

**Setting price controls for 2015-20
– risk assessment tool
supporting documentation**

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1 Introduction

- 1.1 The [risk assessment tool \(RAT\)](#) has been designed to test the impact of various scenarios on companies' return metrics and customer bill impacts. This tool assists Ofwat in taking a view on the level of risk included in a company's business plan and how this risk is allocated between the company and its customers.
- 1.2 This document describes the principles, logic and functionality adopted in the RAT designed for use during the risk-based review period of the 2014 price review (PR14). The RAT has been designed to replicate, in broad terms, key return metrics and customer bill outputs from the [PR14 financial model](#).
- 1.3 The RAT has been designed to interface with Ofwat's own data management system: 'Fountain', but can also be used on a stand-alone basis.
- 1.4 This supporting documentation is not a policy statement and users are referred to '[Setting price controls for 2015-20 – final methodology and expectations for companies' business plans](#)' (our 'final methodology') and associated documents for further information. Any numbers contained in this document are provided for illustrative purposes.
- 1.5 The RAT is designed to provide a reduced form model of company business plans and enable comprehensive testing of company plans under a range of scenarios **to provide an indication of the magnitude and areas of risk**. To meet this requirement, the RAT includes a number of simplifying assumptions for calculations and a simpler structure compared with the financial model. As a result, the RAT will be, to varying degrees, less precise than the financial model, but will provide evidence on a greater range of possible outcomes rather than one central case. Given this, the model user should exercise judgement when interpreting outputs from the RAT, which are also calculated in the financial model.
- 1.6 To gain meaningful information from the RAT, the user should have a high-level understanding of regulatory pricing, risk and financial management. A sound working knowledge of Microsoft Excel and Ofwat's PR14 methodology has also been assumed.
- 1.7 The purpose of this document is to provide a description of the RAT and the interaction between the inputs, calculations and outputs in the tool as well as to serve as a practical user guide. Following this, the remainder of the document is structured as follows.

- Section 2 provides an overview of the purpose and functionality of the RAT.
- Section 3 sets out instructions on how to use the RAT.
- Section 4 describes the different inputs used in the RAT.
- Section 5 explains the outputs from the RAT and how to interpret them.
- Appendices 1, 2 and 3 provide supplementary detail to the main body of this supporting document.

2 Purpose and functionality of the risk assessment tool

- 2.1 This section provides a high-level overview of the purpose and functionality of the RAT. It is suitable as an introduction to the RAT for potential users and to provide non-users (that is, interested parties that will not operate the RAT) with an understanding of its key features.

Purpose of the risk assessment tool

- 2.2 The RAT is designed to generate information that will assist Ofwat in testing data submitted in company business plans and additional information submitted in response to the [risk and reward guidance we published in January 2014](#) (our 'risk and reward guidance'). In particular, the RAT has been designed to allow the user to analyse company performance under a range of up- and down-side scenarios. To assess the impact of these scenarios, the RAT uses data by companies as well as inputs specified by the user to calculate the following.

- **Return metrics** – return on regulated equity (RoRE), return on regulated capital value (RoRCV)¹, and net margins.
- **Customer bill impacts** – the average year-on-year change for household (HH) and non-household (NHH) customers.

- 2.3 These outputs may be used to assess whether a company has created a business plan with appropriate rewards and penalties in the PR14 period (2015-20) that are consistent with the guidance for acceptable levels of both risk and returns set out in the risk and reward guidance. If a company is pre-qualified for enhanced status, it will have the option to accept the risk and reward package proposed by Ofwat in the guidance document. To do this it will need to resubmit some data to demonstrate that there are sufficient levels of out-/under-performance (that is, a range of returns) in its plan.

¹ In the financial model this indicator is referred to as return on capital employed (RoCE).

Functionality of the risk assessment tool

- 2.4 The RAT uses fixed inputs, which are extracted from company business plans, and flexible inputs, which are specified by the user of the RAT. The RAT calculates a series of outputs that indicate the level of risk and returns that a company may achieve in the PR14 period under a range of scenarios. The RAT also provides information about expected changes in customer bills and the likely magnitude of PR14 period incentive payments in the 2019 price review (PR19) period (2020-25).
- 2.5 Using company business plan data, the RAT calculates a set of base case outputs. The RAT allows the user to overlay a range of different scenario impacts on top of the base case data. These incremental scenario impacts are taken directly from the company business planning data tables (table A20).
- 2.6 The RAT allows a total of 14 scenarios to be tested. Some scenarios were proposed by Ofwat and others are defined by the companies themselves. The detail of each scenario is set out in detail in the PwC paper ‘[Economic assumptions for PR14 risk analysis](#)’ dated July 2013 and published with ‘[Setting price controls for 2015-20 – final methodology and expectations for companies’ business plans](#)’ (our ‘final methodology’). The full set of scenarios is set out in table 1 below.

Table 1 RAT outputs by company level

Ofwat-specified scenarios	Company-specified scenarios
Base case	Company-specific scenario (1 to 6)*
Households scenario	Incentive performance scenario
Industrial demand scenario	Combined scenario
Input cost scenario	
Combined economic scenario	
Rainfall scenario	

* The RAT accommodates up to six company-specific scenarios

- 2.7 Each scenario, except for the base case scenario, has a ‘low’ and a ‘high’ case. The basis for each of the Ofwat-specified scenarios is described in detail in the PwC paper ‘[Economic assumptions for PR14 risk analysis](#)’. As described on page 62 of our risk and reward guidance, the scenarios are designed to represent:

“outcomes with a 10% probability of occurring on either the down or upside. This is equivalent to scenarios in the 10th and 90th percentile of possible outcomes, referred to as the P10 and P90 reference points. This means the outcomes being modelled are not the most extreme possible, but still have a relatively low probability of occurring.”

- 2.8 In general, the ‘high’ case refers to **an increase, relative to the base case, of the key scenario variable(s)**. For example, table 8 in appendix 5 of our final methodology shows that in the upside/high case all economic variables increase. The exception is the unemployment rate, which decreases, that is, there is an improvement, relative to the base case. The ‘high’ case for the rainfall scenario represents an increase in the volume of rainfall.
- 2.9 The ‘low’ case refers to a decrease relative to the base case. Again, the exception is the unemployment rate, which increases relative to the base case. The ‘low’ case for the rainfall scenario represents a decrease in the volume of rainfall.
- 2.10 In addition to the scenarios, the user of the RAT can also choose to switch each of the different incentive mechanisms on and off. This allows the user to view model outputs with and without the impact of incentive payments. The incentive mechanisms included in the RAT are:
- cost performance incentives;
 - outcome delivery incentives (ODIs);
 - service incentive mechanism (SIM);
 - water trading (export) incentives; and
 - water trading (import) incentives.

