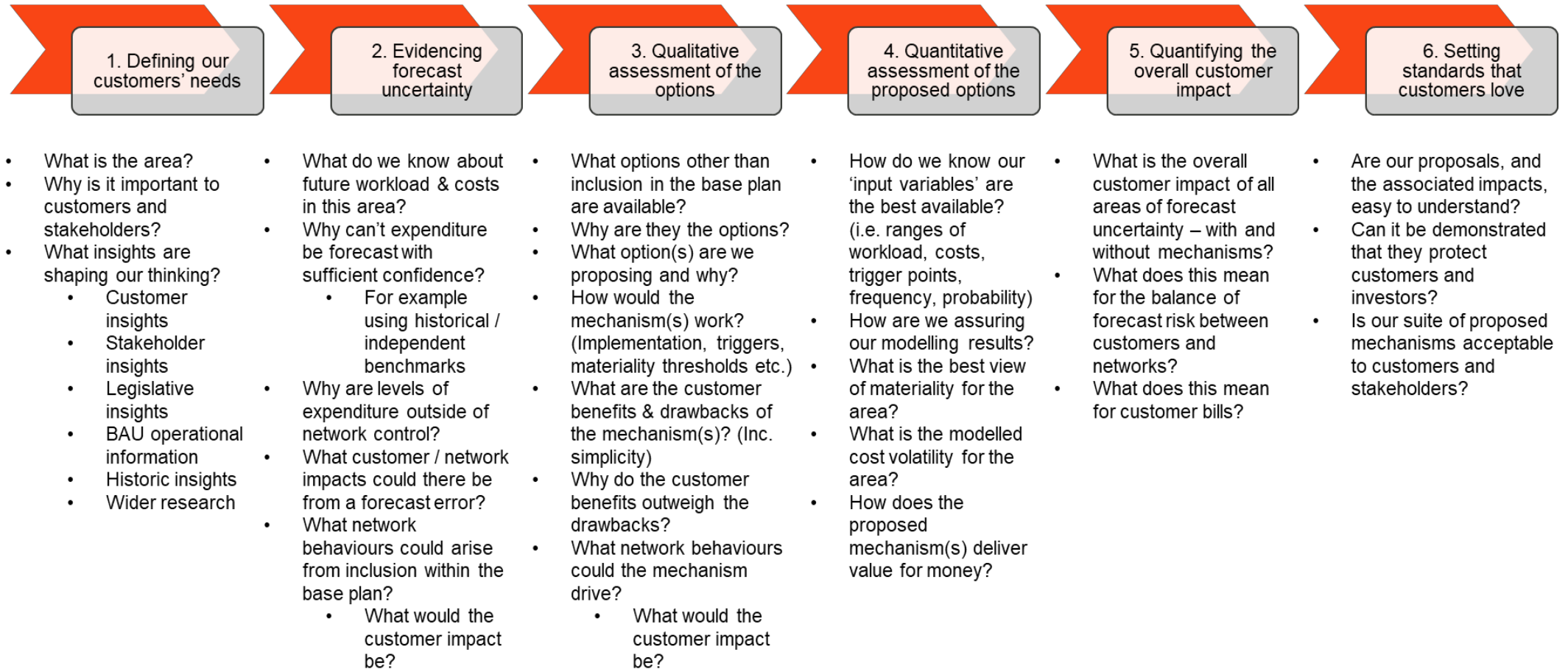


Appendix 10.02

Uncertainty Mechanism Case

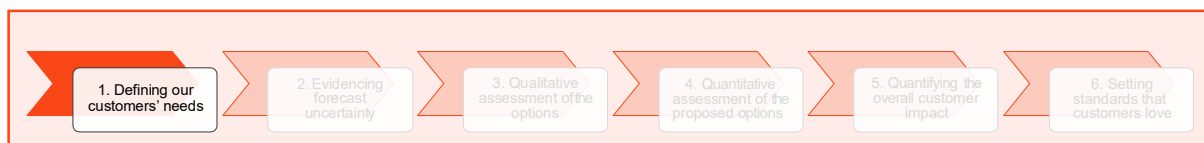
Repex – HSE policy changes

Cadent's systematic approach to developing uncertainty mechanisms to manage forecast uncertainty



