

Water & Sewerage Services Price Control 2015-21

Final Determination - Annex S
Opex Frontier Shift Report
December 2014



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1.0 Introduction

1.1. Purpose

- 1.1.1 The purpose of this report is to decide whether the Utility Regulator (UR) should be making an addition to or subtraction from its catch-up target for NI Water.
- 1.1.2 This decision is based on the projected rate of water industry costs and productivity trends compared to Retail Price Index (RPI) measured inflation movement. The comparison can work both ways.
- 1.1.3 Extra allowance is made when water industry cost inflation is forecast to outstrip RPI estimates automatically included in the regulatory decision. Conversely, an additional challenge will arise if industry costs rise by a factor lower than RPI inflation.
- 1.1.4 The methodology used follows that first detailed as part of the PC13 final determination. This paper simply updates the previous forecasts with a more up-to-date information set. This includes both historical or recent actual out-turn data and our best, most up-to-date view on where prices are likely to go across the 6-year period represented by PC15.
- 1.1.5 The difference in this report is that the forecasts cover a longer period.
- 1.1.6 This paper focuses on providing an updated forecast and explains any changes since our previous examination of frontier shift both at PC13 and at our PC15 draft determination.
- 1.1.7 The original frontier shift paper for PC13 can be found at the link below.

[www.uregni.gov.uk/uploads/publications/ANNEX_D - Rate of Frontier Shift - PC13 FD.pdf](http://www.uregni.gov.uk/uploads/publications/ANNEX_D_-_Rate_of_Frontier_Shift_-_PC13_FD.pdf)

1.2. Summary of findings

- 1.2.1 Frontier shift is a key element in setting the opex efficiency targets for NI Water in PC15. Alongside the assessment of catch-up, frontier shift represents another element of challenge on the company.
- 1.2.2 The concept of frontier shift is wider than simple productivity assumptions. Within this report, the UR has adopted the methodology used in PC13, which aligns closely with the Competition Commission (CC) determination for Northern Ireland Electricity. This process combines nominal input price forecasts with productivity expectations and RPI inflation.

$$\text{Frontier shift in real terms} = \text{Input prices } \textit{minus} \text{ Productivity } \textit{minus} \text{ Forecast RPI inflation}$$

1.2.3 The forecast for each of the components and the frontier shift to be applied to PC15 opex targets is given in the table below.

Table 1.1 – Frontier shift calculations (%)

	PC13		PC15					
	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21
Weighted Input Prices	3.3%	2.9%	3.2%	4.0%	4.0%	4.0%	4.1%	4.1%
RPI	(2.9%)	(2.5%)	(2.4%)	(3.2%)	(3.4%)	(3.2%)	(3.2%)	(3.2%)
Productivity	(0.9%)	(0.9%)	(0.9%)	(0.9%)	(0.9%)	(0.9%)	(0.9%)	(0.9%)
Frontier Shift	RPI-0.5%	RPI-0.5%	RPI-0.1%	RPI-0.2%	RPI-0.4%	RPI-0.1%	RPI-0.1%	RPI-0.1%

Figures may not sum due to rounding

1.2.4 The table highlights the findings of the analysis. Whilst it is very difficult to predict with accuracy so far in advance, the frontier shift given above is the UR's best estimate with the available information. Further detail on the make-up of the frontier shift is contained in the following sections.

2.0 Input Price Inflation

2.1. Input mix

- 2.1.1 In order to estimate input price inflation, we first examine key cost drivers and their relative contributions to total opex.
- 2.1.2 We use an input mix based on representative Ofwat regulated companies, whose expenditure can be categorised into labour, power, materials & equipment, rates, chemicals, bad debt, EA charges and other costs.