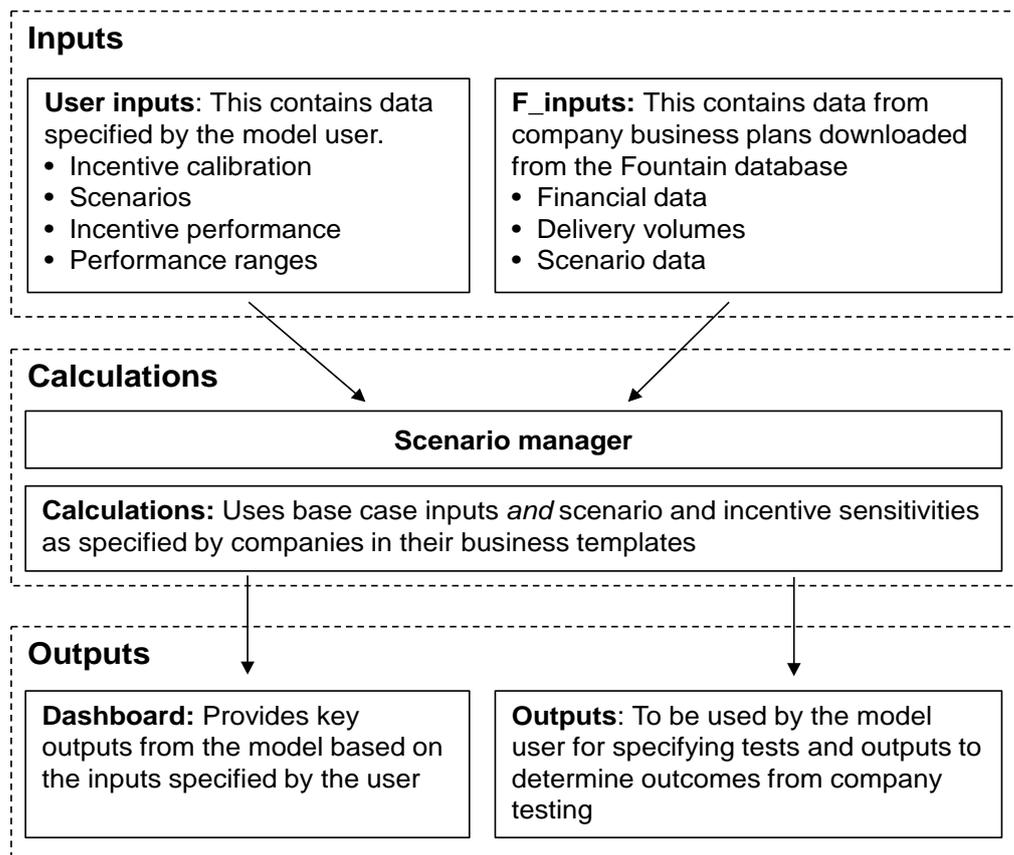
Structure of the risk assessment tool

- 2.11 The calculations in the RAT are structured into three distinct sections, which are set out sequentially in the ‘Calculations’ worksheet. These are:
- the base case;
 - scenario calculations; and
 - incentive calculations.
- 2.12 These calculations result in a set of outputs including return metrics and bill impacts. A series of charts and tables are produced for a ‘live’ scenario

chosen by the user and for the full suite of scenarios, including both Ofwat- and company-specified scenarios.

2.13 Figure 1 below provides a high-level schematic of the model structure and flow, with the physical structure represented in table 2.

Figure 1 Overview of the risk assessment tool



2.14 Table 2 below sets out the physical structure of the RAT and describes the contents/purpose of each worksheet in the tool.

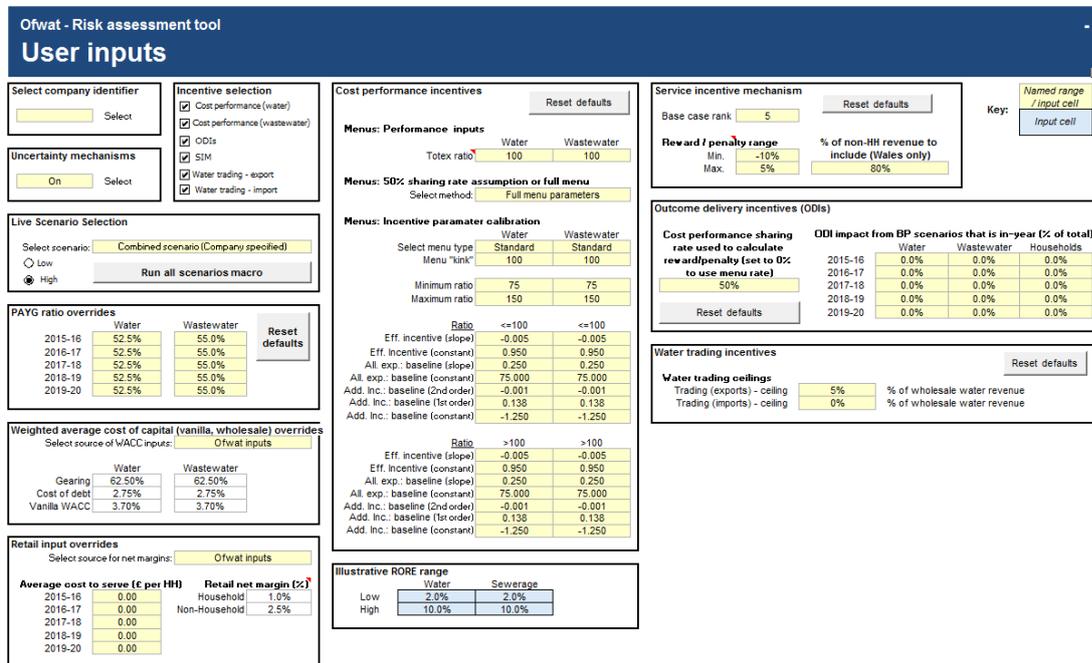
Table 2 Structure of the risk assessment tool

Sheet name	Key contents of worksheet
User inputs	<p>This worksheet contains flexible inputs and settings that allows the user to test different scenarios and calibration options, which are then applied to a company’s financial data. A detailed explanation of the various inputs is set out in section 4 of this document.</p> <p>This worksheet, along with the ‘Dashboard’ worksheet, are the primary parts of the model to which the user should refer.</p>
Dashboard	<p>This worksheet contains key outputs derived from the combination of scenario and incentive inputs that the user specifies on the ‘User inputs’ worksheet. A detailed explanation of these outputs is set out in section 5 of this document.</p>
Calculations	<p>This worksheet contains base case, scenario and incentive calculations.</p>
Scenario manager	<p>This worksheet contains the scenario impacts used in the calculations worksheet. The scenario impacts are linked directly to the F_inputs worksheet.</p>
Lists	<p>This worksheet is a store for the different lists and default settings that are used in the model, primarily on the ‘User inputs’ and ‘Dashboard’ worksheets.</p>
F_Inputs	<p>This worksheet contains inputs from the business plan data tables. The sheet is structured to download this data for each company from Ofwat’s internal ‘Fountain’ database. Companies wishing to populate the ‘F_inputs’ worksheet will need to do so manually.</p>
Outputs	<p>This sheet summarises key output data from the model and is designed to facilitate comparison between the RAT outputs for each company.</p>
END	<p>This sheet is intentionally left blank and signifies the end of the workbook.</p>