Uncertainty area			
Demand uncertainty	Legislative uncertainty	Cost confidence	Heat policy
<p>Repex - HSE Policy Changes</p> <p>Proposed by Ofgem</p> <p>Re-opener Uncertainty Mechanism</p> <p>We are focused on the safety of our customers and are regulated by the Health and Safety Executive (HSE) to required standards of safety. The HSE mandated work through enforcement policy that sets the standard for a safe service and reflects society's appetite for risk. By far the largest driver of work is the Iron Mains Risk Reduction Programme (IMRRP). Alongside this, we also have obligations under Pipeline Safety Regulations which mean we must act where pipes are in an unsuitable condition to transport gas.</p> <p>As societies attitude to safety risk evolves through time, legislation and the HSEs approach to enforcement also evolves. These changes are beyond our control but could lead to significant variation in the work which our safety regulator expects us to deliver. Our requirements under the HSE drive a significant part of our repex programme, therefore any future policy changes may have material impacts on our operations.</p>			

1. Defining the need



1.1. What is the area?

Throughout our operations, we are focused on the safety of our customers. As a company, we are regulated by the Health and Safety Executive (HSE) who set the standards of safety we are required to meet. In response to these regulations, most of our network investment is driven primarily by safety legislation and HSE enforcement.

This includes, but is not limited to, the Iron Mains Risk Reduction Programme (IMRRP) and interventions on risers to ensure compliance with building and other requirements under the Pipeline Safety Regulation.

In previous price controls, there have been changes in enforcement by HSE. As part of setting the RIIO-1 price control, the HSE updated their approach to irons mains replacement, reducing the scope of the programme and thereby reducing the work Cadent was mandated to deliver. This evolution resulted in significant savings for customers.

Conversely, we would expect the HSE to increase the requirements for intervention if they were aware of increases in risk for a particular asset group or were required to enforce new legislation following a change in Government policy.

1.2. Why is it important?

As HSE policy and enforcement drives most of our investment, any change that occurs in their approach during RIIO-2 could have significant implications for the standards we are required to meet, and therefore the expenditure we must undertake. Such policy changes will be driven by safety considerations. Therefore, it is extremely important that gas networks have the flexibility to adapt and respond accordingly to any new requirements.

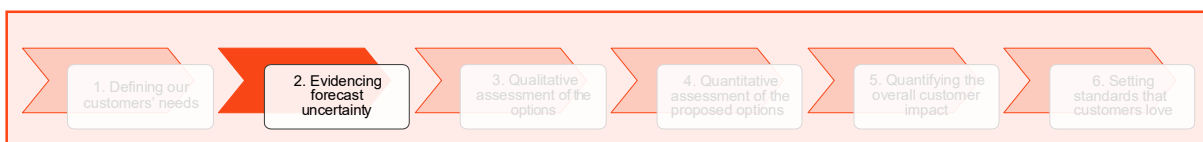
1.3. What insights are shaping our thinking?

We are focused on maintaining the security of supply to our customers, who have a primary expectation that we operate our assets in such a way as to keep them safe. The HSE has been clear that it will not allow changes in delivery that could be perceived as decreasing public safety.

