RP7 - NIE Networks Price Control 2025-2031

Draft Determination Annex C

Frontier Shift

November 2023

About the Utility Regulator

The Utility Regulator is the economic regulator for electricity, gas and water in Northern Ireland. We are the only multi-sectoral economic regulator in the UK covering both energy and water.

We are an independent non-ministerial government department and our main duty is to promote and protect the short- and long-term interests of consumers.

Our role is to make sure that the energy and water utility industries in Northern Ireland are regulated, and developed within ministerial policy, as set out in our statutory duties.

We are governed by a Board of Directors and are accountable to the Northern Ireland Assembly.

We are based at Queens House in Belfast. The Chief Executive and two Executive Directors lead teams in each of the main functional areas in the organisation: CEO Office; Price Controls, Networks and Energy Futures; and Markets and Consumer Protection.

Our mission

To protect the short- and long-term interests of consumers of electricity, gas and water.

Our vision

To ensure value and sustainability in energy and water.

Our values

- Be a best practice regulator: transparent, consistent, proportionate, accountable and targeted.
- Be professional – listening, explaining and acting with integrity.
- Be a collaborative, co-operative and learning team.
- Be motivated and empowered to make a difference.

Abstract

We determine frontier shift, or the addition to or subtraction from the amounts determined, for the NIE Networks operational and capital expenditure (opex and capex). Our calculations are based on the projected rate of electricity industry input costs compared to our assumptions for CPIH and productivity growth.

Audience

This document is likely to be of interest to the licence holder affected, consumers and consumer groups, other regulated companies in the energy industry, government and other statutory bodies.

Consumer impact

The overall impact of our determined frontier shift across RP7, including the three prior years from base year, helps reduce NIE Networks operational expenditure (opex) compared to what would otherwise have been the case absent of frontier shift. This is due in large part to our assumed 1% per annum productivity challenge.

For capital expenditure (capex) the analysis adds costs compared to what would otherwise have been the case. This is largely due to the impact of material costs which makes up a greater proportion of spend and are forecast to rise at a faster rate than general inflation.

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Executive Summary

The purpose of this report is to determine the addition to or subtraction from the amounts determined for NIE Networks operational and capital expenditure (opex and capex) to account for frontier shift (FS).

This calculation is based on the projected rate of electricity industry input costs compared to general inflation movements, as measured by CPIH (Consumer Prices Index, including owner occupiers housing costs), and the projected rate of productivity growth. The sum of these components can be a positive or a negative difference.

Frontier shift in real terms = input price increase *minus*

forecast CPIH (measured inflation) *minus*

productivity increase

(NB: Taken together, nominal input costs compared to general inflation are referred to as 'real price effects' or RPEs).

Within this report, we have adopted a methodology similar to that which we first introduced at PC13 for NI Water. This aligns closely with the Competition Commission (CC) determination for Northern Ireland Electricity at RP5 and more recent Competition and Markets Authority (CMA) decisions.

The forecast for each of the components and the resulting frontier shift to be applied to RP7 opex and capex targets are given in Table 1 and Table 2 below.

Figures in % (excl. cost base impact)	RP6			RP7					
	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31
Weighted nominal input prices	6.83	4.42	1.56	1.46	2.04	2.51	2.54	2.54	2.54
CPIH Forecast	9.61	2.88	0.54	-0.08	1.06	1.83	2.00	2.00	2.00
RPE (annual)	**-2.54**	**1.50**	**1.01**	**1.54**	**0.97**	**0.67**	**0.53**	**0.53**	**0.53**
Productivity	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FS (annual)	-3.51	0.48	0.00	0.52	-0.04	-0.34	-0.48	-0.48	-0.48
Cumulative FS	-3.51	-3.05	-3.05	-2.54	-2.58	-2.91	-3.37	-3.83	-4.29
Effect on cost base	**0.96**	**0.97**	**0.97**	**0.97**	**0.97**	**0.97**	**0.97**	**0.96**	**0.96**

Table 1: RP7 opex frontier shift calculations

Figures in % (excl. cost base impact)	RP6			RP7					
	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31
Weighted nominal input prices	9.23	6.42	3.34	2.16	2.56	2.89	2.91	2.91	2.91
CPIH Forecast	9.61	2.88	0.54	-0.08	1.06	1.83	2.00	2.00	2.00
RPE (annual)	**-0.35**	**3.44**	**2.78**	**2.24**	**1.49**	**1.04**	**0.89**	**0.89**	**0.89**
Productivity	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FS (annual)	**-1.35**	**2.40**	**1.75**	**1.22**	**0.47**	**0.03**	**-0.12**	**-0.12**	**-0.12**
Cumulative FS	-1.35	1.03	2.79	4.04	4.53	4.57	4.45	4.33	4.21
Effect on cost base	**0.99**	**1.01**	**1.03**	**1.04**	**1.05**	**1.05**	**1.04**	**1.04**	**1.04**

Table 2: RP7 capex frontier shift calculations

Further detail on the make-up of the frontier shift analysis is contained in the following report sections. It is important to note that numbers for the final determination will automatically be subject to change based on updated forecasts. The numbers can adjust either up or down. The key purpose for this consultation is to seek feedback on the methodological principles that have been applied.

1. Introduction

1.1 This annex gives detail of our analysis and considerations around frontier shift assumptions for RP7.

1.2 Taken together, RPEs and productivity (or ongoing efficiency) when adjusted for general inflation gives the frontier shift. This can be represented as:

Frontier shift in real terms = input price increase *minus*

forecast CPIH (measured inflation) *minus*

productivity increase

1.3 The various components of the calculations are assessed in turn in the following sections before drawing draft determination conclusions at the end of the paper.

1.4 This annex sets outs the NIE Networks business plan proposals, our views, sensitivity analysis and draft determination conclusions.

1.5 It is important to note that numbers for the final determination will automatically be subject to change based on updated forecasts. The numbers can adjust either up or down. The key purpose for this consultation is to seek feedback on the methodological principles that have been applied.

2. Real Price Effects

Background

2.1 The cost of a company's inputs may vary over time. Price controls have usually been indexed by a measure of general inflation to account for broad changes in prices. Historically, the measure used by regulators has been the Retail Price Index (RPI).

2.2 More recently, this has been moving to newer measures such as the Consumer Prices Index (CPI) or Consumer Prices Index including owner occupied housing costs (CPIH).

2.3 However, not all types of costs experienced by a network business will be reflected in the basket of prices used to calculate general inflation.

2.4 To account for this, it is common practice to calculate and adjust for the difference between particular input price changes for a company / industry and the general measure of inflation. This difference is described as the real price effects (RPEs).

Company business plan submission

2.5 NIE Networks provided a supplementary paper from their consultants (E&Y) to address real price effects within their business plan submission. As per the business plan guidance, the company assessed input costs against CPIH inflation.

2.6 The overall conclusion adopted by the company was that during the period of RP7 in nominal terms;

a) Labour cost will increase on average by 1.4% higher than the general inflation (CPIH) each year.

b) Material cost is predicted to increase by 3.8% above the general inflation measure (CPIH) on average each year.

c) Plant and equipment cost is estimated to increase by 1.0% per annum over general inflation.

d) Other costs will typically follow the general trend of CPIH over the RP7 period. However, NIE Networks adopted later forecasts of inflation which resulted in an average RPE of 0.7% per annum.

2.7 The overall impact of their forecasts differs between opex and capex given the different weightings placed on the inputs. The real price effects as set out in the business plan are as follows in Table 2.1:

Figures in %	RP6			RP7					
	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31
Labour	3.3%	2.4%	2.4%	2.6%	2.7%	2.8%	2.8%	2.8%	2.8%
Materials	18.2%	11.2%	9.9%	8.0%	6.1%	4.1%	4.1%	4.1%	4.1%
Plant & Equipment	3.7%	3.4%	3.1%	2.8%	2.5%	2.2%	2.2%	2.2%	2.2%
Other	6.6%	3.5%	1.6%	1.9%	2.0%	2.0%	2.0%	2.0%	2.0%
CPIH Forecast	**9.6%**	**3.8%**	**-0.1%**	**-1.3%**	**1.2%**	**1.9%**	**2.0%**	**2.0%**	**2.0%**
Annual RPE (opex)	**-4.3%**	**-0.5%**	**3.0%**	**4.2%**	**1.6%**	**0.8%**	**0.7%**	**0.7%**	**0.7%**
Annual RPE (capex)	**-1.3%**	**1.4%**	**4.8%**	**5.5%**	**2.3%**	**1.1%**	**1.0%**	**1.0%**	**1.0%**

Table 2.1: RPE cost categories and forecasts from NIE Networks

2.8 The impact of the submission is an expectation that input costs will typically rise faster than inflation. The effect is more pronounced for capex given the larger weighting attributed to material costs.

