SSC - Appendix A35

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South Staffordshire Water PR19

Monte Carlo modelling of ODI RoRE

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South Staffordshire Water

South Staffordshire Water PR19

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Author:	Alec Yeowell
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Jacobs Engineering Group Inc.

1999 Bryan Street, Suite 1200
Dallas, Texas 75201
United States
T +1.214.638.0145
F +1.214.638.0447
www.jacobs.com

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Acronyms and Abbreviations

RoRE	Return on Regulatory Equity
PC	Performance Commitment
ODI	Outcome Delivery Incentive
P10	10% of results would be expected to be less than this value.
P50	50% of results would be expected to be less than this value and 50% of results would be expected to be greater that this value. This is also the median value.
P90	90% of results would be expected to be less than this value.

1. Introduction

Ofwat set out its methodology for the 2019 price review in *Delivering Water 2020: Our methodology for the 2019 price review*. The suite of documentation includes two appendices related delivering outcomes to customers.

Appendix 2, *Delivering outcomes for customers*[1], Ofwat provides guidance on performance commitments (PCs) and outcome delivery incentives (ODIs). The preferred option includes a balance of common and bespoke performance commitments to promote better regulation by proportionately balancing the need for stretching PC levels for common PCs, and the need for bespoke PCs to reflect the unique circumstances surrounding each water company.

In Appendix 12, *Aligning risk and return*[2], Ofwat provides guidance on the expected balance of the ODI risk and reward package. The guidance requires companies to demonstrate that the package of PCs and ODIs for PR19 expose the company to a range of risk and reward that gives an indicative uncapped range of +/- 1 to 3% of RoRE. The guidance requires companies to provide estimates of expected performance and outcomes at the P10 and P90 performance levels, and to investigate incentivisation scenarios. Outputs should be generated at both the performance commitment and price control levels.

Companies' proposals for individual PC and ODI packages are to be returned to Ofwat in table App1, *Performance commitments (PCs) and outcome delivery incentives (ODIs)*. The ODI package range should be provided in table App26 by price control[3].

The P10 and P90 performance levels for each performance commitment are driven by various factors, and therefore it should not be expected that the P10 and P90 values for each ODI would occur together, and some statistical analysis of all ODIs is required to estimate the overall ODI package range by price control.

This technical report describes the methods used to derive the statistical outputs associated with the ODI package as reported in tables App1 and App26. The analysis was completed using a Monte Carlo Simulation approach.

2. PC and ODI mechanisms

The terminology of PC and ODI mechanisms is provided in Ofwat's final guidance on business plan tables. The following definitions have been quoted from Ofwat's final guidance document to set out the key concepts.

> ***Deadbands and Caps and Collars***
>
> Companies can propose deadbands i.e. a range around the performance commitment level in which no incentive rates apply. Companies will need to set out why their proposed approach is in the best interest of customers.
>
> Outside the deadband range, the proposed incentives should apply automatically based on performance during the next price control period – subject to any limits on the incentive size proposed by the companies.
>
> Companies can propose limits on the performance range over which the individual ODI incentives apply: a cap on outperformance payments and a collar on underperformance penalties.

[1] Delivering Water 2020: Our methodology for the 2019 price review, Appendix 2: Delivering outcomes for customers. Appendix to Chapter 4: Delivering outcomes for customers. 13 December 2017.
[2] Ibid., Appendix 12: Aligning risk and return.
[3] Ibid., Supporting document to the final data tables.

Incentive rates

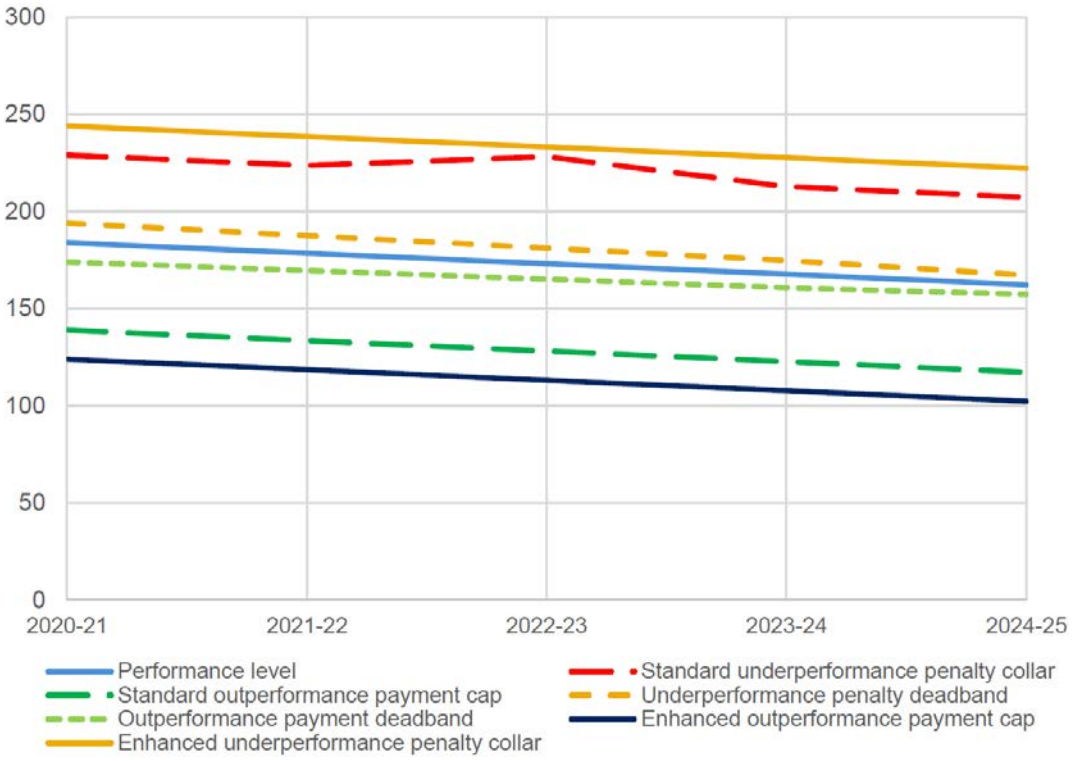
Companies complete table App1 with the financial incentives rates (if any) they are proposing for their ODIs over different ranges of service performance.

Table App1 allows for four types of incentive rates:

- Standard underperformance penalty rate – this applies between the underperformance penalty deadband and the standard underperformance penalty collar
- Standard outperformance payment rate – this applies between the outperformance payment deadband and the outperformance payment cap.
- Enhanced underperformance penalty rate – this applies between the standard underperformance penalty collar and the enhanced underperformance penalty collar
- Enhanced outperformance payment rate – this applies between the standard outperformance payment cap and the enhanced outperformance payment cap.

[We] are assuming that companies' enhanced outperformance payments and underperformance penalties apply from the performance level at which the standard outperformance payments and under performance penalties stop applying respectively.

Figure 1 Performance levels, deadbands, caps, and collars - example. From Ofwat (2017), Delivering Water 2020: Our methodology for the 2019 price review, Final guidance on business plan data tables: Supporting document to the final data tables.



3. Monte Carlo simulation

3.1 Introduction

Monte Carlo simulation methods are a broad range of methods that rely on repeated random sampling on one or more input probability distributions to obtain results.

Monte Carlo simulation methods are often used with spreadsheet models. The Monte Carlo simulation process is usually managed by a spreadsheet 'add-in' that selects randomly from defined input distributions and records and analyses the outputs from the model to generate results. There are several spreadsheet Monte Carlo simulation spreadsheet add-ins available. Palisade @RISK was used for the analysis described in this report.

Completing a spreadsheet Monte Carlo simulation usually involves the following steps:

- Build and test a spreadsheet model of the mechanism
- Define input distributions and appropriate correlations between input distributions
- Run simulations (sample many times from the input distributions and record and summarise the results)
- Examine the results and make decisions.

3.2 Spreadsheet model

A spreadsheet model was built to reproduce the performance incentive mechanism defined in the Ofwat documentation. A copy of App1 was incorporated in the spreadsheet along with separate sheets to simulate each of the proposed financial PC and ODI mechanisms. The model enabled the result of a change in performance to be transformed into an estimated underperformance penalty or outperformance reward payment. The model functionality supported scenario analysis optionally including deadbands, penalty collars and reward caps. In line with South Staffordshire Water's ODI design, all ODIs were modelled as in-period.

3.3 Input distributions

Each of the proposed PCs with financial incentives were assigned input distributions which defined the expected range of performance for the measure. The Palisade @RISK spreadsheet add-in was used to define the distributions using knowledge of historic performance and consideration of the risks and mitigations contained in the business plan.

The distributions used for each model are given in Appendix B.

3.4 Output statistics

The output from a Monte Carlo simulation is usually a distribution resulting from the random sampling of the input distributions values cascading through a numerical model. The outputs from the Monte Carlo simulations for the ODI model were captured and the statistics summarized by the @RISK spreadsheet add-in. The spreadsheet add-in captures and generates a range on outputs including interactive charts of the shape and characteristics of the output distributions.

