



Price Effects for the RIIO-ED2 Price Control Review – Addendum

Prepared for the Energy Networks Association (ENA)

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Executive Summary

NERA Economic Consulting (NERA) was commissioned by the Energy Networks Association (ENA) to review and update our analysis on real price effects (RPEs) for the RIIO-ED2 price control to reflect the most recently available data.

Ofgem intends to set allowances for Distribution Network Operators (DNOs) in constant prices (i.e. in “real terms”) at the beginning of the RIIO-ED2 price control. Ofgem intends to index allowances for DNO costs in each year of the price control to changes in general inflation, measured by the Consumer Price Index including owner occupiers’ housing costs (CPIH). It intends to index allowances for certain input cost categories to a set of benchmark indices (yet to be selected), that are expected to reflect the evolution of DNOs’ costs in those categories more closely than does CPIH.¹ The difference between the benchmark index growth and CPIH growth is known as a Real Price Effect (RPE).

We published a report on RPEs on 8 June 2021, in which we recommended a selection of benchmark indices that Ofgem should use to set RPEs for each input cost category and provided forecasts of RPEs based on that selection of benchmark indices.

In this addendum to the June report, we make two revisions to our recommended selection of benchmark indices and forecast of RPEs:

- We replace one of our recommended benchmark indices, which has been discontinued by the Office for National Statistics (ONS), with an alternative but similar index. The replaced index is “ONS Wood, Sawn and Planed (JU89)” and the replacement is “ONS Wood, Sawn and Planed for Domestic Market (EVUD)”.
- We update the forecasts of RPEs in light of the revised forecast of CPIH in the final version of Ofgem’s Business Plan Data Template (BPDT), issued in October 2021. The nature of Ofgem’s revised forecast leads us to change the method we use to forecast RPEs. In the June report, we forecast the RPE for each benchmark index based on the difference between the average historical growth of the index and Ofgem’s forecast of CPIH. In this addendum, we forecast the RPE for each index directly, based on the average historical RPE of the index. We change the forecasting approach because Ofgem’s revised forecast is for CPIH growth above its historical average across the forecast horizon (2022-2027), suggesting that Ofgem expects the economy to enter a period of high price growth. If the economy enters a period of high price growth, we expect that growth rates of benchmark indices will also exceed their historical averages. Therefore, a forecast based on these historical averages may underestimate the RPE.

We present the updated forecasts of RPEs for each input cost category in Table 1 and Table 2. These are analogous to Table 2 and Table 4 of our June report.² The change of forecasting method means that the forecast RPE is constant over the forecast horizon in this addendum, whereas it varied by year in our June report.

¹ Ofgem’s Business Plan Data Template (BPDT) for RIIO-ED2 allows DNOs to provide RPE assumptions for the following six input cost categories: General Labour, Specialist Labour, Materials (Capex), Materials (Opex), Plant and Equipment (P&E), and Transport.

² NERA (8 June 2021), Price Effects for the RIIO-ED2 Price Control Review [CONFIDENTIAL], p. xiv

The forecasts in Table 2 of this addendum include mean adjustments. We described mean adjustments in our June report. The need for mean adjustments arises because of Ofgem's new approach at RIIO-2 of setting RPEs by annual indexation. If RPEs are set by annual indexation, the selection of benchmark indices must attach more weight to whether indices track short-term, annual movements in DNO unit costs. By attaching more weight to this short-term tracking, the selection process necessarily attaches less weight to whether the long-run average growth of the benchmark index aligns with the long-run average growth of DNO unit costs. Mean adjustments correct for this, by adjusting the RPE by an amount equal to the difference between the historical average growth of the benchmark index and the historical average growth of DNO unit costs.

Table 1: RPEs by Input Cost Category

Category	Constant RPE
Labour (General)	1.10%
Labour (Specialist)	0.87%
Materials (Capex)	1.25%
Materials (Opex)	2.18%
Plant and Equipment	0.66%
Transport	0.66%

Source: NERA analysis

Table 2: Mean-Adjusted RPEs by Input Cost Category

Category	Constant RPE
Labour (General)	2.09%
Labour (Specialist)	1.48%
Materials (Capex)	1.89%

Source: NERA analysis

1. Introduction

NERA Economic Consulting (NERA) was commissioned by the Energy Networks Association (ENA) to review and update our analysis on real price effects (RPEs) for the RIIO-ED2 price control to reflect the most recently available data.

We published an analysis of RPEs on 8 June 2021, in which we recommended a selection of benchmark indices that Ofgem should use to set RPEs for Distribution Network Operators (DNOs) and forecasts of RPEs based on that selection of benchmark indices.

In this addendum to the June report, we make the following revisions to our recommendation and forecast, based on newly available data:

- We replace one of our recommended benchmark indices, which has been discontinued by the Office for National Statistics (ONS), with an alternative but similar index.
- We update the forecasts of RPEs in light of Ofgem's revised forecasts of CPIH, first released in August 2021. As part of this, we update the method we use to forecast RPEs.

This addendum is structured as follows:

- In Chapter 2, we provide further detail on the two methodological changes to the analysis set out above, including the reasons for which these changes are necessary.
- In Chapter 3, we provide updated forecasts of RPEs for each benchmark index, each input cost category, and totex, following the structure of Chapter 5 of our June report.

2. Methodological Changes Relative to Previous Report

In this chapter, we explain the methodological changes we make in this addendum relative to our June report.

2.1. Replacement of Discontinued Materials (Capex) Index

In our June report, we recommended that six benchmark indices be used to set the RPE for the Materials (Capex) input cost category.³

We selected these indices based on a statistical comparison of historical data on the benchmark indices with historical data on relevant DNO unit costs, collected from DNOs. We collected historical data from DNOs on unit costs for three representative Materials (Capex) items: wood poles, cables, and transformers. We then compared annual growth in those DNO unit costs (averaged across DNOs) to annual growth in the benchmark indices, using the Mean Square Deviation (MSD) metric. We recommended benchmark indices that better tracked DNO unit cost growth than did CPIH, based on this MSD metric. The full details of our selection procedure are set out in Chapter 3 of our June report.

Based on our analysis of DNO unit cost data on wood poles, we recommended the benchmark index “ONS Wood, Sawn and Planed (JU89)”.

