April 2023

Consultation on return on RCV calculations in the PR24 financial model

Ofwat

About this document

This document sets out our consultation on return on regulatory capital value (RCV) calculations in the financial model for the 2024 price review (PR24).

An external review of the PR24 financial model found a departure in the convention applied by us and other regulators in the calculation that applies the allowed return to the RCV to calculate allowed revenues. The review found that our approach generates a structurally higher allowance than an approach calculated on a net present value neutral basis. We consult on the issues arising from a revision to the calculation, including whether we should change the calculation approach in the PR24 financial model and, if so, which new approach we should adopt.

Executive summary

This consultation relates to the allowed return on RCV calculations within the PR24 financial model. Our current approach in the PR24 financial model is to calculate the return on RCV by multiplying the real wholesale weighted average cost of capital (WACC) by the average RCV balance during the year.

An external review of the financial model identified that this formula is not an algebraically consistent approach to calculating the return on RCV. The challenge made to our current approach is that it is not present value (PV) neutral. The key driver of the PV issue is that return on RCV and run-off payments are received during the year, rather than at the end of the financial year.

Analysis suggests that our current approach results in extra revenue equivalent to circa 11 bps on the return on regulated equity. We therefore believe there is a clear case for changing our current approach.

There are two approaches to dealing with this issue: adjusting the WACC or amending the return on RCV calculation. We propose amending the return on RCV calculation as it is more transparent and addresses the issue in a clearer way. The proposed approach would use the formulae for real returns below:

$$Allowed\ return = WACC \times \frac{\left(RCV_{Closing} \times f + RCV_{Opening} \times (1 - f)\right)}{1 + (f \times WACC)}$$

$$f = \frac{(1 + WACC)^{0.5} - 1}{WACC}$$

Ofgem, the CAA and the Utility Regulator for Northern Ireland (UREGNI) all adjust or have adjusted the closing balance in return on regulated asset calculations to reflect mid-year cashflows. If adopted, our proposed approach will mean that we will also adjust our return on regulated asset calculations to reflect mid-year cashflows. Our proposed approach is more complex than that used by other regulators, but we believe that the precision in PV terms that the formulae deliver justifies the additional calculation complexity.

Responding to this consultation

We would welcome any comments on this document. Please email them to PR24@ofwat.gov.uk or post them to:

Return on RCV Consultation response
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The closing date for this consultation is 16 May 2023. If you wish to discuss any aspect of this consultation, please contact the PR24 team by email at PR24@ofwat.gov.uk.

We intend to publish responses to this consultation on our website at www.ofwat.gov.uk. Subject to the following, by providing a response to this consultation you are deemed to consent to its publication.

If you think that any of the information in your response should not be disclosed (for example, because you consider it to be commercially sensitive), an automatic or generalised confidentiality disclaimer will not, of itself, be regarded as sufficient. You should identify specific information and explain in each case why it should not be disclosed and provide a redacted version of your response, which we will consider when deciding what information to publish. At a minimum, we would expect to publish the name of all organisations that provide a written response, even where there are legitimate reasons why the contents of those written responses remain confidential.

In relation to personal data, you have the right to object to our publication of the personal information that you disclose to us in submitting your response (for example, your name or contact details). If you do not want us to publish specific personal information that would enable you to be identified, our privacy policy explains the basis on which you can object to its processing and provides further information on how we process personal data.

In addition to our ability to disclose information pursuant to the Water Industry Act 1991, information provided in response to this consultation, including personal data, may be published or disclosed in accordance with legislation on access to information – primarily the Freedom of Information Act 2000 (FoIA), the Environmental Information Regulations 2004 (EIR) and applicable data protection laws. Please be aware that, under the FoIA and the EIR, there are statutory Codes of Practice which deal, among other things, with obligations of confidence. If we receive a request for disclosure of information which you have asked us not to disclose, we will take full account of your explanation, but we cannot give an assurance that we can maintain confidentiality in all circumstances.

Contents

1. Approaches to calculating real return on RCV

An external review of the Final Methodology PR24 financial model was carried out by CubeLynx between January and March 2023. We have published the review report[1] alongside our updated PR24 financial model.

The external review has raised an issue with the calculation used to calculate the return on RCV. This has an impact on allowed revenues, and we are therefore consulting with interested parties on whether we should change the calculation approach in the PR24 financial model.

In this chapter we have excluded inflation from the analysis to enable the issues to be presented more clearly. Inflation is considered in chapter 2.

The examples in this document are illustrative and the inputs used should not be taken as an indication of policy on run-off rate levels or the WACC.

1.1 Our current approach

We use a building block approach to calculate wholesale allowed revenues for companies. One of the key components of this approach is a return that is paid on RCV.

Our approach in the current PR24 financial model is to calculate the return on RCV by multiplying the real wholesale WACC by the average RCV balance during the year.

The real return can be represented by the following formula:

$$\left(\frac{Opening\ RCV + Closing\ RCV}{2}\right) \times Wholesale\ WACC$$

An example of this calculation is shown below.