3 Running the tool

- 3.1 This section provides a step-by-step guide as to how the user of the RAT should operate the tool. This is largely based on information provided in this document, but sets out in a user-friendly sequential format.
- 3.2 The tool is controlled via the ‘User inputs’ worksheet. Figure 2 below shows a screenshot of this worksheet. The remainder of this section sets out the steps to use the RAT. Excerpts from the ‘User inputs’ worksheet shown above are provided for clarity.

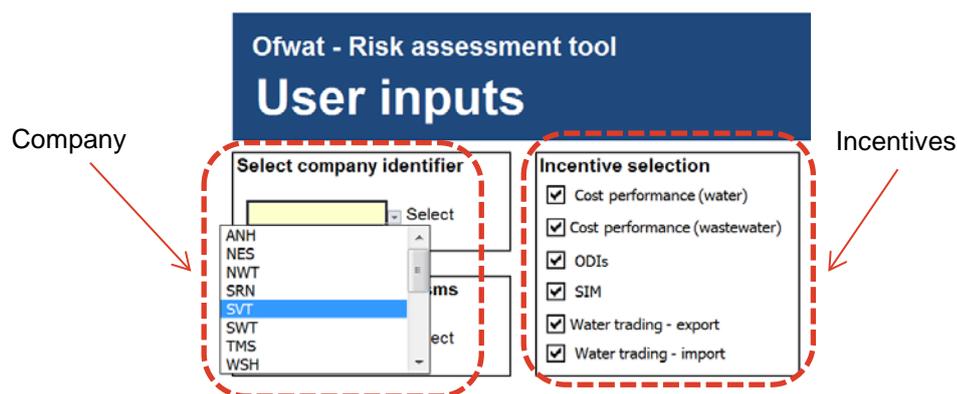
Figure 2 Screenshot of ‘User inputs’ worksheet



Source: Risk assessment tool

Note: The menu parameters in the cost performance incentives section in the screenshot above are illustrative only and are not representative of the actual menu parameters that will be used for the PR14 period. These illustrative parameters have been sourced from the CEPA paper ‘[Incentives and menus](#)’ published on the Ofwat website in August 2012.

- Step 1. Open the tool and change the company identifier drop-down menu on the ‘User inputs’ worksheet to have the relevant company code.



- Step 2. Import data for the company selected on the ‘User inputs’ worksheet into the ‘F_inputs’ worksheet using the Fountain Excel add-in. Companies wishing to populate the ‘F_inputs’ worksheet will need to do so manually.
- Step 3. On the ‘User inputs’ worksheet, click all the buttons that are labelled ‘Reset defaults’. These buttons are applicable for ‘PAYG ratio overrides’, ‘Cost performance incentives’, ‘Service incentive mechanism’, ‘Outcome delivery incentives (ODIs)’, and ‘Water trading incentives’.
- Step 4. After clicking the ‘reset defaults’ button in the PAYG ratio overrides box, the PAYG inputs will be updated to those submitted in the company’s business plan. While the business plan data tables were originally formatted to allow a single PAYG ratio for the whole of the PR14 period, as explained on page 62 of our risk and reward guidance, pre-qualified companies are **“free to vary the PAYG...rates within their business plan”**. This means that companies could potentially use a different PAYG ratio in each year of the PR14 period. The PAYG inputs in the ‘User inputs’ worksheet allow the user to do this.

PAYG ratio overrides			Reset defaults
	Water	Wastewater	
2015-16	57.8%	53.2%	
2016-17	57.8%	53.2%	
2017-18	57.8%	53.2%	
2018-19	57.8%	53.2%	
2019-20	57.8%	53.2%	

- Step 5. In the ‘Weighted average cost of capital overrides’ box select whether to use Ofwat inputs (as set out in the risk and reward guidance) or the

company inputs as submitted in company data tables². Similarly, for the ‘Retail input overrides’ the user can select whether to use Ofwat or company inputs. The user can also input an average cost to serve for calculating retail household allowed revenue (see section 4 for further details).

Weighted average cost of capital (vanilla, wholesale) overrides

Select source of WACC inputs:

	Water	Wastewater
Gearing	62.50%	62.50%
Cost of debt	2.75%	2.75%
Vanilla WACC	3.70%	3.70%

Retail input overrides

Select source for net margins:

Average cost to serve (£ per HH)	Retail net margin (%)
2015-16	0.00
2016-17	0.00
2017-18	0.00
2018-19	0.00
2019-20	0.00

	Household	Non-Household
Retail net margin (%)	1.0%	2.5%

Step 6. Update all other fields on the ‘User inputs’ worksheet as required. Of particular importance are the ‘Outcome delivery incentives (ODIs)’ and the ‘Service incentive mechanism’ inputs.

- a. A company’s forecast SIM performance in the base case is **not** provided in the business planning data tables, but should be provided by companies in their supporting documents (see section 4 for further details).

Outcome delivery incentives (ODIs)

Cost performance sharing rate used to calculate reward/penalty (set to 0% to use menu rate)	ODI impact from BP scenarios that is in-year (% of total)		
	Water	Wastewater	Households
50%	0.0%	0.0%	0.0%
Reset defaults	0.0%	0.0%	0.0%

Service incentive mechanism

Base case rank:

Reward / penalty range	% of non-HH revenue to include (Wales only)
Min. -10%	80%
Max. 5%	

Step 7. To ensure all charts and outputs on the ‘Dashboard’ reflect the selected settings on the ‘User inputs’ worksheet click the button labelled ‘Run all scenarios macro’.

Live Scenario Selection

Select scenario =>

Low High

² The cost of capital here refers to the wholesale vanilla WACC, as opposed to the appointee level vanilla WACC.

- Step 8. Switch to the 'Dashboard' worksheet to view all relevant outputs for the company. The user can change inputs and select different scenarios and incentives on the 'User inputs' worksheet at any time. After changing any inputs the user should always click the 'Run all scenario macro' button to ensure outputs on the 'Dashboard' are updated.
- Step 9. Save the file using the naming convention 'RAT_ [3-letter company code].xism'. For example, the RAT for Anglian Water Services Ltd should be saved as 'RAT_ANH.xism'. The tool must be saved in a macro enabled format in order for it to operate correctly.