The benchmark index “ONS Wood, Sawn and Planed (JU89)” has now been discontinued by the ONS. We consulted the ONS to identify whether a replacement index is available, and the ONS suggested the index “ONS Wood, Sawn and Planed for Domestic Market (EVUD)”.⁴

The index “ONS Wood, Sawn and Planed for Domestic Market (EVUD)” is very similar to the index “ONS Wood, Sawn and Planed (JU89)”, as seen in Figure 2.1. Full data on both indices is available for financial years 1997-2020. For the period 1997-2020, the correlation between the indices is 0.96. As can be seen from the Figure, the two indices are less closely correlated from 2010 onwards; over the period 2010-2020, the correlation between them is 0.88.

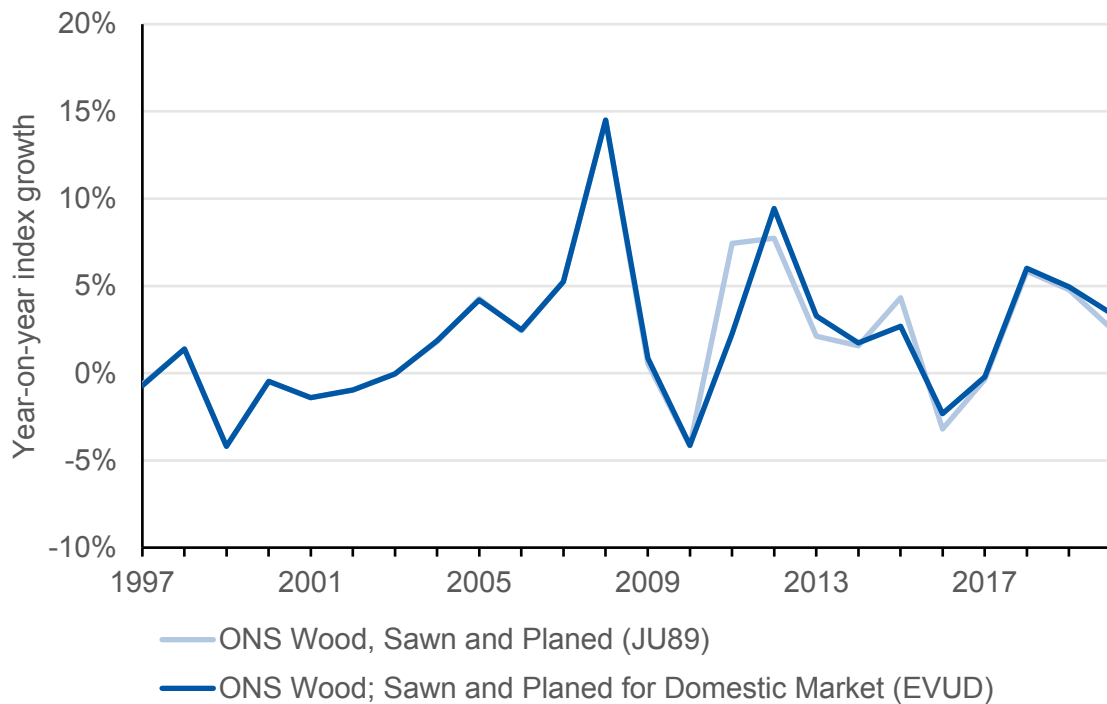
The index “ONS Wood, Sawn and Planed for Domestic Market (EVUD)” performs slightly better than the index “ONS Wood, Sawn and Planed (JU89)” when we consider how well it tracks the historical evolution of DNO unit costs for wood poles. In our previous report, we found that the MSD for “ONS Wood, Sawn and Planed (JU89)” was 6.81 percentage points⁵; the comparable MSD for “ONS Wood, Sawn and Planed for Domestic Market (EVUD)” is 6.79 percentage points.⁶ A lower MSD indicates that the index more closely tracks DNO unit costs, i.e. a lower MSD is a better result.

³ NERA (8 June 2021), Price Effects for the RIIO-ED2 Price Control Review [CONFIDENTIAL], p. 47

⁴ Email communication from ONS Business Prices (24 September 2021).

⁵ NERA (8 June 2021), Price Effects for the RIIO-ED2 Price Control Review [CONFIDENTIAL], p. 36

⁶ We calculate this MSD using the same time horizon of data that we used to calculate the MSD for “ONS Wood, Sawn and Planed (JU89)” in our June report, that is, financial year 2012 through financial year 2021. We exclude the final two months of financial year 2021 which we did not use in our June report.

Figure 2.1: The Two ONS Wood Indices Track Each Other Closely

Source: NERA analysis of ONS data

2.2. Inclusion of Data from Final Two Months of Financial Year 2021

In our previous report, we did not have data from the final two months of financial year 2021 (i.e. February and March 2021) for all benchmark indices. Since we used data from financial years 2012-2021 to select our benchmark indices, it is possible that the index selection in our previous report was affected by the lack of complete data for 2021.

To check whether our previous index selection was affected by missing data from February and March 2021, we repeat our index selection procedure using the full data for financial year 2021. While there are slight changes to the MSD values for some indices, the changes are too small to alter the index selection (see Appendix A). Based on complete data from 2021, we therefore recommend the same selection of benchmark indices as in our June report, except that we replace the discontinued wood index as explained in Section 2.1.

Our final index selection is set out in Table 2.1. This Table is identical to Table 1 and Table 3.5 of our June report, except for the replacement wood index which is highlighted in red in Table 2.1.

