitious Business Plans. The BPI would incorporate assessments of both totex costs and quality. The assessment of these two elements, through a four-stage process, would result in a net penalty or reward of +/- 2% of allowed totex. For the cost assessment element, the BPI would distinguish between high confidence and lower confidence costs as for the setting of the totex incentive rate.

4.109 Our differentiation between high and lower-confidence costs within the confidence-dependent incentive rate approach may have two relevant effects:

- It encourages companies that are seeking a higher totex incentive rate to provide higher confidence in their cost submissions, for example by providing independent baseline information that can support our cost assessment. By incentivising 'confidence', this should have the effect of reducing information asymmetries and, in turn, the potential for information rents.
- It protects against a high level of information asymmetry and in areas where technological change may undermine our ability to base costs on historic data by assigning a lower totex incentive rate. Therefore, where these problems are greatest, the increased potential for information rents is reduced by lower totex incentive rates. This also provides protection to companies. Where uncertainty is high in relation to future developments, companies will be protected via a lower totex incentive rate.

4.110 Overall, we consider that the delineation of high and lower-confidence costs (both in the BPI and for the setting the level of the sharing factor) and the incentives that this places on companies to provide us with confidence in their totex cost forecasts should help to mitigate the risks of information asymmetry. Where information challenges remain, consumers would be protected through a lower totex incentive rate which reflects the greater proportion of lower-confidence costs in companies' submissions. Together, we consider that this is likely to result in a reduction in the

level of information rents while maintaining incentives for genuine cost efficiencies relative to option 2 and, to an even greater extent, relative to the counterfactual. The lower risk / return balance reflected in the potential for lower totex incentive rates where uncertainty is greatest may be appropriate in the context of lessons learned from RIIO-1.

4.111 We do acknowledge that the introduction of new mechanisms brings implementation and design risks and consider these further in Chapter 7.

Summary of impacts resulting from changes to the totex incentive rate and informational tools

4.112 In our central case, we identify a potential reduction in company revenues of around £782 million as a result of the first and second order effects of changes to the level of the totex incentive rate.

4.113 Under option 2, there would be no change to the range of expected totex incentive rates relative to RIIO-1. Therefore, the impact on company revenues would be zero.

4.114 As set out above, given available information we have not attempted to quantify the third order effect.

4.115 We expect some reduction in companies' revenues resulting from changes to informational tools, which aim to mitigate information rents while maintaining incentives to deliver cost efficiencies. We would expect the magnitude of this effect to be greater under option 3 compared to option 2, resulting in a more significant impact on companies' revenues.

Table 20: Summary of expected impacts from changes to totex incentive rate and informational tools under options 2 and 3 over a five-year price control (£m 2021/22 (CPIH), discounted)

	Option 2	Option 3 (low case)	Option 3 (central case)	Option 3 (high case)
Changes to totex incentive rate – central case (first and second order effects only)	0.0	-169.6	-781.8	-1,333.7
Changes to totex incentive rate - third order effect	No change	No significant impact as companies benefit equally from underspend due to information rents or cost efficiencies ⁸²		
Changes to informational tools	Not quantified - small reduction in companies' revenues due to reduced informational rents	Larger reduction in companies' revenues under assumptions that greater proportion of information rents are removed		

⁸² While delivery of cost efficiencies may come at some cost to companies, we may assume that these costs are captured within company Business Plans with a corresponding impact on their totex allowances (where they are efficient). Therefore, while information rents may not come at such a cost, the company will benefit roughly equally from underspends delivered as a result of cost efficiencies as they do from information rents.

- 4.116 Overall, we expect a reduction in revenues under both options. The expected reduction under option 2 would be relatively small, resulting only from the elimination of some proportion of information rents due to improvements to the IQI. The impacts on revenues would be more substantial under option 3 given the reduction in the totex incentive rates and the introduction of the new confidence-dependent incentive rate and BPI.
- 4.117 We note that a proportion of this reduction in revenues would be reflected in consumer benefits through direct transfers from companies to consumers. We consider this further in Chapter 5.

Impacts from output delivery incentives, price control deliverables and licence obligations

- 4.118 We use the provision of revenues and the targeted application of financial incentives on companies to deliver certain outputs within a price control period where there is evidence of consumer value.
- 4.119 As part of the next price control, companies will be encouraged to deliver outputs in three main ways:
- We will incentivise service level improvements through Output Delivery Incentives (ODIs)
 - Price Control Deliverables (PCDs) will capture those outputs that are directly funded through the price control settlement
 - We will continue to set minimum standards of performance through retaining the use of Licence Obligations (LOs)
- 4.120 In this draft impact assessment, we do not seek to explore the individual impacts of each ODI, LO and PCD. Rather, we consider the broader impact of some general themes in relation to how we would apply these tools under options 2 and 3.
- 4.121 One of the main changes under options 2 and 3 would be our approach to ODIs. These can be set in a number of ways. For example, they may be set as an absolute reward or penalty or as an allowed percentage point of companies' revenues above or below certain thresholds set by Ofgem ('cap and collar'). Where we can directly observe the costs of delivering a certain output, then we can fund this output directly. However, where this is not possible, we can use output delivery incentives.
- 4.122 An output incentive should be set at or below the level at which consumers value the output (so that consumers benefit when the output is delivered). In order to incentivise companies to deliver the output in question, the incentive must be set above the company's costs of delivery. Where the level of the incentive is set at a level closer to the company cost (which is not observable), consumers may realise more of the benefits associated with delivery but a company may be less likely to deliver the output. Where it is set closer to the consumer value, companies may be more likely to deliver the output but consumers will benefit less from its delivery.
- 4.123 Under the options (including the counterfactual), we would revise our application of ODIs and PCDs in the following ways (this remains subject to Final Determinations in 2020):
- **(All options) Update of calibration to reflect prevailing conditions** – we update outputs and incentive targets to reflect recent data on performance against the incentives observed in RIIO-1.

- **(Options 2 and 3) Removal of incentives** where we do not expect their continuation to have benefits for consumers that outweigh the associated costs (for example incentive payments).
- **(Options 2 and 3) Re-balancing ODI value** between companies and consumers. RIIO-1 is a high-powered incentive regime as is reflected in the high rewards applied to both totex performance and to ODIs. In the context of ODIs, this can lead to setting incentives which are focussed on encouraging company delivery of outputs. In some cases, this means setting incentives closer to our estimation of consumer value to ensure that the incentive is set above company costs thus maximising the incentives to deliver the output in question. Under option 2, we would retain this high-powered incentive regime, retaining the broad alignment between ODIs and the totex incentive rates. However, under option 3, we would re-balance the incentive package. By setting the value closer to plausible ranges of company costs and further from potential consumer value, we would allow consumers to benefit more where outputs are delivered while acknowledging a trade-off with the strength of incentive placed on companies to deliver these outputs.
- **(Option 3 only) Use of relative and dynamic ODIs** where consumer value is particularly difficult to assess. This would allow relative performance between companies to define incentive payments, protecting consumers against outperformance which we do not consider to reflect consumer value. This would also ensure that ODIs remain sufficiently challenging over the length of the price control and across each sector.
- **(Options 2 and 3) The opportunity for companies to propose bespoke outputs** which allows for the introduction of incentives targeted more effectively at the particular consumers of a given company.
- **(Options 2 and 3) Define use of PCDs** to link allowed revenue more directly to the delivery of outputs. For example, we would tie cost allowances to delivery of certain outputs and protect consumers against non-delivery.

4.124 We summarise the options for ODIs and PCDs below.

Table 21: Summary of options for ODIs and PCDs

	Option 1 (counterfactual)	Option 2	Option 3
Number of incentives	Same as for RIIO-1	Limited number of incentives removed	Limited number of incentives removed
Incentive target calibration	Updated to reflect data on performance	Updated to reflect data on performance	Updated to reflect data on performance and re-calibrated to revise balance between company incentive and consumer value

Incentive rates and caps and collars	Same as for RIIO-1	Same as for RIIO-1	Incentive rates and/or caps and collars reduced for some incentives to reflect change in balance between company incentive and consumer value
Dynamic/relative incentives	Only where they exist in RIIO-1	Only where they exist in RIIO-1	Applied where appropriate
Bespoke incentives	No	Yes	Yes
PCDs	PCDs used in some areas	Define PCDs to increase alignment of allowed revenue and output delivery	Define PCDs to increase alignment of allowed revenue and output delivery

4.125 Options 2 and 3 would collectively result in a reduction in expected revenues for companies compared to the counterfactual.

4.126 However, many ODIs allow for companies to be penalised should they fail to meet targets. Therefore, option 3 may also represent a reduction in the level of risk associated with the ODIs where incentive rates are reduced or caps and floors narrowed.

4.127 Given that we have experienced a general trend towards outperformance in RIIO-1, we expect that re-calibration of incentive targets under option 3 would lead to a reduction in the extent of outperformance. However, we acknowledge that this would come with some risk of reducing the incentives on companies to deliver outputs which may otherwise be in consumer interests. We explore the behavioural response from companies below.

4.128 In the section below we consider first the impacts of options 2 and 3 in relation to ODIs. We then consider impacts resulting from PCDs.

Analysis of ODIs - Methodology

4.129 The primary difference between option 2 and the counterfactual is the reduction in the number of incentives as shown in table 22. Where incentives remain in place, we assume that companies will deliver outputs and so earn revenues which are broadly aligned with those observed so far under RIIO-1. Therefore, our quantification of option 2 reflects the reduction in revenues associated with those incentives that we would remove under this option.

4.130 For options 2 and 3, we would not provide any financial penalty/reward for the stakeholder engagement incentive and would remove discretionary rewards from all sectors. We would also remove the NTS Shrinkage incentive in the gas transmission sector.

4.131 For option 3, in addition to removing the same incentives as under option 2, we also re-calibrate incentive targets, caps and floors and incentive rates. The intention would be to ensure that consumers retain a greater proportion of benefits where companies deliver outputs in response to the incentives. This would result in lower revenues to companies.

4.132 Our analysis does not incorporate bespoke outputs. Network companies may propose bespoke outputs when they submit their Business Plans; therefore bespoke outputs cannot be assessed in this draft impact assessment. In the absence of historic performance data, nor do we incorporate assumptions on performance under any new ODIs that may be introduced – for example in relation to interruptions within the gas distribution sector. In combination, this may increase the scope for company rewards and penalties resulting from the ODIs to some extent.

4.133 For option 3, we have estimated the revenues that we would expect to see companies achieve under three scenarios.⁸³ These range between a 'low case' in which companies may fail to meet targets and receive penalties in some or a number of areas and a 'high case' in which companies perform well against targets, potentially coming close to the cap on some of the incentives. The high and low cases are designed to reflect the broadest range of performance that we consider plausible and we would not expect to observe the resulting impacts on revenues for companies across sectors under normal circumstances.

4.134 We also consider a 'central case' which is based on what we consider to be a plausible scenario of company performance.

4.135 While some of the assumptions of re-calibration and company performance will be further refined as we develop our policy on incentives in detail, we present in the table below a summary of the assumptions that we have used in each case.

Table 22: Definition and assumptions under each scenario of revenue impacts (option 3 analysis)

Feature	Low case	Central case	High case
Target calibration	Significantly more challenging than RIIO-1	More challenging than RIIO-1	Similar to RIIO-1
Incentive range of outcomes (for example incentive rates, caps and floors)	RIIO-1 range. Relatively high potential penalties	Narrower than RIIO-1. Absolute upside and downside risk less than under RIIO-1	Similar to RIIO-1. Relatively high potential rewards
Expected performance levels	Some companies underperform and few outperform	Mixed. Many companies only slightly outperform incentives	Similar to RIIO-1. Some significant outperformance.

4.136 For both options 2 and 3, we compare expected revenues against actual company revenues to date under RIIO-1. In doing so, we can estimate the potential impact on company revenues resulting from the changes we are introducing for the incentives package relative to the counterfactual.

4.137 For the avoidance of doubt, the incentive calibration considered within this analysis should not be taken to represent our position on earning potential under the ODIs before policy has been finalised.

⁸³ We followed a bottom-up approach, considering how we would expect companies to perform against incentives in each area relative to RIIO-1 performance. The detailed analysis is confidential but we present aggregated analysis in this draft impact assessment.

Results – Option 2**Table 23: Impacts of ODIs under option 2 - annual (£m 2021/22 (CPIH))**

Sector	RIIO-1 average annual revenues (to date)	Option 2 estimated annual revenues	Impact of option 2 relative to counterfactual
Gas Distribution	27.0	13.1	-13.9
Gas Transmission	30.6	23.4	-7.2
Electricity Transmission	31.2	22.7	-8.4
Total	88.7	61.5	-29.5
Total (five-year price control period, discounted)	414.7	287.5	-138.0

4.138 Under option 2, we would expect overall company revenues to reduce by approximately £29 million per year (2021/22 CPIH) relative to the RIIO-1 counterfactual. After discounting, this amounts to approximately £138 million (2021/22 CPIH) over the five-year price control.

Results – Option 3

4.139 Results for our high, low and central cases for option 3 are presented below.

Table 24: Impacts of ODIs under option 3 – annual (£m 2021/22 (CPIH))

Sector	RIIO-1 average annual revenues (to date)	Option 3 annual revenues (low case)	Options 3 annual revenues (central case)	Options 3 annual revenues (high case)
Gas Distribution	27.0	-6.1	4.9	27.9
Gas Transmission	30.6	-24.6	12.6	28.9
Electricity Transmission	31.2	-18.0	9.0	27.4
Total	88.7	-48.8	26.4	84.2
Total (five-year price control period, discounted)	414.7	-228.2	123.4	393.5

Table 25: Impact of ODIs on company revenues under option 3 relative to the counterfactual over a five-year price control (£m 2021/22 (CPIH), discounted)

	Impact of option 3 relative to RIIO-1 counterfactual (low case)	Impact of option 3 relative to RIIO-1 counterfactual (central case)	Impact of option 3 relative to RIIO-1 counterfactual (high case)
Cross-sector annual impact of option 3 relative to counterfactual	-128.6	-58.3	-4.2
Total difference in cross-sector revenues over five-year price control period	-642.9	-291.3	-21.2

4.140 Under option 3, we would expect overall company revenues to reduce by approximately £62.3 million per year (2021/22 CPIH) under our central case relative to the RIIO-1 counterfactual. After discounting, this amounts to £291.3 million (2021/22 CPIH) over the five-year price control.

Consideration of company behavioural response under option 3

4.141 The quantitative analysis above only considers the direct bill impact of changes to the power and design of ODIs. It does not capture the behavioural response of companies that may result. The anticipated effect may depend on the nature of the change to each respective ODI:

- **Reduction in incentive rate (or removal of ODI):** The incentive rate sets the marginal revenue to companies resulting from a unit of improved performance against the output in question. Where the incentive rate is reduced (or where an ODI is removed altogether), companies may respond by decreasing the level of effort which they invest in delivering the respective outputs. However, this may also lead to higher levels of underspend against totex allowances, balancing the possible reduction in revenue to some extent.
- **Reduction in maximum rewards and penalties (for example caps and collars):** Separate to the incentive rate, a cap and collar may place a limit on the upside or downside revenue potential. A reduction in the total potential value of the incentive will only have an impact where it results in a company expectation that the cap or floor is now more likely to be hit, or where the cap or floor is actually reached within the price control period. Where this is the case, companies may choose to exert less effort on the output in question given an expectation that performance is no longer likely to affect their revenues. As before, this may also lead to higher levels of underspend against totex allowances.
- **Introduction of more stretching targets:** Where it does not impact on the marginal incentive strength or the likelihood of hitting the cap or floor, traditional economic theory would suggest that the placement of the incentive target will not affect company performance (because the marginal reward/penalty of the next

unit of output remains the same). However, more stretching targets may impact on company behaviour for two reasons:

- **They may change the likelihood of the cap or floor being reached:** A more stretching target may decrease the likelihood of the cap being reached and increase the likelihood that companies may hit the incentive floor (where relevant).
- **They may have a behavioural implication:** Companies may exhibit risk and loss aversion, in which case they may be more driven to avoid penalties than they are to seek rewards. In this context, more stretching targets may encourage greater effort from companies due to the greater risk of missing targets and facing penalties.
- **Bespoke outputs and incentives:** By providing the opportunity to propose bespoke outputs, companies may benefit from additional revenue opportunities (as well as downside risk) where their proposals can be well-justified and evidenced. We would also expect to see greater levels of innovation and engagement with stakeholders to identify such opportunities. This would also apply to option 2.
- **Dynamic incentives** (for example where targets or incentive rates change over time): Dynamic incentives are intended to ensure that ODIs remain appropriate and challenging over the course of the price control. However, dynamic incentives can also introduce complexity and uncertainty for companies about the application of incentives over time which can lead to sub-optimal responses. For example, they may discourage very strong performance early in the price control period where this could lead to un-realizable targets later on.
- **Relative incentives** (for example where incentive performance is influenced by performance by other companies across the sector): Relative ODIs can protect against challenges with calibrating ODIs such as a lack of evidence of consumer value given that significant sector-wide outperformance or underperformance is no longer possible. They can also introduce an element of competition into the delivery of outputs within a sector. However, we acknowledge that in certain contexts, relative incentives can have undesirable impacts on company behaviour. For example, they can discourage collaboration and knowledge dissemination across the sector where they encourage companies not to reveal information to each other that may reduce their relative performance. They can also create the risk of collusive behaviour, for example where companies may jointly agree to relax performance against certain incentives to benefit to a greater degree from outperformance against another.

Defining use of PCDs under options 2 and 3

4.142 Under options 2 and 3, we would use PCDs, where appropriate, to specify outputs that are directly funded through the price control. PCDs will have specific revenue allowances assigned to them and will strengthen the mechanisms linking price control allowances to delivery of outputs in comparison to RIIO-1.

4.143 Under options 2 and 3, we will define PCDs in areas where there are clear deliverables funded directly through the allowed revenues in the price control settlement. This will ensure that companies deliver the outputs that consumers are paying for. In case of non-delivery or sub-standard delivery, Ofgem will be able to adjust allowed revenues accordingly.