The spreadsheet add-in includes a number of 'MS Excel' type functions that can be incorporated in spreadsheets to return specific measures of the distribution outputs. The 'MS Excel' type functions were built into a summary dashboard for the PC and ODI analysis spreadsheet that was used to investigate several output scenarios for ODI packages.

Figure 2 shows an example of a Monte Carlo simulation for the package of ODIs. The columns in the table show the results for each simulated year. The row labelled *Sum* contains the output for the last random sample of the model and changes for each iteration. The row labelled *Percentile 10%* captures the 10th percentile value (-1.92 £million) of the distribution created from the simulation. The *Percentile 50%* row describe the 50th percentile value (-1.02 £million) which is also the median value of the distribution, and *Percentile 90%* describes the 90th percentile value (-0.26 £million). Based on the input distributions and the underlying numeric model, the simulation outputs can be interpreted as there being an 80% chance that the ODI package output range lies between the lower 10% value and upper 90% value.

		2020-21	2021-22	2022-23	2023-24	2024-25	
	Sum	**-£1.65**	-£1.08	-£1.63	-£0.90	-£1.02	Million
Percentile	10%	-£1.92	-£1.91	-£1.93	-£1.96	-£2.02	
Percentile	50%	-£1.02	-£1.02	-£1.04	-£1.07	-£1.11	
Percentile	90%	-£0.26	-£0.26	-£0.28	-£0.31	-£0.34	Average
% of RoRE	10%	-1.2%	-1.1%	-1.1%	-1.0%	-1.0%	-1.1%
% of RoRE	50%	-0.6%	-0.6%	-0.6%	-0.6%	-0.6%	-0.6%
% of RoRE	90%	-0.2%	-0.2%	-0.2%	-0.2%	-0.2%	-0.2%

Figure 2 Example Monte Carlo simulation summary of RoRE range outputs

The percentile values describe the shape of the output distribution at the P10 and P90 points. An example of the underlying distribution described by these values for year 2020/21 is shown in Figure 3. The percentile values described above delineate the 10th percentile (P10) left-hand shaded tail and 90th percentile (P90) right-hand shaded tail of the distribution.

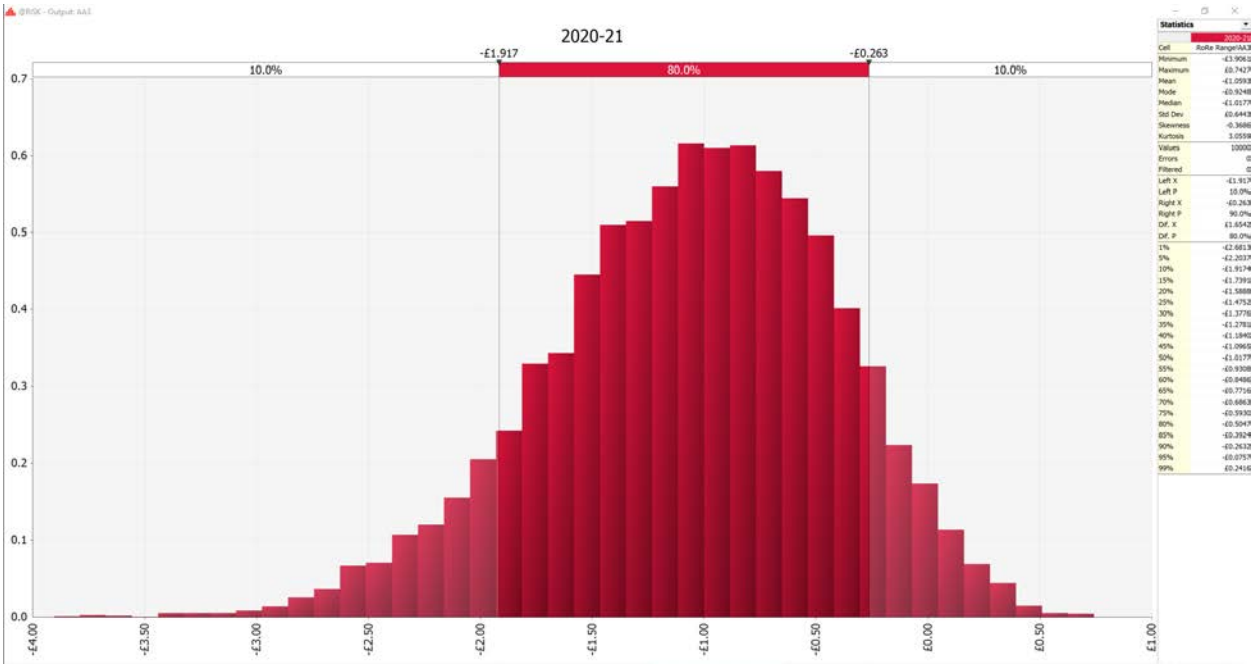


Figure 3 Chart illustrating example ODI package range resulting from 10,000 iterations.

It is important to note that Monte Carlo simulations techniques rely on randomized sampling from the defined input distributions, meaning that the outputs would not be exactly reproduced if the simulation were to be run a second time. However, given enough iterations (random selections) for each scenario, the output statistics from multiple runs should tend to converge to very similar values.

In table App1, for an ODI with both penalty and reward, the ODI package P10 value is expected to be negative, and describe underperformance-derived penalties. The P90 value is expected to be a positive value and describe outperformance-derived rewards. In the example shown in Figure 2 and Figure 3, the P10 and P90 ODI range are negative, indicating that the balance of the ODI package is shifted 'left' toward penalty.

The next section describes three scenarios that illustrate how the incentive rates were adjusted and scaled to produce a balanced ODI package.

4. Scenarios

Several scenarios were assessed with Monte Carlo simulation to balance the penalty and reward elements of the ODI package to the range of +/- 1 to 3%.

The scenarios presented in this section assume:

- That the RoRE is:
    - Year 1: £160m
    - Year 2: £170m
    - Year 3: £180m
    - Year 4: £190m
    - Year 5: £200m
- There are no deadbands applied
- There are no caps or collars applied.

4.1 Natural scenario

The base-case scenario was based on penalty and reward incentive rates that directly reflect information gathered through customer research. The findings are presented in Figure 4.

Figure 4 ODI package Monte Carlo summary for the base case natural scenario.

		No Cap or Collar					
		2020-21	2021-22	2022-23	2023-24	2024-25	
	Sum	-£0.25	-£0.23	-£2.04	-£1.30	-£0.64	Million
Percentile	10%	-£1.92	-£1.91	-£1.93	-£1.96	-£2.02	
Percentile	50%	-£1.02	-£1.02	-£1.04	-£1.07	-£1.11	
Percentile	90%	-£0.26	-£0.26	-£0.28	-£0.31	-£0.34	Average
% of RoRE	10%	-1.2%	-1.1%	-1.1%	-1.0%	-1.0%	-1.1%
% of RoRE	50%	-0.6%	-0.6%	-0.6%	-0.6%	-0.6%	-0.6%
% of RoRE	90%	-0.2%	-0.2%	-0.2%	-0.2%	-0.2%	-0.2%

At the P10, P50 and P90 reference points the value of the ODI package is negative, indicating that the package was shifted and skewed toward penalties. The range of P10 and P90 in year one of PR19 was -1.2% to -0.2% of RoRE.

The next section describes top down adjustments of the PC penalty and reward rates to rebalance the package.

4.2 Top down adjusted scenario

The base-case scenario showed a balance toward to penalty for these potential reasons;

- Several of the PCs are penalty-only.
- For all PCs, with the exception of Leakage (C1 and C2) and Unplanned outage (D5), research indicates that customer preferences are generally to have symmetrical penalties and rewards, or penalties that are greater than rewards, for each unit change in PC.
- The distributions assigned to each PC (see Appendix B) are generally skewed towards under-performance, reflecting South Staffordshire Waters' view that out performance to achieve rewards will be stretching.

The 'Top down' scenario was created by adjusting the incentives applied to individual PCs. The adjustments are presented in Table 1. Note that the adjustments to penalty and reward incentive rates are symmetrical.

Table 1 Top-down adjustments to incentive rates.

PC ref	PC Name	Penalty adjustment	Reward adjustment
B1	Financial support	None	None
B2	Extra Care assistance	None	None
C1	Leakage South Staffs region	Multiply by 3	Multiply by 3
C2	Leakage Cambridge region	Multiply by 3	Multiply by 3
C3	Residential water consumption SST	None	None
C4	Environmentally sensitive water abstraction	None	None
C6	Protecting wildlife, plants, habitats and catchments	None	None
D2	Supply interruptions	None	None
D4	Mains bursts	None	None
D5	Unplanned outage	None	None
D6	Customer contact about water quality	None	None
D7	Visible leak repair time	Multiply by 10	Multiply by 10
E2	Residential void properties and gap sites	None	None
C7	Residential water consumption Cam	None	None

The Monte Carlo simulation outputs from the top-down adjusted scenario are provided in Figure 5. The impact of the adjustments has shifted the total package towards the 'right' and the P90 value has moved into reward. However, the package remains narrower than the guidance suggests and remains shifted towards penalties.