4 Description of inputs

- 4.1 The user must input relevant information into the RAT in order to generate calculations and outputs. Some of these inputs are fixed and come from a company's business plan. Other inputs are 'flexible' meaning that the user can change from default values to run different variations of the base case values and generate results.
- 4.2 The fixed inputs are sourced from company business plans and are downloaded to the RAT using the Ofwat database called 'Fountain'. There are two types of flexible inputs in the RAT – the first are those inputs on the 'User inputs' worksheet and the second are the manual adjustment inputs in the 'Calculations' worksheet.
- 4.3 There are also a number of switches and settings that the user can change manually in order to display and/or update certain results, figures and outputs.

Fixed inputs – Fountain

- 4.4 All company-specific data used in the RAT must be downloaded into the 'F_inputs' worksheet using Ofwat's Fountain add-in for Microsoft Excel. A bespoke Fountain report has been created to facilitate the data upload to the RAT. As mentioned above, companies wishing to populate the 'F_inputs' worksheet will need to do so manually.
- 4.5 A screenshot of an unpopulated version of the 'F_inputs' worksheet is shown in figure 3 below. The required input cells are highlighted in yellow and the reference codes refer to the codes used in the PR14 data tables.

Figure 3 Screenshot of ‘F_inputs’ worksheet

Reference	Item description	Unit	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	2015-20	2020-25
Wholesale water data																
BP767N	Total capital expenditure excluding grants and contributions	£m														
BM351TAS	Total operating expenditure (Total - accounting separation)	£m														
W3017	Total cash expenditure	£m														
W10001	Run-off rate - water	%														
W10002	Method used to apply run off rate (straight line or reducing balance)	Text														
W10003	Totex average life	years														
W10004	PAYG% - water	%														
W18009	Gearing	%														
W18021	Gearing	%														
W18004	Cost of debt	%														
W18016	Cost of debt	%														
W18010	WACC - vanilla (pre-tax cost of debt and post-tax cost of equity)	%														
W18022	WACC - vanilla (pre-tax cost of debt and post-tax cost of equity)	%														
Wholesale sewerage data																
BP867N	Total capital expenditure excluding grants and contributions	£m														
BM850TAS	Total operating expenditure excluding third party services -sewerage	£m														
S3021	Total cash expenditure	£m														
S10001	Run-off rate - sewerage	%														
S10002	Method used to apply run off rate (straight line or reducing balance)	Text														
S10003	Totex average life	years														
S10004	PAYG% - sewerage	%														
S18009	Gearing	%														
S18021	Gearing	%														
S18004	Cost of debt	%														
S18016	Cost of debt	%														
S18010	WACC - vanilla (pre-tax cost of debt and post-tax cost of equity)	%														
S18022	WACC - vanilla (pre-tax cost of debt and post-tax cost of equity)	%														
Retail data																
R3001	Total operating expenditure (excluding exceptional items)	£m														
R4001	Total operating expenditure (excluding exceptional items)	£m														
R5004	Proposed household retail net margin	%														
R5011	Proposed non-household retail net margin	%														
W4009	Water delivered (billed total households)	Mt/d														
W4010	Water delivered (billed total non-households)	Mt/d														
W3023	Bulk supply export costs - contract qualifying for bulk supply export incentives	£m														
W3024	Bulk supply import costs - contract qualifying for bulk supply import incentives	£m														
W9006	Bulk supplies - contract qualifying for water trading incentives (to be signed on or after 1 April 2015)	£m														
R3017	Households connected for water only - unmetered	000s														
R3018	Households connected for water only - metered	000s														

Source: Risk assessment tool

4.6 Once the ‘F_inputs’ worksheet has been populated the user should not need to access or edit this worksheet again to operate the RAT.

Flexible inputs – user inputs

4.7 The ‘User inputs’ worksheet is the main worksheet that the user can edit to operate the RAT. The user can choose the scenario and incentives that the RAT models, insert overriding assumptions to use in the calculation sheets, and specify company performance against selected incentive mechanisms.

4.8 A screenshot of the ‘User inputs’ worksheet is shown in figure 2, section 3 of this document. Each of the inputs on the ‘User inputs’ worksheet is described in the sub-sections below.

Select company identifier

4.9 The user should select the relevant reference code to identify the company that the RAT relates to. This identifies the company being analysed throughout the tool and will also change the application of the SIM for companies operating wholly or mainly in Wales. For these companies, a portion of the non-household price control is also subject to the SIM. For the purposes of the RAT we have assumed that the household and non-household parts of a Welsh company receive the same SIM ranking.

Uncertainty mechanisms

- 4.10 The user can select whether or not to apply the uncertainty mechanism impacts submitted by companies to the calculations in the tool. Selecting the 'On' option will apply any uncertainty mechanism impacts, whereas the 'Off' option will mean no uncertainty mechanism impacts are applied.

Incentive selection

- 4.11 Each incentive mechanism can be switched on or off. This allows the model user to isolate the impacts of individual, or combinations of, incentives.

Live scenario selection

- 4.12 **Select scenario:** this menu allows the user to choose which scenario – for example, input cost, rainfall, company specific – to apply to the model. The user can also choose whether to apply the 'low' or 'high' case of the scenario.
- 4.13 **Run all scenarios button:** this button activates a macro which calculates the RoRE range across all scenarios (see appendix 3 for a description of macros used in the RAT). The outputs from this macro are presented on the Dashboard in the charts in boxes 2 and 3. We explain these charts in more detail in section 5.

PAYG ratio overrides

- 4.14 The user can override the PAYG ratios for water and wastewater submitted by companies. This will impact the amount of totex that is added to the RCV and the amount of expenditure that is included in allowed revenue. The default setting for this, which can be restored by using the 'Reset defaults' button, is the PAYG ratio submitted in company business plans. As noted in section 3, these over rides also allow the user to input different PAYG ratios for each year of the PR14 period (**note: when uploading data for a new company the user must click the 'Reset defaults' button to bring in the correct PAYG data from the company business plans**).

Weighted average cost of capital overrides

- 4.15 The user can select whether to use either 'Ofwat inputs', which are the cost of capital inputs set out in the risk and reward guidance, or 'Company inputs' which are the notional inputs submitted in companies' business plans. The figures that are used in the tool calculations are set out below the selection cell for ease of reference.

Retail input overrides

4.16 This allows the user to input two different overrides for retail calculations in the model. This includes:

- **Average cost of serve (£ per HH):** the user can input an average cost to serve (ACTS) in each year in order to calculate household retail expenditure. If a value is entered for the ACTS then the model will calculate household retail expenditure using the minimum of the ACTS value or the household expenditure submitted in companies' business plans.
- **Retail net margin (%):** as with the cost of capital overrides, the user can select whether to use either 'Ofwat inputs', which are the retail net margins set out in the risk and reward guidance, or 'Company inputs', as submitted in company business plans. The figures that are used in the tool calculations are set out below the selection cell for ease of reference³.