Table 2.1: Final Index Selection

Category	DNO unit cost	Index Name	NERA	ED1	Notes
Labour (General)		ONS Private Sector AWE (K54V)	C	C	These indices have a lower MSD than CPIH. However, since they are negatively correlated with DNO unit costs (whereas CPIH is positively correlated), we set a constant RPE rather than using indexation.
		ASHE Median Hourly Earnings for All Employees	C		
Labour (Specialist)		BEAMA Electrical Engineering Labour (BEL)	I	C	All four indices have a lower MSD than CPIH.
		BCIS PAFI civil engineering (4/CE/01)	I	C	
		BCIS Electrical Installations – cost of labour (2/E1)	I		
		BCIS Electrical Engineering Labour (4/CE/EL/01)	I		
Materials (Capex)	Poles	ONS Wood, Sawn and Planed for Domestic Market (EVUD)	I		This index has a lower MSD than CPIH.
	Cables	BCIS PAFI Pipes and Accessories: Aluminium (3/59)	I	C	Of all candidate cables indices that had a lower MSD than CPIH, we select the two with the lowest MSD.
		BCIS PAFI Pipes and Accessories: Copper (3/58)	I	C	
	Transformers	BCIS PAFI Pipes and Accessories: Copper (3/58)	I	C	Of all candidate transformers indices that had a lower MSD than CPIH, we select the two with the lowest MSD.
		BCIS Electrical – materials (3/E2)	I		
		BCIS PAFI Structural Steelwork - Materials: Civil Engineering Work (3/S3)		C	
	Other	BCIS RCI Infrastructure Materials (FOCOS)	I		For these categories, we do not have DNO unit cost data. We therefore select indices that (a) have regulatory precedent and (b) have long-run mean growth that is statistically significantly different from that of CPIH.
Materials (Opex)	BCIS RCI Infrastructure Materials (FOCOS)	I	C		
Plant and Equipment		ONS Machinery and Equipment Output PPI (K389)		C	have long-run mean growth that is statistically significantly different from that of CPIH.
		BCIS PAFI plant and road vehicles (90/2)	I	C	
Transport		BCIS PAFI plant and road vehicles (90/2)	I	C	

* Note: For columns “NERA” and “ED1”, “C” indicates used to set a constant RPE and “I” indicates used for RPE indexation.

Source: NERA analysis

2.3. Change to Forecasting Method

In our June report, we prepared forecasts of RPEs using the forecast of CPIH growth that was available in version 4.2 of Ofgem’s draft Business Plan Data Template (BPDT). That forecast is based on the November 2020 forecast of CPIH prepared by the Office of Budget Responsibility (OBR).⁷

In August, Ofgem updated its forecast of CPIH and has adopted that forecast for the final BPDT for RIIO-ED2.⁸ The new forecast is equal to Her Majesty’s Treasury’s (HMT’s) Consensus forecast from August 2021.⁹ We present the old and new forecasts in Table 2.2.

Table 2.2: Ofgem Updated its Inflation Forecast for the Final RIIO-ED2 BPDT

CPIH Forecast	2022	2023	2024	2025	2026	2027+
Ofgem RIIO-ED2 BPDT version 4.2	1.30%	1.60%	1.78%	1.93%	2.00%	2.00%
Ofgem RIIO-ED2 final BPDT	2.88%	2.66%	2.18%	2.07%	2.00%	2.00%

Source: Ofgem RIIO-ED2 BPDT, version 4.2 and final version

In light of Ofgem’s revised forecast of CPIH, we have changed the method we use to forecast RPEs.

In our June report, we used the forecasting method adopted by CEPA for the RIIO-ET2 price control.¹⁰ That method involves calculating the forecast RPE using separate forecasts of the benchmark index and CPIH. In this addendum to the June report, we instead forecast the RPE directly, using the long-run average RPE.

The two different forecasting approaches have different relative merits. The choice of which method to use depends on both the historical relationship between CPIH and the benchmark indices, and whether the available forecasts for CPIH and the benchmark indices are based on similar underlying assumptions about the broader economy.

In a first-best world, we would forecast RPEs using comparable forecasts of CPIH and the benchmark indices, where both sets of forecasts incorporate the latest available information. Ofgem uses forecasts of CPIH published by HM Treasury in August 2021. Third-party and comparable forecasts of the benchmark indices are not readily available and we therefore rely on long-term averages to forecast these indices.

If CPIH and the benchmark indices were strongly correlated and broadly equally volatile, historical RPEs would be a good guide to the future RPE in each year. As a result, forecasting the evolution of the benchmark indices using a forecast of CPIH plus a constant premium would make the best use of the available information.

⁷ The OBR forecasts are for the year ending June; Ofgem converts these to financial year forecasts in tab “I2 – Monthly Inflation” of BPDT version 4.2. OBR (25 November 2020), Economic and Fiscal Outlook, Table 2.6.

⁸ Ofgem (8 October 2021), RIIO-ED2 Data Templates and Associated Instructions and Guidance. Link: <https://www.ofgem.gov.uk/publications/riio-ed2-data-templates-and-associated-instructions-and-guidance>

⁹ HMT (August 2021), Forecasts for the UK economy: a comparison of independent forecasts, Table M3.

¹⁰ CEPA (27 November 2020), RIIO-GD2 and T2: Cost Assessment – Advice on Frontier Shift policy for Final Determinations prepared for Ofgem, p. 48

In practice, CPIH and the benchmark indices are not (at least universally) strongly correlated and equally volatile. As a result, RPEs are likely to vary from year to year. The lack of a strong correlation would favour using separate forecasts for CPIH and benchmark indices because use of separate forecasts would identify potential year on year variation in RPEs.

On the other hand, Ofgem's updated forecast of CPIH is based on underlying assumptions that are inconsistent with those of our forecast of benchmark indices. In particular, Ofgem's forecast for CPIH suggests that economy wide price growth will be relatively high over RIIO-ED2 compared to historical standards. Our forecast of benchmark indices assumes that economy wide price growth over RIIO-ED2 will be the same as in the historical period. Using forecasts based on different underlying assumptions may result in a systematic downward bias in the forecast RPE.