[1] CubeLynx – Ofwat PR24 Final Methodology Model Review Report.pdf

Table 1.1 Illustration of our current approach

Item	Value	Note
WACC	3%	a
Opening RCV	100	b
Run-off	-5	c
Closing RCV	95	d
Average RCV	97.5	e=(b+d)/2
Return on RCV	2.9250	f=a*e

CubeLynx has commented on this formula and state that the formula awards a structurally higher allowance than would be necessary to maintain PV neutrality. The challenge made to our current approach is that it is therefore not PV neutral.

RCV is a commitment made by Ofwat to water companies, on behalf of customers, for future cashflows. For companies to be indifferent about whether to receive funding as RCV or cash, our policy approach assumes that the PV of future cashflows associated with RCV should equal the present value of the RCV. This is an example of PV neutrality.

The example below illustrates that our current approach does not ensure that the sum of the PV of future cashflows equals the present value of the RCV. Companies receive cashflows that have a higher PV than the opening RCV.

Table 1.2 Present value of Ofwat's current approach

	Balance £m real	No of years of discounting	Discount rate	Present value £m real
Opening RCV	100.00	0	1.0000	100.000
Run-off	5.00	0.5	0.9853	4.927
Return on RCV	2.9250	0.5	0.9853	2.882
Closing RCV	95.00	1	0.9709	92.233
PV of Run-off, return on RCV and closing RCV				100.042

Cashflows have been discounted using the following formula:

$$Discount\ rate = \frac{1}{(1 + WACC)^a}$$

Where a = number of years of discounting

The key driver of the PV difference is that return on RCV and run-off payments are received during the year, rather than at the end of the financial year. In the PV calculations it is assumed that the payments are, on average, received on day 182.5. This therefore means that a discount rate of 1/(1+WACC)^0.5 should be used.

1.2 Taking account of the timing of cashflows

There are two potential approaches to considering the timing of cashflows in calculating return on RCV:

- **Adjusting the WACC** - The accounting rate of return (ARR) is a concept that recognises that within a year returns can be reinvested, and therefore in order to earn the WACC by the end of the year, a lower cost of capital (called the ARR) should be applied to the RCV. This approach has been used by some regulators in the past[2].
- **Amending the return on RCV calculation** – The calculation of return on RCV is amended to take into account the timing of cashflows. There are two variants to this approach. The first is a simple approach that approximates the effects of mid-year cashflows. The second is a more complex approach that fully delivers PV neutrality. These are outlined in sections 1.3 and 1.4.

Ofwat proposes amending the return on RCV calculation, rather than the WACC, as this approach is more transparent and more directly addresses the PV issue.

1.3 Discounted closing balance approach for calculating return on RCV

The first method for calculating return on RCV involves discounting the closing RCV balance when calculating the return on RCV. The calculation approach is represented by the formula:

$$\left(\frac{Opening\ RCV}{2} + \frac{Closing\ RCV}{(1 + Wholesale\ WACC)\ \times 2}\right)\ \times Wholesale\ WACC$$

This is shown in the example below.

[2] For example, see CAA, 2013 "Estimating the cost of capital: a technical appendix to the CAA's Final Proposal for economic regulation of Heathrow and Gatwick after April 2014" p.8

Table 1.3 Discounted closing balance approach

Item	Value	Note
WACC	3%	a
Opening RCV	100	b
Run-off	-5	c
Closing RCV	95	d
Average RCV	96.117	e=(b+d/(1+a))/2
Return on RCV	2.8835	f=a*e

This approach is easy to calculate, and as table 1.4 below shows, the calculations come much closer to ensuring PV neutrality.

Table 1.4 PV of discounted closing balance approach

	Balance £m real	No of years of discounting	Discount rate	Present value £m real
Opening RCV	100.00	0	1.0000	100.000
Run-off	5.00	0.5	0.9853	4.927
Return on RCV	2.8835	0.5	0.9853	2.841
Closing RCV	95.00	1	0.9709	92.233
PV of Run-off, return on RCV and closing RCV				100.001

Ofgem, the CAA and UREGNI use or have used this approach in their price review models when calculating returns on regulatory assets. The approach does not ensure exact PV neutrality, and as it works by discounting the closing RCV balance, in situations where the RCV is being fully run-off it delivers the same result as Ofwat's current approach.

The difference in return between Ofwat's current approach and the discounted closing balance approach used by Ofgem, the CAA and UREGNI can be expressed algebraically as a proportion of the WACC. The difference is represented by the following equation:

$$(1+y)\times\frac{WACC^2}{\left(2\times(1+WACC)\right)}$$

WACC = real wholesale WACC

y = annual RCV growth in percentage terms

The difference is a function of both the annual change in RCV and the real wholesale WACC. Our early view of the real wholesale WACC published in our PR24 final methodology was 3.23%. Assuming no RCV growth, then the extra revenue from our current approach is equivalent to circa 5 bps on the cost of capital. Assuming 55% notional gearing, our current approach results in extra revenue equivalent to circa 11 bps on the return on regulated equity. We therefore believe there is a clear case for changing our current approach.