Weights

2.9 To estimate RPEs we first separate a company's input costs into various components. This is a necessary step as the overall cost will be impacted by the proportion of different input factors.

2.10 Nominal price inflation for each category of cost is then calculated. Finally, accounting for general inflation (CPIH) and applying weights to each input category, an overall value or weighted average input cost is calculated.

2.11 NIE Networks weights are based on the same input weights as used in RP6.

Cost Category	RP6 (Opex)	RP7 (Opex)
Labour	77.3%	77.3%
Materials	7.7%	7.7%
Plant and equipment	0.0%	0.0%
Other	15.0%	15.0%

Table 2.2: RPE cost categories and weights for opex

Cost Category	RP6 (Capex)	RP7 (Capex)
Labour	52.8%	52.8%
Materials	30.2%	30.2%
Plant and equipment	5.9%	5.9%
Other	11.1%	11.1%

Table 2.3: RPE cost categories and weights for capex

2.12 This opex / capex approach differs from Ofgem who focus on total expenditure or totex. We queried the weightings with NIE Networks who stated that,

> "we did a high-level assessment of what actual splits have been to date across opex and capex. We found the splits appeared to be broadly in line with those in the RP6 determination, and we concluded we would retain the splits used at RP6 for the RP7 plan…If the UR requires a full and detailed analysis, we could conduct an assessment for the period Oct-17 to Mar-23, but we would need around 3 weeks to carry out this exercise."[1]

2.13 We are minded to accept the company weightings, though a detailed review may be requested for the final determination.

Input indices

2.14 For each input cost category, we identified suitable indices for use in estimating prices. We reviewed the indices available, previously used in regulatory decisions and relevant to the cost categories being assessed.

2.15 The indices adopted by E&Y are closely associated with those used by Ofgem at the ED-2 price control. The indices they selected can be summarised as follows in Table 2.4:

[1] NIE Networks response to UR-0020.

Indices	Weighting
Labour	
ONS EARN01 Average weekly earnings total pay, GB	33.3%
BCIS[2] 4/CE/01 Civil Engineering Labour	33.3%
BEAMA's[3] Electrical Engineering Labour	33.3%
Materials	
BCIS FOCOS Resource Cost Index of Infrastructure Materials	20%
BCIS 3/58 Pipes and Accessories: Copper	20%
BCIS 3/59 Pipes and Accessories: Aluminium	20%
BCIS 3/S3 Structural Steelwork Materials: Civil Engineering	20%
BEAMA's Distribution Transformers	20%
Plant and Equipment	
BCIS 90/2 Plant and Road Vehicles	50%
ONS Machinery & Equipment n.e.c. for domestic market (G6V6)	50%
Other	
General inflation (OBR – November 2022)	100%

Table 2.4: E&Y input indices and weightings

2.16 We have largely adopted the same indices as the company. These have been subject to significant scrutiny by Ofgem. However, we make no separate provision for specialist labour. We have also updated 'other costs' for the latest estimates of inflation. The indices we have used in the draft determination can be summarised as follows in Table 2.5:

[2] BCIS = Building Cost Information Service.
[3] BEAMA = British Electrotechnical & Allied Manufacturers Association.

Indices	Weighting
Labour	
OBR – Average Hourly Earnings Growth	100%
Materials	
BCIS FOCOS Resource Cost Index of Infrastructure Materials BCIS 3/58 Pipes and Accessories: Copper BCIS 3/59 Pipes and Accessories: Aluminium BCIS 3/S3 Structural Steelwork Materials: Civil Engineering BEAMA's Distribution Transformers	20% 20% 20% 20% 20%
Plant and Equipment	
BCIS 90/2 Plant and Road Vehicles ONS Machinery & Equipment n.e.c. for domestic market (G6V6)	50% 50%
Other	
General inflation (OBR – April 2023)	100%

Table 2.5: UR input indices and weightings

Input prices - labour

2.17 As the cost category of labour makes up over half of the opex and capex, it is important that the figures used for these input prices are both fair and robust.

2.18 NIE Networks business plan uses specialised engineering indices for a proportion of their labour costs, in line with Ofgem's approach at ED2. Thus, they have included both general and specialised indices and weighted them equally to generate a single labour cost index.

2.19 The three indices covered under the NIE Networks methodology have identical weights. This results in providing specialist labour (66.7%), as defined by the civil and electrical engineering indices, a higher overall weight than general labour (33.3%).

2.20 There has been no agreed or common approach by regulatory bodies with respect to this issue. There is precedent for and against distinguishing between different types of labour in setting RPEs.

2.21 In terms of data for our estimation of labour RPEs, we consider continued use of Office of Budget Responsibility (OBR) forecast of average hourly earnings to be most appropriate. This follows the approach adopted for gas companies in the recently completed GD23 price control.

2.22 Beyond the 2027-28 OBR forecast and given the uncertainty at that point, we adopt the last available year's forecast as a suitable estimate for the remaining years of RP7.

2.23 Consideration of specialist labour is not unreasonable and some of the specialist labour indices may have grown at faster rates than general wage growth. However, to focus on only some labour costs would be an asymmetric approach to the potential detriment of consumers.

2.24 Other roles that may be pertinent to DNOs where there has been wage growth lower than the whole economy average would also need to be considered. It would be asymmetric and improper to only consider specialist labour costs that are above the economy average.

2.25 As part of the query process, NIE Networks provided data on the breakdown of their staff by standard occupational classification (SOC). This detail was provided from the base year to the end of the RP7 period. The proportional split can be summarised as follows in Table 2.6:

SOC Category	Staff % Split	
	2021	2031
Managers, directors and senior officials	10.3%	6.5%
Professional occupations	30.0%	33.1%
Associate professional and technical occupations	1.6%	1.5%
Administrative and secretarial occupations	19.1%	15.8%
Skilled trades occupations	30.4%	36.4%
Caring, leisure and other service occupations	0.0%	0.0%
Sales and customer service occupations	6.8%	5.1%
Process, plant and machine operatives	0.8%	0.4%
Elementary occupations	1.1%	1.1%
All occupations	100%	100%

Table 2.6: Staff split by SOC code

2.26 Taking time-series data from the ASHE[4] for median hourly wages, we can see the changes in pay from 2011 to 2021.

[4] ASHE = Annual Survey of Hours and Earnings.