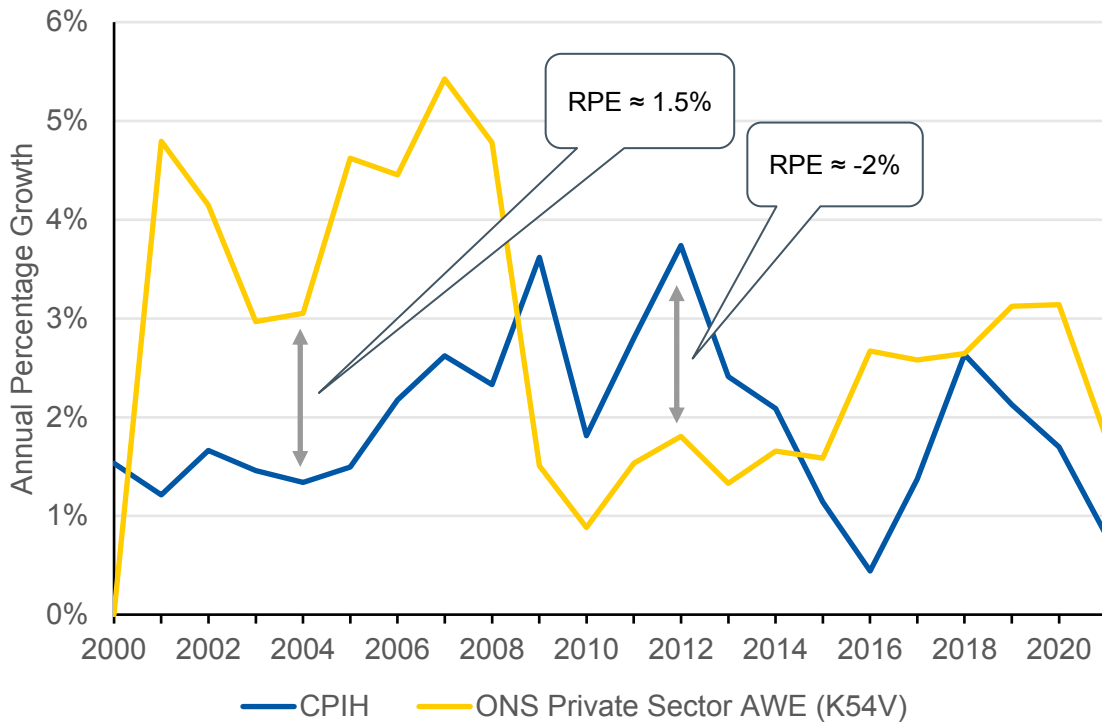
Given Ofgem's plans to index RPEs, the level forecast does not determine the amount that consumers ultimately pay, but merely facilitates the planning of expenditure under the price control. Accordingly, a systematic downward bias in forecast RPEs would cause DNOs to underestimate the growth in allowed revenues each year and subsequently true-up those revenues. Under these circumstances, the benefits of avoiding a systematic downward bias are likely to outweigh the potential benefits of being able to forecast annual variations in RPEs. In this addendum, we therefore forecast constant RPEs based on historical averages. We explain our reasoning in further detail in section 2.3.1 and 2.3.2 below.

2.3.1. The choice of forecasting method depends on the historical relationship between CPIH and the benchmark indices

If CPIH and the benchmark index are not closely correlated, the RPE of the benchmark index is not approximately constant over time. This means that a direct forecast of the RPE based on its long-run historical average is likely to be inaccurate, year-on-year.

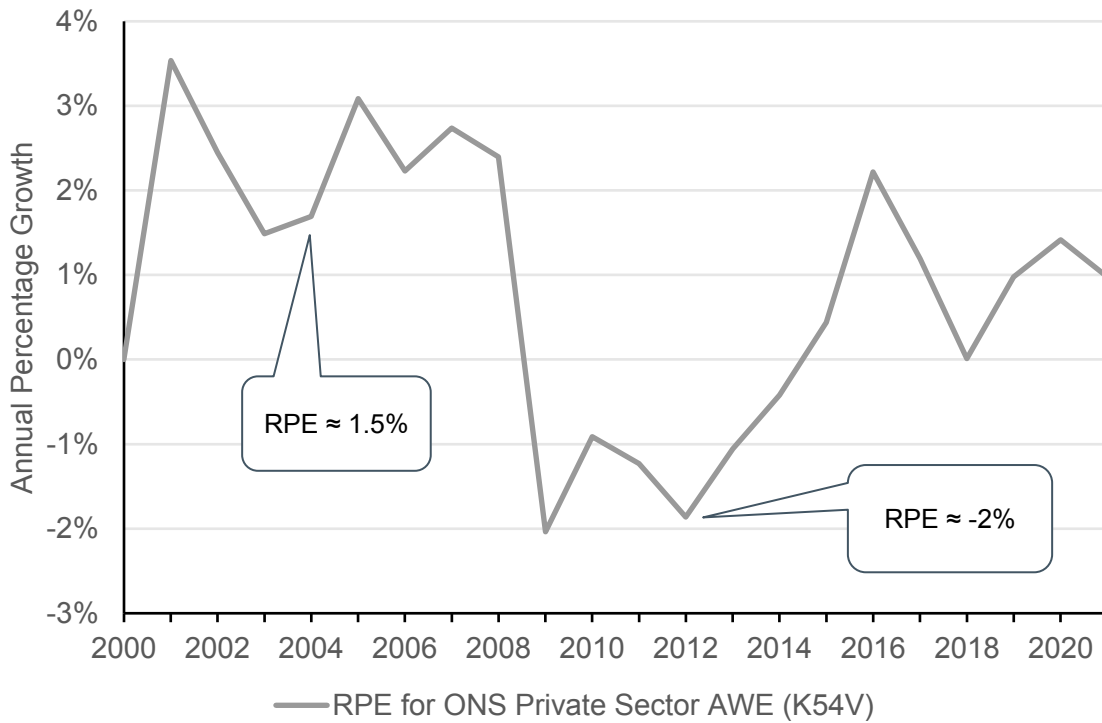
For example, consider the benchmark index "ONS Private Sector AWE (K54V), which we recommend for the Labour (General) input cost category. This index has a negative correlation with CPIH (correlation = -0.14), as can be seen from Figure 2.2. This means that the RPE is not approximately constant at its long-run average of 1.14 per cent; in some years it is above its long-run average (e.g. 2004) and in others it is below its long-run average (e.g. 2012), as shown in Figure 2.3.

Figure 2.2: Some Benchmark Indices are Not Correlated with CPIH



Source: NERA analysis of ONS data

Figure 2.3: The RPE for a Benchmark Index that is Not Correlated with CPIH will Not be Approximately Constant Over Time



Source: NERA analysis of ONS data

Since the RPE is not approximately constant at its long-run average, but rather moves around the long-run average, a forecast RPE that is equal to the long-run average RPE is unlikely to be close to the true outturn RPE in any given year. While such a forecast should be accurate on average over the long term, in any given year it may be either above or below the true outturn RPE.