Cost performance incentives

4.17 The cost performance incentive inputs are divided into three sub-sections.

- **Menus: Performance inputs:** these menu inputs allow the model user to flex the **totex ratio**, which is used to infer Ofwat's baseline totex estimate for the company. For example, a totex ratio of 80 signifies that the totex submitted in a company's business plan is 80% of the Ofwat baseline.
- **Menus: 50% sharing rate assumption or full menu:** this allows the user to choose between two methods for calculating the cost performance incentive reward/penalty used in the RAT. These are the following.
 - **Full menu parameters:** this method will use the fully specified menu parameters to calculate cost performance incentives (see '**Menus: Incentive parameter calibration**' below for further detail).
 - **Assumed 50% sharing rate:** this method assumes that any cost out- or under-performance is split 50-50 between the company and customers. This is consistent with the assumption suggested in our final methodology.

³ If 'Company inputs' is selected as the source for net margins, the retail net margins displayed on the 'User inputs' worksheet are an average of the company figures for the PR14 period. However, the actual year-specific margins will be used in the 'Calculations' worksheet.

- **Menus: Incentive parameter calibration:** these menu inputs allow the model user to calibrate the cost performance menus if they have chosen to calculate cost performance incentives using the full menu parameters (note: If an assumed 50% sharing rate has been chosen to calculate cost performance incentives, then the information in this section is not used). The inputs to be specified by the user include the following.
 - Whether the menu being applied should be ‘Standard’ or ‘Enhanced’. Each time the user changes between standard or enhanced, the menu parameters will reset to the default parameters stored in the ‘Lists’ worksheet.
 - The location of the menu ‘kink’, that is, the ratio above which a different set of parameters will be applied to a company’s totex data.
 - The minimum and maximum ratios that can be applied to a company’s totex data. These inputs form the borders of the menus.
 - The menu parameters used to calculate the incentive reward/penalty for both water and wastewater menus above and below the menu ‘kink’.

Illustrative RoRE range

- 4.18 These inputs allow the user to input an illustrative RoRE range to benchmark the RAT outputs against. These ranges are displayed graphically on the ‘Dashboard’ worksheet. For the purposes of the RAT we have set the illustrative RoRE range at 2.0% to 10.0%. For detailed guidance on our expectations of a suitable RoRE range, refer to appendix 4 of the January risk and reward guidance.

Service incentive mechanism

- 4.19 The user can choose a number of inputs to reflect different performances against the SIM. These include the following.
- **Base case rank:** This is the average rank that a company achieves. This ranges from 1 to 18, where 1 is the best performance and 18 is the worst. Each company should specify its base case SIM ranking in its business plan⁴.

⁴ See ‘Setting price controls for 2015-20 – final methodology and expectations for companies’ business plans. Appendix 5: Guidance on business plan tables’, which states that companies should “make clear any assumptions regarding payment of rewards or penalties as well as their SIM ranking in their base case business plans”.

- **Reward/penalty range (% of allowed revenue):** this input allows the user to define the maximum reward and penalty associated with SIM. This is expressed as a percentage of retail household (and non-household for Welsh water companies) allowed revenue. For the purpose of this model, the change in reward between ranks is assumed to be linear.
- **Proportion of non-HH revenue to include (Wales only):** as discussed above, this input determines the proportion of non-household revenue from Welsh water companies that should be included in the calculation of the SIM reward/penalty. Given that the outcome of the ongoing SIM consultation has not been finalised this option allows some flexibility in how the non-household SIM for Wales is calculated.

Outcome delivery incentives (ODIs)

4.20 The inputs for ODIs are divided into the three price control areas of water, wastewater and households. There are two inputs for ODIs that the user can change. These are:

- **ODI impact from BP scenarios that is in-year (% of total):** in table A20 of the business planning templates, we asked companies to report the incremental impacts on incentive reward/penalties under each scenario. Apart from the SIM, ODI impacts are all requested on an annual basis within the PR14 period. This input table allows the user to specify what proportion of the in-year payment is actually an in-year payment and what proportion will be paid out at the end of the period, that is, in the PR19 period.
- **Cost performance sharing rate used to calculate reward/penalty:** In order to calculate rewards and penalties for ODIs, companies have been asked to assume a cost performance sharing rate of 50%. In the process of calibrating cost performance menus, this rate may change. Companies may also assume different sharing rates. This input, therefore, allows the user to change the sharing rate used to calculate ODI rewards/penalties in order to be consistent with what companies have assumed. If this is set to zero the sharing rate in the full cost performance menus will be used.

Water trading incentives

4.21 The user is able to input an incentive rate ceiling for water exports and imports, which will limit the value of the reward associated with water trading.

Flexible inputs – manual adjustment inputs

4.22 In the ‘Calculation’ worksheet there are a number of input cells that allow the user to make manual adjustments to certain financial data inputs. These include the following.

- Adjustment to allowed revenues (see figure 4 below). For example, an adjustment could be made to the calculation of household revenue for an allowance related to higher levels of bad debt justified by companies in their business plans, but not captured in ACTS figures.
- Adjustment to tax allowance in allowed revenue.

Figure 4 Manual adjustment example

Orwat - Risk assessment tool										
Calculations - Business template										
Year			2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22
Actual Year			2014	2015	2016	2017	2018	2019	2020	2021
Year (relative to base year)			2	3	4	5	6	7	8	9
Year (within price control)			4	0	1	2	3	4	0	1
Year (relative to start of AMP6)			-1	0	1	2	3	4	5	6
Year (relative to end of AMP6)			-5	-4	-3	-2	-1	0	1	2
R3001	£m 3dp	Households: Expenditure (from business plans)	18,143	17,820	18,186	18,324	18,305			
Calculation	£m 3dp	Households: Expenditure (from ACTS)	0,000	0,000	0,000	0,000	0,000			
Manual input	Nr 2dp	Households: Efficiency factor					1.30			
Calculation	£m 3dp	Households: Expenditure (from business plans)	18,143	17,820	18,186	18,324	18,305			
R5004	% 2dp	Households: Net margin	1.00%	1.00%	1.00%	1.00%	1.00%			
Calculation	£m 3dp	Households: Total invoiced revenue	267,177	273,041	272,656	262,260	259,973			
Calculation	£m 3dp	Households: Allowed margin	2,472	2,730	2,722	2,423	2,500			
Manual input	£m 3dp	Households: Adjustment to allowed revenue	0.00	0.00	0.00	0.00	0.00			
Calculation	£m 3dp	Households: Allowed revenue	20,315	20,550	20,912	20,346	20,905			
R4001	£m 3dp	Non-households: Expenditure	2,623	2,308	2,434	2,745	2,643			
R5011	% 2dp	Non-households: Net margin	2.50%	2.50%	2.50%	2.50%	2.50%			
Calculation	£m 3dp	Non-households: Total invoiced revenue	107,229	109,333	104,081	99,502	97,750			
Calculation	£m 3dp	Non-households: Allowed margin	2,681	2,733	2,602	2,488	2,444			
Manual input	£m 3dp	Non-households: Adjustment to allowed revenue	0.00	0.00	0.00	0.00	0.00			
Calculation	£m 3dp	Non-households: Allowed revenue	5,304	5,042	5,036	5,232	5,087			