In addition to routine, ongoing discussions with the HSE as part of the business-as-usual activity, the four Gas Distribution Networks (GDNs) have, to date, held five sessions with the HSE to specifically discuss the RIIO-2 process. From these discussions, we understand that the IMRRP will not be materially changed as we progress into RIIO-2 (i.e. there will be no repeat of the strategic review conducted prior to the start of RIIO-1). There will, however, be a need to update the enforcement policy, and this will be a subject for ongoing discussion

Outside of the IMRRP, we have discussed the risk posed by steel. Building on the HSE/Ofgem research at the start of RIIO-1 (RR888 - HSE/Ofgem: a 10-year review of the Iron Mains Replacement Programme) which highlighted steel as ‘an emerging issue’ we have discussed further research by the industry in this area. The industry is reporting increased failure from steel pipes. As discussed in Appendix 09.02 Distribution Mains and Associated Services, we have also held several bilateral meetings with the HSE to discuss our approach for RIIO-2 to safety replacement work.

2. Evidencing the uncertainty



2.1. What we know about the future

We are aware of existing legislation and policy determined by the HSE and have built our base plan around these requirements, to ensure the safety of our network and customers. However, we also know from previous price controls that these requirements are not fixed in time and may evolve and require adjustments to our planned expenditure.

Comparing uncertainty to costs included in our base plan

This uncertainty mechanism represents a **continuation the principles from RIIO-1**, where a mid-period review was in place for HSE policy changes. Previously, mandated repex work was provided for through a fixed allowance in RIIO-1. In RIIO-2, Ofgem have confirmed that mandatory tier 1 repex will be treated through a price control deliverable (PCD). This ensures that customers only pay for work we actually undertake. Further information on the treatment of mandatory repex is provided in Appendix 09.02.

Appendix 09.02 also discusses in detail the costs included in our base plan that relate to mandatory repex work. In the case of the iron mains replacement programme (as considered in our uncertainty modelling), these costs are equal to a total of £1,132 over RIIO-2, as shown below.

Table 1: Baseline costs associated with the IMRRP

Base costs £m, 18/19 prices	East of England	London	North West	West Midlands
IMRRP mains investment	Redacted due to commercial sensitivity			

The proposed uncertainty mechanism would account for deviations around the costs included in our base plan. As discussed in Section 4, the costs we propose to reclaim through this mechanism are those that may be triggered in response to external changes in policy from the HSE. Our base plan has been developed to deliver our strategy in line with existing requirements.

2.2. Why we face forecasting difficulties

Any change made by the HSE on its policy or enforcement could impact our business operations. Given the significant area of investment our mandatory repex programme represents, any change in our requirements could have significant implications.

We are unable to control any policy changes that may be introduced by the HSE, and we will be mandated to comply with them. This introduces uncertainty over the future volume of work we may need to undertake in RIIO-2, creating uncertainty over the total cost. It would not be appropriate for us to attempt to forecast the direction policy will take in RIIO-2, and to plan on this basis. Any changes will have industry-wide implications that will require a joined-up response.

As discussed in Section 1.3, we undertake regular engagement with the HSE and have specifically focused on the RIIO-2 process with other gas networks. We will continue to undertake engagement on the future direction of policy, providing the opportunity to develop a **better view** of any changes that may be considered for introduction.

2.3. Network impacts and behaviours from including in the base plan

The risk with including costs in our base plan for policy changes from the HSE is that we would be required to forecast costs without knowing the details of any future policy change and, consequently, that our estimate fails to fund the activity mandated by new requirements or, alternatively, that we receive funding for policy changes that do not materialise in RIIO-2.

If costs relating to new requirements from HSE were included in our baseline allowances, we would be required to develop an estimate that pre-empted the scope and timing of any policy change. This speculative exercise would not be grounded in specific proposals and would result in a highly uncertain and low confidence estimate. There is a **credible risk to** that our estimate may fail to provide for new workloads that are introduced in the future. We would therefore face an incentive to price risk into our base plan for mandatory repex to pre-empt any policy changes from the HSE.

However, this **creates a risk to customers**: there is no certainty on whether a policy change will take place and if additional expenditure would be required. This could result in an opportunity for windfall gains to Cadent.

Excluding speculative expenditure from our baseline plan ensures that the requirements of a policy change can be fully considered, and evidence-based investment decisions can be made. This ensures customers only pay for changes to our repex programme that have been mandated from the HSE from a safety perspective.