Table 2.1 – Input mix for a representative water company

Input	% of Opex
Labour	50
Materials and Equipment	10
Chemicals	2.5
Power	12.5
Rates	10
Environment Agency Charges	5
Bad Debt	5
Other	5
Total	100

Weights may not sum due to rounding

- 2.1.3 NI Water like any other company, is unlikely to experience the exact same make-up of costs as the rest of the industry. This is particularly true given the continued absence of domestic charging. However, it is important that the frontier shift is estimated against a cost input mix as closely aligned to a typical company, and the expected change in industry costs at the frontier.
- 2.1.4 As in PC13, the UR for PC15 has made an amendment to these cost proportions in order to allow for special factors in Northern Ireland, specifically those related to labour and power.
- 2.1.5 This revised input mix, is more representative of a hypothetically efficient Northern Ireland company than a typical England and Wales company, now having a higher proportion of costs relating to power (17% as opposed to 12.5%) due to the higher cost of electricity here relative to Great Britain.
- 2.1.6 Our revised input mix also took into account the lower cost of wages in Northern Ireland, meaning that the proportion of spend relating to labour is lower than originally assumed (47% as opposed to 50%). In order for all proportions to sum to 100%, other categories are adjusted to scale back the sum of the individual elements, once our special factors treatment is factored in. Our revised input mix

as was used in our draft determination frontier shift calculations are shown in the table below.

Table 2.2 – Hypothetical input mix for an efficient water company

Input	% of Expenditure
Labour	47
Materials and Equipment	10
Chemicals	2
Power	17
Rates	10
Environment Agency Charges	5
Bad Debt	5
Other	5
Total	100

Weights may not sum due to rounding

- 2.1.7 NI Water, in their consultation response to our draft determination disputed the UR's contention that NI Water's input mix may not differ significantly from the hypothetical company's input mix as illustrated in Table 2.2 above.
- 2.1.8 The company have stated that once internal PPP-related power and other non-unitary charge related PPP costs are included within any input mix analysis, NI Water's weightings vary from the 'typical company's' by quite a significant degree (23.7% versus the 17.0% highlighted above).
- 2.1.9 These are similar arguments to those advanced at PC13 and which were not accepted on the basis that First Economics, our independent expert advised accordingly:
- "We are not persuaded that we should refocus our work to consider an NI Water specific basket of input types or, by implication, NI Water specific cost pressures. To go down this path would create a methodological inconsistency and a real risk of overlap and double counting in the separate comparative efficiency and frontier shift work."*
- 2.1.10 Our view remains there are structural factors which lie outside of NI Water's control which make power costs higher and labour costs lower in Northern Ireland than in England & Wales and we continue to reflect this in our adjustment of frontier shift hypothetical weightings. This means our frontier shift analysis is aligned on a consistent basis to that of our special factors determination.
- 2.1.11 NI Water states that large substantial increases for power costs are forecast in the frontier shift model going forward. Their revised input mix amounts to £11.0m of additional opex allowance for the company over the six years of PC15 which was not previously provided for in the draft determination by the UR.