4.144 However, we recognise that over-specifying price control outputs can reduce companies’ abilities to innovate and find more efficient solutions to deliver outcomes that benefit consumers. This can reduce the extent to which companies are able to identify and deliver legitimate cost efficiencies within the price control period, for example where this would lead to a risk that these efficiencies were interpreted as non-delivery of PCDs. We intend to mitigate this impact by ensuring that when PCDs are assessed, we will take into account genuine efficiencies and changes in circumstances within our assessment.

4.145 Overall, we consider that our approach to PCDs under options 2 and 3 would strike an appropriate balance between tying cost allowances to what companies say they will deliver in company Business Plans while still allowing companies to deliver cost efficiencies where these are identified within period.

Summary of impacts resulting from output incentives and obligations

4.146 Under both options 2 and 3, we would expect to see a reduction in company revenues as a result of our re-calibration of outputs. We have only partly quantified the impact of the options on companies. We would expect this quantified reduction in revenues to be reflected, at least in part, in a transfer of benefits to consumers.

4.147 In addition to the direct impact of re-calibrated incentives, we would expect to see a number of behavioural impacts resulting from options 2 and 3. Depending on the response of companies, this may increase or reduce revenues and may have both positive and negative impacts on consumers.

4.148 Under both options 2 and 3, the refinement of PCDs could result in a reduction of companies’ revenues if they do not deliver the associated outputs.

Table 26: Impact of ODIs and PCDs on company revenues under options 2 and 3 (central case) over a five-year price control (£m 2021/22 (CPIH), discounted)

	Option 2	Option 3
Total impact of changes to ODIs – central case	-138.0	-291.3
Impact of changes to PCDs	Potential for reduction in company revenues if they do not deliver	Potential for reduction in company revenues if they do not deliver

4.149 We expect to see a greater reduction in revenues under option 3 in comparison to option 2 resulting from the recalibration of ODIs. As we will observe when we consider consumer benefits in Chapter 5, this would be reflected in a transfer to consumers.

Other impacts on companies

Impacts resulting from the introduction of a RAM

4.150 Under option 2, we would not introduce any failsafe mechanism on network company returns when they move well outside ex ante expectations.

4.151 Under option 3, Ofgem would introduce a Return Adjustment Mechanism (RAM). The RAM would apply as an adjustment to an individual company’s performance. If

network companies exceed a pre-defined level of RoRE, then we would adjust their returns according to the sculpted sharing approach as set out in our RIIO-2 Sector Methodology Decision document.⁸⁴

4.152 The RAM would not apply to performance on debt and tax allowances. Any income earned from the BPI would also be excluded from the RAM.

Methodology

4.153 We have carried out some analysis to consider if the RAM would be triggered under option 3 across all three sectors.

4.154 The threshold and all other elements of the design of the RAM considered for the purposes of this analysis are indicative only (final design to be set out at determination stage in 2020). We have applied a RAM threshold of 300 basis points around the cost of equity as previously consulted on for the purposes of this analysis.

4.155 We have explored whether the RAM would be triggered under option 3 using RIIO-1 underspend levels observed to date (adjusted to reflect a five-year price control period) but in the presence of the tools proposed under option 3. We have calculated company RoRE and identified whether the RAM would be triggered using the assumptions described in the table below.

Table 27: Description of assumptions used in our analysis of RAM

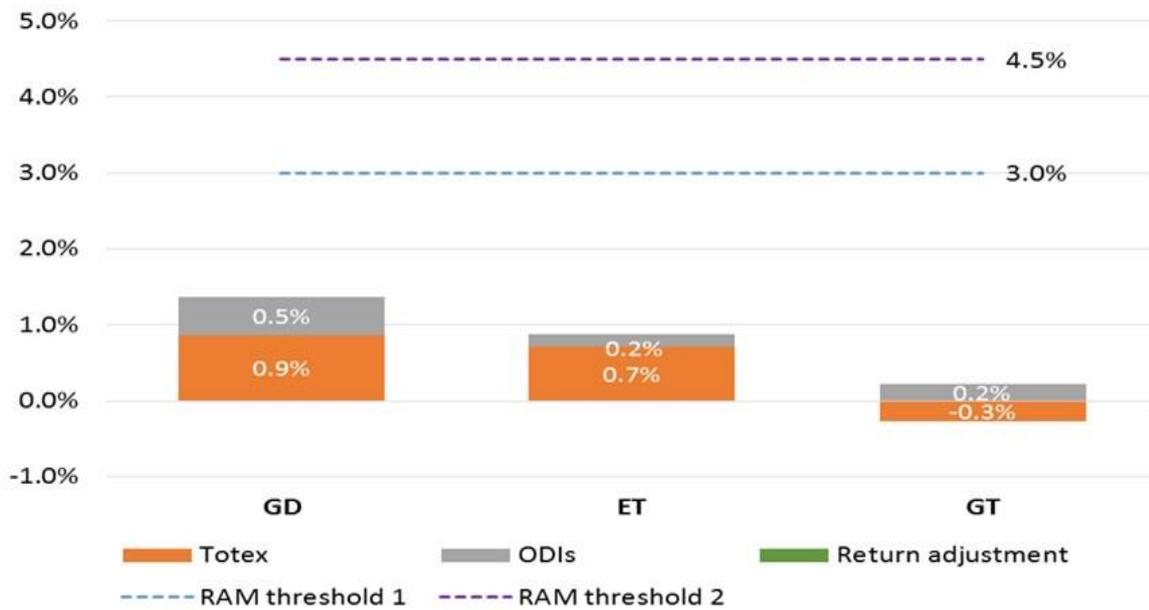
Assumptions	Description
Company underspend levels	As in RIIO-1
Incentive rate and outperformance on outputs	Incentive rate levels: 32.5% (option 3, central case) Performance on output incentives: RIIO-1
Gearing	60%
1st RAM threshold proposed	Indicative level set based on our previous consultation position, ie +/- 300 bps on top of cost of equity
1st RAM sculpting level	50%
2nd RAM threshold proposed	+/- 150 bps on top of 1st RAM threshold
2nd RAM sculpting level	75%

Results

4.156 Under this illustrative scenario, our analysis finds that the RAM would not be triggered in any of the sectors, as shown in the figure below.

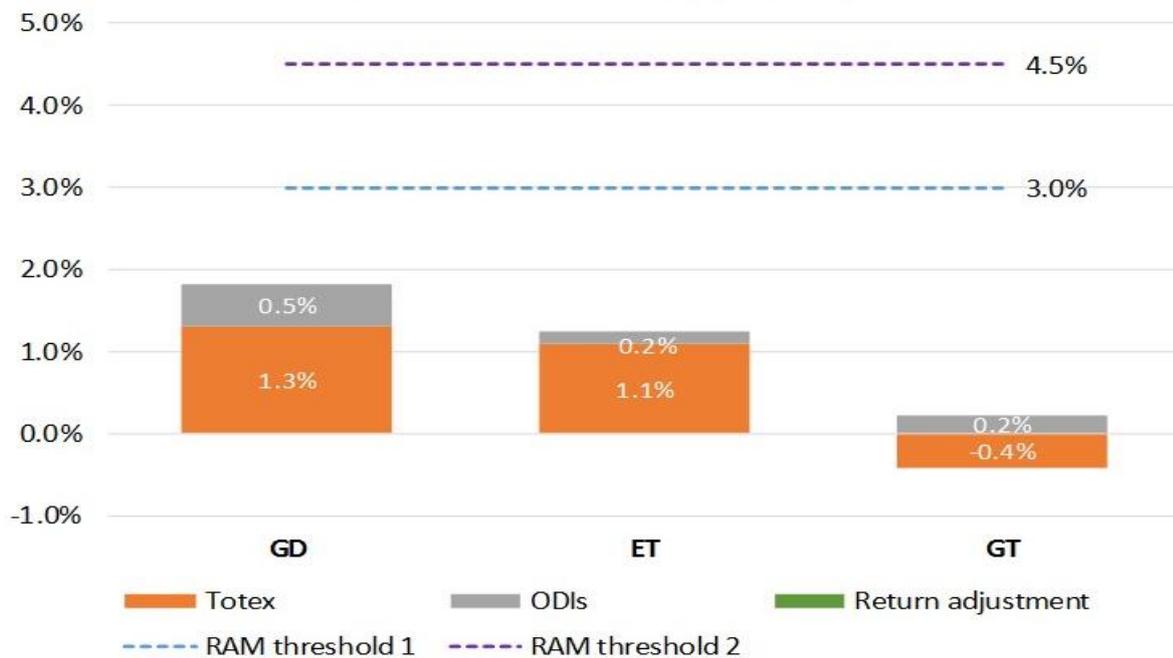
⁸⁴ [RIIO-2 Sector Specific Methodology- Core document](#), Chapter 12, pages 136-137

Figure 6: RoRE above allowed return assuming a 32.5% totex incentive strength – ‘Central scenario’ and RAM thresholds of +/- 300 bps and 450bps



4.157 This remains true with a totex incentive rate of 50% under a five-year price control as shown below.

Figure 7: RORE above allowed return assuming a 50% totex incentive strength – ‘Central scenario’ and RAM thresholds of +/- 300 bps and 450bps



4.158 The analysis above demonstrates that under our assumptions for the design and calibration of the RAM, this is unlikely to be triggered. Our tools and policies under option 3 should also mean that factors outside of the companies' control are less likely to lead to extremely high or low revenues.

Qualitative analysis of the RAM

4.159 We note that the analysis above does not incorporate potential impacts on company behaviour that may arise from the totex incentive rate, additional uncertainty mechanisms and the BPI. We note that the level of underspends we have seen in RIIO-1 may not occur when tools under option 3 are applied. We consider that this further decreases the likelihood of the RAM being applied in practice.

4.160 We acknowledge that the RAM is effectively a form of implicit profit sharing and that, combined with shorter price control periods, can in theory reduce the incentive for firms to seek efficiencies. However, we do not anticipate that the sculpted sharing scenarios set out in the indicative analysis above would result in a change in company behaviour given the very low likelihood of the RAM being applied.

Impacts under option 2

4.161 As we would not include a RAM within option 2, there would be no change relative to the counterfactual. Given the analysis above, which suggests that a RAM is very unlikely to be triggered, the material differences between options 2 and 3 would be limited.

Summary of impacts from the introduction of a RAM

4.162 To the extent that the RAM is applied to the returns of a company, it may have an impact on company profitability. However, based on our evaluation of the likelihood of the RAM being triggered under option 3, we consider that the impact of the RAM on company profits is likely to be zero under a central case. We would not introduce the RAM under option 2 and therefore the impact would also be zero.⁸⁵

Table 28: : Impact of introduction of a RAM under options 2 and 3 (central case) over a five-year price control

	Option 2	Option 3
Impact of the introduction of a RAM	0	0

Impacts from funding of innovation

4.163 Encouraging network companies to innovate in providing network services and outputs has been a key element of the RIIO model. Several features of the price control framework are intended to encourage more innovation by network companies. These include:

- The 'totex' approach, which equalises the incentives between capital and operational expenditure meaning that there are not undue incentives towards investing in capital expenditure.
- An output-based approach, which gives the network companies greater flexibility during the price control to identify suitable and cost effective solutions.

⁸⁵ We have not provided an assessment of high or low cases in this analysis, as the extent of the outperformance required to trigger a RAM is sufficiently illustrated by one case. Cases where there is greater outperformance than RIIO-1 levels would mean it is more likely to be triggered (eg, if totex performance was twice RIIO-GD1 levels, it would trigger a RAM with a 50% incentive strength). Evidence received in company Business Plans and our cost assessment analysis will be part of the final assessment of RAM thresholds.

- 4.164 In addition to the features of the core price control framework, Ofgem also introduced specific innovation funding mechanisms in RIIO-1. These were the Network Innovation Competition (NIC), the Network Innovation Allowance (NIA) and the Innovation Return Mechanism (IRM). Collectively, these were used to encourage companies to do more innovation than might otherwise take place within the regulatory price control context.
- 4.165 Under options 2 and 3, we will retain the opportunity for NIA funding and replace the existing NIC with a new funding pot which will focus on big strategic innovation challenges within networks and system operation. This funding may result in additional allowed revenues for network companies.
- 4.166 The new funding pot will focus network innovation more on strategic energy system transition challenges, increase coordination with other public sector innovation funding and increase third party involvement in network innovation.
- 4.167 Companies will also have the continued opportunity to receive NIA funding under options 2 and 3. These will be use it or lose it allowances for companies that will be primarily used for projects which support the energy system transition and consumer vulnerability related projects.
- 4.168 Under options 2 and 3, compared to the counterfactual, there would be a reduction in the amount of revenues companies would receive as a result of the removal of the IRM re-opener. This mechanism has not been frequently utilised during RIIO-1, therefore the likely impact of its removal would be modest (approximately £24.2m for ET⁸⁶) and might be offset by any increase in innovation spending using companies' totex allowances.

Table 29: Funding available for innovation under RIIO-2 and options 2 and 3

Innovation scheme	NIC in RIIO-1	NIA in RIIO-1	IRM in RIIO-1	NIA under options 2 and 3	New strategic innovation funding pot under option 2 and 3
Purpose of scheme	To fund large flagship development and demonstration projects.	To fund smaller scale research, development and demonstration projects.	To fund rollout of proven innovation with carbon and/or environmental benefits into BAU.	Primarily used to fund smaller-scale energy system transition or consumer vulnerability projects that companies would not otherwise do.	To fund big strategic innovation challenges within networks and system operation, primarily for energy system transition projects.

⁸⁶ To date, there has only been one successful application for IRM funding across the RIIO-1 price controls. In RIIO-ET1, Scottish Power Transmission was awarded £24.28m to deploy a new type of conductor on parts of its network to increase capacity in 2015.

How funding is awarded	Network companies submit bids and compete for project funding via an annual competition administered by Ofgem.	Allowance set at the start of the price control based on the quality of the company's own innovation strategy.	Applications for funding made by network company. Funding only awarded if companies cannot rollout innovation using totex allowance.	Evaluation of companies' RIIO-2 Business Plan submissions.	Ofgem will set strategic innovation challenges and consult on appropriate governance arrangements.
Total funding available	£720m available over the course of RIIO-1. Currently, £20m available annually in gas competition and £70m available annually in electricity competition.	Around £500m available for network companies over the course of RIIO-1. Individually, allowances varied between 0.5-0.7% of companies' allowed revenues.	No cap in funding available.	Individual allowances will be determined as part of Business Plan assessment.	Still to be determined.

4.169 We will determine the funding available under the NIA and the new innovation funding pot at a later stage.

Summary of impact from funding of innovation

4.170 Based on the information currently available, we have not quantified the impacts arising from changes to innovation funding on companies' revenues at this stage. The overall size of the Network Innovation Allowance and any initial funding for the new strategic innovation funding pot will be determined by Ofgem at Determination stage in 2020.

Table 30: Impact of innovation funding on company revenues under options 2 and 3 over a five-year price control

	Option 2	Option 3
Impact of changes to innovation package	Uncertain	Uncertain

Impacts arising from the introduction of late and early competition

4.171 Currently, for onshore network assets, only new, separable and high-value projects in ET are eligible for competition under our late models. Under options 2 and 3, we would ensure the availability of late competition models across the electricity transmission and gas sectors so long as projects meet the relevant criteria, and will

identify projects for further consideration of their suitability for any early competition models.⁸⁷

- 4.172 We have set out in a separate impact assessment the potential costs and benefits of late competition across all sectors.⁸⁸
- 4.173 The introduction of competition ‘for the market’, in the form of early and late models, might drive down allowed revenues, and in turn profits, that the incumbent network companies derive from new projects, primarily as an increase in competition should reduce economic rents (which accrue to the regulated monopoly due to informational asymmetry). This should result in a transfer to consumers, meaning that the reduction in revenue and profits for companies will lead to a bill saving for consumers of equal value. We discuss these impacts in more detail under our assessment of consumer impacts.
- 4.174 Under some of these competition models, the introduction of competition might also result in lower administration costs for the network companies, including where they are not the party responsible for running competitions.
- 4.175 In the absence of Business Plans we do not attempt to estimate the potential loss of revenues/profits to network companies relative to the counterfactual. We also note that any change in revenues/profits to network companies will result from the availability of projects which are found suitable for competitive models.

Table 31: Impact of competition on company revenues under options 2 and 3 over a five-year price control

	Option 2	Option 3
Impact of introduction of more competition	Not quantified - Reduction in company revenues	Not quantified - Reduction in company revenues

Impacts arising from length of price control

- 4.176 Under options 2 and 3, we would set the default length of the price control at five years. We consider the change in approach to be justified in light of evidence gathered from stakeholders.⁸⁹
- 4.177 Due to the nature of network assets and the fact that they have a long economic life, it can be argued that longer regulatory price controls are a better fit for the capital intensive and cyclical nature of investments in the energy networks. In an incentive regulation context, the length of the price control protects the regulated firm against early appropriation of the efficiency gains achieved during the price control period and may stimulate future efficiency and innovation.
- 4.178 A shorter price control can allow for a narrower potential distribution of outcomes which reduces the exposure of companies and consumers to risks which can become increasingly material over a longer time horizon. This is particularly the case in the context of fast paced industry change such as that being observed in the energy

⁸⁷ https://www.ofgem.gov.uk/system/files/docs/2019/05/riio-2_sector_specific_methodology_decision_-_core.pdf
⁸⁸ We consulted on that impact assessment in December and published an updated version, responding to the feedback we received, as part of the suite of RIIO-2 Sector Specific Methodology Decision documents in May
⁸⁹ https://www.ofgem.gov.uk/system/files/docs/2019/05/riio-2_sector_specific_methodology_decision_-_core.pdf

sector at present. However, more frequent price control reviews might also give companies more opportunities to exploit their informational advantage.

4.179 We also acknowledge that in theory, a shorter price control might require fewer uncertainty mechanisms. However, due to the uncertainty surrounding network activity in the future, even within the upcoming years, we expect that defining allowances necessary for a range of different activities will contain a number of challenges. As such, there might be a need to retain existing uncertainty mechanisms and potentially introduce new ones.