3. Qualitative assessment



3.1. Options for addressing uncertainty

Given the uncertainty of future HSE policy changes that may on impact our mandatory repex programme in RIIO-2, we have identified and evaluated other mechanisms that could be used to address this risk:

Table 2: Evaluating options for uncertainty mechanisms

Mechanism Option	Description
Volume driver	A volume driver is not appropriate. There currently is no certainty on the volumes of work that will be affected by future policy changes. Furthermore, costs for mandatory tier 1 repex work are already treated through the use of a PCD.
Re-opener mechanism	<p>A re-opener would account for the current uncertainty in understanding costs when the designs and requirements for projects in RIIO-2 are currently unknown.</p> <p>This mechanism would allow us to effectively develop an evidence-based cost forecast in response to future policy changes once their timing and scope are known.</p>
Use it or lose it allowance (PCD)	This is not applicable in this setting, as a PCD will already be in place to treat the tier 1 mandatory repex workload. This does not address the challenge we face in forecasting the scope or timing of an HSE policy change. There is also a risk that barriers are created if there are insufficient funds to deliver the required solution.

We have also undertaken a qualitative assessment of uncertainty in this area to further understand the need for an uncertainty mechanism for HSE policy changes

Table 3: Qualitative assessment of risks posed by HSE policy changes

Risk	Volume risk	Unit cost risk	Impact on outputs	Material cost / bill impact
Repex - HSE policy changes	High	Low	Medium	High

Further detail on our assessment is provided below:

- **Volume risk:** Our work in this area is mandated by the HSE, and therefore any changes to future policy, which is outside of our control, will directly translate to volumes.
- **Unit cost risks:** We have a good understanding of the unit costs associated with different mandatory repex work and have costed our RIIO-2 plan on this basis. If a new policy change resulted in new tasks, rather than changes to the existing RIIO-2 workload volumes, this could contribute to some cost uncertainty.
- **Impact on outputs:** This area of uncertainty has significant implications for a range of our outputs in relation to the repex programme. This includes safety-related outputs.
- **Material cost / bill impact:** There is significant uncertainty over the timing of future changes, which cannot be reasonably estimated. This could involve significant levels of investment and therefore may have material bill impacts. We can attempt to manage this risk through engagement with the HSE.

3.2. Proposed uncertainty mechanism

Ofgem has decided to address HSE policy changes for repex using a re-opener mechanism in RIIO-2. We have considered its application with a materiality threshold and an anytime trigger¹. In practice, this mechanism would allow us to make a submission to Ofgem during RIIO-2 once the materiality threshold is breached. In this submission, we would propose the costs we intend to recover from customers, providing evidence on why they are appropriate and efficient. This mechanism ensures that scrutiny remains over any future costs we intend to reclaim and allows us to respond to any changes in HSE policy that may impact our repex programme.

Operation of the proposed re-opener in practice

- **Form of the trigger:** Ofgem has confirmed it will continue to work with networks and other stakeholders on the scope and structure of the re-opener and will consult on this as part of Draft Determinations. In the December SMDD, it outlined its initial view of a trigger as ‘any change by the HSE to the Pipeline Safety Regulations (1996) or Iron Mains Risk Reduction programme that results in a fundamental change to the work that GDNs are mandated to carry out to remain compliant’.
- **Mitigating the likelihood of the trigger:** While the trigger would be externally determined, we would undertake proactive engagement with Government and our safety regulators on any new policy in development.

¹For the purposes of our modelling and analysis we have used a 1% materiality threshold, as is used in RIIO-1. However, due to potentially significant changes in financeability and totex sharing arrangements in RIIO-2 we are assessing if the materiality threshold should be revised.