- 2.1.12 The company furthermore has stated that they believe the Real Price Effects (RPE) calculation should be reassessed as the weighting attributed to power results in NI Water being significantly underfunded overall.
- 2.1.13 Having considered all the reasoning around the weights used in the frontier shift's input mix, the UR believes it would not be logical to have an analysis to establish how costs within the industry will move over the next six years, but then use NI Water's own weights. This is for the following reasons:
- Any relative efficiency analysis which benchmarks to the efficiency frontier (and any associated catch-up as a result) only accounts for a gap at a particular point in time. In the case for PC15, this is for the 2012-13 base year.
 - The principal rationale for the UR undertaking a frontier shift analysis is to recognise that the efficiency frontier is itself a 'moving target' and that the frontier can *move up or down* each year of the price control depending on industry behaviour. The frontier shift allowances ensure that NI Water can keep pace with the frontier's opex movements over the next six years.
 - If the UR used NI Water's actual weights in its frontier shift work, this analysis would not track what is expected to occur in the wider industry but would *partially* reflect NI Water's particular cost pressures given their company circumstance. The reason why it would only partially reflect NI Water's cost pressures or 'real price effects' is primarily because the UR has used cost increase assumptions which it believes applies to the frontier rather than NI Water. NI Water's preferred approach effectively produces a unique estimate of the change in NI Water's forecast costs overall but would not provide any intelligence on the likely *frontier shift* expected over the price control period.
 - If the frontier shift analysis deviated from its principal objective of estimating the shift in the frontier going forward by using NI Water's actual input weights, the UR considers there would be a requirement to use cost increase assumptions across NI Water's cost base. For example, given NI Water's status it may be the case that the assumptions on nominal labour and power cost increases over the six years of PC15 may be somewhat generous given that they were based on what was expected to happen in a frontier company.
- 2.1.14 In short, increasing NI Water's weights would need to be coupled with possibly reduced input price assumptions to reflect continued public sector wage restraint, and the impact of these factors would likely offset any advantage NI Water may have gained from using its specific weights on power within any revised analysis.
- 2.1.15 It is also the case that it would be preferable for the UR to avoid a piece of analysis which includes a high proportion of spend (14.8%) relating to the 'other' category, which would be the case if the UR adopted NI Water's actual weights.
- 2.1.16 The UR will therefore adopt the same input mix proportions which were used in the draft determination, with these having been based on a broadly representative Ofwat regulated company, adjusted to reflect our special factors treatment of labour and power costs which are materially different to those costs faced by the Ofwat companies within the GB marketplace.

2.2. Macroeconomic outlook

- 2.2.1 Input prices will be heavily dependent upon the performance of the economy. Many bodies focus on GDP growth forecasts. These groups will analyse the effects of global trends, policy changes, spending budgets, tax changes etc in order to form a view on economic growth.
- 2.2.2 In this section, reliance is placed on the forecasts of the Office for Budget Responsibility (OBR), the International Monetary Fund (IMF) and the Northern Ireland Centre for Economic Policy (NICEP).
- 2.2.3 The latest GDP/GVA¹ projections of each are provided below.

Table 2.3 – United Kingdom GDP growth forecasts (%)

Forecaster	2013	2014	2015	2016	2017	2018	2019
OBR ² - GDP	1.8%	2.7%	2.3%	2.6%	2.6%	2.5%	-
IMF ³ - GDP	1.7%	3.2%	2.7%	2.4%	2.4%	2.4%	2.4%

Table 2.4 – United Kingdom and Northern Ireland GVA forecasts (%)

Forecaster	2014	2015	2016	2017	2018	2019
NICEP ⁴ - UK GVA	3.3%	3.3%	3.0%	2.2%	1.9%	-
NICEP – NI GVA	2.8%	2.9%	2.6%	1.8%	1.5%	-

- 2.2.4 The projections all appear to convey a similar message. Reasonable growth initially and in the medium-term, with rates predicted to be steady. However, NICEP forecast lower UK growth by 2017 as the impacts of further budgetary restraint and interest rate rises take hold.
- 2.2.5 In global terms, the GDP outlook is slightly more positive. The IMF and OBR have predicted GDP growth rates for the world at the following rates:

Table 2.5 – Estimates of the world GDP growth rate (%)

Forecaster	2014	2015	2016	2017	2018	2019
OBR	3.8%	3.9%	4.1%	4.2%	4.2%	-
IMF	3.3%	3.8%	4.0%	4.1%	4.0%	4.0%

¹ GVA = Gross Value Added; a measure of output similar to GDP.