Table 32: Impact of length of price control on company revenues under options 2 and 3 over a five-year price control

	Option 2	Option 3
Impact of changes to length of price control	Not quantified – uncertain	Not quantified - uncertain

4.180 On balance, we consider the benefits of a shorter price control period in relation to reduced risk of forecast inaccuracies, in light of the uncertainty surrounding network activity in the future, to outweigh the potential costs in relation to the potential to reduce longer-term thinking. Other elements of the packages proposed under options 2 and 3 are designed to mitigate the prevalence of information asymmetries, which might arise from reviews that are less frequent.

4.181 We note that five-year price controls are common in the UK and internationally in a number of sectors⁹⁰ and were used in the energy sectors prior to RIIO-1. We therefore have confidence in the merits of re-aligning with standard cross-sector practice and consider there to be benefits of such an approach in the context of rapidly changing energy networks.

Administration and resource costs

4.182 Some of the changes under options 2 and 3 could potentially impose some additional administrative and resource costs on network companies. These additional costs could, under some circumstances, be passed to consumers through higher network charges. We consider that the following changes in particular would affect companies’ administration and resource costs.

Length of price controls

4.183 Under options 2 and 3, Ofgem would reduce the length of the price control from eight to five years. The increased frequency of the price controls is likely to lead to some increased administration costs for companies as they would need to submit Business Plans, carry out necessary stakeholder engagement and respond to policy consultations more frequently. However, this increased cost is likely to be offset by the removal of the mid-period review process that would be present under the counterfactual. We therefore consider that the overall net impact on companies’ administration costs would not be as significant as other elements of options 2 and 3 set out within this draft IA.

⁹⁰ For example, Ofwat has decided to retain a price control length of five years for the price controls running from 2020 to 2025: <https://www.ofwat.gov.uk/wp-content/uploads/2017/12/Final-meth-exec-summary.pdf>

Enhanced engagement

- 4.184 Under option 2, Ofgem would improve enhanced engagement compared to RIIO-1 by providing guidance on what effective engagement means.
- 4.185 Under option 3, Ofgem would improve the enhanced engagement compared to RIIO-1 and also strengthen the voice of the consumers in the price control settlement process. In particular, network companies would be required to set up the User Groups and Customer Engagement Groups and to submit their Business Plan twice to the RIIO-2 Challenge Group, before a final submission to Ofgem, and to participate in Open Hearings. We consider that this change in process would result in additional resource and administration costs for companies.
- 4.186 We consider that administration and resource costs for companies would be higher under option 3 compared to option 2. However, in comparison to the impacts of some of the other mechanisms that we have evaluated in this draft impact assessment, we would expect the administrative and resource costs of these groups to be relatively small.

Introduction of competition

- 4.187 The introduction of competition under options 2 and 3 might result in a transfer (and reduction) of network competition administration costs as network companies will be relieved of the responsibility of running competitions themselves. This would vary depending on the extent of competition employed in RIIO-1.

Business Plan Incentive and incentive rate

- 4.188 We acknowledge that the development of Business Plans can be a resource intensive task for companies. In order to provide higher quality and more ambitious Business Plans, we accept that the resources that companies need to invest may increase. We also acknowledge some resource and administrative implications resulting from the requirement to develop an understanding of mechanisms that have not previously been applied.

Summary of impacts on revenues resulting from changes in administrative costs

- 4.189 We summarise below the impacts on companies’ revenues resulting from changes in administrative and resource costs under options 2 and 3. Overall, we consider that the impacts resulting from other areas of this draft impact assessment are likely to have a more significant impact on company revenues.

Table 33: Impact of changes in administration costs on company revenues under options 2 and 3 (central case) (£m 2021/22 CPIH), over a five-year price control

	Option 2	Option 3
Length of price controls	Not quantified – potentially a small increase	
Enhanced engagement	Not quantified – small increase in administration costs	
Competition	Not quantified – potential transfer of administration costs	
Business Plan Incentive and incentive rate	Not applicable	Not quantified – some increase in administration costs

5. Impacts on consumers in the next regulatory period

This chapter presents our analysis of the direct impacts arising from our regulatory options on consumers in the next regulatory period. It also considers the impact of our options on vulnerable consumers and other impacts, such as on the environment, in the next regulatory period.

Summary of impacts on consumers in the next regulatory period

- 5.1 We find that consumers would benefit by £1.8 billion under our central case within option 3 compared to the counterfactual.
- 5.2 We note that most of the expected quantified impacts on consumers arise from transfers from companies to consumers due to changes to the allowed return on equity. Under option 3, our central case estimate may be an underestimate of expected consumer benefits, as it is based on conservative assumptions on network companies' responses to a reduction of the totex incentive rate.
- 5.3 We have performed a partial quantification in a number of key areas of the design of the options.
- 5.4 We set out the estimated impacts of options 2 and 3 on consumers in the table below.

Table 34: Impacts on consumers from 2021/22 to 2025/26 (£million 2021/22 real CPIH, discounted)

Area of package	Mechanism	Option 2	Option 3	Option 3 Range	
				Low	High
Changes to financial parameters	Return on equity	1,054	3,424	2,610	3,729
		Network companies will receive less remuneration for equity investment. Key credit ratios are expected to be broadly similar or slightly improved on a notional company basis.			
Changes to financial parameters	Switch to CPIH	-2,022	-2,086	-2,064	-2,094
		This change will be value-neutral to both investors and consumers in the long-term (consumers will be neither worse off nor better off), but does affect the timing of repayment of the RAV. This means the consumer benefit is negative within next regulatory period, but will be positive after about twenty years.			
Changes to incentives	Totex Incentive Mechanism and informational tools	0	225	-676	1,032
		No change from counterfactual	A combination of lower incentive rates and the introduction of our new information tools may reduce information rents, benefitting consumers		
	Output Delivery Incentives	138	291	21	643
		Consumer benefit from more ambitious targets. Benefits may reduce where companies reduce delivery of outputs as a result of removal of incentives.	Consumers are expected to benefit from more ambitious and dynamic output targets and use of dynamic targets. However, consumer benefits may reduce where companies reduce delivery of outputs as a result of removal and re-calibration of incentives.		
	Price control deliverables	Consumers will benefit from tying network company expenditure (totex allowances) more closely to delivery. However, consumer benefits may reduce because network companies will have less flexibility to deliver cost efficiencies			
Changes to other elements	Return Adjustment Mechanisms	0	0	0	0
		RAMs are unlikely to be triggered under all scenarios considered and based on design that has previously been consulted on. Note that the final design of RAMs has not yet been determined and may be different from that considered within this draft IA.			
	Length of price control	Consumers will benefit from lower risk of forecasting inaccuracies. However, there could be some negative impact because companies focus on shorter-term results.			
	Innovation funding	Similar outcomes to RIIO-1, but more targeted on areas that add consumer value. We expect the extent of innovation funding to be broadly in line with that observed in RIIO-1.			
	Competition	Where opportunities are identified to introduce competition into projects, consumers may benefit from additional cost and service efficiencies within the price control period. Future consumers also stand to benefit from better information revealed by prices that are set competitively.			
Administration costs		Additional costs for the regulator and for companies to manage the new tools that will be passed onto consumers. These are likely to be marginally higher under option 3 given introduction of additional tools.			
Total quantified impacts		-829	1,854	-109	3,310
Total, not including switch to CPIH		1,192	3,940	1,955	5,404

- 5.5 A proportion of the quantified consumer benefit that we have identified for the totex incentive rate results from direct transfers from companies to consumers, for example as a result of consumers sharing a greater proportion of underspends relative to the counterfactual. In addition to our quantitative analysis, there are a number of additional areas within options 2 and 3 which we have considered qualitatively and in which we identify consumer benefit. Reducing forecasting uncertainty in the context of a five-year price control period, aligning totex allowances to PCDs and the introduction of competition are all expected to result in consumer benefit.
- 5.6 Also we note that both options 2 and 3 would result in a different risk allocation between consumers and companies compared to the counterfactual. In particular, the indexation of RPEs under both options would protect consumers against the risk of network companies earning additional returns which are not due to performance improvements. Further, under option 3 the introduction of a RAM might further protect consumers.
- 5.7 However, we identify some risks to consumers in certain areas of our options. Whether consumers benefit from our methodologies or face negative impacts is dependent to some extent on how companies respond to the changes that we make under option 2 and particularly under option 3. For example, there may be a loss of productive efficiency where companies respond to reduced incentive rates by exerting less effort to identify cost efficiencies. Similarly, where the incentive strength of output incentives is reduced (or where incentives are removed), consumers may not benefit from outputs that they may have otherwise done. Consumers may also face greater risk associated with company underperformance against the TIM given that they would share more of the overspends in the event of lower incentive rates.
- 5.8 Overall, we consider that any negative impacts are only likely to materialise in the most significant of companies' behavioural responses.
- 5.9 On balance, our assessment of the benefits and risks of the options gives us confidence that consumers are likely to benefit from option 3 under our central and high cases. We estimate that consumers would benefit from option 2 to a lesser extent. We observe consumer benefit in most areas of the package and where downside risk is present (for example, in relation to the impacts of changes to the incentive rates), our 'breaking point' analysis gives us confidence that these negative benefits are unlikely to materialise.
- 5.10 We therefore consider expected consumer benefits to be highest under option 3.
- 5.11 In the rest of this chapter we discuss in more detail the quantified and unquantified impacts on consumers. We also consider impact on the environment, resilience of the network and distributional impacts.

Impacts on consumers from changes to financial parameters

- 5.12 In this section, we consider the impacts on consumers from changes to the allowed return on equity, cost of debt allowance and indexation of the Regulated Asset Value (RAV).
- 5.13 As noted in Chapter 4, the methodology does not include a corresponding reduction in the tax allowances associated with changes in return. Therefore, the impact on

actual network charges would be larger than the decrease in return, because it would also decrease tax allowances.

- 5.14 If we assumed a tax rate of 17% for financial years 2021/22 – 2025/26, the associated tax allowance is an additional 20.5%⁹¹ on the equity return. For an equity return reduction of £3.5 billion, it would reduce tax allowances by a further £700 million.
- 5.15 For simplicity, this is not considered in the tables which follow. This assumption is akin to assuming the taxpayer and consumers are the same group (where then there would be no change in welfare).

Impacts from changes to return on equity

- 5.16 A reduction in the allowed cost of equity will result in a direct transfer from companies to consumers and would therefore increase consumers’ benefit compared to the counterfactual.

Table 35: Net present value of consumer benefit from changes to the cost of equity over a five-year price control (£m 2021/22 (CPIH), discounted)

	Option 2	Option 3 (low)	Option 3 (central)	Option 3 (high)
ET, GT, and GD	1,054	2,610	3,424	3,729

Impacts from indexation of the RAV and allowed returns to CPIH

- 5.17 The RAV would be indexed to CPIH under both options 2 and 3 and result in a reduction of consumer benefit compared to the counterfactual during the next regulatory period. Differences in the high and low option 3 is due to the corresponding cost of capital, as explained in Chapter 4.

Table 36: Net present value of consumer benefit indexation of the RAV and returns to CPIH, over a five-year price control (£m 2021/22 (CPIH), discounted)

	Option 2	Option 3 (low)	Option 3 (central)	Option 3 (high)
ET, GT, and GD	-2,022	-2,064	-2,086	-2,094

Impact on consumers from changes to incentives

- 5.18 Some of the impacts on companies resulting from changes to incentives may lead to absolute cost reductions or increases ultimately affecting consumers. Other impacts might result from a redistribution from network companies to consumers – representing a direct transfer. Changes in company revenues will result in lower/higher network charges which we assume are passed through to consumers.
- 5.19 We draw on our analysis from Chapter 4 to consider the impacts on consumers. We have therefore maintained the same balance between quantitative and qualitative analysis as that set out in the previous section.

⁹¹ $0.17/(1-0.17)=0.205$

5.20 We do not repeat the methodology used for the analysis except where there are changes or new pieces of analysis relative to that carried out in Chapter 4.

Impacts resulting from changes to the TIM rate

5.21 In this section, we explore the impacts on consumers resulting from changes to the totex incentive rate.

Option 3

5.22 In order to estimate the impact of the changes to the approach to the levels of totex incentive rate under option 3, we return to the three orders of effect, which we identified when considering company revenues in Chapter 4. We do not repeat that analysis here but consider the resulting impacts on consumers.

First order effect

5.23 The first order effect would be equivalent to a direct transfer from companies to consumers. Put simply, consumers would receive the same benefits of company underspends while paying less to companies to drive this performance. Estimates of the consumer benefit resulting from the first order effect are thus equal to the reduction in company revenues observed in Chapter 4.

Table 37: Net present value of consumer benefit resulting from first order effect (green cell represents our central case), over a five-year price control (£m 2021/22 (CPIH), discounted)

	Totex incentive rate = 15%	Totex incentive rate = 32.5%	Totex incentive rate = 50%
Total impact on consumer share of underspend	1032.2	601.0	169.6

Second order effect

5.24 We estimate the level of consumer benefit resulting from a combination of the first and second order effects that we presented in Chapter 4 and using the same assumptions as are set out there.

5.25 It is important to note that only a proportion of lost company revenues identified previously result in a direct transfer to consumers. Wherever reduced underspends by companies reflect a loss of cost efficiencies, the benefits to consumers will be lower than the lost company revenues. This is because of a combination of the following two effects⁹²:

- **Transfer to consumers from change to totex incentive rate:** The first order effect results in companies delivering the same level of underspends but with more of these underspends being shared with consumers. All of the lost

⁹² Alternatively, we can consider this arithmetically:

The reduction in company revenues is equal to the change in the incentive rate multiplied by the reduction in underspends: $\Delta CR = \Delta IR \times \Delta US$

The increase in consumer benefit is equal to the inverse of the change to the incentive rate multiplied by the reduction in underspends: $\Delta CB = \Delta(1-IR) \times \Delta US$

Therefore, a reduction in the incentive rate results in an equal and opposite effect. Company revenues are reduced while consumer benefit increases. On the other hand, both company revenues and consumer benefits are reduced by a reduction in the level of underspends.

company revenues from this effect are therefore reflected in additional consumer benefit.

- **Reduction in cost efficiencies resulting from change to totex incentive rate:** Under the second order effect, companies reduce the level of cost efficiencies that they deliver (for all mapping factors other than 1:0). This reduces company revenues as underspends against totex allowances are reduced. But this also reduces consumer benefits as consumers no longer benefit from their share of company underspends (set via the totex incentive rate).

5.26 There are therefore two effects on consumers which are acting in opposite directions. On the one hand, the reduction in the totex incentive rate allows consumers to share a greater proportion of company underspends. On the other hand, consumers will lose out where the reduced totex incentive rate reduces delivered cost efficiencies. We therefore find levels of consumer benefit which are different from the loss of revenues experienced by companies for all mapping factors other than 1:0.

5.27 Using the assumption that 100% of reduced underspend reflects a loss of cost efficiencies, the benefit to consumers is likely to be an under-estimate. In practice, a proportion of the reduction is likely to result from a loss of company information rents. Where information rents are reduced, consumers will benefit as they no longer have to pay for underspends to companies that do not provide actual cost efficiencies. We explore the potential implications of this when considering the third order effect.

5.28 We present how consumer benefits would vary under different mapping assumptions and totex incentive rates in the table below.

Table 38: Net present value of consumer benefit resulting from first and second order effects (green cell represents our central case) over a five-year price control (£m 2021/22 CPIH), discounted)

£m 2021/22 CPIH	Totex incentive rate = 15%	Totex incentive rate = 32.5%	Totex incentive rate = 50%
Mapping 1:0	1032.2	601.0	169.6
Mapping 2:1	178.0	225.3	115.6
Mapping 1:1	-676.0	-150.3	61.6

5.29 A totex incentive rate closer to 50% results in a narrower range of consumer benefit. This is because totex incentive rates of this order are closer to the totex incentive rates applied in RIIO-1 and hence, the proportion of underspends passed onto consumers as well as the company response to reduced overspends are both lower. Thus, the outcome for consumers is similar to that seen under RIIO-1 (with a benefit of £61.6 million to £169.6 million (2021/22 CPIH) depending on the mapping assumption applied).

5.30 On the other hand, at lower totex incentive rates of the order of 15%, we observe a much broader range of outcomes. Consumer benefit ranges between a disbenefit of £676.0 million (2021/22 CPIH) and a benefit of £1032.2 million (2021/22 CPIH). The greater difference in totex incentive rates means that consumers are more significantly affected by the extent of company response where levels of underspend are reduced.

- 5.31 We break these results down by sector in the tables below. It is important to note that we observe a negative consumer benefit associated with relatively lower totex incentive rates in the gas transmission sector given that NGGT is currently expected to overspend against its RIIO-1 totex allowance.⁹³ Therefore, a reduction in the totex incentive rate would leave consumers liable for a larger proportion of that overspend. At a totex incentive rate of 50%, which is higher than the existing totex incentive rate for NGGT, the effect is reversed. This demonstrates the corresponding risk reduction associated with low totex incentive rates – ie consumers will take on a greater proportion of both over and underspends.
- 5.32 Similarly, high totex incentive rates in the electricity transmission sector result in the potential for some consumer dis-benefits at a totex incentive rate of 50%. This is because a totex incentive rate of 50% is above the average totex incentive rate within the sector.
- 5.33 In gas distribution, where current totex incentive rates are above 50%, we observe higher consumer benefits under our central case than for the other sectors.

Table 39: Net present value of consumer benefit attributed to gas transmission (NGGT) resulting from first and second order effects (green cell represents our central case) over a five-year price control (£m 2021/22 (CPIH), discounted)

£m 2021/22 CPIH	Totex incentive rate = 15%	Totex incentive rate = 32.5%	Totex incentive rate = 50%
Mapping 1:0	-46.1	-18.6	8.9
Mapping 2:1	-90.2	-32.8	13.8
Mapping 1:1	-134.4	-46.9	18.8

Table 40: Net present value of consumer benefit attributed to gas distribution resulting from first and second order effects (green cell represents our central case) over a five-year price control (£m 2021/22 (CPIH), discounted)

£m 2021/22 CPIH	Totex incentive rate = 15%	Totex incentive rate = 32.5%	Totex incentive rate = 50%
Mapping 1:0	693.1	442.6	192.1
Mapping 2:1	228.6	207.1	116.4
Mapping 1:1	-235.9	-28.5	40.7

⁹³ This is a result of the methodology we have applied for this analysis which takes RIIO-1 company performance as a baseline for the analysis. We do not expect that company performance in the next regulatory period would necessarily reflect RIIO-1 performance in practice.