- Claiming costs through the re-opener:** As outlined above, we have proposed that costs can be reclaimed at any time during the RIIO-2 period for this mechanism, once a materiality threshold has been breached. We propose that this includes a point in time whereby evidence can be presented that the threshold will be breached in the near future. As part of this process, we would demonstrate costs incurred or expected to be incurred in response to new requirements from the HSE

3.3. Evaluating our proposed uncertainty mechanism

A re-opener ensures that customers only pay for any changes in HSE policy that may materialise and allows us to provide an informed view of future costs in response to any changes that may take place in RIIO-2. If we were instead to pre-empt changes to current risk assessments and include costs in our base plan for this, customers may be exposed to the risk that new protections are not required, creating an opportunity for windfall gains.

Furthermore, a mechanism is already in place during RIIO-1 to address changing requirements from the HSE – this mechanism from Ofgem continues with this approach.

Nevertheless, it is important to fully evaluate the behaviours that our proposed uncertainty mechanism will encourage, to ensure they do not create perverse incentives. Below, we consider positive behaviours that a mechanism should promote.

Table 4: Evaluating incentives created by our proposed uncertainty mechanism

Behaviours and incentives	Evaluation
To minimise costs	The costs we submit to Ofgem through the re-opener process will be subject to review and challenge. Any costs identified as inefficient will be disallowed. This creates an incentive to focus on incurring or estimating efficient costs and demonstrating this with robust evidence.
To deliver required work	<p>Alongside reviewing the efficiency of costs submitted through the re-opener process, Ofgem will focus on ensuring that these only relate to relevant activities. Any costs submitted for work Ofgem does not believe to be required will be disallowed, creating an incentive to focus on work with a compelling need and that is clearly driven by a change in HSE requirements towards repex.</p> <p>Compared to the base plan, it could be believed that a re-opener does not maintain the same incentive to work itself. However, as identified in Section 1.1, this risk relates to work that we may be mandated to do in the future – Cadent would be compelled to move forward and support the implementation of any new policy. Failing to do so would create safety risks for customers and financial and reputational risks to our business.</p>

Behaviours and incentives	Evaluation
To take a whole systems approach or identify strategic solutions.	<p>Opportunities for taking a whole-system approach or identifying strategic solutions in response to any new HSE requirements will remain incentivised under the re-opener mechanism. This creates a further incentive to engage directly with the HSE during the re-opener process to develop an appropriate response from our investment plan</p> <p>As described above, the evidential bar associated with the mechanism will encourage cost minimisation. Where this can be achieved by taking different approaches to future work, we would be able to demonstrate an efficient case to Ofgem.</p> <p>Furthermore, as policy changes will apply to all GDNs, benchmarking undertaken by Ofgem during a re-opener submission creates a further incentive to find the most appropriate solution.</p>

A potential drawback for customers is that any costs incurred through the re-opener mechanism may introduce some bill volatility, with adjustments made in period to account for the additional investment we have undertaken. However, our base plan is already calibrated to deliver a repex programme in line with existing the HSE policy. The mechanism only allows for adjustments around this level in response to significant changes in requirements.

Interactions with other uncertainty mechanisms in our proposed package

Our proposals are independent of our bespoke mechanism Obligations with respect to Multiple Occupancy Buildings (MOBs). The scope of this mechanism is solely focused on HSE changes to the iron-mains replacement programme. Our proposals for MOBs relate to safety related changes that are independent of our mandatory repex programme.

As also discussed, elements of the baseline plan for mandatory repex will be involve the application of PCDs (in the case of tier 1), and volume drivers (in the case of Tier 2a RATs). We have also proposed that this volume driver is extended to all pipes above safety threshold (PAST). If a HSE policy decision was taken that altered the volumes of work we were required to undertake, these drivers ensure that we have the flexibility to respond, without having to re-open the price control.

4. Quantitative assessment



4.1. Inputs for uncertainty modelling

A significant driver of uncertainty in this area is the likelihood that a change in legislation is made by the HSE that requires us to adapt our investment plan for RIIO-2. We have assumed in each year of the price control, that this occurs with a given likelihood, as summarised in Table 5 below.