Figure 5 ODI package Monte Carlo summary for top-down adjusted scenario.

		No Cap or Collar					
		2020-21	2021-22	2022-23	2023-24	2024-25	
	Sum	-£0.86	-£0.72	£0.13	-£0.83	-£0.82	Million
Percentile	10%	-£1.39	-£1.42	-£1.52	-£1.64	-£1.81	
Percentile	50%	-£0.52	-£0.54	-£0.60	-£0.69	-£0.80	
Percentile	90%	£0.29	£0.28	£0.24	£0.20	£0.15	Average
% of RoRE	10%	-0.9%	-0.8%	-0.8%	-0.9%	-0.9%	-0.9%
% of RoRE	50%	-0.3%	-0.3%	-0.3%	-0.4%	-0.4%	-0.3%
% of RoRE	90%	0.2%	0.2%	0.1%	0.1%	0.1%	0.1%

4.3 Scaled and adjusted scenario

This ‘Scaled’ scenario builds on the ‘Top down’ adjusted scenario to both stretch the range and shift the package further to the right to create a symmetrical balance between risk and reward. The scaled scenario uses the top-down adjusted incentive rates and applied a further:

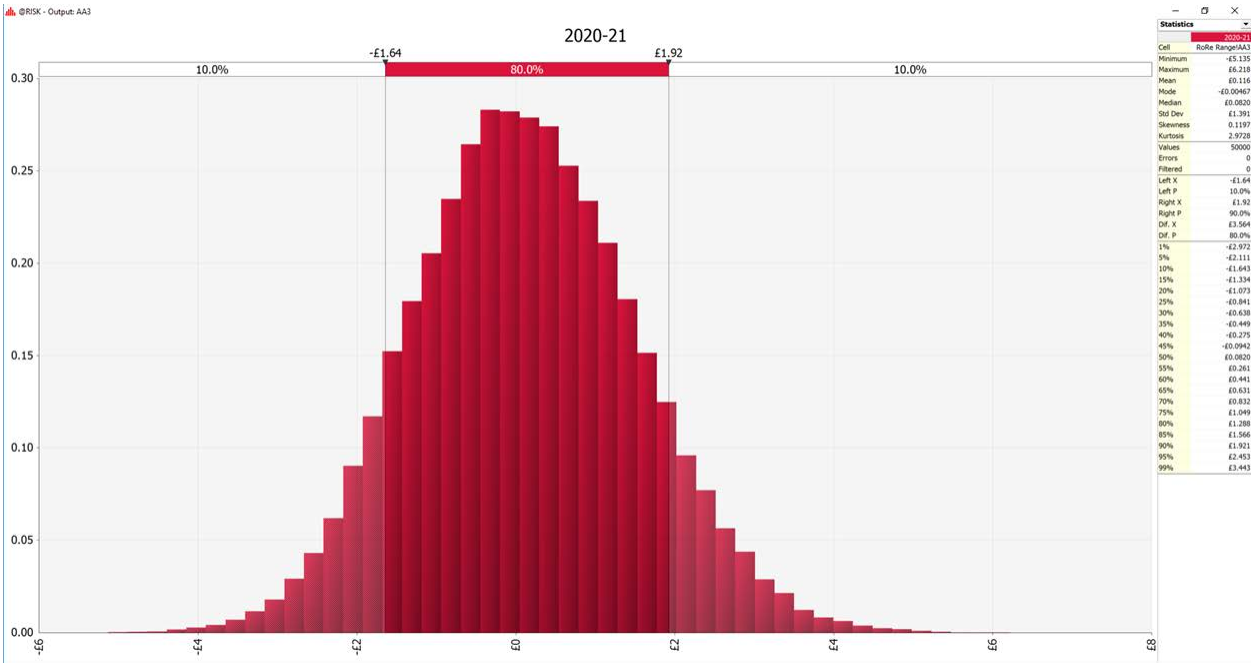
- 1.5 multiplier to penalties
- 3.0 multiplier to rewards.

Figure 6 ODI package Monte Carlo summary for Scaled scenario.

		No Cap or Collar					
		2020-21	2021-22	2022-23	2023-24	2024-25	
	Sum	£2.69	-£0.25	-£0.61	-£2.07	-£0.60	Million
Percentile	10%	-£1.64	-£1.68	-£1.84	-£2.04	-£2.27	
Percentile	50%	£0.08	£0.07	-£0.07	-£0.20	-£0.38	
Percentile	90%	£1.92	£1.93	£1.86	£1.80	£1.70	Average
% of RoRE	10%	-1.0%	-1.0%	-1.0%	-1.1%	-1.1%	-1.0%
% of RoRE	50%	0.1%	0.0%	0.0%	-0.1%	-0.2%	0.0%
% of RoRE	90%	1.2%	1.1%	1.0%	0.9%	0.8%	1.0%

The results of the scenario are provided below in Figure 6. This scaling has the effect of broadening and shifting the distribution of possible outcomes to approximately +/- 1% of RoRE, which is at the lower end of the guided range. The P50 median value is near to zero. The shape of the distribution for the first year of 2020/21 is shown in Figure 7.

Figure 7 Chart of scaled and adjusted ODI package range resulting from 10,000 iterations.



5. Discussion and conclusions

The Monte Carlo spreadsheet model enabled a range of scenarios to be tested to understand the leverage of individual PCs and incentive rates on the total ODI package.

Input distributions for each PC were assigned to reflect the expected range of performance for each measure.

Three scenarios were used to illustrate the process used to create the ODI package that is consistent with the Ofwat guidance on the shape and size of the reward and penalty package.

An ODI package based on a top down adjustment of the incentive rates (Section 4.2) for selected measures and a further scaling of the ODI package (Section 4.3) leads to an ODI package that meets the guidance.

A summary of the individual independent PC P10 and P90 ODI ranges is shown in Appendix C.

Appendix A. List of financial ODIs assessed

Line/item reference	Outcome	PC history	PC ref. (company)	PC name	PC short description (maximum 750 characters with spaces)	ODI type	PC unit	PC unit description
1	Our customers	PR19 new	A1	Customer measure of experience	Level of satisfaction of residential customers.	Out & under	score	C-MeX score
2	Our customers	PR19 new	A2	Developer services measure of experience	Level of satisfaction of developer services customers.	Out & under	score	D-MeX score
4	Our community	PR14 continuation	B1	Financial support	Proportion of household customers that we help with their water bills, using our financial assistance schemes such as our social tariff, charitable trust, payment plans or other types of help	Under	nr	Number of total customers
5	Our community	PR19 new	B2	Extra Care assistance	Proportion of household customers that we help with our 'Extra Care' support, such as our additional meter reads, referral fast-track, a dedicated team to call, voice assistant, tailored communications and links to partnership and advice providers. In addition they will have access to on-line and mobile technology which will feature specifically tailored support.	Under	nr	Number of customers
7	Our environment	PR14 continuation	C1	Leakage South Staffs region	Leakage level in the South Staffs supply region.	Out & under	nr	Ml/d
8	Our environment	PR14 continuation	C2	Leakage Cambridge region	Leakage level in the Cambridge supply region.	Out & under	nr	Ml/d
9	Our environment	PR14 continuation	C3	Residential water consumption SST	The average water consumption of residential customers.	Out & under	nr	Litres per person per day
10	Our environment	PR19 new	C4	Environmentally sensitive water abstraction	Compliance with pre-defined water abstraction thresholds for our designated abstraction incentive mechanism (AIM) sites.	Out & under	score	Score derived from AIM calculation
12	Our environment	PR14 continuation	C6	Protecting wildlife, plants, habitats and catchments	The area of land that we actively manage to protect wildlife, plants, habitats and catchments.	Out & under	nr	Hectares