Table 41: Net present value of consumer benefit attributed to electricity transmission resulting from first and second order effects (green cell represents our central case) over a five-year price control (£m 2021/22 (CPIH), discounted)

£m 2021/22 CPIH	Totex incentive rate = 15%	Totex incentive rate = 32.5%	Totex incentive rate = 50%
Mapping 1:0	385.2	176.9	-31.3
Mapping 2:1	39.6	51.0	-14.6
Mapping 1:1	-305.8	-74.9	2.1

Third order effect

- 5.34 As discussed in the context of company revenues, changes to the totex incentive rate will impact on the strength of company incentives in relation to information rents as well as to delivery of cost efficiencies. While this differentiation may not have a significant impact on company revenues, it will have potentially significant implications for consumer benefits. This is because cost efficiencies benefit consumers who share a proportion of these efficiencies (via the totex incentive rate). However, information rents result in consumer transfers to companies without any corresponding benefit in return.
- 5.35 Therefore, where reduced underspends reflect a reduction in information rents rather than cost efficiencies, consumers will benefit. Under the second order effect we have assumed that 100% of the reduction in underspends resulted from lost cost efficiencies, therefore our estimates of consumer benefit resulting from the first and second order effects can be considered an underestimate.
- 5.36 Given that we would expect information rents as well as cost efficiencies to be reduced with a change to the totex incentive rate, consumer benefit in all scenarios (other than with a 1:0 mapping factor) would increase relative to that considered above.

Breaking-point analysis

- 5.37 The relationship between the totex incentive rate and the level of company effort is difficult to estimate. In Appendix 3, we explore this relationship using historical data on totex incentive rates and underspends within RIIO-1. We do not find any clear relationship between the two.⁹⁴
- 5.38 In the analysis above, we have presented a range which illustrates the potential for significant consumer benefits at one mapping factor but also the potential for negative consumer impacts where the relationship between the totex incentive rate and underspends is strong.
- 5.39 We carried out 'breaking point' analysis in order to identify the level of mapping factor that we would need to assume in order for positive consumer benefits to be realised.
- 5.40 It is important to note that our breaking point analysis does not take into account the third order effect, which would increase consumer benefits under all conditions.

⁹⁴ It is important to note the limited dataset and the numerous factors which can impact on company underspends in addition to the totex incentive rate.

- 5.41 We have only applied this analysis to the gas distribution and electricity transmission sectors. As our analysis is performed relative to RIIO-1 levels of underspend, it would not be meaningful in the gas transmission sector in which NGGT is overspending.
- 5.42 We only consider the 'breaking point' at a totex incentive rate of 15% and 32.5% for electricity transmission. As the average totex incentive rate in the electricity transmission sector in RIIO-1 is below 50%, this analysis would not be meaningful.

Table 42: 'Breaking point analysis' results: mapping factor at which consumers would no longer benefit from changes to the totex incentive rate

	Totex incentive rate = 15%	Totex incentive rate = 32.5%	Totex incentive rate = 50%
Gas distribution 'breaking point' mapping factor	1.34:1	1.06:1	0.79:1
Electricity transmission 'breaking point' mapping factor	1.79:1	1.42:1	

- 5.43 Even at totex incentive rates of 15%, the corresponding reduction in underspend levels would need to be significant⁹⁵ to result in negative impacts on consumers.
- 5.44 This consideration is further supported by the fact that the analysis up until this point has assumed that all of the reduction in underspend would reflect a loss of genuine cost efficiencies rather than a reduction in company information rents. Where option 3 results in a reduction of information rents as opposed to cost efficiencies, consumer benefits will increase from the levels identified under the second order analysis. This would lead to effective breaking points which are closer to the upper bound mapping factor of 1:1 than that reflected above.
- 5.45 Our analysis shows that the potential for consumer benefit resulting from a decrease in the range of totex incentive rates is significant. As an absolute upper bound, the potential benefits to consumers are of the order of £1 billion (2021/22 CPIH). We consider that this potential consumer benefit outweighs the relatively small risk to consumers which would result from a reduction in the totex incentive rate to levels which are theoretically feasible but are not anticipated under option 3.

Impacts from changes to the totex incentive rate under option 2

- 5.46 As discussed in relation to impacts on companies, the impacts of option 2 would not be material due to the fact that the range of totex incentive rates will remain similar to the counterfactual. This would eliminate the first and second order effects on consumers that we have identified above.

Impact from changes to informational tools under options 2 and 3

- 5.47 Under option 3, the confidence-dependent incentive rate and BPI methodologies are intended to reduce information asymmetries by linking the totex incentive rate to our

⁹⁵ Companies would need to respond to a one per cent reduction in the incentive rate by reducing underspends by more than 0.5 per cent to lead to negative consumer benefits.

level of confidence in cost submissions. We would therefore expect our methodologies under option 3 to increase the proportion of company underspend which is due to legitimate cost efficiencies. Successful introduction of these tools would increase consumer benefit further.

- 5.48 Under option 2, a revised IQI could reduce informational rents, however as there would not be a link between the level of confidence in costs under the revised IQI, this might reduce its effectiveness in reducing informational rents compared to option 3.

Summary of impacts resulting from changes to totex incentive rates and informational tools

- 5.49 Under option 2, there would be no change to the range of expected totex incentive rates relative to RIIO-1. Therefore, the quantified impact on consumers would be zero.
- 5.50 Under option 3, we note the broad range of consumer benefits which result from the combined first and second order effects, especially at lower totex incentive rates. We consider these to be an underestimate of consumer benefit, given that the third order effect would result in an increase of transfers from companies to consumers.
- 5.51 Finally, we note that this is only a partial quantification. Based on available information, we have not quantified the third order impact of the change to totex incentive rates, nor have we quantified the impacts on information rents resulting from some of the tools included within options 2 and 3. We would expect these tools to increase benefits to consumers.

Table 43: Net present value of consumer benefit resulting from first and second order effects with a totex incentive rate of 32.5% and assumed mapping of 2:1 over a five-year price control (£m 2021/22 (CPIH), discounted)

£m 2021/22 (CPIH)	Option 2	Option 3 (central case)
Changes to totex incentive rate – central case (first and second order effect only)	0.0	225.3
Changes to totex incentive rate - Impact of third order effect	0.0	Increase consumer benefit
Changes to informational tool	Not quantified - limited increase in consumer benefit	Not quantified - some increase in consumer benefit

- 5.52 Given the potential magnitude of consumer benefit, we consider that the changes to the totex incentive rates proposed under option 3 are in the interests of consumers. We note some risk of negative consumer impacts, which depend on how companies respond to these changes. However, for the reasons presented above, we consider the risk of consumer detriment to be low. We also observe that these risks are only present at totex incentive rates which may be possible in theory but are unlikely to be observed in practice under current working assumptions.
- 5.53 Further to this, we consider that our introduction of the confidence-dependent incentive rate (which determines the totex incentive rate based on the level of

confidence we have in setting totex allowances for example based on independently verifiable information) and Business Plan incentive should support the submission of Business Plans which are ambitious and rigorous, by giving companies some incentive not to exploit their information advantage. Where information asymmetry is greater, consumers would be protected through lower totex incentive rates. In combination, we anticipate that these tools should reduce the information rents that consumers pay for, thus increasing consumer benefits further than that quantified here.

Impacts from output delivery incentives, price control deliveries and licence obligations

- 5.54 We explored in Chapter 4 the impact on company revenues of changes in relation to outputs under options 2 and 3. The quantitative impacts that we identified in terms of the level of revenues achieved by companies will result in a direct transfer of these revenues from companies to consumers, ie where rewards from the incentives are lower, this will be passed through to consumers through a reduction in bills. Accordingly, the impacts on consumers are the mirror image with consumers experiencing the highest direct benefits where company revenues are reduced by a greater level.
- 5.55 We can therefore estimate the direct impact on consumers as the inverse of the impact on company revenues.

Table 44: Net present value of consumer benefit from ODIs over a five-year price control (£m 2021/22 (CPIH), discounted)

Sector	Impact of option 2 relative to RIIO-1 counterfactual	Impact of option 3 relative to RIIO-1 counterfactual (low case)	Impact of option 3 relative to RIIO-1 counterfactual (central case)	Impact of option 3 relative to RIIO-1 counterfactual (high case)
Total (annual)	25.4	4.2	58.3	128.6
Consumer benefit over five-year price control period	127.2	21.2	291.3	642.9

- 5.56 However, in addition to this direct impact, it is also important to consider the less direct impacts on company behaviours which will in turn impact on consumers. We considered a number of these potential impacts on companies in the previous chapter and do not repeat these in detail here.
- 5.57 Where our changes to incentives result in better calibrated and more stretching targets, we may expect companies to invest more effort in delivery of that output, thus improving delivery of outputs in that area which may in turn benefit consumers. In addition, opportunities for companies to propose bespoke outputs should allow them to deliver outputs that consumers care about and that are context-specific.
- 5.58 Conversely, where financial incentives have been removed, where we reduce the incentive rates associated or where we introduce relative performance incentives,

then we may expect companies to reassign some of the effort that they would have otherwise invested in that area. Given that companies are working with finite resources, we have sought to achieve two things in designing incentives for the next regulatory period:

- Strike an appropriate balance between the value to consumers resulting from additional company effort and the costs to consumers resulting from payments required for company outperformance against the incentive in question.
- Balance the incentives appropriately and calibrate the package against other areas of the RIIO-2 framework such as the TIM.

Qualitative assessment of the impact of defining use of price control deliverables on consumers

- 5.59 Under options 2 and 3, we will define the use of PCDs, where appropriate, to specify outputs that are directly funded through the price control. PCDs will have specific revenue allowances linked to them and will strengthen the link between allowed revenues and the delivery of specific outputs.
- 5.60 In RIIO-1, only a limited portion of allowed revenues were linked to specific price control outputs. In some areas, this may have been an important driver of totex outperformance in some areas in RIIO-1.
- 5.61 Options 2 and 3 will tie totex allowances to output delivery through PCDs in a number of areas. This should mean that consumers do not have to pay for outputs unless those outputs are delivered and should have a positive impact on consumers.
- 5.62 As we discussed in Chapter 4, we are aware of the risk that setting or assessing PCDs too strictly may result in companies being less able to innovate and deliver legitimate cost efficiencies during the next price control, which would have a detrimental impact on consumers. On balance, we consider that the benefits to consumers resulting from a closer link between allowed revenues and output delivery will outweigh the potential downside risk of companies delivering lower levels of cost efficiencies. We will also seek to build in sufficient flexibility to ensure genuine efficiencies are captured and acknowledged through our assessment framework.

Summary of impacts resulting from output incentives, price control deliveries and licence obligations

- 5.63 Under both options 2 and 3, we would expect to see consumer benefits as a result of our re-calibration of incentives, which will result in lower incentive payments to companies. We have only partly quantified the impact of the options. In addition to the direct impact of re-calibrated incentives, we would expect to see a number of behavioural impacts on companies which will in turn affect consumers. Where the re-calibration of incentives drives greater ambition from companies, then consumers will benefit. However, where lower incentive rates or the removal of an incentive reduces company efforts, consumers may face a reduction in performance in relation to the output in question.
- 5.64 We expect the consumer benefits resulting from a direct transfer of revenue associated with incentives from companies to outweigh the potentially negative effects, in terms of reduced efforts to deliver outputs in the relevant areas.
- 5.65 We note that we have removed or re-calibrated incentives where our assessment suggests that the consumer benefit resulting from them is marginal. In addition, where we have retained a similar design of incentive but focussed changes on

revision of the baseline or on relatively wide caps and floors, the incentive on companies to deliver the relevant outputs may be retained or even increase.

- 5.66 The opportunities for companies to introduce bespoke incentives should maximise the extent to which incentives reflect outputs that consumers most value.
- 5.67 Finally, PCDs will tie totex allowances more closely to output delivery, reducing the risk that consumers pay for outputs which are not delivered.

Table 45: Net present value of consumer benefit (reduction in network companies’ revenues) from changes to outputs under central case over a five-year price control (£m 2021/22 (CPIH), discounted)

£m 2021/22 CPIH	Option 2	Option 3 (low)	Option 3 (central)	Option 3 (high)
Total impact of change in policy – central case	138.0	21.2	291.3	642.9
Impact of changes to PCD on consumers	Not quantified - Increase consumer benefit	Not quantified - Increase consumer benefit	Not quantified- Increase consumer benefit	Not quantified- Increase consumer benefit

- 5.68 We recognise the balance between incentivising companies to deliver outputs and the potential for consumers to pay for the rewards which drive these incentives. On balance, by linking incentives more effectively to consumer value, we consider that the changes proposed under option 3 more appropriately reflect the type and level of outputs that consumers may be willing to pay for.

Impacts on consumers from changes to other elements

Impacts from the introduction of a RAM

- 5.69 As discussed in Chapter 2, the RAM proposed under option 3 is in essence a failsafe mechanism intended to claw back any profits that turn out to be higher than expected. The RAM does not differentiate between genuine profits that are a result of company real efficiency gains versus profits that are a result of information asymmetry.
- 5.70 Under our option 3 central case and the assumptions described in Chapter 4, the RAM would not be expected to trigger and therefore the impact on consumers would be zero

Table 46: Net present value of consumer benefit (reduction in network companies’ revenues) from the RAM under the central case (£m 2021/22 (CPIH), discounted)

£m 2021/22 CPIH	Option 2	Option 3
Total impact of change in policy – central case	0	0

Impacts from change to length of price control

- 5.71 Under options 2 and 3, we would reduce the length of the price control from eight years to five years. This should help to protect consumers from the risk of forecasting inaccuracies which are greater in the context of a longer price control.
- 5.72 There may be some possibility of negative impacts on consumers to the extent that a shorter price control period reduces the scope for longer-term thinking from companies and reduces the extent to which they are able to deliver cost efficiencies over the price control period.
- 5.73 Given the extent and pace of change anticipated for the energy networks in the coming years, we consider that, on balance a shorter price control period is likely to be of benefit to consumers. We also note that five-year price controls are common internationally, across multiple sectors and were applied for GB energy networks prior to the introduction of RIIO-1.

Table 47: Consumer benefit from change to length of price control

	Option 2	Option 3
Impact of changes to length of price control	Not quantified	Not quantified

Impacts from innovation funding

- 5.74 Under options 2 and 3 Ofgem will retain the opportunity for innovation funding through the NIA and a new network innovation funding pot which will replace the NIC.
- 5.75 Consumers in the next price controls will therefore be funding this innovation. It is unlikely that this additional funding will result in significant short-term benefits to consumers within the next price control period.
- 5.76 Any benefit will be realised in the long-term and beyond the horizon of the next price control and as network companies implement proven innovation into business as usual activities, Ofgem will reduce their cost allowances. Not all benefits from innovation however will accrue to network companies, some will be accrued by other market participants (eg third party providers/partners).
- 5.77 At this stage of the process, we do not estimate the level of innovation funding that will be provided in the next regulatory period and in turn, the benefits to consumers.

Table 48: Consumer benefit from innovation funding

	Option 2	Option 3
Impact of changes to innovation funding	Not quantified	Not quantified

Impacts from the introduction of late and early competition

- 5.78 As discussed in Chapter 2, Ofgem will introduce late and early competition into the electricity and gas sectors. We discussed in Chapter 4 the impact on network companies and noted that this might result in a reduction in companies' revenues and profits (noting that if a third party finances and delivers a project, it also reduces

the costs for network companies). Consumers will benefit from a reduction in bills as competition should reveal information on costs that can be used when setting the price control and help reduce the cost of meeting system needs.

5.79 It has not been possible to quantify the impact on consumers from the introduction of competition at this stage. Quantification will be considered for the updated impact assessment. We note that any benefits to consumers will result from the availability of projects which are found suitable for competition models in the next regulatory period. We consider that these benefits are unlikely to materialise in the next regulatory period in the gas transmission and distribution sectors where there is likely to be limited assets that could meet our defined criteria.

Table 49: Consumer benefit from introduction of late and early competition to gas and electricity transmission, and gas distribution compared to counterfactual

	Option 2	Option 3
Impact of changes to competition	Not quantified - increase in consumer benefit	Not quantified - increase in consumer benefit

Impacts from changes to administration and resource costs

5.80 Some of our methodologies could impose additional administration costs for network companies and for us. We have discussed in Chapter 4 the additional administration costs imposed on network companies. In practice, some of these additional administration costs may be included within company totex allowances and subsequently passed onto consumers. This may result in some impacts which we expect to be small in comparison to many of the impacts considered in this draft impact assessment.

5.81 In addition to impacts on companies, many elements of options 2 and 3 are likely to have an impact on our own administrative costs and resource requirements compared to the counterfactual.

Changes in Ofgem’s administration costs

5.82 In this section we discuss the potential for additional administration and resource costs for us. We would expect these costs to ultimately be passed through to consumers through licence charges to companies (not only network companies) which are subsequently recovered from consumers.

Enhanced engagement process

5.83 As discussed in Chapter 2, under options 2 and 3 we would improve and further strengthen enhanced engagement compared to the model it adopted in RIIO-1. Compared to the counterfactual, under option 3 we estimate that this would result in additional administrative and resource costs for Ofgem and the companies. Most of the additional costs compared to RIIO-1 would be due to the establishment of company specific groups, the RIIO-2 Challenge Group and Open Hearings that would take place as part of the price control review process.

Length of price controls

5.84 Under options 2 and 3, we will reduce the length of the price control from 8 to 5 years. This would introduce additional costs for us as a result of developing more frequent price controls. We do not quantify these costs but consider them to be relatively small in comparison to some of the other costs presented in this draft IA.

Introduction of late and early competition

5.85 Under option 2 and 3, we will introduce late and early competition to the electricity transmission and gas sectors. This change is likely to result, as explained in our separate impact assessment on late competition,⁹⁶ in additional administration costs for us.

5.86 We are not able to quantify the size of additional costs at this stage in the absence of information on the number of projects which might become eligible.

Introduction of the RAM

5.87 Based on the information available, we have not quantified the administration costs of implementing and delivering the RAM under option 3, but we would expect these costs to be small given the mechanistic nature of the mechanism.