Instead, we may obtain a more accurate forecast by combining the best available forecast of CPIH with the best available forecast of the benchmark index to calculate a forecast RPE. This is the approach adopted by CEPA in the context of RIIO-ET2. In our June report, we adopted this approach, using Ofgem's forecast of CPIH and forecasting the benchmark index using its long-run average.

2.3.2. The choice of forecasting method depends on whether the available forecasts for CPIH and the benchmark indices are based on similar underlying assumptions

The approach of calculating an RPE by combining the best available forecasts of CPIH and the benchmark index, rather than directly forecasting the RPE, relies on some assumptions about the nature of the forecasts for CPIH and the benchmark indices. In particular, the approach requires that both forecasts be based on similar underlying assumptions about the future development of prices across the economy.

Ofgem's new forecast of CPIH suggests different underlying assumptions about the future development of prices than the underlying assumptions for forecasts of the benchmark indices based on long-run averages.

The forecasts of benchmark indices based on long-run averages assume that price growth in the economy as a whole will revert to its long-run average. Ofgem's previous CPIH forecast also assumed this, with CPIH growth rising gradually from its 2020 level of 0.80 per cent to 2 per cent, i.e. the Bank of England target rate (slightly above the long-run average of CPIH).

Ofgem's new forecast of CPIH instead appears to assume that, from 2022, the economy will enter a period of relatively high price growth. In Ofgem's new forecast, CPIH growth is above its long-run average across the forecast horizon, though it declines to the Bank of England target rate of 2 per cent by 2026.

The discrepancy between the underlying assumptions of Ofgem's new CPIH forecast, and the forecast of the benchmark indices based on long-run averages, means that an RPE calculated from the two separate forecasts may systematically understate the true RPE.

- In reality, if the economy does enter a period of relatively high price growth, the growth rates of benchmark indices are also likely to be above their long-run historical averages.
- In reality, if price growth in the economy as a whole reverts to its long-run average, then CPIH growth will be lower than Ofgem's revised forecast.

In principle, two options are available to address this risk of systematic RPE understatement:

1. ***We can use alternative forecasts of the benchmark indices that are based on similar underlying assumptions to Ofgem's forecasts of CPIH.*** In practice, we were not able to find suitable alternative forecasts of the benchmark indices. Third-party forecasts are not available for many of the Materials indices we recommend. For the Labour indices, there

is precedent for using forecasts of growth in the Average Earnings Index (AEI) produced by the OBR. However, the most recent OBR forecast of AEI growth was produced in March and is not based on similar underlying assumptions to Ofgem's forecasts of CPIH (it assumes wage growth reverts to its long-run average, rather than assuming a period of relatively high growth).¹¹

2. ***We can change our forecasting approach, and directly forecast the RPE rather than relying on separate forecasts of CPIH and the benchmark indices.*** Although directly forecasting the RPE produces forecasts that may not be accurate year-on-year, as explained in Section 2.3.1, the inaccuracy is not systematic. On average over the long term, the forecasts should be accurate. Forecasts that are inaccurate year-on-year, but accurate on average (i.e. direct forecasts of the RPE), are preferable to forecasts that may systematically understate the RPE (i.e. using separate forecasts of CPIH and the benchmark indices).

Therefore, in light of Ofgem's new inflation forecasts and given the lack of similar forecast for the benchmark indices, we change our forecasting approach and directly forecast the RPE. The results of the new forecasting approach are reported in Chapter 3.

¹¹ OBR (3 March 2021), Economic and Fiscal Outlook, p.15. The next Economic and Fiscal Outlook from the OBR will be released on 27 October 2021. Link: <https://obr.uk/economic-and-fiscal-outlook-date-announced/> (accessed 14 October 2021)

3. Updated RPE Forecasts

In this chapter, we update the forecasts of RPEs from our previous report. We use the index selection set out in Table 2.1 and the forecasting method described in Section 2.3.

3.1. Forecasts of RPEs for Each Benchmark Index

We present the forecasts in Tables following the structure set out in the June report. We present the RPE forecasts for each index in Table 3.1 through Table 3.3 below. These tables are analogous to Tables 5.1 through 5.3 in our June report.¹² However, the forecasts are constant for all years rather than varying from year to year, due to the revised forecasting methodology explained in Section 2.3.

The forecasts in Table 3.1 through Table 3.3 include mean adjustments, which we described in our June report.¹³ Mean adjustments account for persistent differences in growth rates between benchmark indices and DNO unit costs. These are necessary at RIIO-2 because Ofgem intends to change its methodology for setting RPE allowances to annual indexation to benchmark indices. Where RPE allowances are set annually, to ensure cost recovery for DNOs it is necessary to select benchmark indices whose annual changes are similar to the annual changes of DNO unit costs (i.e. indices that are *correlated* with DNO unit costs, in growth terms). However, benchmark indices that are correlated with DNO unit costs in growth terms may have long-run average growth that is systematically higher or lower than DNO unit cost growth. RPEs based on such indices risk systematically over- or under-compensating DNOs for their unit cost growth. Mean adjustments correct for this risk. Mean adjustments are explained further in Section 3.6 of our June report.

Although the forecasts presented here include mean adjustments, we also provide forecasts of each index without mean adjustments in Appendix B.