² OBR Economic and Fiscal Outlook – March 2014

³ IMF World Economic Outlook – October 2014

⁴ NICEP Outlook: Spring 2014

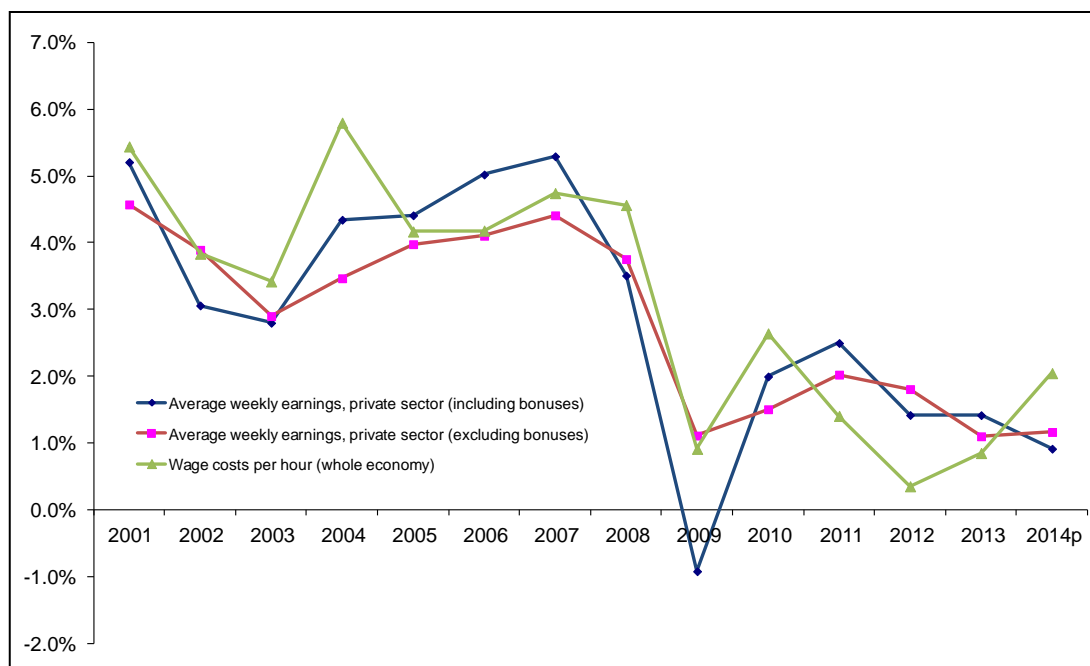
2.2.6 The IMF has indicated that the world outlook is generally positive as countries exit the recession. Advanced economy forecasts have improved since last year with the US predicted to stage a strong recovery. Emerging markets are still doing well, though major threats remain. The dangers of deflation and high levels of debt exist in the Euro area, whilst new geopolitical risks have emerged.

2.3. Wages and salaries

2.3.1 As highlighted above, the single largest component of operational cost is labour. As a result, the forecast movement in labour cost will be a key element of frontier shift.

2.3.2 Since 2001, the rate of private sector labour inflation has averaged about 3% (both including and excluding bonuses). After the recession of 2008, wage growth has been much less buoyant. The last five years has seen earnings rise by approximately 1.5% per annum. Historic changes in wages and salaries are detailed in the figure below.