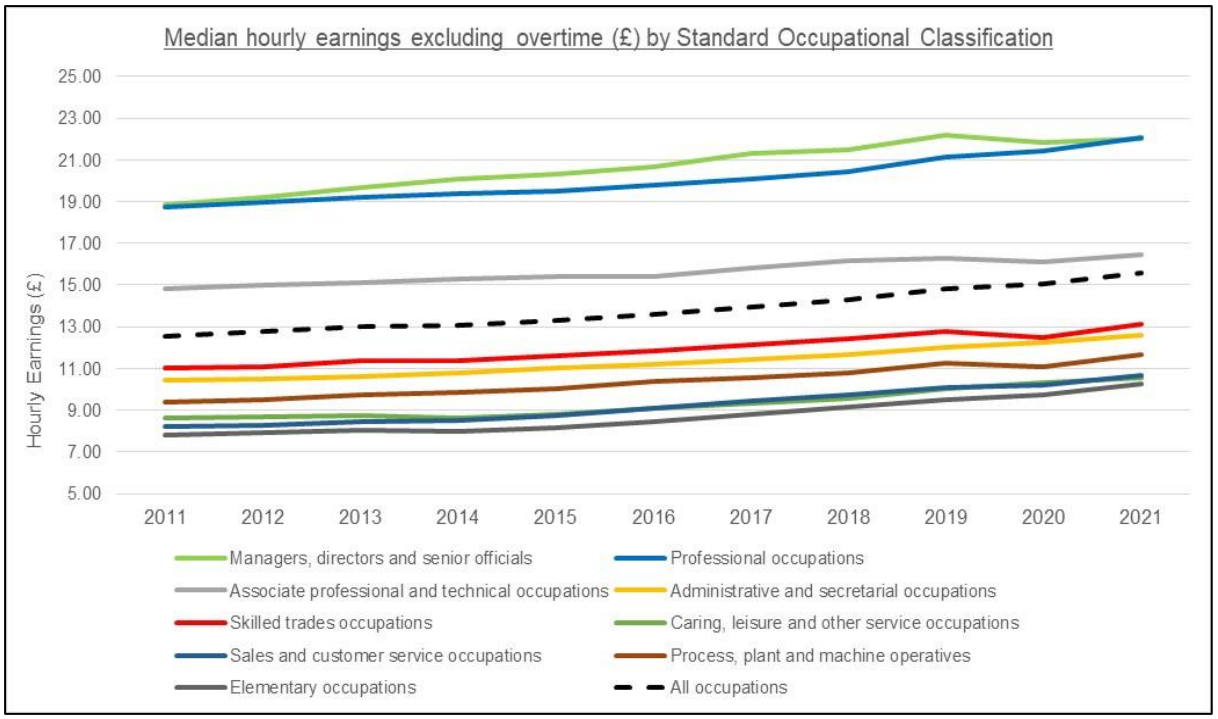

Figure 2.1: Changes in average hourly earnings by SOC code

2.27 From this high-level data, pay increases for key occupations specific to NIE Networks are not growing as fast as the overall average. This includes areas such as professional and technical jobs, skilled trades, administration, and management positions. The change in SOC pay rates is set out in Table 2.7 below and compared to all occupations.

SOC Category	Median hourly earnings excluding overtime (£)		Median hourly earnings % increase	
	2011	2021	10 Years	Annual Average
Managers	£18.87	£19.21	16.6%	1.6%
Professional occupations	£18.73	£18.96	17.8%	1.6%
Professional and technical	£14.83	£15.00	10.9%	1.0%
Administrative	£10.42	£10.48	20.7%	1.9%
Skilled trades	£11.00	£11.07	19.4%	1.8%
Caring other services	£8.63	£8.68	22.5%	2.0%
Sales and customer service	£8.19	£8.29	30.2%	2.7%
Process, plant and machine	£9.40	£9.50	24.1%	2.2%
Elementary occupations	£7.79	£7.95	31.7%	2.8%
All occupations	£12.56	£12.77	24.1%	2.2%

Table 2.7: Changing rates of earnings by SOC

2.28 Given this detail, it is our view that average earnings forecasts will suffice for the purposes of estimating the company's labour costs. When comparing the specialist labour growth over the last 12 years we further see that some specialist salaries are growing slightly below the OBR average hourly earnings index. Specialist provision does therefore not seem necessary.

Input prices - materials

2.29 The next category we assess is materials, which make up around 30% of capex costs and almost 8% of opex costs. This is an important consideration of RPEs.

2.30 NIE Networks provided business plan forecasts for material prices that show high growth in the 2022-23 year followed by a relatively strong growth rate throughout the RP7 period thereafter.

2.31 Rather than using historic long-term averages for forecasts, NIE Networks have adopted a glidepath approach. This involves a uniform return to long-term averages over a 5-year period from 2022-23 to 2027-28. Historic long-term averages are used thereafter.

2.32 Whilst we did something similar in GD23, it was assumed that costs returned to normal in two years. We consider the NIE Networks approach as somewhat problematic because:

- It ensures nominal forecasts above the long-term average for an extended period.
- Based on OBR forecasts, inflation is expected to return to below average levels by 2024-25. It would be inconsistent to treat input costs differently.

2.33 Although we accept NIE Network's idea to utilise a glidepath for material indices, we do however disagree with their plan to use it for five years. Rather we recommend maintaining the GD23 approach which assumes a glidepath for two years. We have assumed a return to the long-term average from year 2025-26.

2.34 In terms of the indices selected, we adopted those as suggested by E&Y. There are a variety of alternatives that could be used. We have undertaken some sensitivity analysis to review the impact of alternate methodologies.

2.35 For the calculation of long-term averages, E&Y suggested the exclusion of certain atypical years i.e. financial crash and COVID years. We have accepted this approach and excluded 2009-10, 2010-11 and the most recent

years from 2020-21 onward, as these have been subject to substantial price fluctuations.

Input prices – plant and equipment

2.36 In terms of impact, the plant and equipment (P&E) category has a relatively small weighting for both opex and capex (0.0% and 5.9% respectively). Nevertheless, it forms an integral part of the cost input base for NIE Networks and so requires appropriate scrutiny.

2.37 We rely upon data from the Machinery & Equipment component (G6V6) of the Producer Prices Index (PPI) and the BCIS Plant and Road Vehicles (90/2) index. This mirrors the same indices as chosen by E&Y.

2.38 NIE Networks have used a similar approach as with 'materials' to calculate forecasted figures i.e. using glidepath approach for five years before returning to long-term averages in 2027-28.

2.39 Again, we are content to utilise the glidepath for P&E indices, however we disagree with their decision to use it for five years. Instead, we advise sticking with the GD23 strategy for two years before switching back to the long-term average in 2025–2026.

Input prices – other

2.40 The E&Y approach assumes that all 'other' costs will rise by inflation. The NIE Networks business plan has however used more recent inflation figures but retained the original forecast for 'other' costs. The result is a small RPE for this input category.

2.41 As was the case in our last price control review (RP6), for the 'other' cost category, it is assumed that these costs rise at the same nominal rate as general inflation. In this case, CPIH is the inflation rate used. This in effect leads to a nil RPE applying to 'other' costs, which seems appropriate in the absence of better information.

Inflation projections

2.42 As the input prices are in nominal terms, it is necessary to apply an inflation discount in order to transform the calculated price effects into real terms.

2.43 We have moved to using CPIH as our inflation measure for RP7. In line with several recent price controls, we have used actual CPIH figures up to 2022-23 (using October figures as per the NIE Networks licence).

2.44 However, our inflation forecasts are based on CPI percentage estimates made by the OBR Economic and Fiscal Outlook. As per the NIE Networks approach, we have used the CPI Q4 forecasts as a proxy for October percentage increases.

2.45 The latest OBR Economic and Fiscal Outlook (March 2023) estimates a much lower rate of growth this financial year (2023-24) to 2.9% from 9.6% in the previous financial year (2022-23). Inflation is expected to dip briefly into negative rates of growth before returning close to target rates by 2027-28. For the last three years of RP7 we have assumed inflation growth of 2% in line with national targets.

RPEs – opex and capex

2.46 The opex input price and inflation forecast decisions of the UR are reflected in Table 2.8 below.

Figures in %	RP6			RP7					
	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31
Labour	5.4%	4.0%	1.1%	1.5%	2.0%	2.5%	2.5%	2.5%	2.5%
Materials	15.5%	11.7%	7.9%	4.1%	4.1%	4.1%	4.1%	4.1%	4.1%
Plant & Equipment	10.5%	7.8%	5.0%	2.3%	2.3%	2.3%	2.3%	2.3%	2.3%
Other	9.6%	2.9%	0.5%	-0.1%	1.1%	1.8%	2.0%	2.0%	2.0%
CPIH Forecast	9.6%	2.9%	0.5%	-0.1%	1.1%	1.8%	2.0%	2.0%	2.0%
Annual RPE (opex)	-2.5%	1.5%	1.0%	1.5%	1.0%	0.7%	0.5%	0.5%	0.5%
Annual RPE (capex)	-0.3%	3.4%	2.8%	2.2%	1.5%	1.0%	0.9%	0.9%	0.9%

Table 2.8: RPE cost categories and UR forecasts

2.47 Over the nine-year period, the opex RPE is estimated at an average of +0.5% per annum. This is a downward shift from an average of +0.8% per annum submitted by NIE Networks in their business plan.