Table 5: Input assumption - Likelihood of change in HSE legislation

Likelihood assumption	21/22	22/23	23/24	24/25	25/26
Likelihood of legislative change	0%	5%	5%	5%	5%

This assumption is based on our historic experience. Our mains replacement programme began in 2002 under legislation from the HSE. Since then, there has been a single policy change. We have also assumed that if a change occurred in 2021/22, we would have knowledge and certainty through our existing engagement with the HSE. The above information implies a 1/20 chance of policy change.

We have also considered relevant cost information to include in our uncertainty analysis for HSE policy changes. For this purpose, we have developed a 'low', 'likely' and 'high' scenario for potential costs arising from changes in requirements. As the IMRRP is the largest component of our work affected by HSE policy, we have based our cost scenarios on the figures included in the base plan for this allowance. Whilst smaller items may be affected, this approach allows us to reflect a significant component of risk without introducing undue complexity.

We have based our likely scenario around a central assumption that no further requirements are introduced beyond those we already meet and have accounted for in our base plan.

In our high scenario, we have assumed an increase in cost of 20% relative to our baseline plan through an increase in safety incidents, driven by changes in HSE legislation. In our low scenario, we have assumed a 5% reduction. The skew in our assumptions reflects our view that increased requirements are more likely, based on our engagement on this matter. Our analysis reflects the potential for a two-sided impact, in line with Ofgem's view in the December SSMD. We have used these assumptions and cost estimates from our baseline plan to develop the total cost estimates presented in Table 6 below.

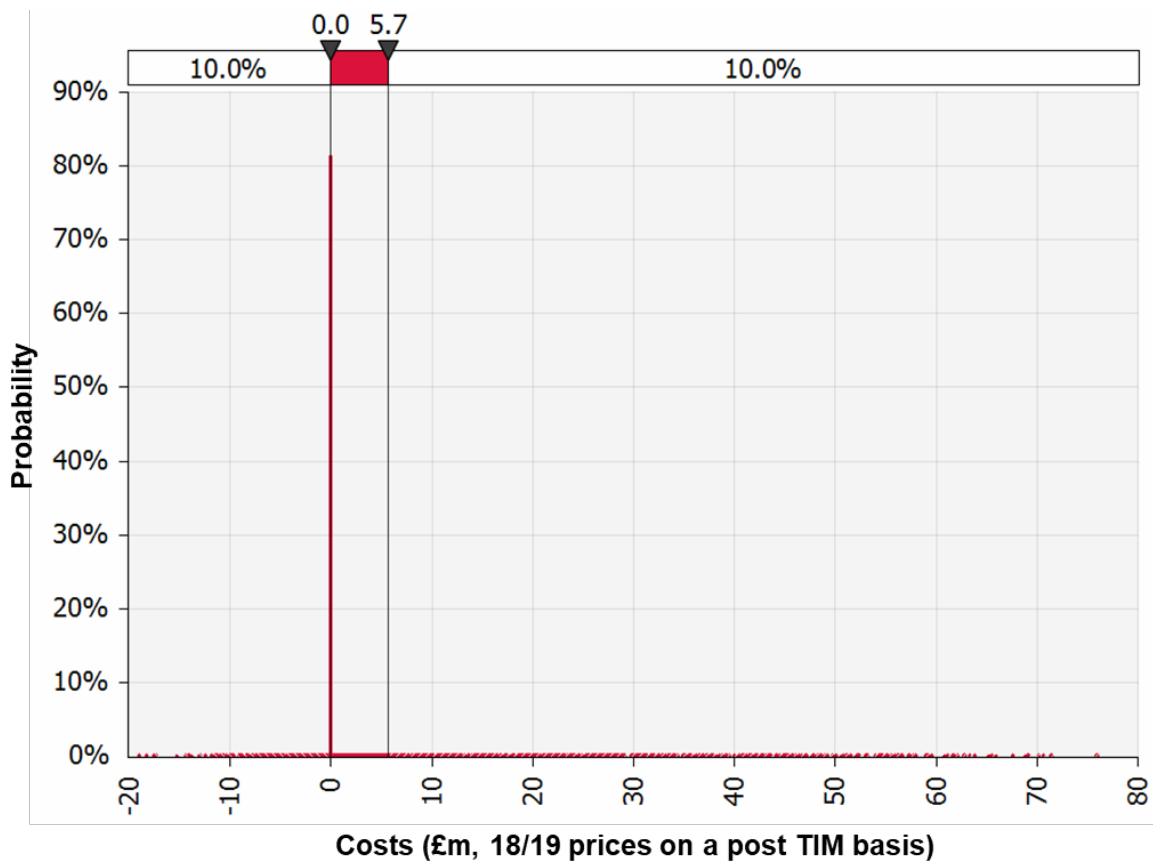
Table 6: Input assumption – Annual cost per scenario