5.88 Assessing whether the RAM would be triggered would require us to incorporate this assessment into our annual ongoing monitoring within the price controls. However, we consider that this would not be disproportionate and would not lead to significant additional costs. As the RAM would only be triggered in exceptional circumstances as a 'failsafe' mechanism, any costs associated with the RAM would be incurred on an ad hoc basis at the price control close out process.

Business Plan Incentive and incentive rate

5.89 Under option 3, we would introduce the BPI and the confidence-dependent incentive rate. Under these mechanisms, we would need to distinguish between high-confidence and lower-confidence costs. We consider that drawing this distinction may lead to a small increase in our resource costs given the additional complexity involved in performing our cost assessment.

Summary of impacts from changes to our administration and resource costs

5.90 Options 2 and 3 may result in marginally higher administration and resource costs for network companies and Ofgem compared to the counterfactual.

5.91 We would expect administration and resource costs to be somewhat lower under option 2 compared to option 3 given the introduction of new tools such as the BPI, confidence-dependent incentive rate and the RAM. We do not expect the additional costs from other elements of options 2 and 3 to be significant.

⁹⁶ https://www.ofgem.gov.uk/system/files/docs/2019/05/competition_impact_assessment_may_2019.docx.pdf

Table 50: Net present value of consumer benefit from changes to administration costs over a five-year price control, (£m 2021/22 (CPIH), discounted) compared to counterfactual

£m 2021/22 CPIH	Option 2	Option 3
Enhanced engagement	Not quantified – marginally higher resource and admin costs	Not quantified - higher administration and resource costs
Length of price control	Not quantified - Uncertain	
Competition	Not quantified – Uncertain	
RAM	N/A	Not quantified – marginally higher resource and admin costs
Business Plan Incentive and confidence-dependent incentive rate	N/A	Not quantified - marginally higher resource and admin costs

Distributional impacts

- 5.92 Network revenues are recovered through charges on users of the network. The way in which revenues are distributed between different users is set out in charging methodologies which apply in each sector. These network charges are passed onto consumers, in some cases via intermediaries such as energy suppliers.
- 5.93 The combination of charging methodologies which define the distribution of network charges and the price control which determines allowed revenues to be recovered can have distributional impacts. Different types of network users may face different proportions of costs depending on their use of the system.
- 5.94 In turn, this can result in distributional impacts on end consumers. However, it is not within the scope of the price control review or of this draft impact assessment to consider the way in which allowed revenues are collected. There are several Ofgem and industry projects which are currently considering the charging methodologies⁹⁷.
- 5.95 Therefore, we do not provide detailed analysis of the distributional impacts except where options 2 and 3 would have a particular impact on specific consumer groups such as vulnerable consumers. We discuss these impacts below.

Impacts on vulnerable consumers

- 5.96 At a high level, options that increase consumer benefits in general will have a positive impact on vulnerable consumers who will obtain benefits as a result of lower bills (or better quality). Our enhanced engagement process (in particular under option 3) should help to identify the needs of vulnerable consumers.

⁹⁷ Ofgem Future Charging and Access Reforms see: <https://www.ofgem.gov.uk/publications-and-updates/update-timing-and-next-steps-future-charging-and-access-reforms>

- 5.97 However, some of our methodologies will have impacts on specific vulnerable groups of consumers, in particular in the case of the gas distribution sector.
- 5.98 As part of gas distribution price controls in RIIO-1, Ofgem created the Fuel Poor Network Extension Scheme (FPNES) to help off-grid households connect to the gas network by providing funding towards the cost of the connection.
- 5.99 Under both options 2 and 3, we would strengthen the financial support available to vulnerable customers by:
- Retaining the opportunity for funding through the RIIO-2 Network Innovation Allowance (NIA) for network-related innovation projects which seek to address consumer vulnerability.
 - Introducing a PCD in the form of a use-it-or-lose-it allowance of £30m to fund initiatives that support consumers in vulnerable situations: 25% of this allowance will be used solely for collaborative projects between gas distribution network companies. The remaining 75% of the allowance will be set proportionate to the number of customers each gas distribution network company serves.
- 5.100 At this stage of the process it is not possible to quantify how much of the allowance will be used by gas distribution companies and the resulting impact on consumers. This will be done as part of a future update to this draft impact assessment.

Other impacts

Impact on the environment

- 5.101 A key objective of the RIIO-1 regulatory framework is that network companies support the transition to a smarter, more flexible, sustainable low-carbon energy system and take the appropriate steps to mitigate their own environmental impact.
- 5.102 For the electricity transmission, gas transmission and gas distribution sectors we expect that all network companies should:
- Act responsibly towards the environment when making decisions on investment and operational practices / activities. They should internalise environmental impacts in their decision making;
 - Demonstrate high degrees of transparency and public accountability for their network's environmental impacts; and
 - Take responsibility beyond mitigating their own environmental impact. Network companies should play a full role in facilitating the low carbon energy transition by working constructively with customers, suppliers, partners and other stakeholders to overcome the challenges of this transition.
- 5.103 Under both options 2 and 3, we would introduce a common environmental framework across all sectors. The framework would be intended to focus companies on decarbonising the energy networks, reducing their own environmental impacts and supporting the transition to a smarter, more flexible and sustainable low-carbon energy system.
- 5.104 We would use the full range of tools included within the options, including LOs, PCDs and ODIs to drive significant improvements. The improvements we would particularly want to see are:

- The integration of environmental considerations into network companies' decision-making on their Business Plans so that these are addressed at both the same level and same time as economic issues.
- Transparency on the networks' overarching environmental objectives and the actions they will take in the next regulatory period to progress towards these.
- Consistency across the network companies' monitoring and reporting on environmental impacts, including metrics, methodologies and assumptions underpinning these.
- Greater comparability of companies' environmental performance against their peers, network companies in other sectors, and over time.

5.105 We also note the potential for companies to propose bespoke incentives focussed on the low carbon transition where they can demonstrate that these are in consumer interests. The impacts of options 2 and 3 on the environment may therefore be twofold:

- The direct impact arising from improvements made by network companies in relation to their own impact on climate change, the local environment, resource waste, biodiversity, visual amenity and other local impacts.
- The indirect impact of network companies in facilitating decarbonisation through the energy transition, for example by enabling the connection of new renewable generation to the electricity transmission system.

5.106 In combination, the environmental framework and the potential for bespoke incentives should retain a focus on the environment at the same time as removing or reducing the strength of incentives where the consumer benefits in RIIO-1 have been unclear.

Impact on reliability and safety

5.107 As part of price controls, Ofgem provides network companies with funding to maintain a reliable network. Over the past few price controls, we have worked with the industry through a range of output measures in this area such as asset age and condition indices, and progressed to the risk-based measures adopted in RIIO-1.

5.108 In the RIIO-1 counterfactual, the cost allowances were tied, where possible, to the delivery of part of the then Network Output Measures (NOMs) that reflected the levels of risk reduction that network companies should achieve.

5.109 The options considered for the next price controls build on such progress. The general principles would apply across each of the sectors although the detailed application may vary.

5.110 Under options 2 and 3, we will use the Network Asset Risk Metric (NARM) to ensure companies maintain assets in good condition using the price control funding provided for this purpose.

5.111 The general proposals for RIIO-2 for the NARM are intended to apply to the four network sectors (gas and electricity transmission and gas and electricity distribution). However, the detailed application may vary for some elements across the sectors.

5.112 We will consider the reliability and safety impacts in more detail at the determinations stage following review of companies' Business Plans.

6. Impacts beyond the next regulatory period

This chapter presents our analysis of the impacts of our options on network companies and consumers which go beyond the next regulatory period.

Impacts on companies and consumers

- 6.1 Impacts on future consumers have been a major consideration in designing the regulatory framework for the next regulatory period and underpin some key decisions we have made since we published our first consultation. So far, when comparing options 2 and 3 against the RII0-1 counterfactual, we have focused on impacts during the price control period of 2021-2026.
- 6.2 However, we also have to take a longer-term view in the appraisal of these options. In general, impacts beyond the next regulatory period will be limited to where companies may be influenced to make decisions now which have longer-term impacts. For example, companies may respond to elements under option 2 and option 3 which relate to outcomes such as asset resilience, future investment and innovation or the environment. In these areas in particular, there may be consequences of actions taken in the next regulatory period but which go beyond it.
- 6.3 Long-term considerations are often complex, uncertain, hard to monetise and/or extremely sensitive to the assumptions underpinning monetisation. This chapter does not attempt to produce a detailed assessment of long-term impacts but presents evidence that allows us to consider the potential impacts which options 2 and 3 could have on consumers after the end of the price control period. We do not consider the differences between options 2 and 3 to be significant in relation to longer-term impacts so our assessment broadly applies to both.
- 6.4 Our assessment distinguishes two categories of impacts:⁹⁸
- **Medium-term strategic impacts:** In our assessment of medium-term strategic impacts we have considered resilience and impacts that would vary after the five years of the price control period.
 - **Long-term sustainability impacts:** These focus on large, non-marginal or irreversible impacts such as environmental impacts and large capital investments.
- 6.5 As part of our medium-term strategic assessments, we have considered the following impacts:
- moving from RPI to CPIH for RAV indexation;
 - introducing network competition models;
 - network resilience; and
 - changes to incentive rates.
- 6.6 As part of our assessment of sustainability impacts we have considered the impact of options 2 and 3 on the environment, investments and innovation. The assessment of

⁹⁸ See Ofgem's discussion paper: *Strengthening strategic and sustainability considerations in Ofgem decision making*. <https://www.ofgem.gov.uk/ofgem-publications/57015/discussion-paper-strengthening-strategic-and-sustainability-considerations-ofgem-decision-making.pdf>

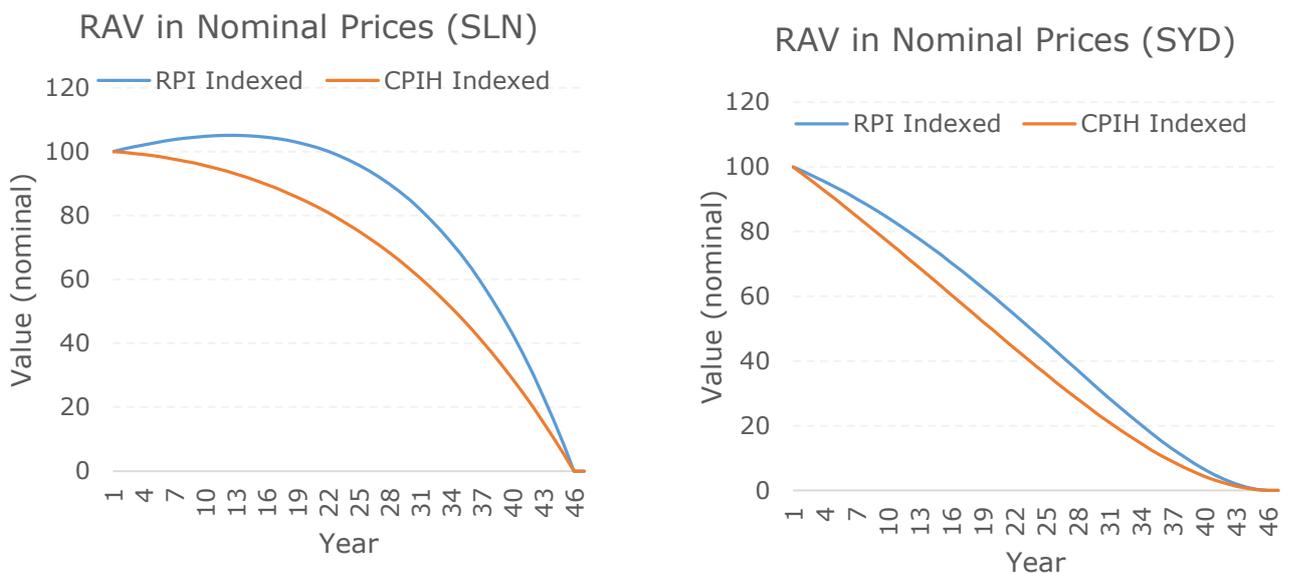
these impacts is necessarily high level, particularly given that we do not have detailed Business Plans at the current time.

Medium-term impacts

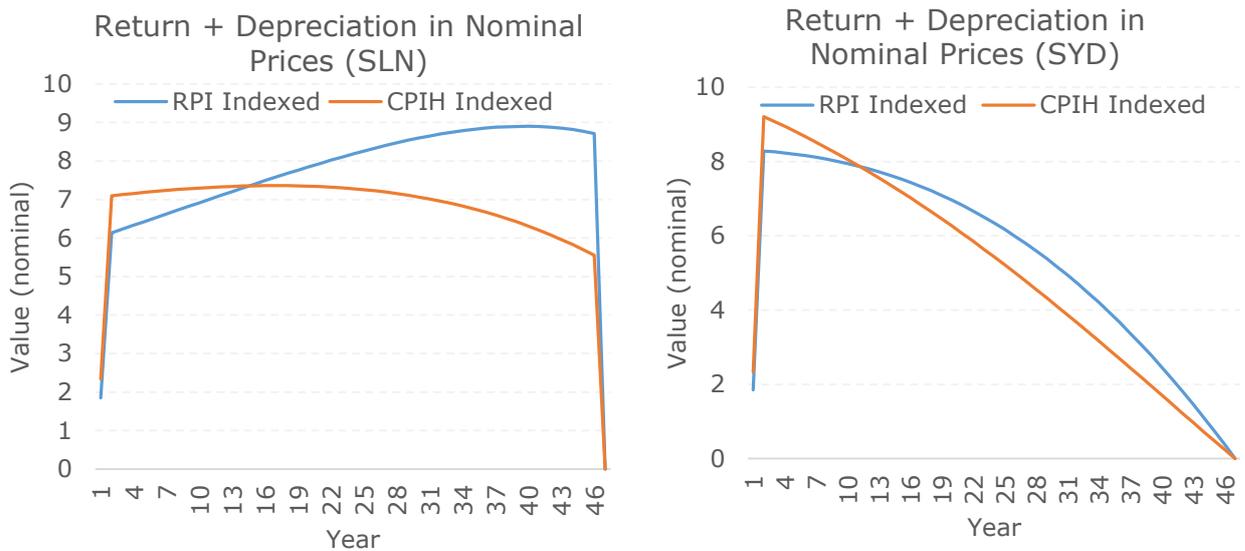
Indexation of RAV and allowed return to CPIH

- 6.7 The Finance Annex of the Sector Specific Methodology Decision describes the switch to CPIH as NPV-neutral. We believe that NPV neutrality is best secured, in terms of RAV and allowed returns, by a one-off, point-in-time switch from RPI to CPIH, reflecting the expected difference at that time.
- 6.8 NPV-neutrality of the switch means that, given the expected rates of inflation, the net present value of return and depreciation allowances over the life of an asset are equal when indexed by CPIH or RPI, when discounted at the WACC. At the outset of the price control, the expected nominal cost of capital would be equivalent whether it was CPIH or RPI linked.
- 6.9 The switch from RPI to CPIH affects allowance timing, but no long-term value change to consumers or networks. We previously set out two primary effects of the switch from RPI to CPIH⁹⁹:
 - To reduce the rate at which the RAV grows (and therefore to reduce depreciation allowances over time)
 - To increase return allowances in the short term, but to reduce them in the longer term (relative to RPI, a higher proportion of investment is paid for earlier under CPIH). As a result, current consumers would pay more than they otherwise would have, while future consumers would benefit.
- 6.10 These points were shown graphically in Ofgem’s July Framework Decision document (Appendix 2). Below, we draw the illustrative graphs for the two methods of depreciation used in the price control: straight line (SLN) and sum-of-years digits (SYD) depreciation profiles.

Figure 8: Switch to CPIH illustrated for a hypothetical asset over 45 years

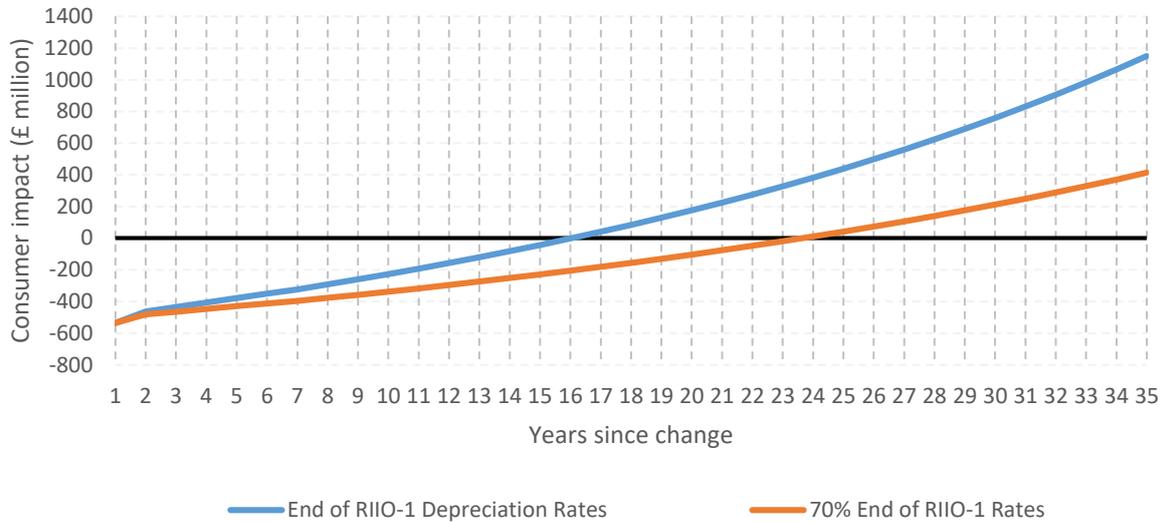


⁹⁹ Ofgem RIIO-2 Framework Decision document (July 2018), Appendix 2



- 6.11 Previously we discussed the impact within the next regulatory period, and here addressed overall NPV neutrality. However, it is worth noting when consumers would become better off under CPIH than RPI. We'll refer to the point at which consumers are paying less due to the switch as the 'crossover'.
- 6.12 The figures above for a single investment show a crossover point of about 13 years, whereafter return and depreciation allowances are lower under a CPIH-indexed asset. However, the calculation is more complicated when there is a historical RAV and continuous investment. Each new asset would have relatively higher allowances under CPIH relative to RPI. This delays the 'overall' crossover.
- 6.13 The expected length of time until allowed company revenues are relatively lower under CPIH is sensitive to assumptions about future totex and depreciation rates (resulting from potentially both depreciation method and asset lives). Therefore, only rough estimates are possible prior to receiving company Business Plans.
- 6.14 The figure below shows the approximate crossover point implied by different depreciation rates.¹⁰⁰ At depreciation rate levels expected at the end of RIIO-1, the crossover point is after 16 years. However, as new asset lives will be longer than most additions within RIIO-1, we expect depreciation rates to decline at current totex levels. For illustration, depreciation rates 30% less than RIIO-1 imply a crossover of about 23 years.
- 6.15 We consider 15 to 25 years to be a reasonable range estimate of the potential crossover time. In the July 2018 Framework Decision, we reported the crossover as roughly 20 years, and maintain this as a reasonable point estimate until better information from Business Plans is available and final determinations are made on asset lives and depreciation methods.