2.48 The methodology for opex and capex for the most part is very similar. The capex RPE is estimated at an average of +1.5% per annum. This is below the average of +1.9% per annum in the NIE Networks business plan.

2.49 The main differences from business plan to draft determination can be summarised as follows:

- Use of the latest OBR inflation forecasts.
- No provision for specialist labour.

- Use of a two-year rather than a five-year glidepath for returns to long term averages.

2.50 Differences between UR and NIE Networks figures for 2022-23 materials and P&E simply reflect later data, not a revised methodology.

Sensitivity analysis

2.51 As a sense check for input cost forecasts we performed several sensitivity checks. These include the following:

- Historic real changes.
- Regression analysis.
- Correlation matrix.

Real change

2.52 Instead of forecasting nominal costs, we adjusted historic nominal indices by CPIH inflation to get real trends. We then used the long-term historical average (excluding exceptional years) real trend to forecast costs. The following results in Table 2.9 were found.

Cost Category	Base Method	Real Change Ave
Opex RPE	+0.53%	+0.85%
Capex RPE	+1.49%	+1.19%

Table 2.9: Sensitivity analysis results compared to base method

2.53 Whilst the opex RPE would be higher, the capex RPE would be lower than the base methodology. This check is perhaps less robust as it does not consider future forecasts. It does however indicate the reasonableness of the current methodology compared to historic outturns.

Regression analysis

2.54 The downside to the long-run trend approach is that it does not account for cyclicality in the data. In other words, the approach assumes that the data will revert to growing at its long-term average rate at the point at which outturn data ends.

2.55 Many indices experienced a downward shock during the COVID pandemic and, more recently, a large upward shock because of the increase in demand as restrictions were relaxed. Other factors such as Brexit, the war in Ukraine and sanctions on Russia may have impacted these costs.

Therefore, it is important to rely on an approach to forecasting that tries to account for the volatility currently seen in the market.

2.56 In the GD23 price control, one of the gas distribution companies argued that a more robust approach to input price forecasting is to rely on an alternate method that controls for the economic conditions predicted. They focused on estimating the historical link between real GDP and CPI and each nominal index, using OLS[5] regressions.

2.57 We have adopted a similar approach to estimate the historical link between real GDP, inflation and each nominal material and plant index, using OLS regressions with the most recent data possible. We also use a time trend to capture the possibility that the indices may be growing or shrinking over time for reasons unrelated to GDP and CPI.

2.58 Two kinds of regression checks were performed on materials[6] and plant & equipment indices:

- Method 1 is a regression as per the approach used in GD23 which utilises GDP, CPI and time as explanatory variables.
- Method 2 is a regression with GDP and time.

2.59 We have used the OBR outlook forecasts for GDP and inflation. For the first method we estimate the regression as per the approach used in GD23 for each of the selected indices as per the following formula:

$$Ln(Nominal\ Index) = \alpha + \beta 1 \times ln(Real\ GDP) + \beta 2 \times ln(CPIH) + \beta 3 \times Time + \varepsilon$$

2.60 The econometric model is characterised by an intercept term (denoted by α) and the slope coefficients (β). The β coefficients describe how real GDP and CPI affect the relevant index. The error term ε represents the variation in the dependent variable (the index) that occurs for reasons not captured by variation in the drivers.

2.61 The model is expressed in “log-log” terms, which is standard practice for a relationship based on growth rates. However, the regression methodology has drawbacks in that GDP and CPI are correlated to each other. Using both together as independent variables may lead to the issue of multi-collinearity resulting in bias in the results.

[5] OLS = Ordinary Least Squares.
[6] The distribution transformer index was excluded as BEAMA already produce forecasts for this input which were relied upon.

2.62 To overcome the above issue, we performed a separate regression on the indices by not taking logs and only using GDP and time as the explanatory variables. Thus, the regression equation was changed to:

$$Nominal\ Index = \alpha + \beta 1 \times Real\ GDP + \beta 2 \times Time + \varepsilon$$

2.63 The opex and capex input price forecast by the two regression approaches are set out in Table 2.10 below and compared with the base approach.

Cost Category	Base Method	Method 1	Method 2
Opex RPE	+0.53%	+0.26%	+0.27%
Capex RPE	+1.49%	+0.35%	+0.37%

Table 2.10: Regression analysis results compared to base method

2.64 We did not adopt the regression approach for GD23 but used it as a useful sense check. The results for RP7 indicate that the use of long-term averages and glidepaths may be somewhat generous. What this does indicate is the reasonableness of the draft determination position.

Correlation matrix

2.65 Correlation between CPI and all individual indices selected under materials and plant / equipment was performed to sense check to what extent the two variables fluctuate in relation to each other. It a useful way of determining the degree to which the value of a particular index responds to the change in the value of CPI.

2.66 Three of the five material indices, as well as the plant and equipment indices, revealed a very high positive correlation with the changing value of CPI. The correlation coefficient for each of these indices was more than 0.96.

2.67 For the remaining two material indices, correlation with CPI was still quite strong, with coefficients of 0.82 for the distribution transformer index and 0.77 for the steelworks index. The correlation equation was then used to predict the values of all indices for the period of RP7 using OBR forecasts of inflation. The figures below show the correlation of all the indices with CPI.