Cadent cost for HSE policy changes (£m, 18/19 prices)	21/22	22/23	23/24	24/25	25/26
Low scenario	£56.1m	£56.1m	£56.1m	£56.1m	£56.1m
Likely scenario	-	-	-	-	-
High scenario	(£14.0m)	(£14.0m)	(£14.0m)	(£14.0m)	(£14.0m)

4.2. Assessing uncertainty

Using our input data, described above, we have undertaken Monte Carlo analysis to understand the range of cost impacts for this area of uncertainty in RIIO-2. This provides a distribution of the potential cost outcomes for HSE policy changes, based on 10,000 iterations. This approach illustrates the high and low scenarios of uncertain costs, alongside the mean cost outcome and the associated volatility. Figure 1 below summarises this distribution, whilst Table 7 provides a breakdown by network.

Figure 1: Monte Carlo: Total RIIO-2 cost risk for HSE policy changes, no mechanism. Costs, £m 18/19 prices on a post TIM basis.



Minimum	Maximum	Mean	Standard Dev	Iterations
(£19.03m)	£76.03m	£2.23m	£8.39m	10,000

The results of our Monte Carlo analysis demonstrate the scale of uncertainty associated with potential future costs to respond to new HSE requirements. Without the introduction of an mechanism, there is a considerable risk at the top end of the distribution that actual costs incurred in RIIO-2 may deviate from our base-plan allowance. Whilst the mean risk is relatively low in this analysis, due to the low likelihood assumption of a HSE policy change being introduced, the high range and volatility supports the continuation of this mechanism.

Table 7: Monte Carlo: Total RIIO-2 cost risk by network for HSE policy changes, no mechanism. Costs, £m 18/19 prices

Network	Minimum	Maximum	Mean	Standard Dev
East of England	(£5.08m)	£20.32m	£0.60m	£2.42m
London	(£3.43m)	£13.69m	£0.40m	£1.51m
North West	(£5.41m)	£21.63m	£0.63m	£2.39m

West Midlands	(£5.10m)	£20.40m	£0.60m	£2.25m
---------------	----------	---------	--------	--------

4.3. Impact of our proposed uncertainty mechanism

Table 8 below summarises the impact of introducing a re-opener mechanism to address this risk. As shown, the use of a re-opener reduces the materiality and volatility of the residual risk that remains in costs after the sharing associated with HSE policy changes. As the uncertainty mechanism would ensure we only recovered appropriate and acceptable costs from customers, this is an improvement from including a potentially higher base plan allowance to mitigate against the cost risk identified without the presence of an uncertainty mechanism in Table 8.