1.4 PV neutral approach for calculating return on RCV

CubeLynx has put forward another approach that does ensure complete PV neutrality with mid-year cashflows. The approach that is consistent with the common convention of mid-year cashflows involves the following formulae:

$$Allowed\ return = WACC \times \frac{\left(RCV_{Closing} \times f + RCV_{Opening} \times (1-f)\right)}{1 + (f \times WACC)}$$

$$f = \frac{(1+WACC)^{0.5} - 1}{WACC}$$

Table 1.5 PV neutral approach

Item	Value	Note
WACC	3%	a
Opening RCV	100	b
Run-off	-5	c
Closing RCV	95	d
Adjustment Factor	0.496	e=(((1+a)^0.5)-1)/a
Return on RCV	2.8826	f=a*((d*e) + (b*(1-e))) / (1+(a*e))

Table 1.6 PV of PV neutral approach

	Balance £m real	No of years of discounting	Discount rate	Present value £m real
Opening RCV	100.00	0	1.0000	100.000
Run-off	5.00	0.5	0.9853	4.927
Return on RCV	2.8826	0.5	0.9853	2.840
Closing RCV	95.00	1	0.9709	92.233
PV of Run-off, return on RCV and closing RCV				100.000

On balance, Ofwat proposes adopting this approach. We believe that the precision in PV terms that the formulae deliver justifies the additional calculation complexity.

The PV neutral calculation ensures exact PV neutrality and the materiality of the impact of this approach is comparable with the materiality calculated using the discounted closing balance method.

2. Nominal returns on RCV

We have considered how the new formulae work when inflation is factored into the calculations. We conclude that no further adjustment is needed to account for inflation.

An appendix to this document provides a demonstration of how the formulae works with inflation and shows that PV neutrality is preserved. In the appendix we have assumed that the same CPIH index is used to index RCV and deflate the nominal WACC. This is a simplifying assumption to illustrate the calculations more clearly. Our policy approach to inflation is unchanged and can be found in section 7.5 and 7.6 of our final methodology for PR24[3].

[3] https://www.ofwat.gov.uk/wp-content/uploads/2022/12/PR24_final_methodology_main_document.pdf

3. Consultation questions

We welcome views on the following consultation questions. Please provide the rationale for your view.

- **Question 1** – Do you agree that the value of RCV should match the PV of return and run-off cashflows generated by that RCV?
- **Question 2** – How should we take account of the timing of cashflows in calculating return on RCV? Should we amend the Wholesale WACC or should we amend the return on RCV calculation?
- **Question 3** – Should we amend the return on RCV calculation to the simple discounted closing balance method or the more complex fully PV approach?

The closing date for this consultation is 16 May 2023.

Appendix 1 – Demonstration of PV neutrality with inflation

	T=-0.5	T=0	T=0.5	T=1	Notes
Example dates	Mid-year 24/25	1 April 25	Mid-year 25/26	31 March 26	
RCV value at T=-0.5 - This is the RCV value at mid-year prices from the previous financial year. It is the value immediately after run-off is deducted and additions added (both of which are assumed to happen mid-year). This is the closing RCV balance calculated by the financial model.	100.000				a
Annual CPIH inflation from FYA T=-0.5 to T=0.5			2.0%		b
RCV value at T=0 (1 April prices). Six months of inflation are applied to move from T=-0.5 to T=0. Note this figure is NOT calculated by the financial model		100.995			c = a * (1+b)^0.5
RCV value at T=0.5 before run-off deducted. This is the opening RCV balance in the financial model. It is expressed in FYA prices (i.e. in T=0.5 prices)			102.000		d = a * (1+b)
Run-off %			5.0%		e
Run off in T=0.5 prices. This is Opening RCV in T=0.5 prices x run-off rate			5.100		f = d * e
Closing RCV in T=0.5 prices. This is the closing RCV as calculated in the financial model. It is the equivalent of the T=-0.5 figure above but one year further forward.			96.900		g = d - f
Closing RCV in T=1 prices. A further six months of inflation are applied to the T=0.5 closing RCV balance. Note that this figure is NOT calculated by the financial model.				97.864	h = a * (1+b)^0.5
Nominal return			5.0%		i
Real return			2.94%		j = (1+i)/(1+b) - 1
f factor used in return on RCV calculation			0.4964		k = ((1+j)^0.5 -1) / j
Return on RCV in T=0.5 prices			2.883		l = j * ((g*k) + d*(1-k)) / (1+k*j)

	Value	No of years of discounting	Discount rate	PV
Opening RCV at T=0	100.995	0	1.000	100.995
Run-off at T=0.5	5.100	0.5	0.976	4.977
Return on RCV at T=0.5	2.883	0.5	0.976	2.814
Closing RCV at T=1	97.864	1	0.952	93.204
Check that PV of Opening RCV equals PV of closing RCV and cashflows				100.995

Note that the discount rate used is the nominal WACC of 5%

Ofwat (The Water Services Regulation Authority) is a non-ministerial government department. We regulate the water sector in England and Wales.

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