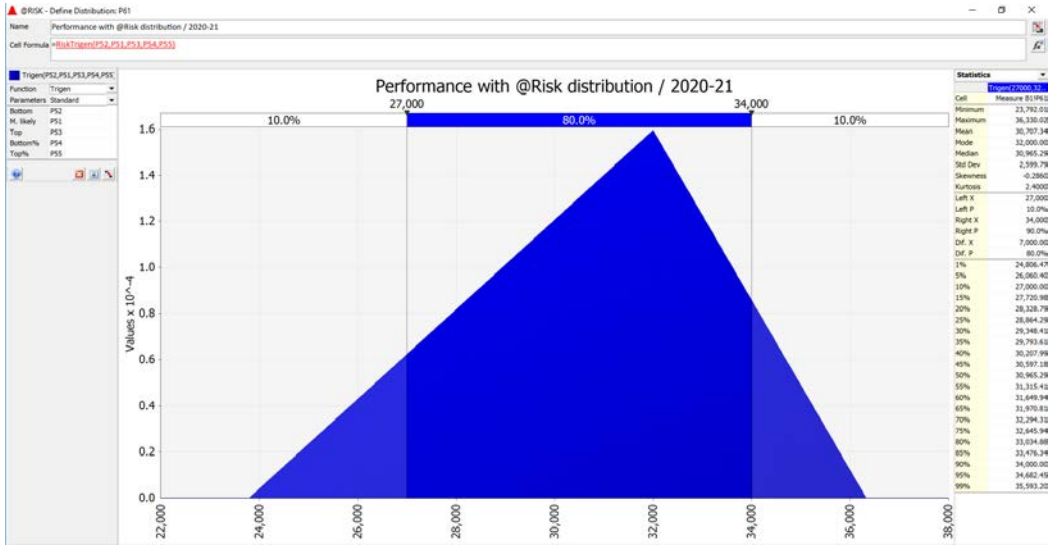
13	Our service	PR19 new	D1	Compliance risk index	Compliance with drinking water quality regulations, as measured using the DWI's compliance risk index metric.	Under	score	Score as per DWI CRI calculation
14	Our service	PR14 continuation	D2	Supply interruptions	Average minutes of interruption each connected property experiences for interruptions of 3 hours or greater.	Out & under	nr	Average minutes per connected property
16	Our service	PR14 revision	D4	Mains bursts	Number of burst mains.	Out & under	nr	Number of bursts
17	Our service	PR19 new	D5	Unplanned outage	Production capacity lost through unplanned outage.	Out & under	%	Percentage outage of peak week production capacity
18	Our service	PR14 continuation	D6	Customer contact about water quality	The number of customer contacts we get each year about the appearance, taste and odour of water, or perceived illness.	Out & under	nr	Number of contacts per 1,000 population
19	Our service	PR19 new	D7	Visible leak repair time	The average number of days that we take to repair a visible leak on our network, measured from the time the leak is found or reported.	Out & under	nr	Average days to repair
20	Our service	PR19 new	D8	Water treatment works delivery programme	This measure supports our cost adjustment claim, protecting customers against non and late delivery of our water treatment works upgrade programme and associated expenditure.	Under	category	Set delivery milestones
22	Our business	PR19 new	E2	Residential void properties and gap sites	The proportion of residential voids we have validated each year, along with the completion of our gap site identification activity.	Under	%	Process execution/timing vs % target for completion

Appendix B. Input distribution parameters

B.1 B1 Financial Support

Line/item reference	B1

Outcome	Our community
PC history	PR14 continuation
PC ref.(company)	B1
PC name	Financial support
ODI type	Under
PC unit description	Number of total customers
ODI form	Revenue
ODI timing	In-period
Direction of improving performance	Up
PC unit	nr

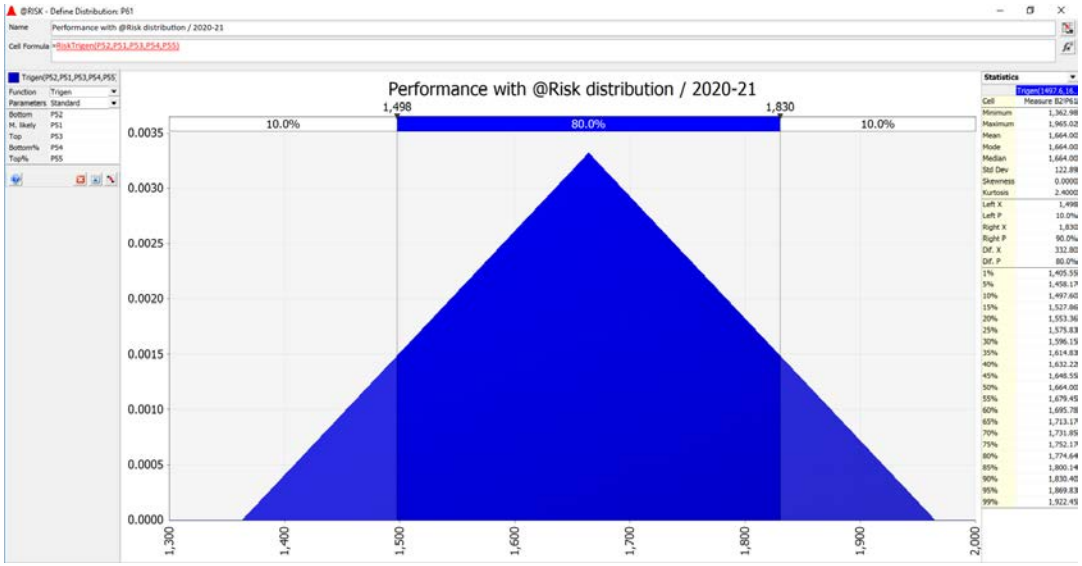


Year	2020/21	2021/22	2022/23	2023/24	2024/25
Distribution Parameters (Best estimate)	32000.0	34000.0	36000.0	38000.0	40000.0
Distribution Lower Value Point	27000.0	29000.0	31000.0	33000.0	35000.0
Distribution Upper Value Point	34000.0	36000.0	41000.0	48000.0	55000.0
Distribution lower point (%)	10.0	10.0	10.0	10.0	10.0
Distribution upper point (%)	90.0	90.0	90.0	90.0	90.0

B.2 B2 Extra Care assistance

Line/item reference	B2

Outcome	Our community
PC history	PR19 new
PC ref.(company)	B2
PC name	Extra Care assistance
ODI type	Under
PC unit description	Number of customers
ODI form	Revenue
ODI timing	In-period
Direction of improving performance	Up
PC unit	nr

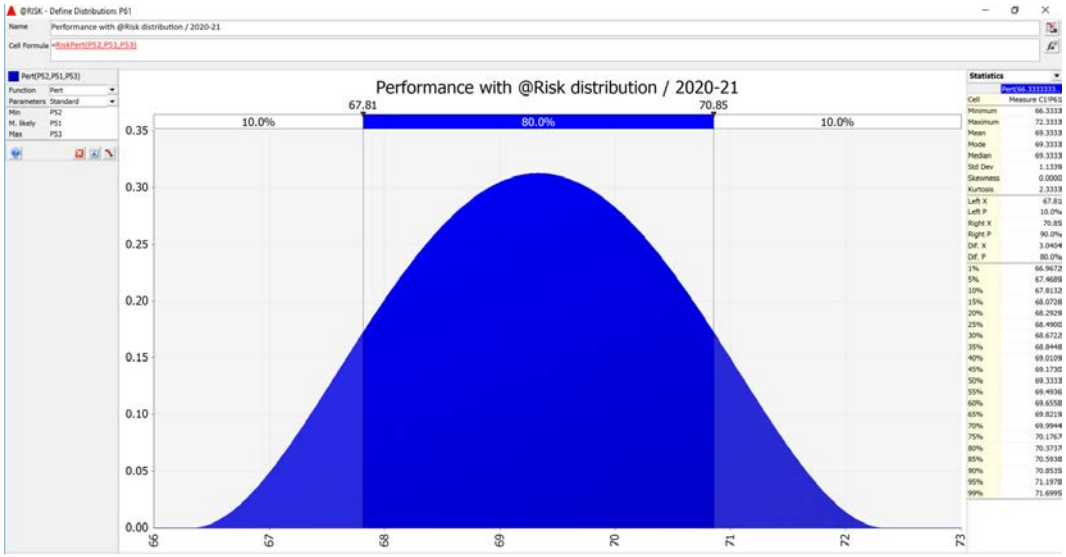


Year	2020/21	2021/22	2022/23	2023/24	2024/25
Distribution Parameters (Best estimate)	1664.0	1827.0	1991.0	2205.0	2269.0
Distribution Lower Value Point	1497.6	1644.3	1791.9	1984.5	2042.1
Distribution Upper Value Point	1830.4	2009.7	2190.1	2425.5	2495.9
Distribution lower point (%)	10.0	10.0	10.0	10.0	10.0
Distribution upper point (%)	90.0	90.0	90.0	90.0	90.0

B.3 C1 Leakage South Staffs region

Line/item reference	C1

Outcome	Our environment
PC history	PR14 continuation
PC ref.(company)	C1
PC name	Leakage South Staffs region
ODI type	Out & under
PC unit description	Ml/d
ODI form	Revenue
ODI timing	In-period
Direction of improving performance	Down
PC unit	nr