Table 3.1: Mean-Adjusted RPEs for Labour Indices

Category	Index Name	Constant RPE
Labour (General)	ONS Private Sector AWE (K54V)	2.09%
	ASHE	2.09%
Labour (Specialist)	BEAMA Electrical Engineering Labour (BEL)	1.09%
	BCIS PAFI civil engineering (4/CE/01)	1.16%
	BCIS Electrical Installations - cost of labour (2/E1)	2.70%
	BCIS Electrical Engineering Labour (4/CE/EL/01)	0.97%

Source: NERA analysis

¹² NERA (8 June 2021), Price Effects for the RIIO-ED2 Price Control Review [CONFIDENTIAL], p. 55

¹³ NERA (8 June 2021), Price Effects for the RIIO-ED2 Price Control Review [CONFIDENTIAL], p. 48

Table 3.2: Mean-Adjusted RPEs for Materials (Capex) Indices

Category	Sub-Category	Index Name	Constant RPE
Materials (Capex)	Poles	ONS Wood, Sawn and Planed for Domestic Market (EVUD)	0.22%
	Cables	BCIS PAFI Pipes and Accessories: Aluminium (3/59)	0.79%
		BCIS PAFI Pipes and Accessories: Copper (3/58)	1.95%
	Transformers	BCIS PAFI Pipes and Accessories: Copper (3/58)	3.38%
		BCIS electrical - materials (3/E2)	2.81%
Other	BCIS RCI Infrastructure Materials (FOCOS)	2.18%	

Source: NERA analysis

Table 3.3: Mean-Adjusted RPEs for Materials (Opex), P&E, and Transport Indices

Category	Index Name	Constant RPE
Materials (Opex)	BCIS RCI Infrastructure Materials (FOCOS)	2.18%
Plant and Equipment	BCIS PAFI plant and road vehicles (90/2)	0.66%
Transport	BCIS PAFI plant and road vehicles (90/2)	0.66%

Source: NERA analysis

3.2. Forecasts of RPEs for Each Input Cost Category

Each index is associated with one of six input cost categories: General Labour, Specialist Labour, Materials (Capex), Materials (Opex), Plant and Equipment (P&E), and Transport. There is also an Other input cost category, for which we do not set an RPE.

To forecast the RPE for a given input cost category we take an unweighted average of the forecast RPEs for the benchmark indices within that category. Note that within Materials (Capex), “BCIS PAFI Pipes and Accessories: Copper (3/58)” appears twice and so gets double weight.

We use unweighted averages as there is no clear, data-driven alternative to determine the appropriate relative weights on, for instance, the four Specialist Labour indices. Any alternative to equal weighting would therefore be subjective and risk introducing bias.

We report the forecast RPEs for each input cost category with mean adjustments in Table 3.4, and without mean adjustments in Table 3.5. These are analogous to Table 5.4 and Table 5.5, respectively, in our June report.

Table 3.4: Input Cost Category RPEs Using NERA Index Selection Based on Long-run Arithmetic Average Forecasts, with Mean Adjustments

Category	Sub-category	Constant RPE
General Labour		2.09%
Specialist Labour		1.48%
Materials (Opex)		2.18%
Materials (Capex)		1.89%
	Poles	0.22%
	Cables	1.37%
	Transformers	3.10%
	Other	2.18%
Plant and Equipment		0.66%
Transport		0.66%

Source: NERA analysis

Table 3.5: Input Cost Category RPEs Using NERA Index Selection Based on Long-run Arithmetic Average Forecasts, with No Mean Adjustments

Category	Sub-category	Constant RPE
General Labour		1.10%
Specialist Labour		0.87%
Materials (Opex)		2.18%
Materials (Capex)		1.25%
	Poles	0.93%
	Cables	1.44%
	Transformers	0.76%
	Other	2.18%
Plant and Equipment		0.66%
Transport		0.66%

Source: NERA analysis

3.3. Forecasts of Totex RPE

We calculate an RPE for totex by combining the RPEs for each of the input cost categories, using the weights on input cost categories implied by a notional cost structure.

We use the same notional cost structure that we used in our June report. That notional cost structure was constructed as an average of DNO cost structures and so represents the structure of a hypothetical “average” DNO. Further details can be found in Section 5.3.1 and Appendix C.4 of the June report.¹⁴

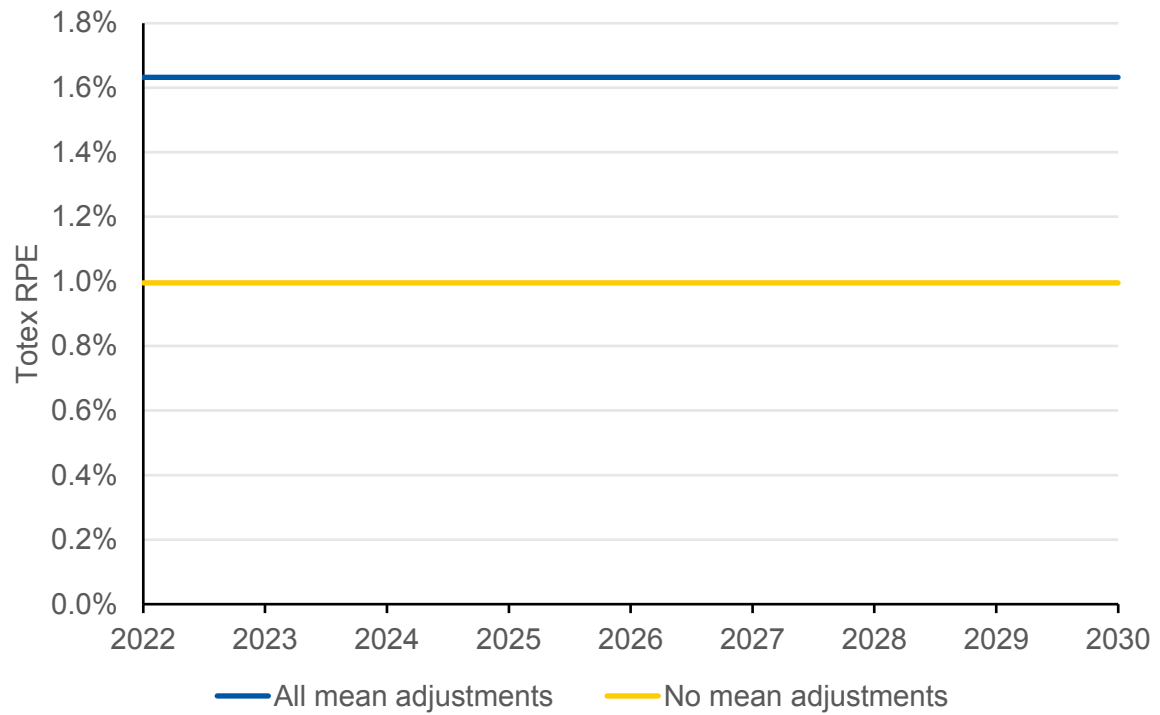
We present our forecast totex RPE, with and without mean adjustments, in Table 3.6 and Figure 3.1. These are analogous to Table 5.7 and Figure 5.1, respectively, in our June report.