¹⁰⁰ Where the depreciation rate is the depreciation allowance divided by the NPV-neutral RAV return base.

Figure 9: Consumer impact of CPIH switch by year since the change

TIM and output incentive rates

- 6.16 When considering the impact on companies of a lowering of incentive rates under option 3, we discussed the potential for companies to respond by lowering the level of effort they invest in identifying and delivering cost efficiencies. Successive iterations of price control setting processes can help to allay the information asymmetry problem to some degree as we gather additional information on the sectoral efficiency frontier. Historical cost data can complement our cost assessment benchmarking where it is possible and can be an important piece of evidence for bottom-up assessment where benchmarking is not possible.
- 6.17 Therefore, where lower incentive rates discourage companies from moving towards the efficiency frontier, this could have longer term impacts on our ability to perform cost assessments and ensure that companies continue to be effectively incentivised to get as close to that frontier as possible. This could negatively impact on consumers beyond the upcoming regulatory period.
- 6.18 While we acknowledge that under option 3 the reduction of the incentive rate might reduce companies' effort and in turn reduce productive efficiency, we consider that any negative effect is likely to be relatively small.

The introduction of late and early competition

- 6.19 Under options 2 and 3 we are looking to expand the use of competition where it is in the interests of consumers. Our focus has been on ensuring the availability of late competition in the electricity transmission and gas sectors, and the introduction of early competition. In Chapter 10 of our decision document,¹⁰¹ we set out the rationale and supporting evidence for these choices in more detail.
- 6.20 As discussed in Chapter 4 and 5, there are a number of potential benefits associated with the introduction of competition for the market under our options. Our assessment indicates that early and late competition models have the potential to

¹⁰¹ See Ofgem's Decision, RIIO 2 Sector Specific Methodology – Core document.
https://www.ofgem.gov.uk/system/files/docs/2019/05/riio-2_sector_specific_methodology_decision_-_core.pdf

reduce the information asymmetry problem that we face in regulating these companies. This, in turn, can increase efficient network procurement and drive down allowed revenues.

- 6.21 However, these benefits are unlikely to materialise in the next regulatory period in the gas transmission and distribution sectors where there is likely to be limited assets that could meet our defined criteria. This may change in the future if substantial heat decarbonisation is achieved by conversion of gas to hydrogen networks.

Network Resilience

- 6.22 Due to the long operating life of network assets, the impact of any shortfall in asset management activities may not be directly observable within the horizon of the price control. Under options 2 and 3, we would expect our NARM¹⁰² methodology to protect consumers against the risk of companies underinvesting in long-term network resilience.
- 6.23 In addition, we note that our emphasis on the use of PCDs to ensure that companies deliver what they say they will should mitigate the potential for companies to underinvest in network resilience in order to maximise short-term returns within the price control period at the expense of long-term asset resilience.

Longer-term impacts

Environmental sustainability

- 6.24 We consider that the environmental framework under both options 2 and 3 will benefit consumers over the long-term. We note that there are challenges around setting robust output delivery incentives for environmental improvement in some impact areas. This difficulty arises in part because we do not currently have the data to measure performance, set target metrics, or calibrate incentives that reflect consumers' valuations of improvements in these areas. In addition, the challenges of making these trade-offs are increased by the fact that we are able to draw on research to understand the perspective of existing consumers but need to infer the preferences of future consumers.
- 6.25 We consider that the environmental framework will encourage network companies to take fundamental steps to achieve meaningful reductions in the networks' environmental impacts in the longer term across the range of impact areas. It will also focus companies on the transition to a more sustainable energy system.
- 6.26 Of key importance, the approach is intended to ensure that there is a comprehensive dataset on a range of environmental impacts from the energy networks that can be used in the future. This will give greater transparency to stakeholders and consumers on the level of responsibility the network owners are taking for reducing their impacts on the environment and contributing to wider government and societal goals. Lastly, it will provide solid foundations for developing robust output delivery incentives beyond the next regulatory period.

Future investment

- 6.27 Where cost efficiencies result from deferral of investment, there may be a beneficial impact on existing consumers but at a cost to future consumers. The overall effect may be positive or negative depending on the discounted value of the action when

¹⁰² Ofgem (2019), RII0-2 Sector Specific Methodology Decision, Core Document, Chapter 6

the impacts on both sets of consumers are taken into account. Where the increased (discounted) costs to future consumers outweigh savings for existing consumers, net of consumer benefit, the activity may have a net negative impact on consumers.

- 6.28 We have taken this into account within our methodologies for PCDs under both options 2 and 3. By tying totex allowances more closely to PCDs, we will mitigate the risk of future consumers paying for lower levels of delivery than expected over the RIIO-2 period.
- 6.29 Where cost efficiencies result from innovation or efficiencies which mean that savings can be made now without costs arising in the future, existing consumers will share a proportion of the benefits. We would expect future consumers to be at least no worse off and in many cases they may benefit from improved outputs and cost efficiencies which may be reflected in consumer benefits beyond the next price controls.

Impacts from innovation

- 6.30 As discussed in Chapter 5, any additional innovation funding provided to network companies has the potential to result in significant benefits to future consumers while the impacts on consumers in the next regulatory period may be relatively small. This implies that consumers in the next regulatory period are financing benefits that are likely to be realised beyond it.
- 6.31 As network companies implement proven innovation into business as usual over time, this will help to improve efficiency and reduce consumer bills over time.

Summary of impacts beyond the next regulatory period

- 6.32 A large proportion of the impacts that we identify in this draft impact assessment will take place within the next regulatory period.
- 6.33 However, there are some potential impacts beyond the next regulatory period which result from policy and company responses undertaken in the next regulatory period. In some areas, revenues allowed to companies and funded by existing consumers may benefit consumers in the future. In other areas, regulatory mechanisms and company responses may benefit consumers in the next regulatory period while future consumers may face some costs.
- 6.34 We expect both existing and future consumers to benefit from our decision. It is likely future consumers will expect proportionately greater gains because of the switch to CPIH indexation, and potentially as a result of the focus on environmental impacts and innovation. While it is difficult to assess some of these impacts quantitatively, we consider that both options 2 and 3 strike an appropriate balance between the next regulatory period and beyond.

7. Risks and uncertainties

This chapter presents our consideration of the main risks and uncertainties associated with options 2 and 3.

- 7.1 The implementation of any of the options discussed in this draft impact assessment inevitably presents some risks and potential for unintended consequences, especially in areas where we are introducing new mechanisms.
- 7.2 We discuss below risks faced by Ofgem in implementing the options considered, the uncertainties associated with the quantified impacts presented in Chapters 4 and 5, the potential for some unintended consequences, and the risk allocation between consumers and companies under the options considered.

Implementation risk

- 7.3 In any price control, the regulator faces several risks when it resets company cost allowances. While Ofgem set the price control using the best information available, there is a risk that key parameters, including allowances, could be set inaccurately.
- 7.4 Under option 3, Ofgem has considered the introduction of a number of new tools, in particular the BPI and the confidence-dependent incentive rate approach for determining the incentive rate.
- 7.5 The introduction of new tools in a price control, in the context of informational asymmetry, introduces implementation risk for the regulator. This risk could materialise from sub-optimal implementation of policy decisions, in legal challenge, or material error that might affect the performance of network companies relative to ex ante expectations and affect the delivery of benefits to consumers.

Uncertainties and potential for unintended consequences

- 7.6 Some of the consumer benefits that we have identified throughout this document are dependent on assumptions, many of which relate to how companies might respond to the tools and parameters proposed within the options. Where these assumptions do not hold, some of these consumer benefits might not materialise.
- 7.7 To reflect the uncertainties relating to the network companies' responses we have undertaken scenario analysis. We present our estimates of the monetised direct impacts as a range reflecting the limits generated by these scenarios in Chapter 4 and 5.
- 7.8 In some areas, such as the impacts on consumers (Chapter 5), we also present 'breaking point' analysis to understand the conditions that need to hold for the options to have a beneficial impact on consumers.
- 7.9 We identify below specific areas of uncertainty of our methodologies and describe the analysis we have undertaken:
 - **Changes to level of incentive rates (option 3 only):** Our analysis demonstrated that the extent of consumer benefit will depend on the behavioural response of companies to lower incentive rates. We observed that at low incentive rates, a mapping factor close to 1:1 could result in negative consumer benefits. However, we noted that the third order effect should mitigate

this risk to some degree. Nonetheless, should companies respond to lower incentive rates with a significant reduction in efforts to identify cost efficiencies, option 3 may have the unintended consequence of reducing cost savings that are passed onto consumers.

- **Approach used to set incentive rates/informational tools:** Under both options 2 and 3, we include tools that we have designed to reduce information rents. This should increase consumer benefits across all incentive rates. However, these improvements are untested. In the case of option 2, we have observed challenges with the application of the IQI which may endure. We note that the same challenge would apply to retaining the IQI under the counterfactual. For option 3, the combination of the Confidence Dependent Incentive rate and Business Plan would be applied for the first time. If these mechanisms do not work as effectively as we expect, the benefits relative to the counterfactual could be lower.

7.10 In practice, there could potentially also be some unintended consequences arising from the implementation of our methodologies. We identify the following:

- **Changes to output incentives:** While considering the monetary transfer from companies to consumers resulting from a reduction in the expected rewards associated with ODIs, we noted that this is also likely to reduce output levels in areas that consumers may value. On balance, we consider that the former outweighs the latter and that the opportunity for bespoke incentives will help to rebalance this. However, an unintended consequence of the options could be reduced consumer benefit from delivery of outputs to a greater degree than the resulting monetary benefits for consumers.
- **Bespoke incentives:** While bespoke incentives should allow more targeted delivery of outputs that companies can demonstrate are in the interests of their consumers, they come with implementation challenges. We may need to determine bespoke and differentiated targets and incentive calibration for different companies without comparative information on the performance of other companies from which to draw on. As bespoke incentives may be evidenced through engagement with stakeholders through various fora in which we are not always extensively involved, there may be an additional risk that companies can have undue influence on the bespoke incentives put forward. In combination, this could lead to bespoke incentives which are not necessarily reflective of consumers' best interests and are calibrated too generously meaning that companies benefit while consumers lose out. We expect to retain a high burden of proof on companies to justify bespoke incentives and calibration in order to mitigate this risk.
- **Investing in the future:** Some companies have argued that the combination of lower incentive rates and a lower cost of capital may lead to increased short-termism, with reduced investment in innovation and adoption of new technologies as they may have done otherwise. For example, the confidence-dependent incentive rate approach could strengthen this risk by encouraging companies to focus on 'high-confidence' costs to benefit from a higher incentive rate. However, we consider that sufficient funding is in place to invest in technologies that can drive cost efficiencies and deliver for both existing and future consumers through RIIO-2 innovation stimulus. Based on our assessment of RIIO-1, we consider that the benefits to consumers of receiving a higher share of underspends and paying less for financial outperformance outweigh the associated risks.

- **PCDs:** By tying totex allowances more closely to output delivery, we intend to minimise the extent to which consumers pay for outputs that companies simply defer or never deliver. However, this may also reduce the scope and incentive for companies to identify and deliver genuine alternative approaches that may result in cost reductions during the price control period where these have not been included in company Business Plans.
- **Finance tools and parameters:** We consider that we have proposed an appropriate methodology and working assumptions for the cost of capital under options 2 and 3 based on the prevailing economic environment and our identification of the level of risk present for companies. However, should the cost of capital be set at a level which is too low, and other mitigating factors were not in place, we note that this could have the unintended effect of introducing financeability challenges for companies. This may undermine their ability to invest in the network at an important time of transition. Conversely, should it be set too high then consumers would be paying higher charges than is appropriate for these network services.
- **RAMs:** Our analysis of the RAMs suggested that they are unlikely to be applied to companies during the price control period. Therefore, we would not expect any material impact on company revenues and behaviours. However, in the case that there is an actual (rather than stated) perception from companies that performance levels may lead to the RAM thresholds being reached, this will impact on company behaviours. For example, a company that expects to reach the upper RAM threshold may reduce effort given the lower marginal benefits from additional outperformance. This may reduce the extent of consumer benefit resulting from genuine cost efficiencies.
- **Length of price control:** Given the pace of change in the energy industry at the current time, we consider that the benefits of a five-year price control outweigh the potential downsides. However, an unintended consequence could be to drive short-termism from companies such that long-term benefits (including for future consumers) reduce relative to the counterfactual.

Risk allocation

- 7.11 In deciding on the option we adopt for the next regulatory period, we need to take account of how our methodologies impact risk allocation between network companies and consumers and whether the level of baseline revenues envisaged is in line with the risks to which companies are exposed.
- 7.12 Two key principles should inform how the regulatory framework should treat risk:
- risks should be allocated to the parties best placed to manage them in order to maximise the efficiency of risk allocation.
 - the price control package should be calibrated so that baseline revenues are consistent with the level of risk that network companies are exposed to.
- 7.13 The risk/reward balance can impact on expected company revenues and ultimately on consumers. High risk/reward profiles can provide companies with the potential for high returns, commensurate with some risk of under-delivery that could result in losses. Low risk/reward profiles protect companies from risk but allow them only a low level of potential returns.

- 7.14 Regulated networks are relatively low-risk businesses. They are natural monopolies and subject to price control regulation that provides a high degree of certainty on their future revenues. The degree of risk network companies are exposed to depends on the design of the regulatory frameworks that they work within.
- 7.15 Within regulatory models that rely on setting an allowed revenue that companies can recover from their consumers, companies are protected from demand risk. They face a degree of delivery risk related to actual spending versus allowances and performance against targets set by the regulator.
- 7.16 The design of RIIO-1 was intended to provide a relatively high risk and high reward regulatory framework that would incentivise network companies to deliver better outcomes for consumers and allow the best performing companies to earn high revenues.
- 7.17 Observations of company performance within RIIO-1 suggest that the RIIO-1 framework has provided network companies with more upside potential than downside risk.

Risk and uncertainty tools under options 2 and 3

- 7.18 For the next regulatory period, we are learning from the risk-reward assignment in RIIO-1 to rebalance what we consider to be an asymmetric bias towards company reward.
- 7.19 A number of elements under options 2 and 3 are likely to have an impact on the allocation of risk between network companies and consumers. The options that we have developed are intended to recalibrate the risk/reward balance to ensure risk and return are better aligned.
- 7.20 Elements that help to recalibrate the risk/reward balance in the next regulatory period can be categorised as:
- Measures that reduce the network companies' exposure to risks that are outside their control. These include mechanisms such as the indexation of RPEs and of the risk-free rate (and to some extent shorter price controls which result in allowances being reset more often).
 - Measures that reduce the network companies' exposure to risks related to their performance (eg totex incentive rates).
 - Measures that reduce the overall variability of revenues.
- 7.21 We assess how each of the main elements of options 2 and 3 impact the risk allocation between consumers and network companies and how this risk allocation changes compared to RIIO-1 below.
- 7.22 Under option 2, we would make better use of tools to manage uncertainty (eg RPE indexation, shorter price controls) and would also recalibrate some output delivery incentives. Therefore the overall framework of rewards and penalties would be better than RIIO-1.
- 7.23 Under option 3, in addition to indexation of RPEs, recalibration of output delivery incentives, we have proposed tools that reduce the overall variability of revenues and the risks related to company performance (eg lower totex incentive rates). We therefore consider that we have introduced a more balanced risk/reward profile under this option than has been observed in RIIO-1. Companies will face lower risks than under option 1 but their scope to earn rewards above the allowed cost of equity

through factors outside of a company's control or due to information asymmetries will also be more limited.

- 7.24 Both option 2 and 3 would reduce (but not eliminate) the scope for returns to vary due to factors outside a network company's control thus representing an improvement on the risk profile relative to the counterfactual. However, we believe that option 2 would not eliminate the potential asymmetric bias towards company reward and therefore would not deliver a more balanced risk/reward profile to the same degree as option 3.

Summary of risk and uncertainty

- 7.25 The implementation of any of the options discussed in this draft impact assessment inevitably presents some risks, uncertainties and potential for unintended consequences (eg where the impact of a new mechanism may carry some uncertainty).
- 7.26 Whilst low, we identify some potential implementation risk under option 3, where Ofgem would be introducing new mechanisms such as the BPI and confidence-dependent incentive rate.
- 7.27 In addition, we note that most of the consumer benefits we have identified throughout this document are dependent on assumptions, many of which relate to how companies might respond to different incentives. Where these assumptions do not hold, it is possible that the consumer benefits identified could be lower than assessed. We also note that some of our options could have unintended consequences.
- 7.28 Further, we also consider risk allocation between consumers and companies under options 2 and 3. The changes proposed under both options 2 and 3 would result in a better risk allocation between consumers and companies compared to the counterfactual. In particular, the indexation of RPEs under both options would protect consumers against the risk of network companies earning additional returns that are not due to performance improvements.
- 7.29 Under option 3, we have proposed tools that reduce the overall variability of revenues and the risks related to company performance (eg lower totex incentive rates). We therefore consider that we have introduced a more balanced risk/reward profile under this option than has been observed in RIIO-1. Companies will face lower risks than under option 1 but their scope to earn rewards above the allowed cost of equity through factors outside of a company's control or due to information asymmetries will also be more limited. Further, under option 3 the introduction of a RAM might further protect consumers against unaddressed informational asymmetries, benchmarking and forecasting errors.