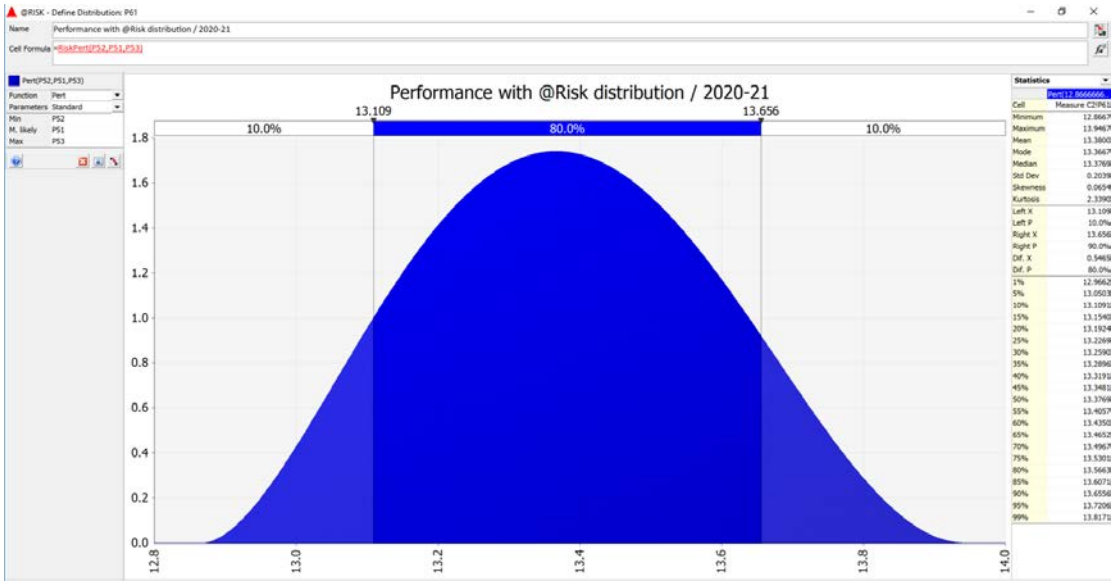


Year	2020/21	2021/22	2022/23	2023/24	2024/25
Distribution Parameters (Best estimate)	69.3	67.0	63.5	60.0	56.5
Distribution Lower Value Point	66.3	64.0	60.5	57.0	53.5
Distribution Upper Value Point	72.3	70.5	68.0	66.0	64.5
Distribution lower point (%)	Minimum	Minimum	Minimum	Minimum	Minimum
Distribution upper point (%)	Maximum	Maximum	Maximum	Maximum	Maximum

B.4 C2 Leakage Cambridge region

Line/item reference	C2

Outcome	Our environment
PC history	PR14 continuation
PC ref.(company)	C2
PC name	Leakage Cambridge region
ODI type	Out & under
PC unit description	Ml/d
ODI form	Revenue
ODI timing	In-period
Direction of improving performance	Down
PC unit	nr

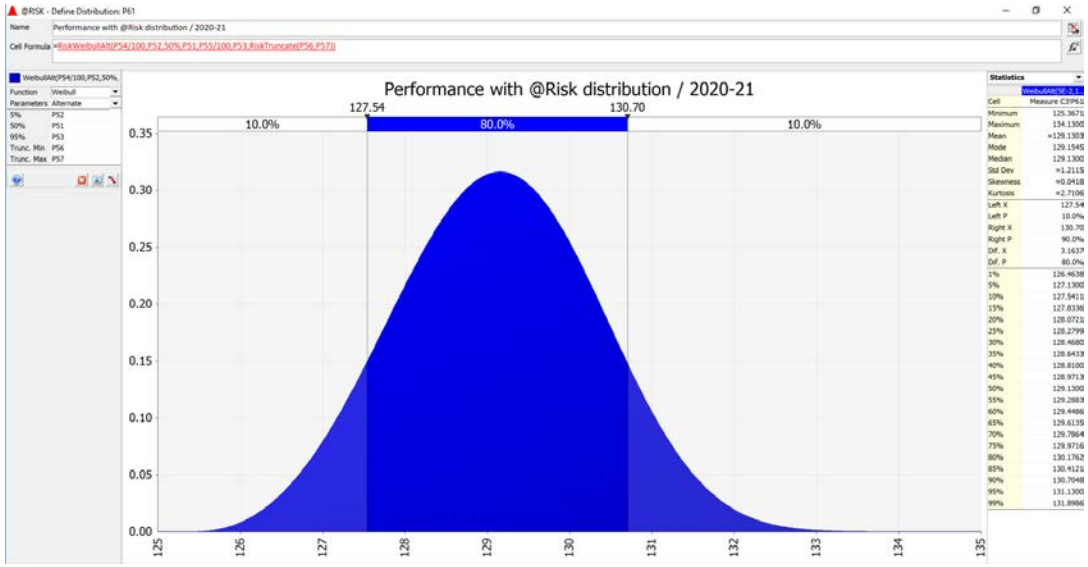


Year	2020/21	2021/22	2022/23	2023/24	2024/25
Distribution Parameters (Best estimate)	13.4	13.1	12.7	12.3	11.9
Distribution Lower Value Point	12.9	12.6	12.2	11.8	11.4
Distribution Upper Value Point	13.9	13.7	13.6	13.5	13.4
Distribution lower point (%)	Minimum	Minimum	Minimum	Minimum	Minimum
Distribution upper point (%)	Maximum	Maximum	Maximum	Maximum	Maximum

B.5 C3 Residential water consumption SST

Line/item reference	C3

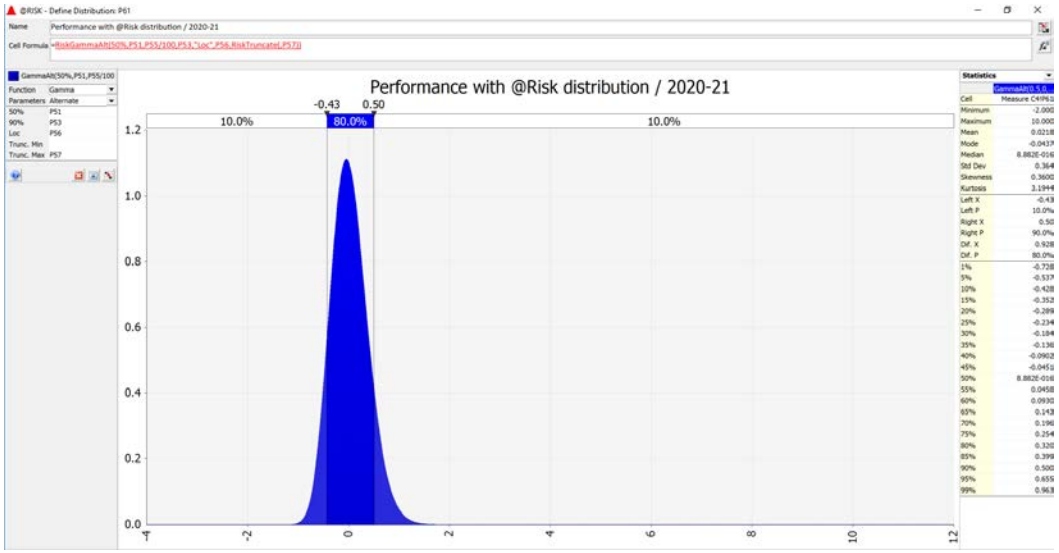
Outcome	Our environment
PC history	PR14 continuation
PC ref.(company)	C3
PC name	Residential water consumption SST
ODI type	Out & under
PC unit description	Litres per person per day
ODI form	Revenue
ODI timing	In-period
Direction of improving performance	Down
PC unit	nr



Year	2020/21	2021/22	2022/23	2023/24	2024/25
Distribution Parameters (Best estimate)	129.1	128.9	128.7	128.5	128.3
Distribution Lower Value Point	127.1	126.9	126.7	126.5	126.3
Distribution Upper Value Point	131.1	130.9	130.7	130.5	130.3
Distribution lower point (%)	5.0	5.0	5.0	5.0	5.0
Distribution upper point (%)	95.0	95.0	95.0	95.0	95.0
Truncation Lower	124.1	123.9	123.7	123.5	123.3
Truncation Upper	134.1	133.9	133.7	133.5	133.3

B.6 C4 Environmentally sensitive water abstraction

Line/item reference	C4
Outcome	Our environment
PC history	PR19 new
PC ref.(company)	C4
PC name	Environmentally sensitive water abstraction
ODI type	Out & under
PC unit description	Score derived from AIM calculation
ODI form	Revenue
ODI timing	In-period
Direction of improving performance	Down
PC unit	score

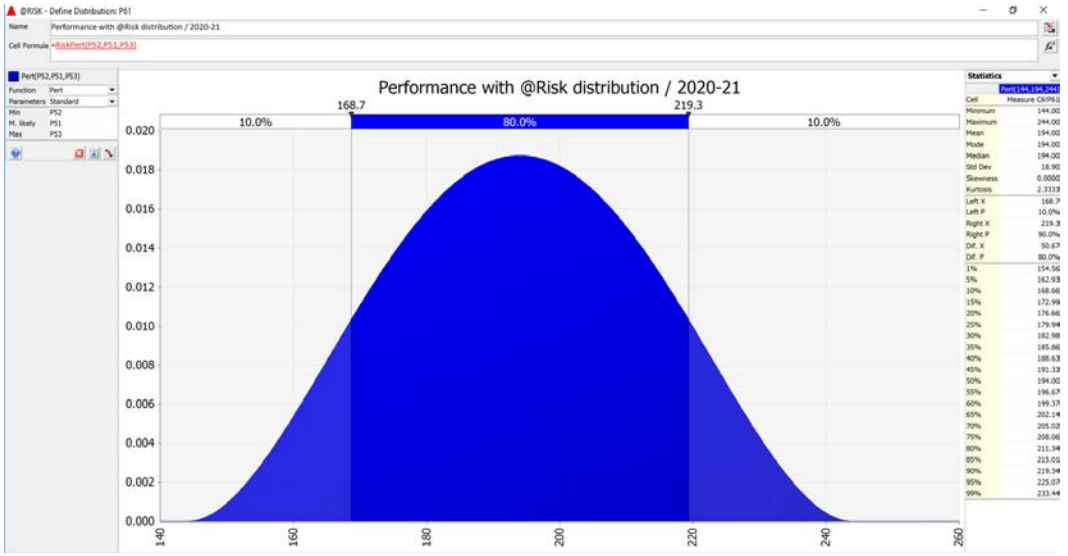


Year	2020/21	2021/22	2022/23	2023/24	2024/25
Distribution Parameters (Best estimate)	0.0	0.0	0.0	0.0	0.0
Distribution Lower Value Point	#N/A	#N/A	#N/A	#N/A	#N/A
Distribution Upper Value Point	0.5	0.5	0.5	0.5	0.5
Distribution lower point (%)	#N/A	#N/A	#N/A	#N/A	#N/A
Distribution upper point (%)	90.0	90.0	90.0	90.0	90.0
Distribution Location shift	-2.0	-2.0	-2.0	-2.0	-2.0
Truncation Upper	10.0	10.0	10.0	10.0	10.0