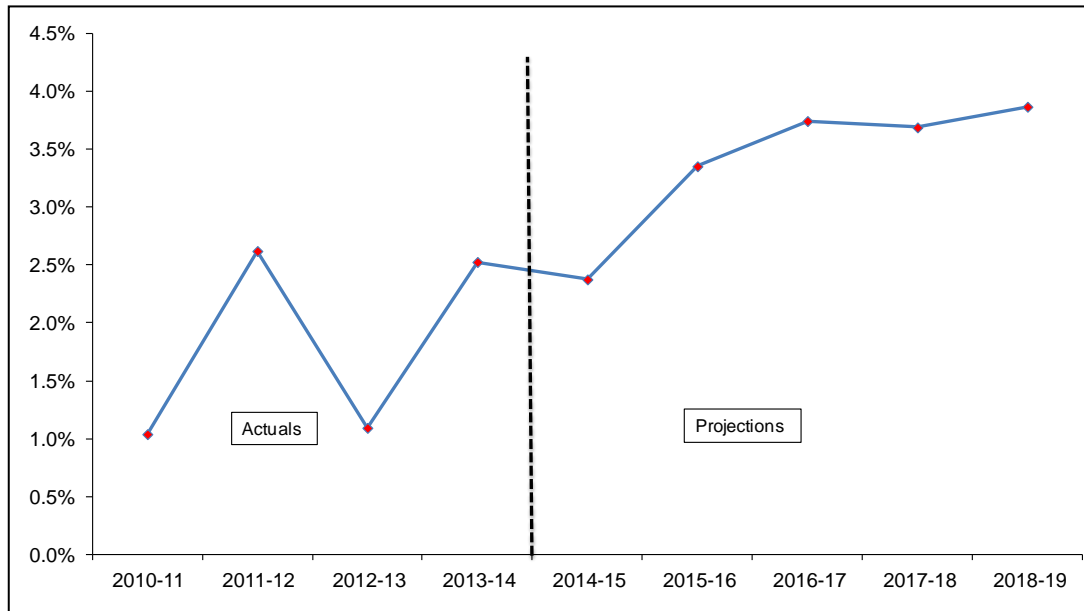
Figure 2.1 – Private sector earnings inflation and whole economy hourly wage costs (% change)⁵



2.3.3 The OBR expects earnings to follow a similar trajectory to GDP.

⁵ Source: Office of National Statistics (ONS) – Monthly Digest of Statistics and the Index of Labour Costs per Hour (ILCH).

Figure 2.2 – Forecast average weekly earnings for the private sector (including bonuses)



2.3.4 Whilst earnings growth is anticipated to be modest in the short-term, the OBR anticipates a return to >3.5% p.a. increases by 2016-17. This inflationary pressure coincides with expected reductions in the unemployment rate and a fall in the amount of spare capacity in the economy.

2.3.5 These projections were used in the draft determination as the forecast for general wage inflation for the water industry.

Table 2.6 – Wage inflation projections (used at draft determination)

Year	Average Earning Growth (%)
2013-14	2.5%
2014-15	2.4%
2015-16	3.4%
2016-17	3.7%
2017-18	3.7%
2018-19	3.9%
2019-20	4.0%
2020-21	4.0%

Source: OBR Economic and Fiscal Outlook – March 2014 figures used up to 2018-19, with UR assumptions used for 2019-20 and 2020-21 years.

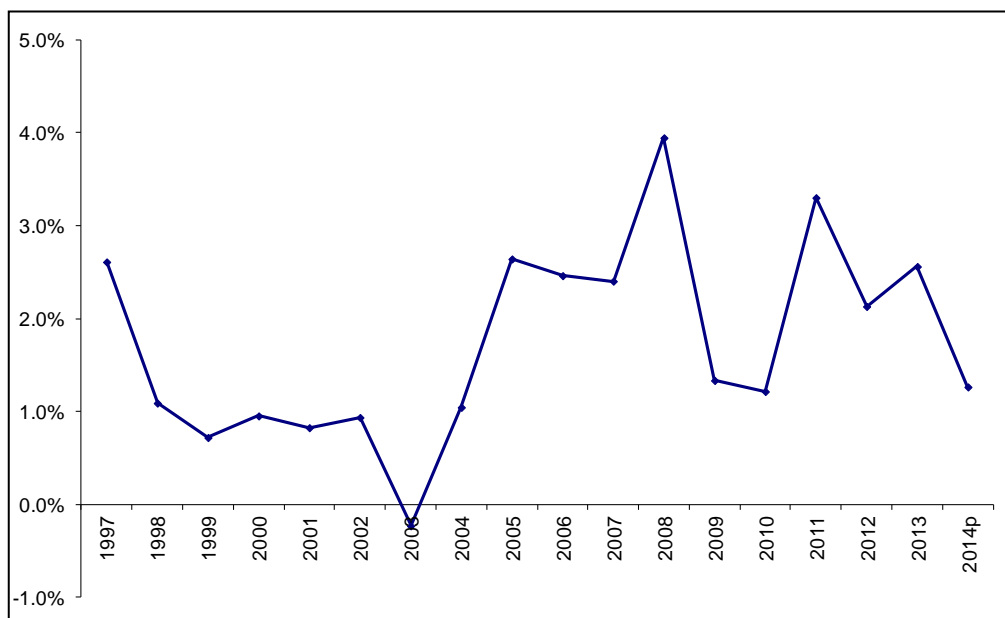
2.3.6 Now that we are over halfway through the 2014-15 year, it is clear in light of new earnings data released since the draft determination that the 2.4% assumption which OBR had for wage growth may be somewhat high.