Source: Risk assessment tool

5 Description of outputs

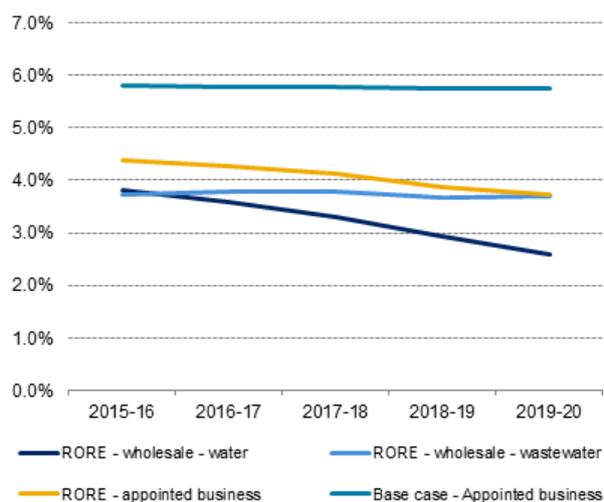
- 5.1 The key outputs from the RAT are set out in the ‘Dashboard’ worksheet in a series of charts and tables. Some of the outputs are dynamic and will change when the user makes changes to the input variables on the ‘User inputs’ worksheet. Other outputs will only update when the ‘Run all scenarios macro’ button is activated on the ‘User inputs’ worksheet.
- 5.2 The remainder of this section explains each of the exhibits presented on the ‘Dashboard’.

RoRE (based on ‘live’ scenario and incentive selection)

5.3 This chart (see figure 5 for an example) shows the RoRE based on the scenario and incentive settings that are inputted on the ‘User inputs’ worksheet. The chart shows RoRE in each year of the PR14 period for:

- wholesale water;
- wholesale wastewater;
- the appointed business; and
- the appointed business in the base case.

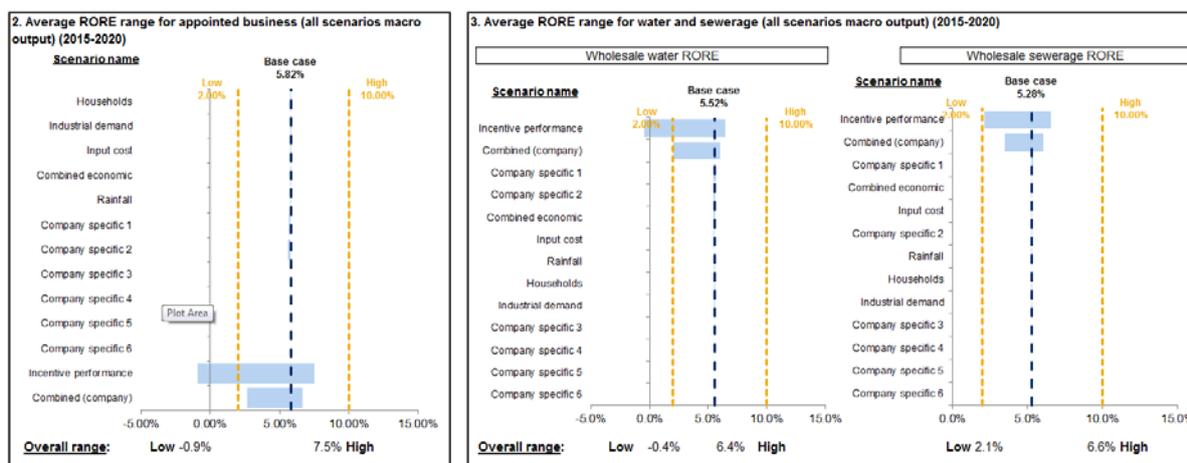
Figure 5 Dashboard RoRE



Average RoRE range (all scenarios macro output) (2015-2020)

5.4 These charts (see figure 6 below for an example) shows the outputs of the scenario simulation macro (see appendix 2), which calculates the average RoRE in the PR14 period for the high and low case of each scenario for the incentive settings that are selected on the ‘User inputs’ worksheet.

Figure 6 Dashboard RoRE ‘tornado’ charts



5.5 Each blue bar in the chart represents the low and high RoRE value in that scenario (that is, the p10 and the p90 values – see pages 61 and 62 of our risk and reward guidance). The dashed orange lines are the illustrative ranges for RoRE, which can be changed by the user on the ‘User inputs’ worksheet.

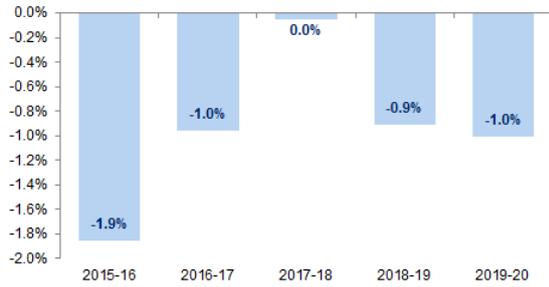
5.6 The separate RoRE charts for water and sewerage automatically rank the scenarios with the largest range of RoRE. In contrast, the order of scenarios for the Appointee-level RoRE chart is fixed.

Notional customer impacts (average change in bills - 2015-2020)

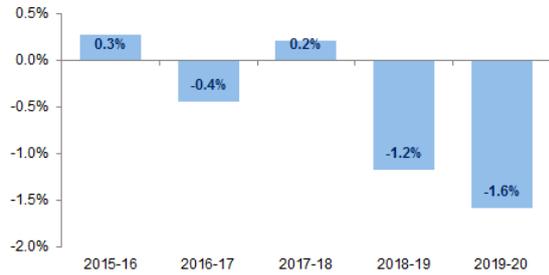
5.7 This chart (see figure 7 for an example) shows the deviation in bills from the base case for households and non-households in each year of the PR14 period. In practice, annual changes in customer bills will be determined at the beginning of this period, therefore the changes here can be viewed as bill impacts that are being ‘stored up’ and will have an NPV-equivalent impact in the PR19 period.