B.7 C6 Protecting wildlife, plants, habitats and catchments

Line/item reference	C6

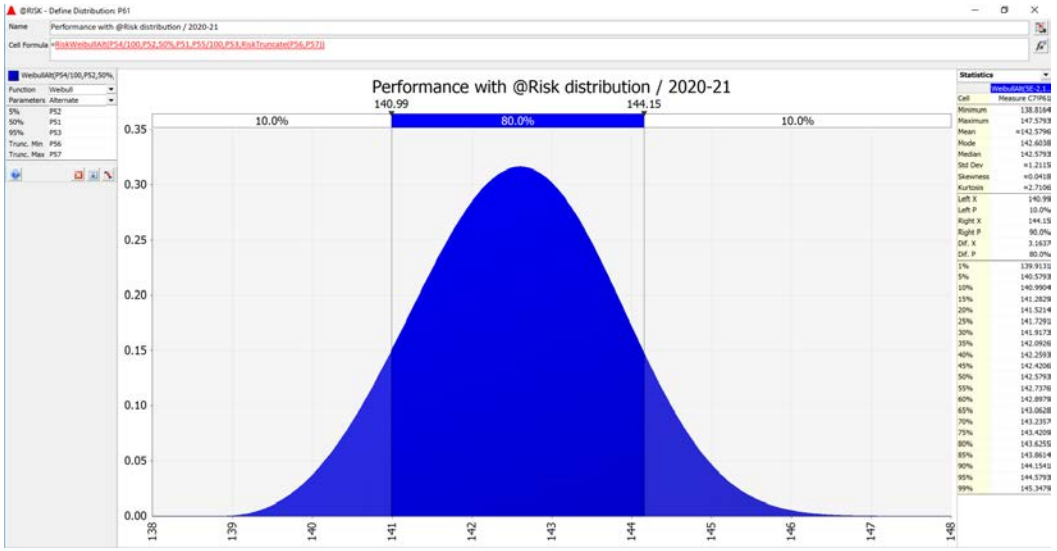
Outcome	Our environment
PC history	PR14 continuation
PC ref.(company)	C6
PC name	Protecting wildlife, plants, habitats and catchments
ODI type	Out & under
PC unit description	Hectares
ODI form	Revenue
ODI timing	In-period
Direction of improving performance	Up
PC unit	nr



Year	2020/21	2021/22	2022/23	2023/24	2024/25
Distribution Parameters (Best estimate)	194.0	320.0	451.0	592.0	690.0
Distribution Lower Value Point	144.0	270.0	401.0	542.0	640.0
Distribution Upper Value Point	244.0	370.0	501.0	642.0	740.0
Distribution lower point (%)	Minimum	Minimum	Minimum	Minimum	Minimum
Distribution upper point (%)	Maximum	Maximum	Maximum	Maximum	Maximum
n/a					
n/a					

B.8 C7 Residential water consumption Cambridge region

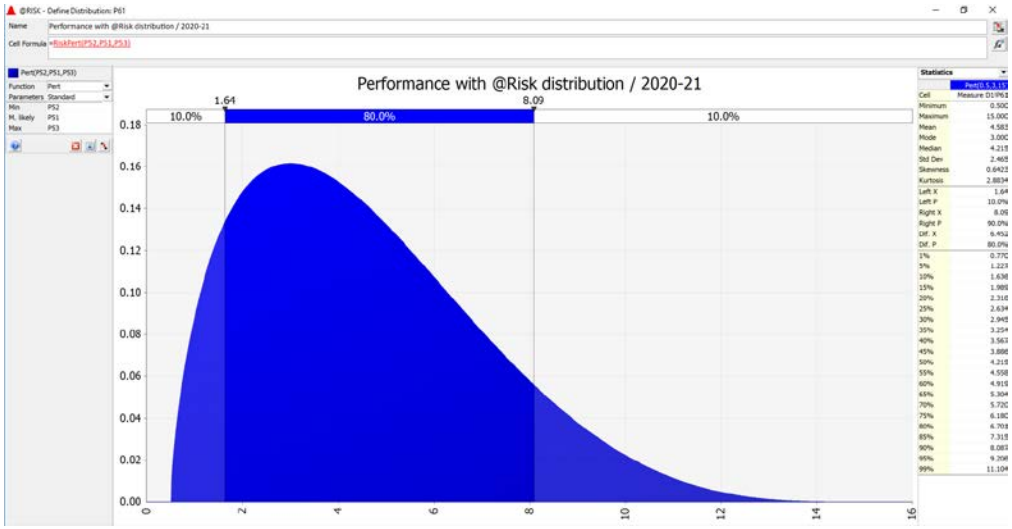
Line/item reference	C7
Outcome	0
PC history	0
PC ref.(company)	C7
PC name	Residential water consumption Cam
ODI type	Out & under
PC unit description	Litres per person per day
ODI form	Revenue
ODI timing	In-period
Direction of improving performance	Down
PC unit	nr



Year	2020/21	2021/22	2022/23	2023/24	2024/25
Distribution Parameters (Best estimate)	142.6	141.4	140.2	138.9	137.7
Distribution Lower Value Point	140.6	139.4	138.2	136.9	135.7
Distribution Upper Value Point	144.6	143.4	142.2	140.9	139.7
Distribution lower point (%)	5.0	5.0	5.0	5.0	5.0
Distribution upper point (%)	95.0	95.0	95.0	95.0	95.0
Truncation Lower	137.6	136.4	135.2	133.9	132.7
Truncation Upper	147.6	146.4	145.2	143.9	142.7

B.9 D1 Compliance risk index

Line/item reference	D1
Outcome	Our service
PC history	PR19 new
PC ref.(company)	D1
PC name	Compliance risk index
ODI type	Under
PC unit description	Score as per DWI CRI calculation
ODI form	Revenue
ODI timing	In-period
Direction of improving performance	Down
PC unit	score

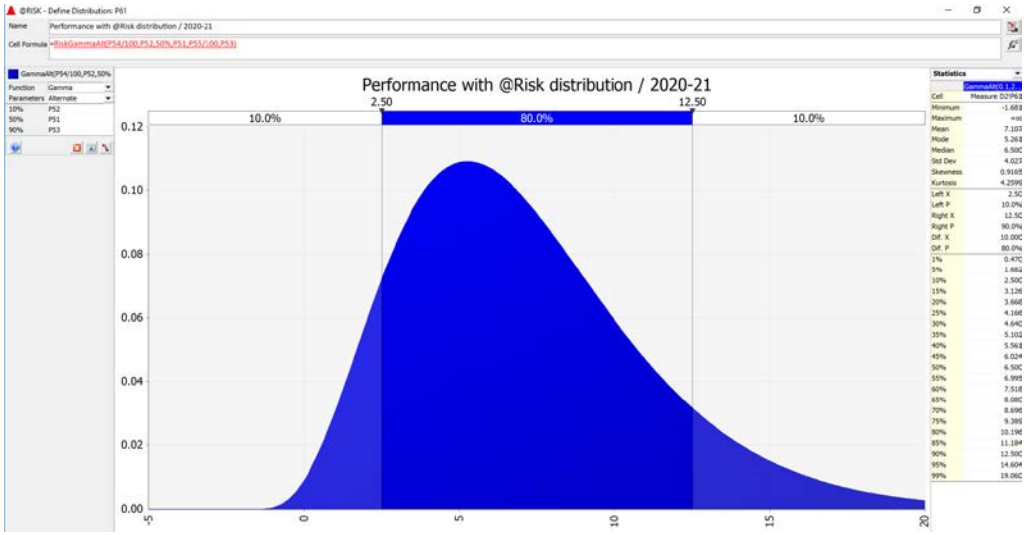


Year	2020/21	2021/22	2022/23	2023/24	2024/25
Distribution Parameters (Best estimate)	3.0	3.0	3.0	3.0	3.0
Distribution Lower Value Point	0.5	0.5	0.5	0.5	0.5
Distribution Upper Value Point	15.0	15.0	15.0	15.0	15.0
Distribution lower point (%)	Minimum	Minimum	Minimum	Minimum	Minimum
Distribution upper point (%)	Maximum	Maximum	Maximum	Maximum	Maximum
n/a					
n/a					