8. Summary and conclusions

- 8.1 The current RIIO-1 network price controls for electricity and gas transmission, and gas distribution companies end in March 2021. A new set of price controls are required to be in place for the start of the next price control period on 1 April 2021 and we have to decide whether to continue using the existing RIIO-1 framework or any of the other regulatory options discussed in this draft impact assessment.
- 8.2 The choice of regulatory options is made by Ofgem in a context of incomplete and asymmetric information, where there may be challenges in directly observing a company's efficient costs, other attributes or the level of managerial effort.¹⁰³ Although Ofgem over time and ex post has acquired more information about the companies it regulates, companies continue to have an informational advantage over the regulator.
- 8.3 These informational problems are compounded by technological change and the evolving nature of the gas and electricity sectors. These factors increase uncertainty and make it difficult to establish ex ante revenues and cost allowances for a multi-year regulatory period (ie forecast error). Furthermore, as technology evolves, companies' past cost performances might not be as good an indicator of future efficient costs (ie benchmark error),¹⁰⁴ which needs to be properly reflected in the cost assessment process.
- 8.4 The combined impact of these problems appears to be more severe in those sectors where technological and policy change is greater and where there is a lack of suitable comparators, such as in gas and electricity transmission.
- 8.5 Within this evolving context, Ofgem needs to ensure that regulated network companies deliver the value for money services that both existing and future consumers need whilst having regard to the need to secure that network companies are able to finance their activities.
- 8.6 We recognise that there are inherent trade-offs in the regulatory options considered in this draft impact assessment for achieving the objectives above. We have considered both qualitatively and - to the extent possible - quantitatively the impact that different options may have on:
- Providing appropriate incentives for cost efficiency, reliability and safety of the networks
 - Minimising profits arising from the exploitation of information asymmetries
 - Protecting the interests of existing and future consumers
 - Network company incentives to innovate and seek productive and dynamic efficiency over time
- 8.7 In coming to a decision on our preferred option, we also need to consider the learning from RIIO-1 to date, that the existing regulatory framework, in the context

¹⁰³ Joskow (2014). NBER, [Incentive Regulation in Theory and Practice. Electricity Distribution and Transmission Networks](#).

¹⁰⁴ Jenkins, Jesse D. and Ignacio J. Pérez-Arriaga. (2017). "Improved regulatory approaches for the remuneration of electricity distribution utilities with high penetrations of distributed energy resources." *The Energy Journal* Vol. 38(1), page 65.

described above, has not led to an appropriate risk/reward balance and has resulted in higher returns for companies.

Comparison of options and discussion

- 8.8 In this draft impact assessment, we have considered four options. We ruled out option 4 based on consideration about the mixed evidence on effectiveness of incentive regulation versus rate of return regulation. Most of our analysis has therefore focussed on comparing options 2 and 3 against the RIIO-1 counterfactual.
- 8.9 We present in the table below our results from a partial quantification of some components of option 2 and 3, compared to the counterfactual. In the table, we also present a qualitative assessment of other elements of our options. We note that our quantification should be taken as indicative and that most of the impacts presented in the table are a direct transfer from companies to consumers. Under both options 2 and 3, the largest impact on consumers would arise from changes to the cost of equity.
- 8.10 We consider that both options 2 and 3 represent an improvement over the counterfactual as they offer:
- Methodology on the cost of equity aligned with updated evidence on the cost of finance, within a regulatory framework that retains incentives to invest and seek efficiency
 - Methodologies for ODIs and PCDs that better align with our sustainability objectives and minimise the possibility of informational rents
 - Indexation of RPEs, which improve risk allocation between consumers and companies
 - Methodologies that extend the use of competition and would benefit consumers

Table 51: Impact on consumers for options 2 and 3 compared to counterfactual - quantified and non- quantified impacts. Net present value of consumer benefit (£m 2021/22 (CPIH))

Area of package	Mechanism	Option 2	Option 3	Option 3 Range	
				Low	High
Changes to financial parameters	Return on equity	1,054	3,424	2,610	3729
		Network companies will receive less remuneration for equity investment. Key credit ratios are expected to be broadly similar or slightly improved on a notional company basis.			
	Switch to CPIH	-2,022	-2,086	-2,064	-2,094
		This change will be value-neutral to both investors and consumers in the long-run (ie consumers will be neither worse off nor better off), but does affect the timing of repayment of the RAV. This means the consumer benefit is negative within next regulatory period, but will be positive after about twenty years.			
Changes to incentives	Totex Incentive Mechanism and informational tools	0	225	-676	1032
		No change from counterfactual		A combination of lower incentive rates and the introduction of our new information tools may reduce information rents, thus benefitting consumers	
	Output Delivery Incentives	138	291	21	643
		Consumer benefits from more ambitious targets and minimum standards of performance. Benefits may reduce where companies reduce delivery of outputs as a result of removal of incentives.		Consumer benefits may reduce where companies reduce delivery of outputs as a result of removal and re-calibration of incentives.	
	Price control deliverables	Consumers will benefit from tying network company expenditure (totex allowances) more closely to delivery. However, consumer benefits may reduce because network companies will have less flexibility to deliver cost efficiencies			
Changes to other elements	Return Adjustment Mechanisms	0	0	0	0
		RAMs are unlikely to be triggered under all scenarios considered and based on design that has previously been consulted on. Note that the final design of RAMs has not yet been determined and may be different from that considered within this draft IA.			
	Length of price control	Consumers will benefit from lower risk of forecasting inaccuracies. However, there could be some negative impact on longer-term thinking from companies.			
	Innovation funding	Similar outcomes to RIIO-1 but more targeted on areas that add consumers value. We expect the extent of innovation funding to be broadly in line with that observed in RIIO-1.			
Competition	Where opportunities are identified to introduce competition into projects, consumers may benefit from additional cost and service efficiencies within the price control period. Future consumers also stand to benefit from better information revealed by prices that are set competitively.				
Administration costs		Additional costs for the regulator and for companies to manage the new tools that will be passed onto consumers. These are likely to be marginally higher under option 3 given introduction of additional tools.			
Total quantified impacts		-829	1,854	-109	3,310
Total, not including switch to CPIH		1,192	3,940	1,955	5,404

Our preferred option

8.11 On balance, based on the analysis presented in this draft impact assessment and in other documents,¹⁰⁵ we think that the package of proposals under option 3 offers the most effective option for the next regulatory period as it offers:

- Incentive strength tailored to the environment of considerable information asymmetry and uncertainty (this is supported by economic theory and practice by our experience of RIIO-1) - given this, we consider option 3 to be better than option 2.
- Lower allowed return on equity aligned with updated evidence per the May 2019 Sector Specific Methodology Decision Finance Annex, including considerations of the UKRN study.¹⁰⁶
- A more flexible BPI, less anchored to strong assumptions of how companies behave and respond to managerial and shareholder incentives - we consider option 3 to be better than option 2.
- A return adjustment mechanism which protects consumers against material deviations from ex ante expectations, forecast and benchmarking errors (better than option 2).
- Higher quantified consumer benefit compared to option 2, of approximately £1 billion over a five-year period.

8.12 We acknowledge that option 3, compared to the RIIO-1 counterfactual and option 2, present some risks and uncertainty around how network companies would respond in practise to some of the tools we are introducing. These include the risk that lower incentives might reduce network companies' drive to seek efficiency cost savings; and lead to less innovation in output delivery. Similarly, there is some risk that the introduction of new mechanisms could have some unintended consequences, affecting network company performance. These risks are, however, somewhat mitigated through the following mechanisms:

- The RIIO-2 Challenge Group, Company User Groups and Customer Engagement Groups will place more scrutiny on companies to improve the quality of their Business Plans and cost projections. This will also help to reduce the information advantage network companies have in assessing future network requirements.
- The RAM would protect consumers against information asymmetries, forecast and benchmarking errors.

8.13 Based on the analysis presented in this draft impact assessment and in other documents,¹⁰⁷ we have therefore decided to use option 3 for regulating the gas and

¹⁰⁵ While not an exhaustive list, we refer to four documents in particular:

- Ofgem (March 2018), RIIO-2 Framework Consultation
- Ofgem (July 2018), RIIO-2 Framework Decision
- Ofgem (December 2018), RIIO-2 Sector Specific Methodology Consultation
- Ofgem (May 2019), RIIO-2 Sector Specific Methodology Decision

¹⁰⁶ <https://www.ukrn.org.uk/wp-content/uploads/2018/06/2018-CoE-Study.pdf>

¹⁰⁷ While not an exhaustive list, we refer to four documents in particular:

- Ofgem (March 2018), RIIO-2 Framework Consultation
- Ofgem (July 2018), RIIO-2 Framework Decision
- Ofgem (December 2018), RIIO-2 Sector Specific Methodology Consultation
- Ofgem (May 2019), RIIO-2 Sector Specific Methodology Decision

electricity transmission and gas distribution network companies in the next regulatory period

Next steps

- 8.14 We will update this draft impact assessment at draft determinations in 2020. This will include updating the analysis using actual allowed revenues as set in the price controls for gas electricity and gas transmission, and gas distribution network companies relative to the values we would have set under RIIO-1 (counterfactual).

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Appendix 1 - Summary of responses to consultation questions on the preliminary impact assessment

In our December 2018 Sector Specific Methodology consultation, the reasoning, analysis and evidence associated with our consultation proposals was integrated into the consultation document, with a relatively high-level approach to the Preliminary Impact Assessment published within the core consultation document.

We received 15 responses to the questions associated with the Preliminary Impact Assessment. All of the network companies, Citizens Advice, the RIIO-2 Challenge Group, Centrica and Oil and Gas UK responded. All non-confidential responses are published on the Ofgem website.¹⁰⁸

The key points from these responses are set out below. The key theme from responses was that further detail was required to support the proposals that were set out at that stage.

In response, we have published this separate, more comprehensive draft impact assessment, which is intended to complement the relevant supporting information and analysis provided within the May 2019 Sector Specific Methodology Decision documents. In doing so we have, in particular:

- set out our analysis of the benefits and costs to consumers and network companies of alternative options for regulating gas and electricity transmission, and gas distribution energy networks in the next regulatory period.
- compared costs and benefits of these alternative regulatory options against the RIIO-1 counterfactual.
- considered the short term (next price control) and long-term impacts on consumers and network companies.
- considered wider impacts, including on the environment.
- quantified the impact of a switch from RPI to CPIH.
- considered the cumulative impact of all of the proposed changes under the options we have assessed; where possible we have quantified these impacts.
- undertaken scenario analysis to capture the uncertainty in relation to companies' responses to our sector methodologies.

Our assessment has been conducted in accordance with Ofgem's Impact Assessment Guidance.¹⁰⁹ In developing this draft impact assessment, we have also drawn on HM Treasury Green Book and Business case model.¹¹⁰

This impact assessment is preliminary since we have not yet seen network companies' Business Plans for RIIO-2. We intend to publish a full impact assessment at the Determinations stage in 2020.

¹⁰⁸ <https://www.ofgem.gov.uk/publications-and-updates/riio-2-sector-specific-methodology-consultation>

¹⁰⁹ Ofgem (2016), Impact Assessment Guidance; <https://www.ofgem.gov.uk/publications-and-updates/impact-assessment-guidance>

¹¹⁰ HM Treasury (2018), The Green Book: appraisal and evaluation in central government; <https://www.gov.uk/government/publications/the-green-book-appraisal-and-evaluation-in-central-government>

Consultation questions on the preliminary impact assessment

What are your views on the approach we are proposing for assessing the impact of our RIIO-2 proposals?

Summary of responses

Most of the network companies were critical of the approach we set out in December. There was a general complaint that we had provided insufficient detail on our proposals and we had not presented a sufficiently quantified assessment of their associated costs and benefits, both individually and as a package.

Several highlighted the need to compare the impact of our proposals against the counterfactual of RIIO-1, in either its existing state or in a recalibrated form. One network company emphasised the need to demonstrate the longer-term consequences that they considered would arise from certain aspects of our proposals.

As a result, at least three network companies observed that our approach did not appear to be consistent with Ofgem's guidelines or statutory requirements for producing an impact assessment.

Some network companies and non-network stakeholders recognised that at this stage in the process, and in the absence of more detailed information, the impact assessment needs to be broadly qualitative. One non-network respondent highlighted that this would be more appropriate than generating quantitative analysis on the back of subjective assumptions. There was still an expectation from this respondent though that we would quantify impacts where possible, such as on the switch from RPI to CPIH.

Two non-network stakeholders wanted to see us set out the combined impact of our proposals on the three outcomes we had used to describe the outputs framework. A consumer representative wanted to see more coverage of the environmental and low carbon aspects of our proposals.

Our views

In December, the reasoning, analysis and evidence associated with our consultation proposals was integrated into the consultation document alongside a relatively high-level impact assessment.

In support of the sector methodology decisions taken we included additional evidence and analysis within the suite of documents published on 24 May. Additionally, and in light of previous consultation responses, we have also published this separate, more comprehensive draft impact assessment.

What are your views on the assumptions we have made in our assessment to date?

Summary of responses

Many of the responses to this question from network companies largely reiterated their concern at the adequacy of the analysis presented to date. Two network companies considered that we had placed insufficient weight on consumers' needs and how a framework of incentives can enable these to be met. They both commented that by seeking to avoid overfunding companies, we were limiting the scope for outperformance through a regime that offered weaker incentives and less support for innovation. They noted that any short-term cost reduction benefit this offered would be outweighed by the detriment from a

corresponding reduction in effort to drive down costs, maintain and improve service quality and facilitate the energy system transition. One network company highlighted the risk that low incentive rates may encourage overspending in order to grow the network asset base. One network company drew our attention to a paper published by John Earwaker 'RIIO-2: The role of incentives',¹¹¹ from which they quoted (and agreed with):

'...it is imperative that incentive rates are pitched at an appropriate level - ie neither too low nor too high – and stay constant and predictable within each RIIO planning horizon'

'...in the current economic and political climate, it may be tempting for a regulator to err towards the safety of rate of return regulation. In my view this would be a mistake'

There was also criticism that our proposed BPI would be ineffective and would therefore not encourage companies to submit cost efficient plans.

One DNO considered that we had omitted the additional costs to consumers that might arise from lower levels of collaboration as a result of our proposals. They also cited additional costs and disbenefits that may arise from our proposed framework, including new arrangements for ensuring asset reliability and uncertainty mechanisms. The same company also considered we had not recognised the benefits of competition arising from existing arrangements.

One network company made a more specific criticism of our assumption that a reduction in the cost of capital will benefit consumers. They viewed our proposals as unsustainable in the longer term and likely to drive up long-term borrowing costs. Another network company considered that our assessment of our financing proposals did not account for the impact of the error they perceived we would make in setting the cost of equity allowance below the true cost of equity. The same company commented that our assessment of the cashflow floor did not account for additional costs associated with protecting underperforming companies.

One DNO also considered that we had omitted the additional costs that would arise from the move to CPIH indexation, due to the mismatch between existing levels of RPI linked debt and the new index. The same company also considered that we had misrepresented the cost reduction impact of RPE indexation, and that this may introduce additional pro-cyclicality into cost allowances, which may raise the systemic risk levels.

Our views

Additional supporting evidence and analysis has been published within the main suite of decision documents and within this draft impact assessment. This includes additional material on key financial issues, including the impact of changes arising from the allowed return on equity and indexation of RAV and allowed returns to CPIH.

Having carefully considered consultation responses, we decided to refine the design of the BPI, as stated in the Sector Specific Methodology Decision. We also decided to engage with stakeholders to seek further views and held an initial workshop session in June 2019.

The impact on collaboration across network companies was also considered in the context of other key policy areas, including the outputs and incentives framework and innovation.

¹¹¹ <http://www.first-economics.com/rrio2incentives.pdf>

Our decisions and supporting evidence around these areas are set out in the Sector Specific Methodology Decision.

What are your views on the uncertainties we have identified for the purpose of this assessment?

Summary of responses

Two network companies considered that we had not taken into account the potential impact on investment of a low cost of equity. Another believed that our proposals should be tested in the context of Brexit and wider political uncertainty.

At least two companies were keen to encourage us to continue to keep the impact assessment updated with the 'best information available' and to allow parameter values to change in line with market conditions and/or other circumstances. One DNO encouraged us to consider introducing mechanisms that allow the price control to account for material differences in forecast expenditure that arise in the latter years of RIIO-ED1.

A non-network stakeholder highlighted the need to consider the Government's Industrial and Clean Growth Strategies, as well as how debt providers and credit rating agencies might respond to our proposals.

Our views

We have been clear and transparent on the assumptions underpinning the analysis presented in this draft impact assessment, acknowledging the level of uncertainty that applies.

Our working assumptions around the cost of capital have been set in line with market conditions and the level of risk that should be rewarded in the context of a stable and predictable regulatory framework. This follows careful consideration of consultation responses and relevant engagement with all stakeholders, including credit rating agencies.

We will update this draft impact assessment at the Determinations stage in 2020. This will capture available data and information and an updated assessment of risk, including through consideration of company Business Plans and relevant market information.

Our decisions and supporting evidence around key policy areas, including the approach to managing uncertainty, are set out in the Sector Specific Methodology Decision published in May 2019. Further supporting information on finance-related issues is set out in the Finance Annex to that Decision document.

What additional evidence should we consider as part of our ongoing assessment?

Summary of responses

Several network companies were keen that we take into account a longer-term view on the level of performance within RIIO-1. This should reflect any adjustments that arise through the close-out process. Only then could we establish an accurate view on the costs and benefits of the current controls and the impact of changes. One network company added that we should factor in any increased risk the companies may face as a consequence of their changing role in the energy system transition.

Network companies also encouraged us to consider the views of credit rating agencies, as well as stakeholders that had provided input to the process through the enhanced engagement arrangements.

One network company wanted to see us consider evidence on the different impacts of our proposals on both companies and on consumers, and to examine any distributional impacts, including how these might vary by geographic region.

Our views

Where appropriate, we have set out additional evidence and analysis within the main suite of decision documents published on 24 May and within this draft impact assessment. This reflects careful consideration of consultation responses and relevant engagement with all stakeholders, including credit rating agencies and those related to the enhanced engagement programme.