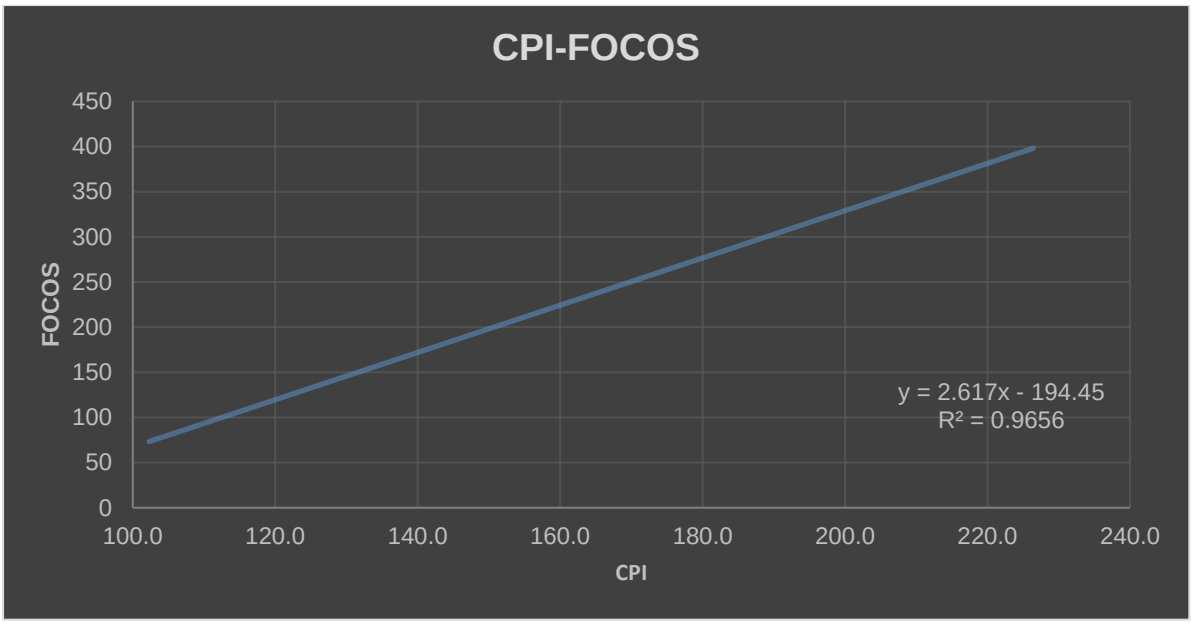

Figure 2.2: Correlation between FOCOS and CPI

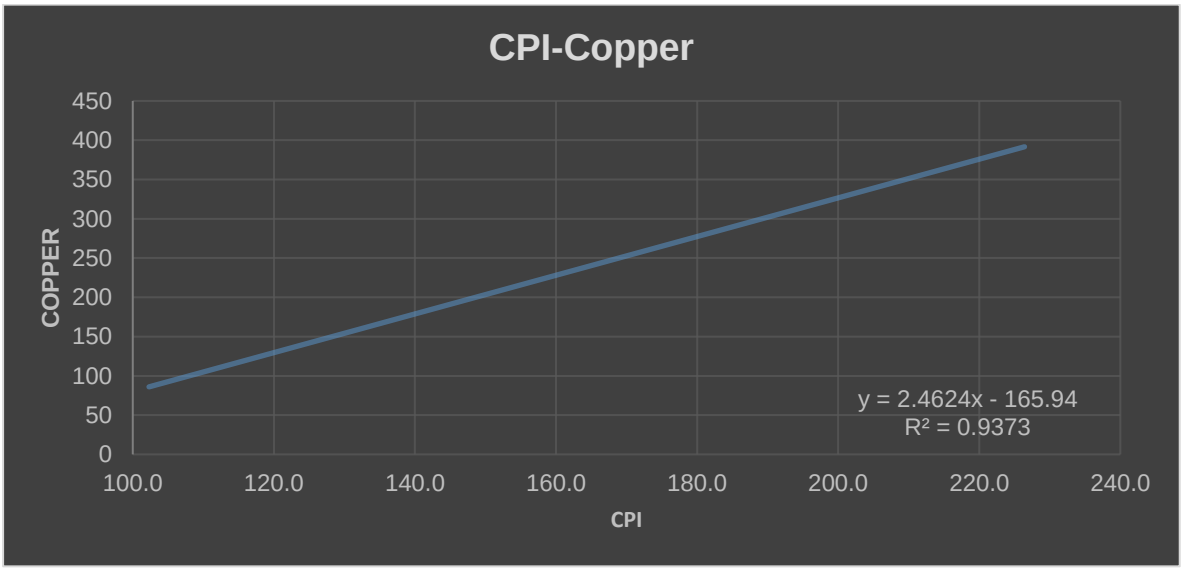

Figure 2.3: Correlation between Copper and CPI

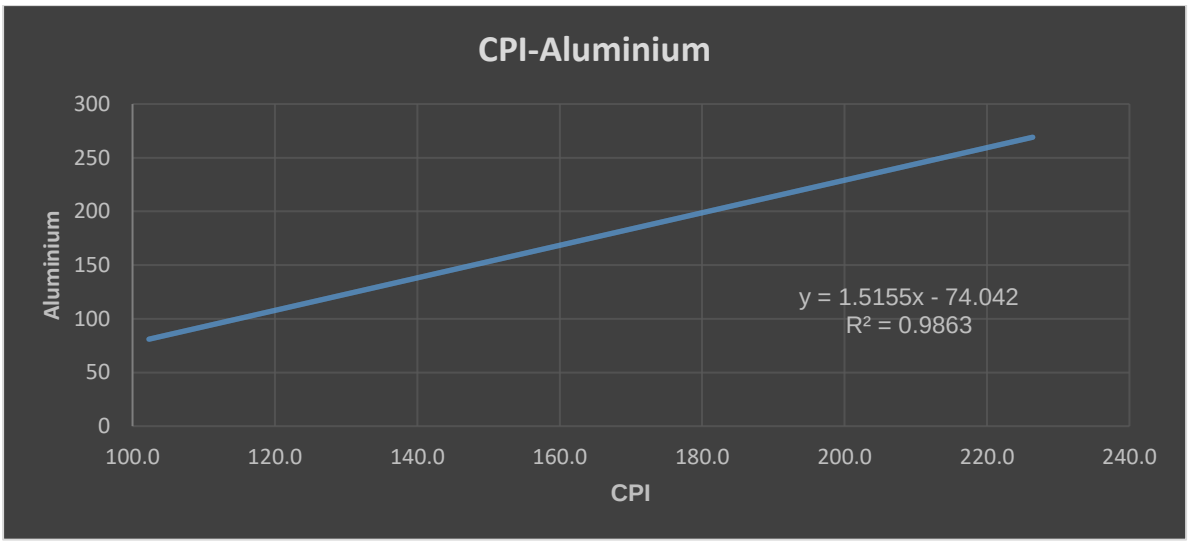

Figure 2.4: Correlation between Aluminium and CPI

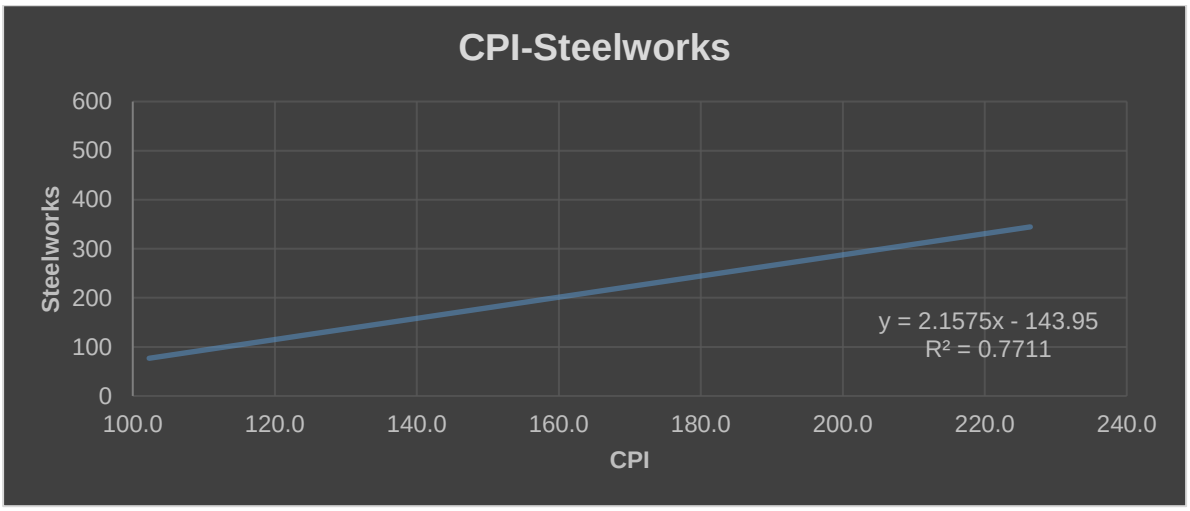

Figure 2.5: Correlation between Structural Steelwork and CPI

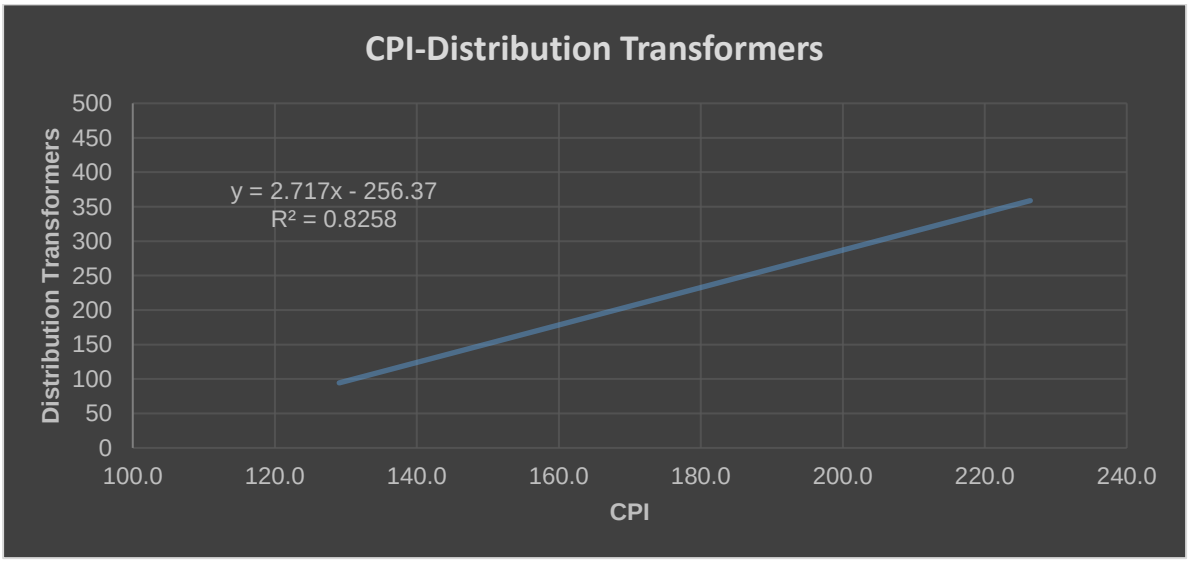

Figure 2.6: Correlation between Structural Steelwork and CPI

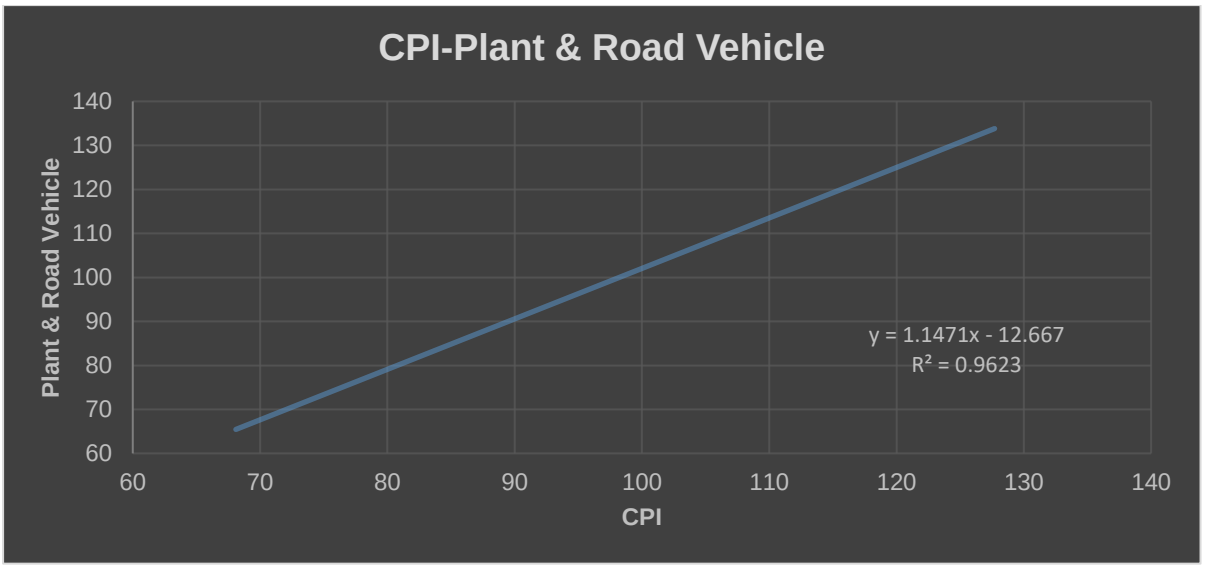

Figure 2.7: Correlation between Plant & Road Vehicles and CPI

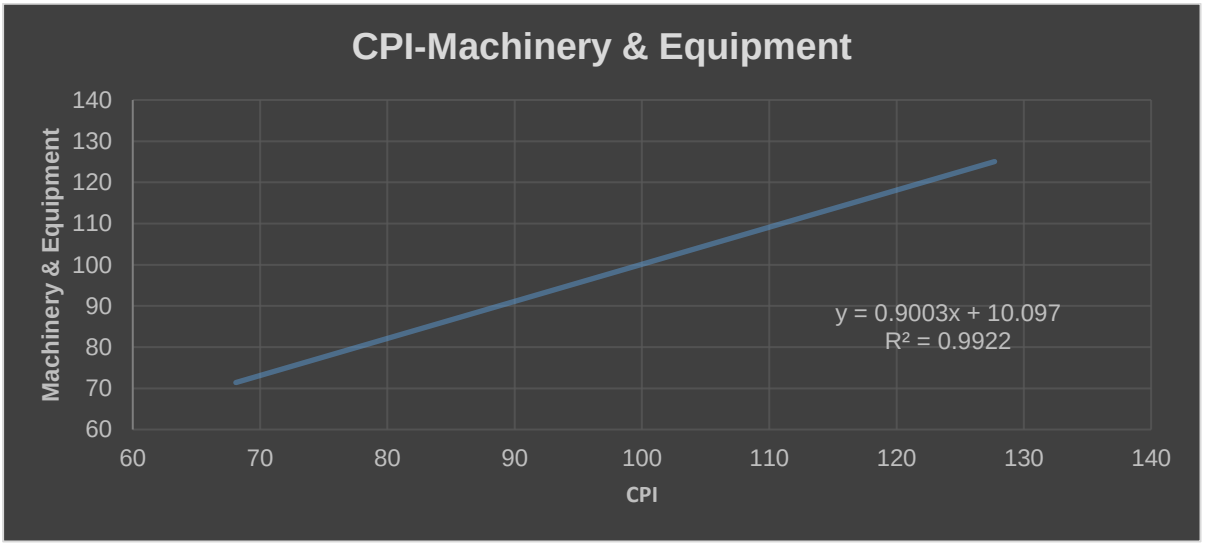

Figure 2.8: Correlation between Machinery & Equipment and CPI

2.68 The opex and capex RPEs for the recommended approach and the inflation correlation method are compared in Table 2.11 below:

Cost Category	Base Method	Correlation
Opex RPE	+0.53%	+0.21%
Capex RPE	+1.49%	+0.17%

Table 2.11: Correlation analysis results compared to base method

2.69 Like the other approaches, this method has flaws as we have seen with the recent supply side shocks which impacted producer prices a lot faster than general inflation. The low medium term inflation predictions are also holding down input price forecasts. Again however, it serves as a useful check.

2.70 All the sense checks have predicted that average RPEs will be close to or lower than our recommended approach during the RP7 period. Thus, our recommended approach provides some headroom for the company.

True-up mechanism

2.71 NIE Networks raised the issue of a 'true-up' mechanism for RPEs. They suggested following Ofgem precedent in this regard but applying no corresponding materiality thresholds. When asked via the query process how such a mechanism might work, NIE Networks stated:

"We suggest following Ofgem's precedent. Ofgem has indicated that there will be an annual true-up of the RPE allowances after the relevant index/indices are published each year, and a final true-up will occur at the end of RIIO-2 as part of the close-out process.

To true-up the RPEs allowance, the Annex [for allowances] would need to contain a repeat of the above calculations but using actual data for the indices as opposed to forecasts. This will drive different catch-up efficiency / frontier shift factors and compound efficiency effect factors, which will in turn drive a different allowance for RPEs."[7]