B.10 D2 Supply interruptions

Line/item reference	D2

Outcome	Our service
PC history	PR14 continuation
PC ref.(company)	D2
PC name	Supply interruptions
ODI type	Out & under
PC unit description	Average minutes per connected property
ODI form	Revenue
ODI timing	In-period
Direction of improving performance	Down
PC unit	nr

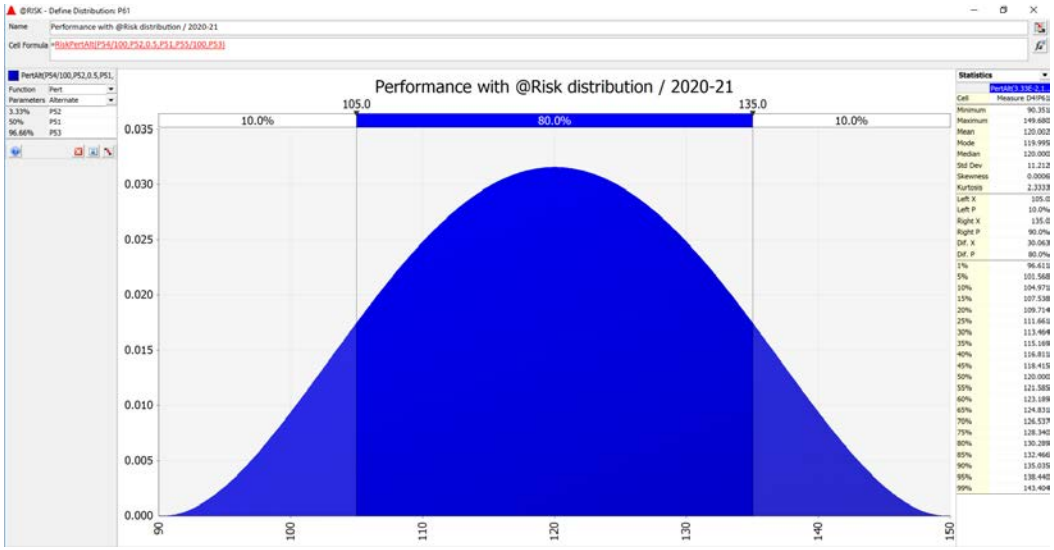


Year	2020/21	2021/22	2022/23	2023/24	2024/25
Distribution Parameters (Best estimate) (P50)	6.5	6.5	6.5	6.5	6.5
Distribution Lower Value Point	2.5	2.4	2.3	2.2	2.1
Distribution Upper Value Point	12.5	12.5	12.5	12.5	12.5
Distribution lower point (%)	10.0	10.0	10.0	10.0	10.0
Distribution upper point (%)	90.0	90.0	90.0	90.0	90.0
n/a					
n/a					

B.11 D4 Mains bursts

Line/item reference	D4

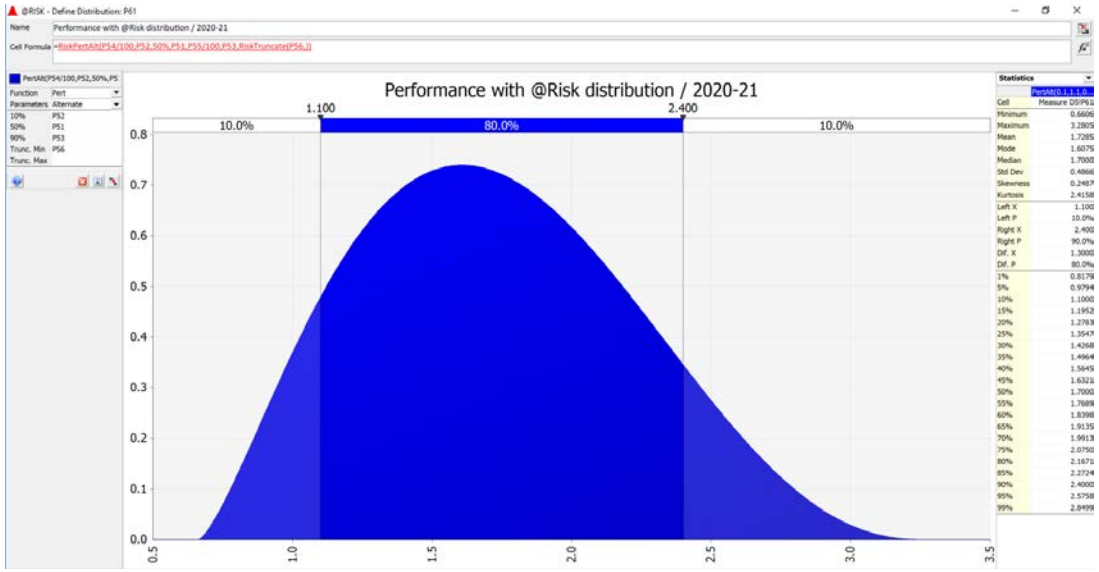
Outcome	Our service
PC history	PR14 revision
PC ref.(company)	D4
PC name	Mains bursts
ODI type	Out & under
PC unit description	Number of bursts
ODI form	Revenue
ODI timing	In-period
Direction of improving performance	Down
PC unit	nr



Year	2020/21	2021/22	2022/23	2023/24	2024/25
Distribution Parameters (Best estimate)	120.0	120.0	120.0	120.0	120.0
Distribution Lower Value Point	100.0	100.0	100.0	100.0	100.0
Distribution Upper Value Point	140.0	140.0	140.0	140.0	140.0
Distribution lower point (%)	3.3	3.3	3.3	3.3	3.3
Distribution upper point (%)	96.7	96.7	96.7	96.7	96.7
n/a					
n/a					

B.12 D5 Unplanned outage

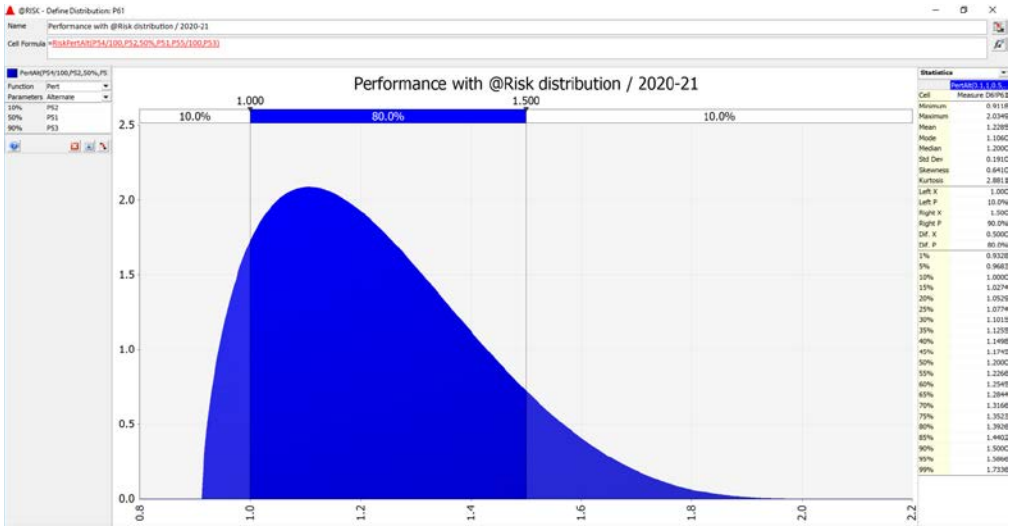
Line/item reference	D5
Outcome	Our service
PC history	PR19 new
PC ref.(company)	D5
PC name	Unplanned outage
ODI type	Out & under
PC unit description	Percentage outage of peak week production capacity
ODI form	Revenue
ODI timing	In-period
Direction of improving performance	Down
PC unit	%



Year	2020/21	2021/22	2022/23	2023/24	2024/25
Distribution Parameters (Best estimate)	1.7	1.7	1.7	1.7	1.7
Distribution Lower Value Point	1.1	1.0	1.0	1.0	1.0
Distribution Upper Value Point	2.4	2.4	2.4	2.4	2.4
Distribution lower point (%)	10.0	10.0	10.0	10.0	10.0
Distribution upper point (%)	90.0	90.0	90.0	90.0	90.0
Truncation Lower	0.0	0.0	0.0	0.0	0.0
n/a					

B.13 D6 Customer contacts about water quality

Line/item reference	D6
Outcome	Our service
PC history	PR14 continuation
PC ref.(company)	D6
PC name	Customer contact about water quality
ODI type	Out & under
PC unit description	Number of contacts per 1,000 population
ODI form	Revenue
ODI timing	In-period
Direction of improving performance	Down
PC unit	nr