We will update this draft impact assessment, capturing available data and information, at the Determinations stage in 2020. Note that the timelines for the closeout of the RIIO-1 electricity transmission, gas transmission, and gas distribution price controls are still to be determined.

Our working assumptions around the cost of capital have been set in line with market conditions and the risk that should be rewarded in the context of a stable and predictable regulatory framework. As part of the update at Determinations stage we will consider specific instances where risk may have changed as submitted in company Business Plans or consultation responses. This will be a factor in our assessment of the allowed return on equity.

As set out in Chapter 5, we do not provide detailed analysis of the distributional impacts except where options 2 and 3 would have a particular impact on specific consumer groups, including vulnerable consumers. The combination of charging methodologies, which define the distribution of network charges, and the price control, which determines allowed revenues to be recovered, can have distributional impacts. Different types of network users may face different proportions of costs depending on their use of the system, which can result in distributional impacts on end consumers. However, it is not within the scope of the price control review or of this draft impact assessment to consider the way in which allowed revenues are collected.

Appendix 2 - Evidence from economic literature

To inform our choice of regulatory options and their assessment, we have reviewed some of the economic theory. Below we present some insights from the literature on incentive regulation.

We can think of the problem of regulating network companies as a principal-agent problem, where Ofgem (the principal) incentivises network companies (the agent) via the price control framework and methodologies to deliver the outcomes that energy consumers want at lowest cost.¹¹²

In addition to deciding which tools to employ, Ofgem also has to decide what should be the strength (calibration) of these tools by setting a number of parameters (for example, determining the level of the cost of equity).

The choice of tools and parameters employed by Ofgem will affect companies' behaviour (for example, managerial effort level) and eventually determine the costs network companies will incur and the final outcomes.

At the start of each regulatory period Ofgem decides which methodologies to use and their calibration. It makes such decisions without having full information about the costs of the regulated firms and attributes such as quality.¹¹³ Regulated companies have more information about their costs and quality than the regulator and may use their informational advantage strategically to increase their profits (for example by submitting inflated costs as part of their Business Plans) or for other goals to the disadvantage of consumers.

The asymmetry of information between Ofgem and regulated companies might result in a gap between the returns that Ofgem expects companies to realise ex ante, at the start of the regulatory period, and actual ex post returns earned by companies.

As we discussed in Chapter 2, Ofgem has considered employing different combinations of methodologies, which resulted in the four options we described in Chapter 2.

In addition to incomplete and asymmetric information Ofgem also faces uncertainty about future network use and future cost saving technologies (or network management practices) within the regulatory period that shift the efficient frontier. In turn this uncertainty might lead to forecast error and benchmark errors¹¹⁴ which might further increase the gap between the ex ante expected returns and the ex post realised returns.

We have arranged some elements of the theory described above in a 'logic model'.¹¹⁵ The logic model is a simplified graphic representation of how the tools and parameters used by Ofgem produce a number of impacts.

¹¹² Jean-Jacques Laffont (1994), [The New Economics of Regulation Ten Years After. Econometrica, Vol. 62, No. 3](#) (May, 1994), pp. 507-537.

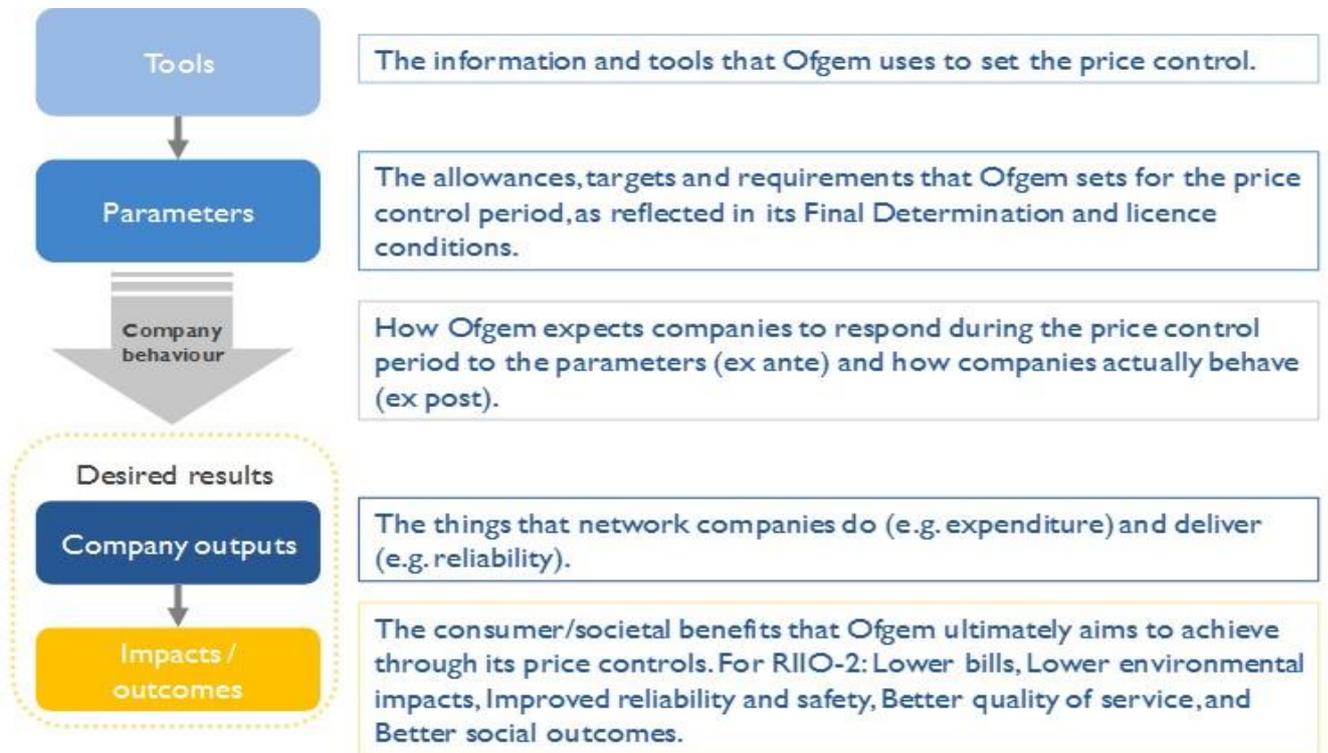
¹¹³ Joskow (2014). NBER, [Incentive Regulation in Theory and Practice. Electricity Distribution and Transmission Networks.](#)

¹¹⁴ Jenkins, Jesse D. and Ignacio J. Pérez-Arriaga. (2017). "Improved regulatory approaches for the remuneration of electricity distribution utilities with high penetrations of distributed energy resources." *The Energy Journal* Vol. 38(1).

¹¹⁵ A logic model is a graphic which represents the theory of how an intervention produces its outcomes. It represents, in a simplified way, a hypothesis or 'theory of change' about how an intervention works. Process evaluations test and refine the hypothesis or 'theory of change' of the intervention represented in the logic model. Source: Gov.uk.

The figure below provides a graphical representation of this logic model.¹¹⁶

Figure 10: Logic model used in this draft impact assessment



¹¹⁶ We have developed a Logic Model based on best practice evaluation techniques, using an 'Input-Output-Outcome-Impact' model. However, since the terms "output" and "outcome" have particular connotations within the existing RIIO regulatory framework, we have used slightly different terminology in order to aid with readers' understanding. Figure 10 demonstrates the structure of the Logic Model.

Appendix 3 - Incentive rate and underspend in RIIO-1

In this draft impact assessment we consider the relationship between incentive rate and totex underspend/overspend, defined as the difference between totex allowances and actual totex costs incurred by companies. We do this in order to understand the impact that a reduction in the incentive rate would have on network companies and consumers as part of our assessment of option 3. Economic theory would suggest a positive relationship between these two variables.

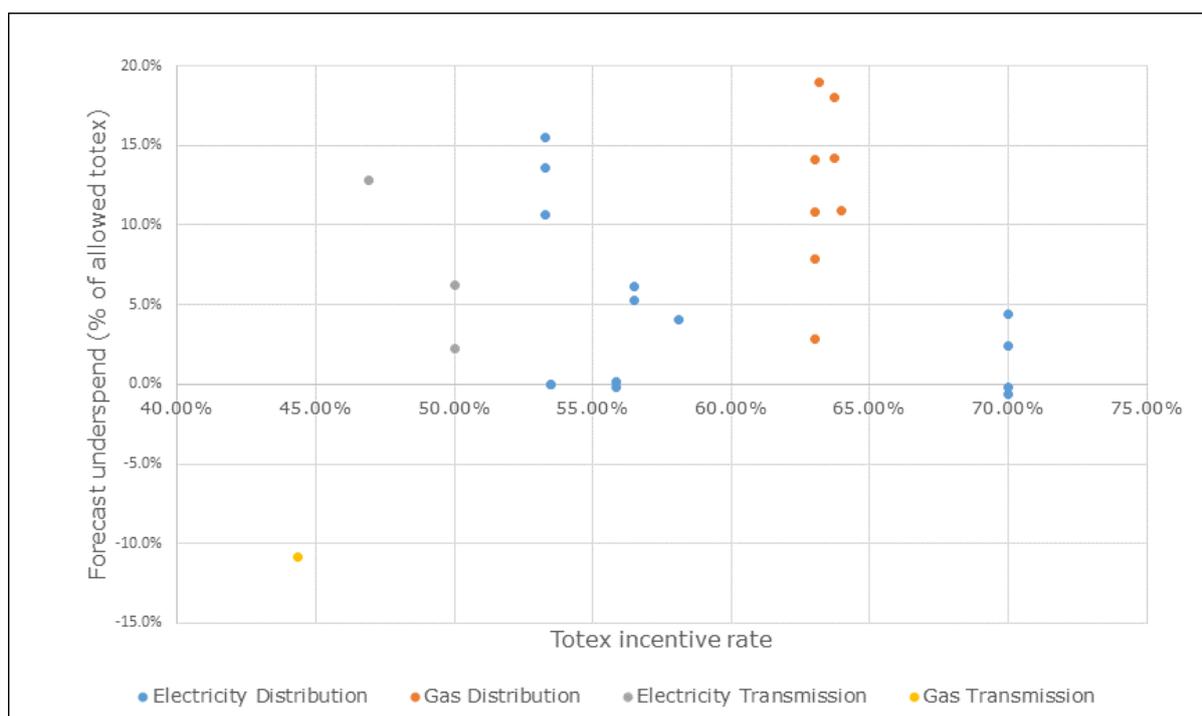
Here, we explore what we can learn about the strength of this relationship by considering totex under/over spend within the RIIO-1 regulatory period.

The figure below shows totex underspend/overspend in RIIO-1 plotted against the relevant incentive rate for companies in each sector.

We note that it is not possible to identify a clear relationship between these two variables from this historic and forecast data. We consider that this could be due to the difficulty of isolating any effects arising from the totex incentive rate from other potential factors affecting totex underspend/overspend. These factors may include (i) the level of allowed totex and Ofgem’s ability to set accurate allowances (ii) the scope for efficiency improvements faced by individual companies or sectors (iii) the regulatory framework in place at the time of the RIIO-1 price control and (iv) the strategy employed by companies in response to that framework.

We have not undertaken more sophisticated analysis to explore this relationship and in this draft impact assessment we have made a number of simplifying assumptions to illustrate how different ‘mapping factors’ would affect consumers and network companies under option 3. We explain our mapping assumptions in Chapter 4.

Figure 11: RIIO-1 (actual + forecast) totex performance and totex incentive rates in transmission and distribution sectors



Appendix 4 - Cost of debt and indicative bill impacts

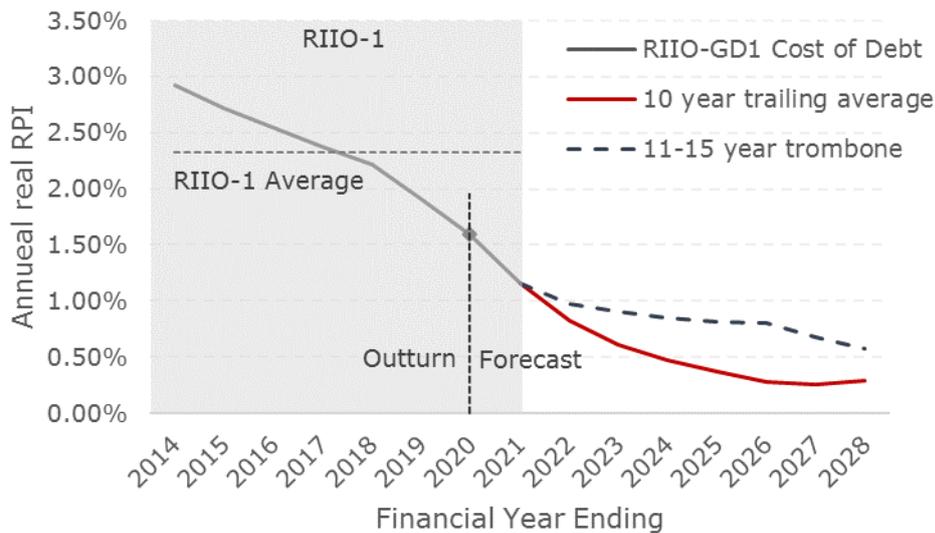
In this appendix we set out our initial analysis of the impacts on the bill of a domestic dual fuel customer arising from a reduction to the cost of capital. These include the lower return on equity already described, but also a forecast of declining debt costs (as debt allowances are indexed).

We expect the costs of network companies' debt and their cost of debt allowances to decline because yields have fallen in recent years so maturing historical debt can be refinanced at lower rates and the trailing averages used for allowances mimic this, as shown below.

Two forecasts of debt trailing average mechanisms are shown in the figure below. Because debt costs have fallen over time, the 11-15 year trombone implies a somewhat higher cost of debt than the 10 year trailing average. The difference in revenues between the two calibrations is about £530 million (real CPIH 21/22 discounted, for ET, GT, and GD sectors)

Without prejudice to the eventual calibration of the index at Final Determination, which will be based on information available at the time, we have proposed that the networks use a working assumption based, illustratively, on an 11-15-year trombone for Business Plan submission. This is consistent with current central estimates of expected sector debt costs but does not indicate a methodology decision to this trailing average period.

Figure 12: Forecast declines in potential cost of debt indices



The expected decline can be compared to the average for RIIO-1, or the latest outturn value for the financial year 2019/20. These three values are compared below (with RPI and CPIH equivalents).

Table 52: : Cost of debt during RIIO-1 and in the next regulatory period (RIIO-2) under RPI and CPIH

	RPI	CPIH
RIIO-1 Average	2.33%	3.40%
FY 2019/20	1.59%	2.66%
RIIO-2 Average	0.87%	1.93%

Decline from RIIO-1 average

Comparing the expected average cost of debt in RIIO-2 to the RIIO-1 average is more consistent if the figure is updated at subsequent stages of the RIIO-2 process, rather than continuously comparing to the 'current' cost of debt rate. Average rates in RIIO-1 are about 2% to 2.3% real RPI.¹¹⁷ The RPI equivalent of the RIIO-2 working assumption is 0.87%.

The table below sets out bill impacts, calculated with and without the inclusion of the electricity distribution (ED) sector. While decisions in the finance methodology could, in principle, apply to ED, we will consult separately on the electricity distribution price control (RIIO-ED2). The Net Present Value (NPV) and average bill impact is presented here for illustration and completeness of the potential impacts.

In total, changes to the cost of capital would reduce company returns by about £7.6 billion in RIIO-2, corresponding to approximately¹¹⁸ £30 per year on a domestic dual fuel consumer bill.

Table 53: : Net present value and associated bill impacts arising from changes to the cost of capital from RIIO-1 for a dual fuel average consumer (£m, 2021/22 (CPIH discounted) using RIIO-1 average cost of debt

	Transmission and Gas Distribution		Including Electricity Distribution	
	Net Present Value	Average Bill Impact	Net Present Value	Average Bill Impact
	£ million	£/year	£ million	£/year
Return on equity	3,424	14	4,607	17
Cost of debt	2,318	10	2,990	13
Total cost of capital	5,741	24	7,598	30

¹¹⁷ Last year of RIIO-1 is a forecast

¹¹⁸ To translate this impact to the consumer bill, we use base revenues from the PCFM, extrapolated into RIIO-2. We then take typical consumer bill network charges from the Ofgem price cap models, and assume the bills grow at the same rate as revenues. A X% decrease in base revenues is assumed to be the same X% decrease in consumer bills.

Decline from financial year 2019/20

Other Ofgem documents and press releases¹¹⁹ have compared the expected decline in the cost of debt during RIIO-2 to the prevailing cost of debt rates. The table below compares the RIIO-2 working assumption with the 2019/20 cost of debt (about 1.5% to 1.8% real RPI by sector).

Table 54: Net Present Value (NPV) and associated bill impacts from changes to the cost of capital from RIIO-1 for a dual fuel domestic consumer (£m, 2021/22 (CPIH discounted) using RIIO-1 (2018/19) cost of debt rates

	Transmission and Gas Distribution		Including Electricity Distribution	
	Net Present Value	Average Bill Impact	Net Present Value	Average Bill Impact
	£ million	£/year	£ million	£/year
Return on equity	3,424	14	4,607	17
Cost of debt	1,129	5	1,696	8
Total cost of capital	4,552	19	6,303	25

The table above sets out bill impacts calculated both with and without the inclusion of the ED sector. The figures presented in the table for ED are illustrative only. In total, changes to the cost of capital using current cost of debt rates would reduce company returns by about £6 billion in RIIO-2, corresponding to approximately¹²⁰ £25 per year on a domestic dual fuel consumer bill.

¹¹⁹ For example, the 24 May 2019 press release: <https://www.ofgem.gov.uk/publications-and-updates/ofgem-confirms-network-price-control-methodology-so-consumers-can-benefit-cheaper-smarter-and-more-sustainable-energy-network>

¹²⁰ To translate this impact to the consumer bill, we use base revenues from the PCFM, extrapolated into RIIO-2. We then take typical consumer bill network charges from the Ofgem price cap models, and assume the bills grow at the same rate as revenues. A X% decrease in base revenues is assumed to be the same X% decrease in consumer bills.