Figure 7 Dashboard customer impacts

Household bills: Deviation from from base case bills due to scenario and incentive impacts



Non-household bills: Deviation from from base case bills due to scenario and incentive impacts



* Scenario bills include incentive & scenario impacts

Household impacts in the PR19 period (2020-2025)

5.8 This table (see figure 8 for an example) shows two sets of data. The top part of the table shows the incentive cash-flows attributable to households in the PR19 period resulting from company performance in the PR14 period. The first two years of PR19 period are shown separately, and the total for this period is shown in aggregate. The second part of the table shows the incremental impacts to revenue and expenditure attributable to households caused by different scenarios and reported in company data tables. These figures exclude the impact of incentive rewards/penalties on revenue.

Figure 8 Dashboard household impacts in the PR19 period (2020-2025)

5. Household impacts in the PR19 period (2020-2025)			
	2020-21	2021-22	PR19 total
Incentive cashflows (£ / hh)			
£/hh ODIs - water	-20.00	-22.00	-120.00
£/hh ODIs - wastewater	-18.00	-18.00	-90.00
£/hh ODIs - households	0.00	0.00	0.00
£/hh Cost performance - water	7.00	7.50	35.00
£/hh Cost performance - wastewater	9.30	9.50	45.00
£/hh Water trading - imports	0.05	0.05	0.15
£/hh SIM	-30.00		-30.00
£/hh Total incentive cashflows	-51.65	-22.95	-159.85
Incremental impacts from scenario templates (ex. incentives)			
	2020-21	2021-22	
Revenues (per household)			
£/hh Wholesale - water	-30.00	-20.00	
£/hh Wholesale - wastewater	-35.00	-10.00	
£/hh Retail - households	-20.00	0.15	
£/hh Total revenue impact	-85.00	-29.85	
Incremental expenditure impact (per household)			
£/hh Wholesale - water (totex)	10.00	9.00	
£/hh Wholesale - wastewater (totex)	17.00	18.00	
£/hh Retail - households	-5.00	-7.00	
£/hh Total expenditure impact	22.00	20.00	

Summary of key metrics (based on ‘live’ scenario and incentive selection)

5.9 This table sets out revenue data and key return metrics based on the scenario and incentive settings that are inputted on the ‘User inputs’ worksheet (see figure 9 below). The average wholesale return metrics (RoRE and RoRCV) are weighted by RCV.

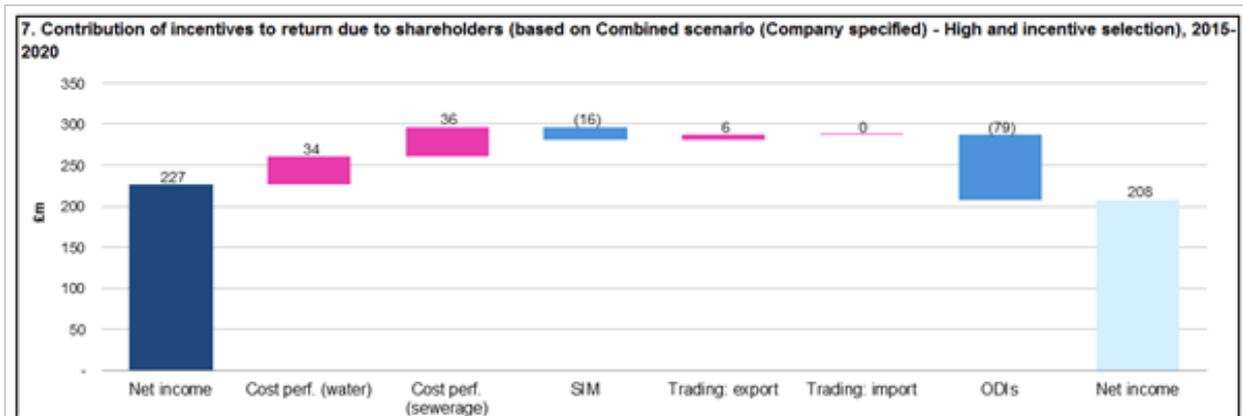
Figure 9 Dashboard summary of key metrics

6. Summary of key metrics (based on Combined scenario (Company specified) - High and incentive selection)						
	2015-16	2016-17	2017-18	2018-19	2019-20	Total
Revenues (ex. incentives)						
£m Wholesale - water	145.0	152.5	156.2	147.1	144.6	745.5
Change in revenue (%)		5.15%	2.44%	-5.81%	-1.69%	
£m Wholesale - wastewater	211.3	217.2	212.2	201.5	200.2	1,042.5
Change in revenue (%)		2.76%	-2.27%	-5.05%	-0.67%	
£m Retail - households	20.8	20.6	21.0	21.0	21.0	104.3
Change in revenue (%)		-1.20%	1.89%	0.22%	-0.08%	
£m Retail - non-households	5.3	5.0	5.0	5.2	5.1	25.7
Change in revenue (%)		-4.95%	-0.11%	3.90%	-2.78%	
£m Incentive revenue	- 37.8 -	- 34.1 -	- 21.4 -	- 16.1 -	- 7.5 -	116.9
£m Total revenue	344.7	361.2	373.0	358.8	363.4	1,801.0
% % change from Base Case	-11.0%	-8.6%	-4.3%	-4.3%	-2.0%	-6.1%
Return metrics (incl. scenario and incentive impact)						
						Average
% RORE - wholesale - water	0.86%	1.55%	2.52%	2.42%	2.76%	2.03%
% RORE - wholesale - wastewater	2.63%	3.18%	3.91%	3.74%	4.06%	3.51%
% Retail margin -households	0.49%	0.08%	-0.24%	-0.60%	-0.73%	-0.20%
% Retail margin - non-households	-1.46%	-1.40%	-1.57%	-1.73%	-1.80%	-1.59%
% RORE - appointed business	1.83%	2.33%	3.07%	2.83%	3.11%	2.64%
% RoRCV - wholesale - water	1.96%	2.18%	2.59%	2.55%	2.68%	2.40%
% RoRCV - wholesale - wastewater	2.63%	2.80%	3.11%	3.05%	3.16%	2.95%
% RoRCV - appointed business	2.33%	2.48%	2.79%	2.70%	2.81%	2.62%

Contribution of incentives to return due to shareholders (based on ‘live’ scenario and incentive selection) (2015-2020)

5.10 This waterfall chart shows the individual contribution of each of the incentive rewards/penalties to the overall net income of the company (see figure 10 below). These figures represent the total incentive payments over the PR14 period. Given that the majority of incentives payments are made in the following price control period, these payments are notional, that is, they represent the incentive rewards/penalties in the year that they are earned.

Figure 10 Dashboard contribution of incentives to return due to shareholders



Appendix 1: Detailed description of calculations

Base case regulatory calculations

The base case calculations draw on information submitted by companies in their business plan data tables. From this information, high-level calculations are performed to determine key inputs and outputs used to set price controls.

The base case section is broken into a number of sub-sections, including the following.