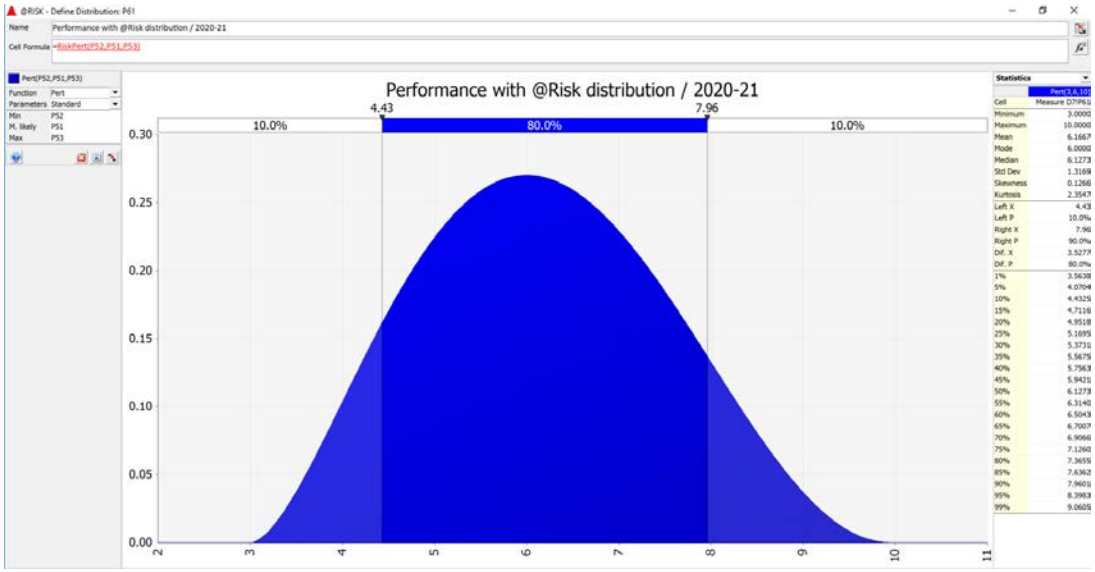


Year	2020/21	2021/22	2022/23	2023/24	2024/25
Distribution Parameters (Best estimate)	1.2	1.2	1.1	1.0	0.8
Distribution Lower Value Point	1.0	1.0	0.9	0.8	0.6
Distribution Upper Value Point	1.5	1.5	1.4	1.3	1.1
Distribution lower point (%)	10.0	10.0	10.0	10.0	10.0
Distribution upper point (%)	90.0	90.0	90.0	90.0	90.0
n/a					
n/a					

B.14 D7 Visible leak repair time

Line/item reference	D7

Outcome	Our service
PC history	PR19 new
PC ref.(company)	D7
PC name	Visible leak repair time
ODI type	Out & under
PC unit description	Average days to repair
ODI form	Revenue
ODI timing	In-period
Direction of improving performance	Down
PC unit	nr

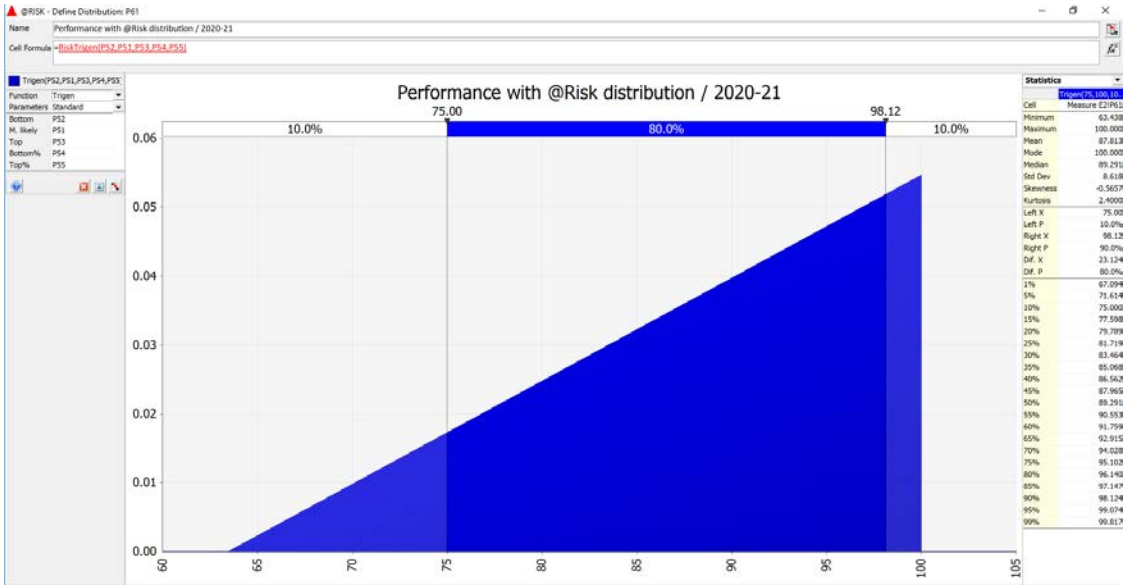


Year	2020/21	2021/22	2022/23	2023/24	2024/25
Distribution Parameters (Best estimate)	6.0	5.0	4.0	4.0	4.0
Distribution Lower Value Point	3.0	2.5	2.0	2.0	2.0
Distribution Upper Value Point	10.0	9.0	8.0	8.0	8.0
Distribution lower point (%)	Minimum	Minimum	Minimum	Minimum	Minimum
Distribution upper point (%)	Maximum	Maximum	Maximum	Maximum	Maximum
n/a					
n/a					

B.15 E2 Residential void properties and gap sites

Line/item reference	E2

Outcome	Our business
PC history	PR19 new
PC ref.(company)	E2
PC name	Residential void properties and gap sites
ODI type	Under
PC unit description	Process execution/timing vs % target for completion
ODI form	Revenue
ODI timing	In-period
Direction of improving performance	Up
PC unit	%



Year	2020/21	2021/22	2022/23	2023/24	2024/25
Distribution Parameters (Best estimate)	100.0	100.0	100.0	100.0	100.0
Distribution Lower Value Point	75.0	80.0	85.0	90.0	95.0
Distribution Upper Value Point	100.0	100.0	100.0	100.0	100.0
Distribution lower point (%)	10.0	10.0	10.0	10.0	10.0
Distribution upper point (%)	100.0	100.0	100.0	100.0	100.0
n/a					
n/a					

Appendix C. Independent P10 and P90 values for ODIs for Adjusted and Scaled scenario

App1	Measure	"P10 underperformance penalties -£m (2017-18 CPIH deflated, financial year average)"						"P90 outperformance payments £m (2017-18 CPIH deflated, financial year average)"					
		2020-21	2021-22	2022-23	2023-24	2024-25	2020-25 (AMP7 max)	2020-21	2021-22	2022-23	2023-24	2024-25	2020-25 (AMP7 max)
B1	Financial support	-0.04	-0.04	-0.04	-0.04	-0.04	-0.04	0.00	0.00	0.00	0.00	0.00	0.00
B2	Extra Care assistance	-0.01	-0.01	-0.02	-0.02	-0.02	-0.02	0.00	0.00	0.00	0.00	0.00	0.00
C1	Leakage South Staffs region	-0.39	-0.45	-0.56	-0.72	-0.92	-0.92	1.18	1.20	1.23	1.26	1.28	1.28
C2	Leakage Cambridge region	-0.32	-0.32	-0.46	-0.59	-0.76	-0.76	0.88	0.88	0.91	0.93	0.94	0.94
C3	Residential water consumption SST	-0.15	-0.15	-0.15	-0.15	-0.15	-0.15	0.10	0.10	0.10	0.10	0.10	0.10
C4	Environmentally sensitive water abstraction	-0.07	-0.07	-0.07	-0.07	-0.07	-0.07	0.06	0.06	0.06	0.06	0.06	0.06
C6	Protecting wildlife, plants, habitats and catchments	-0.10	-0.10	-0.10	-0.10	-0.10	-0.10	0.10	0.10	0.10	0.10	0.10	0.10
D1	Compliance risk index	-0.67	-0.67	-0.67	-0.67	-0.67	-0.67	0.00	0.00	0.00	0.00	0.00	0.00
D2	Supply interruptions	-0.94	-0.97	-0.99	-1.01	-1.04	-1.04	0.79	0.77	0.73	0.70	0.67	0.79
D4	Mains bursts	-0.44	-0.44	-0.44	-0.44	-0.44	-0.44	0.87	0.87	0.87	0.87	0.87	0.87
D5	Unplanned outage	-0.19	-0.19	-0.19	-0.19	-0.19	-0.19	0.65	0.76	0.76	0.76	0.76	0.76
D6	Customer contact about water quality	-0.70	-0.70	-0.70	-0.70	-0.70	-0.70	0.94	0.94	0.94	0.94	0.94	0.94
D7	Visible leak repair time	-0.35	-0.34	-0.33	-0.33	-0.33	-0.35	0.45	0.38	0.31	0.31	0.31	0.45
E2	Residential void properties and gap sites	-0.27	-0.22	-0.16	-0.11	-0.05	-0.27	0.00	0.00	0.00	0.00	0.00	0.00
C7	Residential water consumption CAM	-0.15	-0.15	-0.15	-0.15	-0.15	-0.15	0.10	0.10	0.10	0.10	0.10	0.10