- 2.3.7 Although the unemployment picture continues to improve, wage growth has remained quite muted, with the latest HM Treasury Independent Forecast Report (November 2014), for example, predicting earnings growth of just 1.1% in 2014-15 and 2.4% in 2015-16.
- 2.3.8 In examining a wide range of data and forecasts since the draft determination, the UR believes that the wage growth estimates for the 2014-15 and 2015-16 years may be relatively high and that the predicted pick-up in wage growth may be delayed somewhat. For the final determination we will therefore change our assumptions for 2014-15 pay growth to 1.7% (previously 2.4%) to partly reflect the new forecasts and will adjust our 2015-16 assumption downwards to 2.5% (previously 3.4%).
- 2.3.9 The medium-to-long term outlook for wage growth still remains positive. As the final determination coincides with OBR's December 2014 data release we have been unable to use any more recent OBR data than March 2014. However, with the Bank of England recently projecting pay to rise by close to 4% by late 2016,⁶ we remain confident that OBR's and UR's projections for pay from 2016-17 onwards remain relevant and so are unchanged from our draft determination.

2.4. Materials and equipment

- 2.4.1 Materials and equipment is a key cost area for water companies. It will include items such as tools, machinery, clothing and equipment necessary to operate and maintain the network. A good indicator of price movements in this area is given by the machinery and equipment price index produced by the ONS.

Figure 2.3 – Annual price changes for machinery and equipment (%)⁷



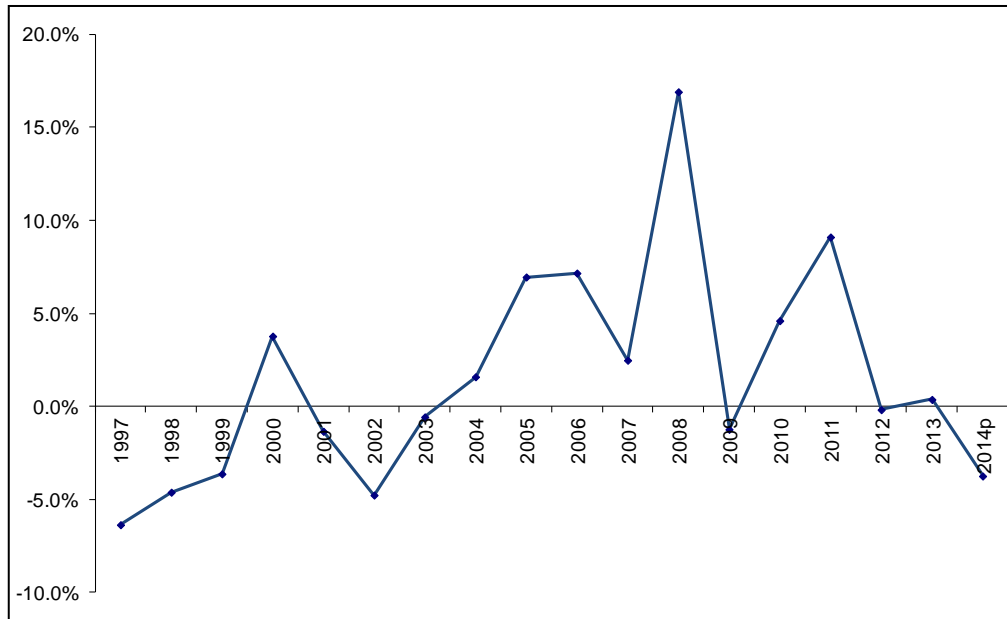
⁶ Page 47 of the Bank of England's Inflation Report (November 2014)