- Depreciation, which is calculated based on two components, the sum of these forms the total depreciation value. The two components of depreciation are as follows.
 - A run-off rate applied to the opening RCV in 2015. This can be applied on a straight-line or a declining balance basis. The method for applying the run-off rate is specified by companies in their business plans.
 - Assets added during the PR14 period ('totex RCV additions'), which are depreciated using an average asset life expressed in years.
- Regulatory capital value (RCV).
 - Closing RCV in each year is calculated as opening RCV + capitalised totex less depreciation.
 - Average RCV is a simple average of the opening and closing RCV in each year.
- Revenue requirement (this includes the calculation of allowed revenue and the calculation of initial k-factors).
 - Allowed revenue for the wholesale controls (water and wastewater) is calculated as the sum of the PAYG component of annual totex, a return on capital (RCV x WACC), depreciation and a tax allowance.

- Allowed revenue for the retail controls is calculated as expenditure plus a margin. The margin is inclusive of tax and financing costs. For the households retail control the user can input an average cost to serve (ACTS) on the ‘User inputs’ worksheet. The allowed revenue for households will be calculated using the lower of the ACTS expenditure and the retail household expenditure submitted by companies’ in their business plans.
- In the base case, initial k-factors are calculated using the calculated allowed revenue and data on the number of households and volume of water delivered. The allowed revenue from the wholesale controls is firstly allocated to households and non-households based on the companies’ own projected revenues. The average household bill is expressed as a pound value per connected household, while the non-household bill is expressed as a pound value per m³ of water delivered.
- Tax calculations are based on regulatory building block components of allowed revenue calculated above and notional financing costs based on a company’s actual capital structure. Tax is calculated at the level of the appointed business and then allocated to the different price control areas based on the profit before tax in each area of the business.
- Profit – a simple notional profit and loss statement is calculated for the purposes of calculating net margins for the different control areas.
- Return on regulated equity (RoRE) – the RoRE and RoRCV are calculated for the water and wastewater controls as well as the appointed business as a whole.

Scenario calculations

The calculation of allowed revenue and RCV in the scenario calculations section is the same as in the base case section described above. Scenario impacts are incorporated into the outturn results of the company in the ‘Scenario profit’ section of the calculations. The section titled ‘Stylised P&L (outturn figures)’ adds the incremental scenario impacts in company data tables to the base case figures. This section also includes incentive rewards/penalties as well as any impacts from uncertainty mechanisms.

The RoRE and RoRCV in the scenario calculations are based on the outturn return figures calculated above.

Incentive calculations

The incentive calculations section calculates the incentive reward/payments on both a cash basis and a notional basis, that is, the value of the reward or penalty as it is accrued. Each incentive reward/penalty is calculated based on inputs determined by the user on the 'User inputs' worksheet and data from company business plans.

Cost performance incentives are calculated using menus. The menu parameters and company performance against the menus are inputted by the user on the 'User inputs' worksheet. This is discussed in greater detail in section 4.

The SIM is calculated based on the rank and range of reward/penalty determined by the User, that is, the SIM reward/penalty in the base case is a user input. The percentage reward or penalty is then applied to households (and a proportion of non-households for Wales) allowed revenue. The incremental impact to the SIM resulting from a scenario is then added to this figure.

Water exports are calculated using data from the business template sheets. On the business planning template sheet, we have calculated the export incentive as 100% of water trading profits. We understand that water exporting costs are added to the RCV and the allowed revenue is reduced by the value of these costs, so that the company does not receive double remuneration for these costs (that is, once through customers and once through the charges to importing companies). For the purposes of modelling the incentives under different scenarios we assume that companies will reflect these changes to allowed revenues/costs through the incremental impacts to revenue and totex which are also requested in each scenario. Because of this, there is no revenue feedback adjustment.

The water import reward is calculated as 5% of import costs. The incremental impact to water import rewards provided by companies in their business plan templates is added to this figure to get the overall import reward.

Outcome delivery incentives (ODIs) are different to the other incentive mechanisms. Because the exact details of ODIs differ from company to company, the RAT calculates the impact of ODI rewards/penalties at the aggregate price control area, that is, water, wastewater and households. The ODI reward/penalty in the base case is assumed to be zero. The scenario impact is then calculated using the incremental impacts provided by companies in the business templates.

Appendix 2: Differences between the risk assessment tool and the financial model

In general, the RAT aims to follow the underlying logic of the calculations used in the main PR14 financial model. However, given the requirement for this tool to be 'lighter' and easier to use than the main financial model, all calculations in the tool will to varying degrees be less precise than those of the main financial model.

We explain the more significant simplifying assumptions used in the RAT below.

- **Real/nominal terms:** the financial model calculates outputs in both real and nominal terms for different purposes. In contrast, the RAT only calculates outputs in real (2012-13 prices) terms.
- **Tax calculations:** the tax calculations in the financial model are complex. The focus of the RAT is not on the impact of tax (which should be small compared to changes in revenue and expenditure). The RAT therefore calculates tax for the appointed business by grossing up the allowed revenue before a tax allowance using the main rate of UK corporate tax. The tax payment is then allocated between the different price control areas.
- **Interest calculations:** the financial model calculates interest payments and income on a much more disaggregated basis than the RAT. In particular, the financial model calculates interest costs of nominal/index-linked interest, fixed/floating interest as well as wholesale and retail debt financing costs. In general, the RAT uses notional company inputs where possible. Following this, interest costs are calculated by applying the notional cost of debt provided in company business plans to the notional value of net debt.
- **K-factors:** the changes in allowed revenue during the price control period are calculated through an iterative 'k-solving' process in the PR14 financial model. These changes in allowed revenue broadly represent the annual changes in customer bills. In the RAT, we represent changes in customer bills by calculating 'initial k-factors', which represent unsmoothed annual changes in average bills for households and non-households. The details of the k-factor calculations are set out in appendix 1.

Appendix 3: Description of macros used in the risk assessment tool

Module: 'RAT_Macros'

Sub DefaultIncentiveInputs[1 – 6]()

These six macros reset different sections of the 'User inputs' worksheet to their 'default' settings. The default settings for each input can be changed in the 'Lists' worksheet of the RAT. The different default incentive macros are for:

1. cost performance menus;
2. ODI inputs;
3. SIM inputs;
4. PAYG inputs; and
5. water trading inputs.

Sub ScenarioSimulation()

This macro calculates the RoRE for each scenario in the 'low' and 'high' case. The macro is activated on the 'User inputs' worksheet by clicking the 'Run all scenarios macro' button. The outputs of this macro are displayed in **Chart 2: Average RORE range (all scenarios macro output) (2015-2020)** and **Chart 3: Average RORE range for water and sewerage (all scenarios macro output) (2015-2020)**, both of which are on the 'Dashboard' worksheet.



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February 2014

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