2.72 A 'true-up' device is a reasonable suggestion. However, we have followed the GD23 approach and not adopted such a mechanism. It is our expectation that such an approach has various flaws. For instance:

a) Given that the indices are a proxy for electricity industry costs, any adjustment will not be perfect. The evidence presented on actual overhead line (OHL) contractor costs for the RP6 extension year highlights this issue as they were of a different magnitude to labour indices.

b) The mechanism would add significant complication to the annual tariff process. Not only would it require interaction with at least eight different indices, but each have different publication dates and processes (such as provisional figures) which may not be conducive to annual adjustments.

c) In contrast to the NIE Networks view, we would expect a significant regulatory burden. Annual reporting would have to be amended to accommodate such detail as the existing reports do not split costs in the same fashion as the RPE analysis. This is demonstrated by the problems NIE Networks has admitted when requested to provide the current cost splits.

[7] Response to query UR-0018.

d) Not being a national statistic, it is possible that some of the indices may become defunct. This occurred during RP6 for the machinery and equipment index.

2.73 Departure from regulatory precedent needs to be well justified. The onus for this justification is on NIE Networks. In our view, the justification provided is not sufficiently well evidenced to support the introduction of a true-up.

2.74 The inability of NIE Networks to provide an up-to-date cost split highlights the concerns with company proposals. The mechanism would impose significant regulatory burden, introduce annual complications and will still be heavily dependent upon selection of the appropriate methodology / indices.

2.75 Sensitivity analysis show how RPE forecasts, and thus the RPE allowance, is dependent on methodological choices for which there is not a clear right/wrong option. However, this problem exists regardless of whether the true-up mechanism is adopted or not.