www.bankofengland.co.uk/publications/Documents/inflationreport/2014/ir14nov.pdf

⁷ Source: ONS Producer Price Index – (K389)

- 2.4.2 Despite the recession, equipment prices have consistently risen in the last few years. First Economics attributed this to both the depreciation of sterling and global demand. Since 2010, the increases have followed a 2% p.a. trend. When we use the latest data, released since our draft determination, we can see that the index has an overall average of a 1.7% price increase each year from 1997.
- 2.4.3 By way of a check, our report also looked at the general input price inflation experienced by all manufacturers.

Figure 2.4 – Manufacturing input prices percentage change (excluding food, drink, tobacco and fuel) ⁸

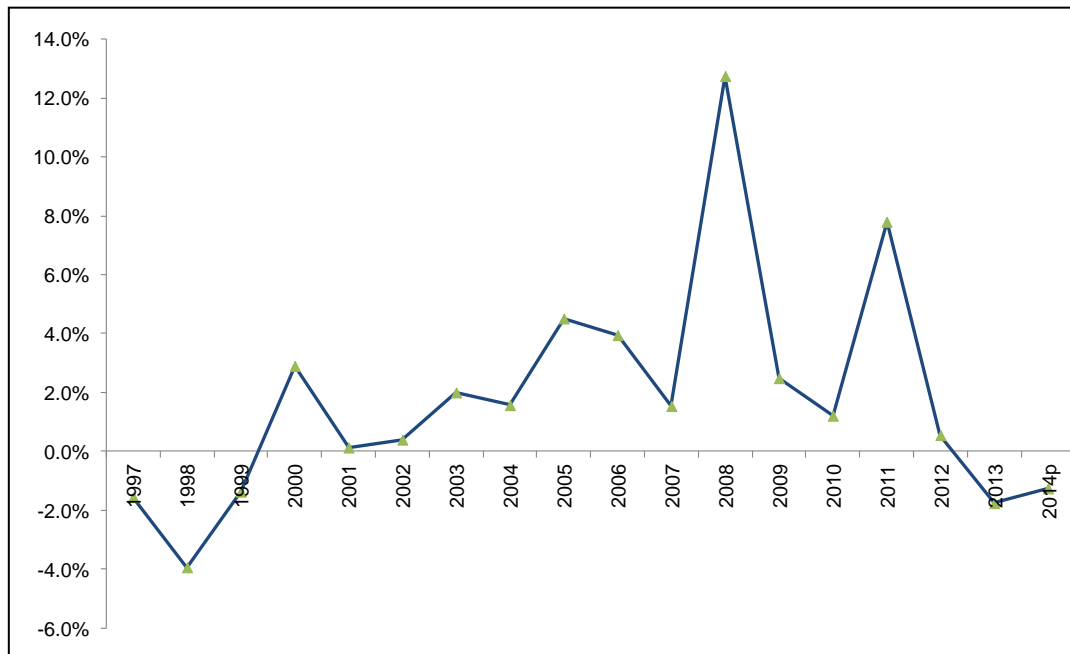


- 2.4.4 Whilst prices can tend to fluctuate, the overall trend since 1997 has been 1.8% per annum price rises. This is similar to the findings for the machinery and equipment index.
- 2.4.5 The analysis suggests that the input price for machinery is going to remain reasonably low. In the absence of further market intelligence, the UR has adopted an average figure of 2.0% per annum price rises for materials and equipment, in line with the long-run average, and unchanged from our draft determination.