¹⁴ NERA (8 June 2021), Price Effects for the RIIO-ED2 Price Control Review [CONFIDENTIAL], p. 57 and p. 80

Table 3.6: Totex RPE Forecasts

	Constant RPE
With mean adjustments	1.63%
Without mean adjustments	1.00%

Source: NERA analysis

Figure 3.1: Totex RPE Forecasts

Source: NERA analysis

Appendix A. Index Selection Tables

Table A.1: Materials Index Selection for Transformers

Input Cost Category	Index Name	Relevance/Volatility					Regulatory Precedent		
		Mean of RPE	Standard deviation of RPE	Correlation with DNO unit transformers cost	MSD relative to DNO unit transformers cost	Nominal relevance	ED1	ET2 (FD)	NERA
Economy inflation	CPIH	n/a	n/a	0.18	7.98%				
DNO average 11kV 500kVA ground transformer unit cost		1.96%	1.96%	5.22%					
Materials (capex): Transformers	BCIS Structural Steelwork Materials (4/CE/ST/02)	1.99%	9.13%	0.59	10.76%	Mid	n	n	n
	BCIS Aluminium Products (4/CE/25)	-1.08%	6.82%	0.83	8.33%	Mid	n	n	n
	BCIS PAFI Pipes and Accessories: Copper (3/58)	0.46%	5.04%	0.64	7.82%	Mid	Y	n	Y
	BCIS electrical - materials (3/E2)	-1.17%	1.89%	0.72	7.51%	Mid	n	n	Y
	BCIS PAFI Structural Steelwork - Materials: Civil Engineering Work (3/S3)	-1.62%	6.74%	0.76	9.80%	Mid	Y	n	n
	BEAMA CPA Large Power Transformer (BLT)	-0.38%	1.13%	0.33	7.93%	High	n	n	n

Notes: all statistical metrics calculated on annual data for financial years 2012-2021. All RPEs calculated with respect to CPIH. We omit indices that have been discontinued by the ONS.

Table A.2: Materials Index Selection for Wood Poles and Cables

Input Cost Category	Index Name	Relevance/Volatility							Regulatory Precedent		
		Mean of RPE	Standard deviation of RPE	Correlation with DNO unit wood poles cost	Correlation with DNO unit cables cost	MSD relative to DNO unit wood poles cost	MSD relative to DNO unit cables cost	Nominal relevance	ED1	ET2 (FD)	NERA
Economy inflation	CPIH	n/a	n/a	0.52	0.74	7.97%	10.15%				
DNO average 12m stout poles unit cost		0.66%	5.06%								
Materials (capex): Wood poles	ONS Wood, Sawn and Planed for Domestic Market (EVUD)	1.37%	2.44%	0.48	0.74	6.99%	8.96%	High	n	n	Y
	BCIS Timber (4/CE/21)	0.32%	6.34%	0.31	0.41	13.01%	10.82%	Mid	n	n	n
	BCIS Timber (90/12)	0.04%	5.60%	0.21	0.36	12.27%	10.00%	Mid	n	n	n
DNO average 11kV 185mm cable unit cost		0.54%	6.26%								
Materials (capex): Cables	BCIS PAFI Pipes and Accessories: Aluminium (3/59)	0.76%	3.71%	0.53	0.93	7.20%	5.42%	Mid	Y	n	Y
	BCIS PAFI Pipes and Accessories: Copper (3/58)	0.46%	5.04%	0.12	0.88	11.93%	3.53%	Mid	Y	n	Y
	BCIS Electrical Installations - cost of materials (2/E2)	-1.17%	1.91%	0.08	0.72	9.21%	8.05%	Mid	n	n	n
	BCIS Plastic Products (including pipes) (4/CE/24)	0.21%	2.25%	0.35	0.82	8.46%	7.36%	Mid	n	n	n
	BCIS electrical cables (4/CE/EL/03)	-2.05%	3.84%	0.17	0.56	11.39%	9.48%	High	n	n	n
	BEAMA CPA Basic Electrical Equipment (BEE)	-0.38%	5.33%	0.35	0.81	11.04%	6.88%	Mid	n	n	n

Notes: all statistical metrics calculated on annual data for financial years 2012-2021. All RPEs calculated with respect to CPIH. We omit indices that have been discontinued by the ONS.

Table A.3: Labour Index Selection

Input Cost Category	Index Name	Relevance/Volatility							Regulatory Precedent		NERA
		Mean of RPE	Standard deviation of RPE	Correlation with DNO general labour cost	Correlation with DNO specialist labour cost	MSD relative to DNO general labour cost	MSD relative to DNO specialist labour cost	Nominal relevance	ED1	ET2 (FD)	
Economy inflation	CPIH	n/a	n/a	0.43	-0.05	2.70%	2.47%				
DNO average general labour unit cost		1.35%	1.34%	0.76%							
Labour (general)	ASHE Median Hourly Earnings for All Employees	0.33%	1.73%	-0.13	0.18	2.45%	2.43%	High	n	n	Y
	ONS Private Sector AWE (K54V)	0.39%	1.23%	-0.43	-0.13	2.12%	2.28%	High	Y	Y	Y
	AWE: Construction index (K553)	0.06%	2.37%	-0.33	-0.27	4.58%	4.82%	Mid	n	Y	n
DNO average specialist labour unit cost		1.09%	1.08%	1.18%							
Labour (specialist)	BCIS PAFI civil engineering (4/CE/01)	0.55%	1.34%	-0.19	0.12	2.35%	2.41%	Mid	n	Y	Y
	BCIS Electrical Engineering Labour (4/CE/EL/01)	0.47%	1.63%	-0.25	0.30	2.22%	2.39%	High	n	n	Y
	BCIS PAFI Labour and Supervision in Civil Engineering (70/1)	0.60%	1.51%	-0.32	-0.06	2.67%	2.73%	Mid	Y	n	n
	BEAMA Electrical Engineering Labour (BEL)	0.40%	1.28%	-0.34	-0.36	2.17%	2.30%	High	Y	Y	Y
	BCIS Electrical Installations - cost of labour (2/E1)	0.45%	1.62%	-0.29	-0.14	2.24%	2.42%	Mid	n	Y	Y

Notes: all statistical metrics calculated on annual data for financial years 2012-2021. All RPEs calculated with respect to CPIH. We omit indices that have been discontinued by the ONS.