2.76 There is risk to both NIE Networks and consumers in setting ex-ante allowances for RPEs. However, the existing approach represents a 'fair-bet' that we consider to be justified. The risk is also reduced by virtue of various factors such as the 50:50 sharing mechanism, NIE Networks control over its own labour costs and linking contractor spend to general inflation uplifts.

3. Productivity

Background

3.1 A company can become more efficient over time and so close the gap between its efficiency level and that of the frontier performer. Equally, the industry's overall efficiency or frontier can change over time. It is possible the most efficient company in an industry can find new or improved ways of using less input volumes to maintain current output levels.

Company business plan submissions

3.2 NIE Networks provided estimates of productivity improvement to apply in RP7. These proposals are shown in Table 3.1 below.

DNO	Opex	Capex
NIE Networks	0.80%	0.80%

Table 3.1: Annual efficiency improvements proposed by NIE Networks

3.3 The efficiency challenge is in line with the NIE Networks consultants paper conclusions. They state, "we consider that an ongoing productivity assumption within the range of 0.5% - 1.0% would be a well evidenced, yet stretching, target for NIE." They further argue that a challenge beyond 1% p.a. would not be appropriate due to the following:

- CMA found that Ofgem's decision to add an innovation uplift was not sufficiently well evidenced.
- Innovation funding embedded in the NI regulatory framework is not directly comparable to GB.
- Northern Ireland's labour productivity is 18% lower than the UK average. This indicates that the appropriate target for NIE Networks is likely to be well below the range supported by UK wide data.

3.4 Given the issues, NIE Networks has adopted a challenge of 0.8% per annum. This applies to both their opex and capex spend.

UR draft assessment

Benchmark industries

3.5 In their decision for ongoing efficiency for RIIO-ED2, Ofgem assessed the productivity that could be observed from comparator sectors to the GB DNOs

using EU KLEMS[8] data. This was one method in establishing the range of possible productivity improvement factors.

3.6 We note the ED2 analysis and that it established a challenge range of 0.4% - 1.2% p.a. using the full time series dataset (1995-2016) depending on whether the value added (VA) or gross output (GO) approach is adopted. E&Y further noted the sensitivities around business cycle definitions, which could support an even wider range.

3.7 Like Ofgem, we have considered different timespans, VA and GO estimates as well as labour productivity forecasts from the OBR. We looked at productivity against certain selected industries. Whilst the total factor productivity (TFP) using gross output is not published, it can be calculated using the following formula:[9]

$$gTFP_{GO} = gTFP_{VA} \times \frac{VA}{GO}$$

3.8 Our analysis considered estimates using certain industries considered the most applicable comparators. Selected industries include i.e. Construction (F), Wholesale & Retail Trade (G), Transportation & Storage (H) and Finance & Insurance (K).

3.9 We have further included two industries that Ofgem has incorporated into the ED-2 analysis. These include Info & Communication (J) and Professional, Scientific & Technical (M_N).[10] The results for the 2019 data release as used by Ofgem is as follows in Table 3.2and Table 3.3:

	TFP Value Added (2019 Release)		
	(1997-2016)	(2006-2016)	All years (1995-2016)
Unweighted Average of Selected Industries	1.10%	0.17%	1.20%

Table 3.2: Productivity VA growth estimates by UR (2019 release)

	TFP Gross Output (2019 Release)		
	(1997-2016)	(2006-2016)	All years (1995-2016)
Unweighted Average of Selected Industries	0.61%	0.17%	0.65%

Table 3.3: Productivity GO growth estimates by UR (2019 release)

[8] EU KLEMS is an industry level, growth and productivity research project. EU KLEMS stands for EU level analysis of capital (K), labour (L), energy (E), materials (M) and service (S) inputs. Source: https://euklems-intanprod-llee.luiss.it/

[9] See NERA Report: Real Price Effects and Ongoing Efficiency at GD23, p23.

3.10 When considering the most up to date 2023 data release, the productivity scope is not as great. This is evidenced in Table 3.4 and Table 3.5 below.

	TFP Value Added (2023 Release)		
	(1997-2020)	(2006-2020)	All years (1995-2020)
Unweighted Average of Selected Industries	0.62%	0.14%	0.46%

Table 3.4: Productivity VA growth estimates by UR (2023 release)

	TFP Gross Output (2023 Release)		
	(1997-2020)	(2006-2020)	All years (1995-2020)
Unweighted Average of Selected Industries	0.34%	0.12%	0.24%

Table 3.5: Productivity GO growth estimates by UR (2023 release)

3.11 However, the 2023 release provides data up to 2020 which was significantly impacted by the first COVID lockdown. The resultant downturn in activity is captured in these figures. Consequently, we place less reliance on their conclusions as the earlier figures.

3.12 Furthermore, as various commentators have noted, the EU KLEMS data does not account for "embodied technical change" (i.e. improvements in the quality of inputs rather than simply the management practices in using them). Consequently, the data may underestimate the true efficiency gains possible by an electricity DNO.

3.13 Use of this data and the six selected comparator industries suggests a potential improvement range from 0.12% to 1.20% per annum.

Regulatory precedent

3.14 We have also considered regulatory precedent and decisions made for other utilities, as summarised by Table 3.6 below.

Decision body	Year	Opex	Capex
Ofgem RIIO-ED2 Final Determination	2022	1.0%	
CMA RIIO-T2/GD2	2021	1.05%	0.95%
UR NI Water PC21	2021	0.8%	0.6%
CMA PR19	2019	1.0%	
UR NIE Networks RP6	2017	1.0%	1.0%
UR Gas Distribution Networks GD17	2016	1.0%	1.0%
UR NI Water PC15	2014	0.9%	0.6%
Competition Commission – NIE RP5	2014	1.0%	1.0%
UR Gas Distribution Networks GD14	2013	1.0%	1.0%
Ofgem RIIO-T1/GD1	2012	1.0%	0.7%

Table 3.6: Recent regulatory decisions on annual productivity (%)

3.15 The most obvious comparator is that used by Ofgem in the recent ED2 final determination. This would indicate an equivalent challenge of 1.0% would be appropriate for NIE Networks.

Labour and regional productivity

3.16 Consideration was also given to labour productivity. This is appropriate given the integral role staff play in the DNO activities. Figures for labour productivity were taken from those as forecast by OBR.

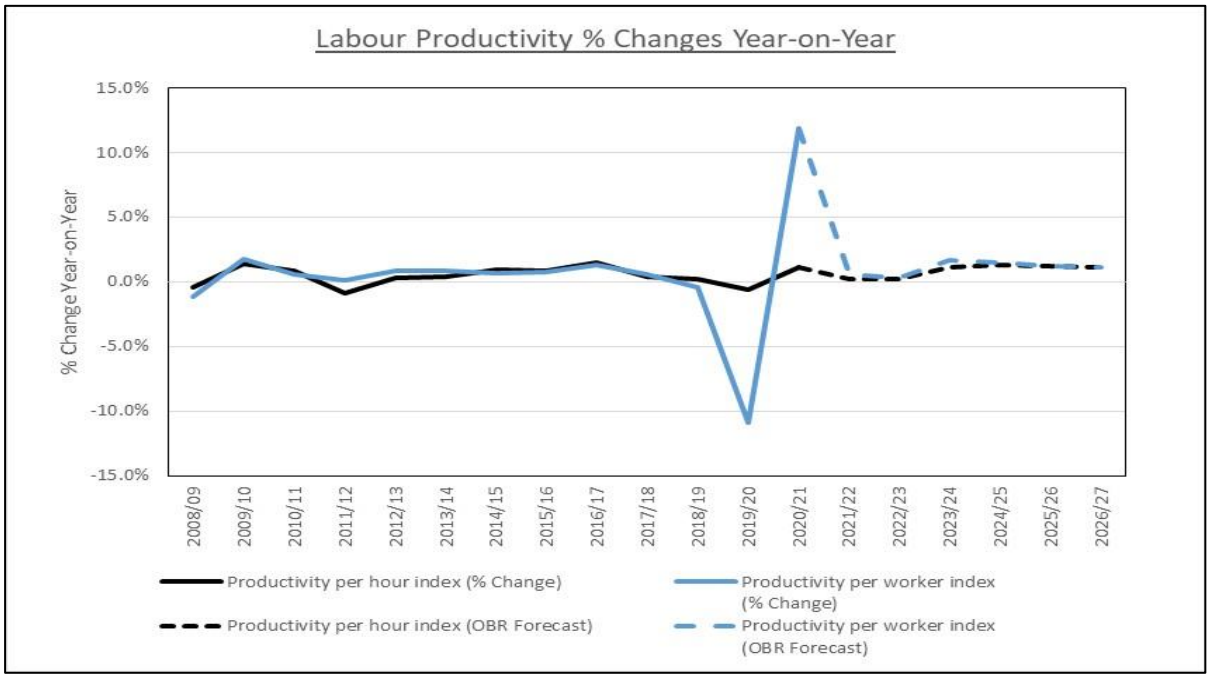

Figure 3.1: OBR labour productivity, % change[11]

[11] Figures taken from Economic and Fiscal Outlook, March 2023, supplementary economy table 1.6.