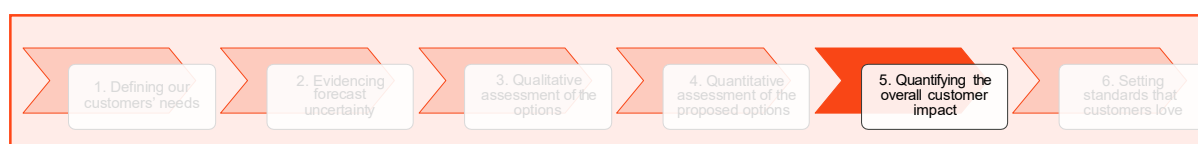
Table 8: Range of cost risks with and without a mechanism, HSE policy changes. Cost, £m 18/19 prices on a post TIM basis

Value	Without mechanism	With mechanism
Range of Impacts	(£19.03m) to £76.03m	(£19.03m) to £11.50m
Materiality (mean risk)	£2.23m	£0.46m
10 th Percentile	£0.00m	£0.00m
90 th Percentile	£5.71m	£0.61m
Standard Deviation	£8.39m	£2.36m

Several assumptions have been made to produce these results:

- Figures are presented on a post TIM basis, using a totex incentive rate of 40%.
- In the case of re-openers, we have assumed a 1% materiality threshold of average annual revenues. We have also assumed 100% of costs are reclaimed in re-openers.
- Finally, we have not considered the phasing of income in this analysis – we have focused on the value of risk and potential incomes.

5. Quantifying the customer impact



In Section 5 of Appendix 10.00 Our approach to managing risk and uncertainty, we have analysed the overall customer impact of uncertain costs with and without our proposed package of mechanisms. We have also evaluated how our proposed package recognises the trade-off between sharing exposure of cost risk between Cadent and our customers. In Chapters 10 and 11 of our Business Plan, we also quantify the impact of our proposed package of uncertainty mechanisms on customer bills in RIIO-2.

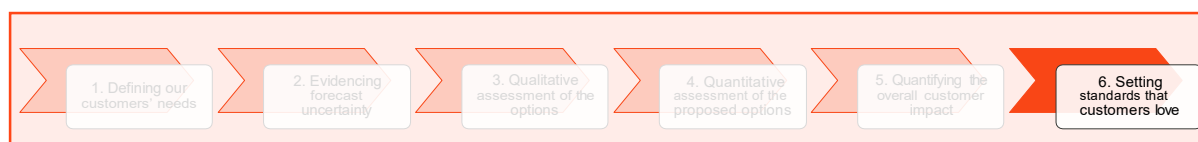
We have also quantified the bill impact associated with the HSE policy change re-opener individually. Table 9 below summarises the potential bill impact per annum by the end of RIIO-2 for the mean, P10 and P90 costs estimated in our Monte Carlo analysis.

Table 9: RIIO-2 end bill impacts, P10 mean and P90 costs from uncertainty analysis

RIIO-2 end bill impact (£, 18/19 prices)	P10	Mean	P90
East of England	£0.00	£0.01	£0.03
London	£0.00	£0.02	£0.04
North West	£0.00	£0.02	£0.06
West Midlands	£0.00	£0.03	£0.07

For the purpose of constructing bill impact estimates, we have focused on the costs from our Monte Carlo analysis and have not considered the potential timing effects on revenue recovery from the use of a re-opener. In practice, bill impacts would materialise with a lag following a successful claim through the re-opener process.

6. Setting the standards



Our proposals for a re-opener mechanism are clear and simple for our customers to understand. We only propose to request funding for the costs associated changes that materialise from the HSE which introduce new requirements for our repex programme. If we are required to lodge a notification through this mechanism within RIIO-2, we would clearly articulate to customers the detail behind any additional expenditure. This would also provide an opportunity for further engagement during the re-opener window.

Our evaluation on the implications of including costs for HSE policy changes in our base plan, as outlined in Section 2.3, and of the incentives associated with our proposed re-opener mechanism demonstrate the benefits of this approach for customers and stakeholders.

Our overall approach to managing risk and uncertainty using uncertainty mechanisms has been tested with customers through our acceptability testing. A full discussion of this engagement is provided in Chapter 10. It is noted here that customers found this approach to be acceptable and that we had been thorough in our process to manage cost risk in RIIO-2.