Appendix B. Additional RPE Forecasts

B.1. Benchmark Index RPE Forecasts without Mean Adjustments

Table B.1 through Table B.3 set out the forecasts for our selected benchmark indices without mean adjustments. These Tables are analogous to Tables B.1 through B.3 in our June report. The forecasts with mean adjustments are presented in Section 3.1, along with an explanation of the need for mean adjustments in the context of RPEs set by annual indexation to benchmark indices.

Table B.1: RPEs for Labour Indices without Mean Adjustments

Category	Index Name	Constant RPE
Labour (General)	ONS Private Sector AWE (K54V)	1.14%
	ASHE	1.07%
Labour (Specialist)	BEAMA Electrical Engineering Labour (BEL)	0.42%
	BCIS PAFI civil engineering (4/CE/01)	0.63%
	BCIS Electrical Installations - cost of labour (2/E1)	2.07%
	BCIS Electrical Engineering Labour (4/CE/EL/01)	0.37%

Source: NERA analysis

Table B.2: RPEs for Materials (Capex) Indices without Mean Adjustments

Category	Sub-Category	Index Name	Constant RPE
Materials (Capex)	Poles	ONS Wood, Sawn and Planed for Domestic Market (EVUD)	0.93%
	Cables	BCIS PAFI Pipes and Accessories: Aluminium (3/59)	1.00%
		BCIS PAFI Pipes and Accessories: Copper (3/58)	1.87%
Transformers		BCIS PAFI Pipes and Accessories: Copper (3/58)	1.87%
		BCIS electrical - materials (3/E2)	-0.34%
Other		BCIS RCI Infrastructure Materials (FOCOS)	2.18%

Source: NERA analysis

Table B.3: RPEs for Materials (Opex), P&E, and Transport Indices without Mean Adjustments

Category	Index Name	Constant RPE
Materials (Opex)	BCIS RCI Infrastructure Materials (FOCOS)	2.18%
Plant and Equipment	BCIS PAFI plant and road vehicles (90/2)	0.66%
Transport	BCIS PAFI plant and road vehicles (90/2)	0.66%

Source: NERA analysis

B.2. Totex RPE Forecasts with Mean Adjustments for a Subset of Input Cost Categories

In Section 3.3, we presented forecasts for the totex RPE with and without mean adjustments. In principle, it would be possible to apply mean adjustments to only a subset of input cost categories. Table B.4 and Figure B.1 show the impact on the totex RPE of applying a mean adjustment for each input cost category. These are analogous to Table B.4 and Figure B.1 in our June report.

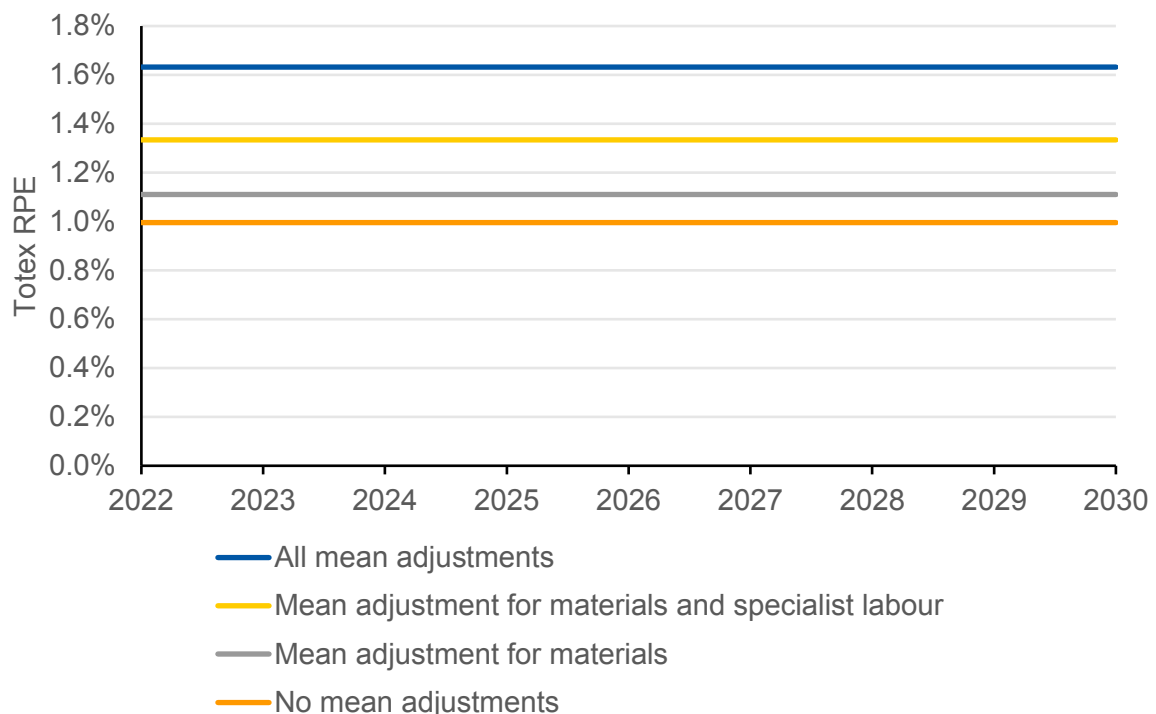
The bottom row of the table and the lowest line in the figure show the totex RPE where no mean adjustments are applied. Working from the bottom up, we introduce mean adjustments sequentially, starting with the Materials (Capex) input cost category, followed by the Specialist Labour cost category, and finally the General Labour cost category.

Table B.4: Totex RPE with Mean Adjustments for Some Input Cost Categories

	Constant RPE
All mean adjustments	1.63%
Mean adjustments for Materials (Capex) and Specialist Labour	1.33%
Mean adjustments for Materials (Capex)	1.11%
Without mean adjustments	1.00%

Source: NERA analysis

Figure B.1: Totex RPE with Mean Adjustments for Some Input Cost Categories



Source: NERA analysis

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