3.17 OBR is predicting labour productivity per hour to rise at an average of 0.85% per annum from 2021-22 to 2027-28. The figure is higher per worker, but hourly analysis is considered the more appropriate index in this instance. This is due to the impact of COVID on the per worker index.

3.18 NIE Networks consultants also referenced the fact that regional GVA output per hour worked over the period 2008-20 indicates that Northern Ireland's labour productivity is 18% lower than the UK average. Their conclusion is that an appropriate target for NIE Networks is likely to be well below the range supported by UK wide data.

3.19 It is true to state that productivity has long been lower in NI than that achieved in the UK. However, this is not considered to be a good argument for reducing the efficiency challenge for NIE Networks. Given the lower starting point, a case could be made for a tougher target. The key issue however is the rate of change.

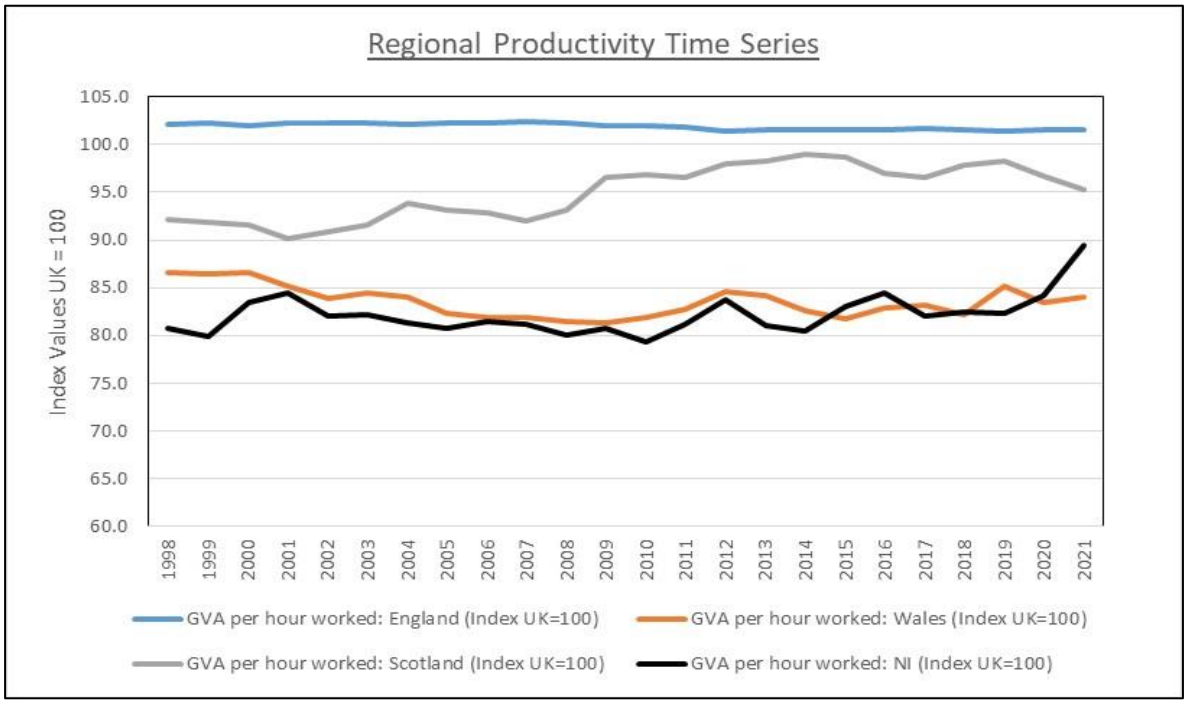

Figure 3.2: GVA per hour worked by region – ONS data[12]

3.20 Whilst a material gap remains, NI productivity has marginally caught up with the UK since 1998. Productivity has increased faster than either England, Wales or Scotland. This suggests that the challenge applicable to GB DNOs should also be replicated in NI or even increased.

[12]Source:https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/labourproductivity/datasets/regionalproductivitytimeseries

Productivity Conclusions

3.21 Given our analysis and review of NIE Networks submission, we are minded to adopt a 1% p.a. productivity target. This has been determined for both opex and capex.

	Opex	Capex
Productivity challenge	1.0%	1.0%

Table 3.7: RP7 productivity target (%) at draft determination

3.22 It is our view that this target is supported by both the quantitative evidence and regulatory precedent. It is also at the top of the range suggested by NIE Networks own consultants. We are not minded to adopt the lower figure of 0.8% as set out in the NIE Networks business plan.

3.23 We have not imposed any further challenge because of innovation funding. However, we would note that some of the innovation projects are expected to have impacts on working patterns and productivity. Given this separate allowance, it might be reasonable to expect NIE Networks productivity to improve at a faster pace than the general economy.

4. Frontier shift conclusions

The respective net impact of frontier shift for both opex and capex is shown in Table 4.1 and Table 4.2 below.

Figures in % (excl. cost base impact)	RP6			RP7					
	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31
Weighted nominal input prices	6.83	4.42	1.56	1.46	2.04	2.51	2.54	2.54	2.54
CPIH Forecast	9.61	2.88	0.54	-0.08	1.06	1.83	2.00	2.00	2.00
RPE (annual)	**-2.54**	**1.50**	**1.01**	**1.54**	**0.97**	**0.67**	**0.53**	**0.53**	**0.53**
Productivity	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FS (annual)	-3.51	0.48	0.00	0.52	-0.04	-0.34	-0.48	-0.48	-0.48
Cumulative FS	-3.51	-3.05	-3.05	-2.54	-2.58	-2.91	-3.37	-3.83	-4.29
Effect on cost base	**0.96**	**0.97**	**0.97**	**0.97**	**0.97**	**0.97**	**0.97**	**0.96**	**0.96**

Table 4.1: Opex Recommended Frontier Shift Calculations

Figures in % (excl. cost base impact)	RP6			RP7					
	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	2028/29	2029/30	2030/31
Weighted nominal input prices	9.23	6.42	3.34	2.16	2.56	2.89	2.91	2.91	2.91
CPIH Forecast	9.61	2.88	0.54	-0.08	1.06	1.83	2.00	2.00	2.00
RPE (annual)	**-0.35**	**3.44**	**2.78**	**2.24**	**1.49**	**1.04**	**0.89**	**0.89**	**0.89**
Productivity	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
FS (annual)	**-1.35**	**2.40**	**1.75**	**1.22**	**0.47**	**0.03**	**-0.12**	**-0.12**	**-0.12**
Cumulative FS	-1.35	1.03	2.79	4.04	4.53	4.57	4.45	4.33	4.21
Effect on cost base	**0.99**	**1.01**	**1.03**	**1.04**	**1.05**	**1.05**	**1.04**	**1.04**	**1.04**

Table 4.2: Capex Recommended Frontier Shift Calculations

4.1 It is important to note that numbers for the final determination will automatically be subject to change based on updated forecasts. The numbers can adjust either up or down. The key purpose for this consultation is to seek feedback on the methodological principles that have been applied.