2.5. Chemicals

- 2.5.1 The ONS Producer Price Index details the movements in chemical costs from year to year. The chart below shows price changes for chemicals.

⁸ Source: ONS Producer Price Index – (K658)

Figure 2.5 – Chemical prices annual change (%)⁹

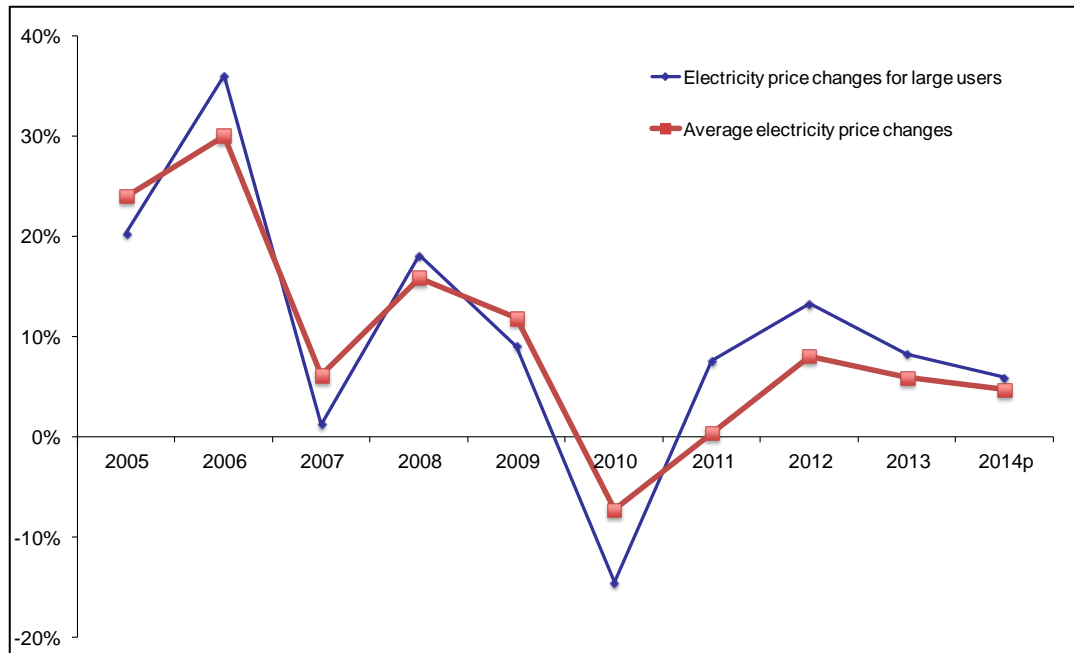
- 2.5.2 The graphic indicates that the price change is generally positive, with a couple of recent exceptions. It is also notable that price increases have mostly continued, in spite of a recession.
- 2.5.3 This can be attributed to two factors. The first is the depreciation of sterling. The second, and more relevant, is the impact of global demand causing raw commodity inflation.
- 2.5.4 When we use the latest data, released since our draft determination, we can see that since 1997, the price growth rate of the chemical indices is roughly 1.9% per annum. It is reasonable however to believe that future prices may be more closely linked to global growth rather than the long-term trend.
- 2.5.5 Chemical price inflation of 3.5% p.a. has therefore been forecast. This represents an average of historic chemical prices and global GDP growth, with a greater weighting given to global growth.

⁹ Source: ONS Producer Price Index – (K37Z)

2.6. Power

2.6.1 Electricity cost is a key component of expense for water and sewage companies. Of late, prices have been quite volatile.

Figure 2.6 – Electricity price changes (%)¹⁰



2.6.2 The graph shows large spikes in price in certain years and some sizeable drops. This demonstrates the somewhat unpredictable nature of energy costs. Since 1997, the overall trend for industrial electricity prices has supported increases of between 5% and 6%.

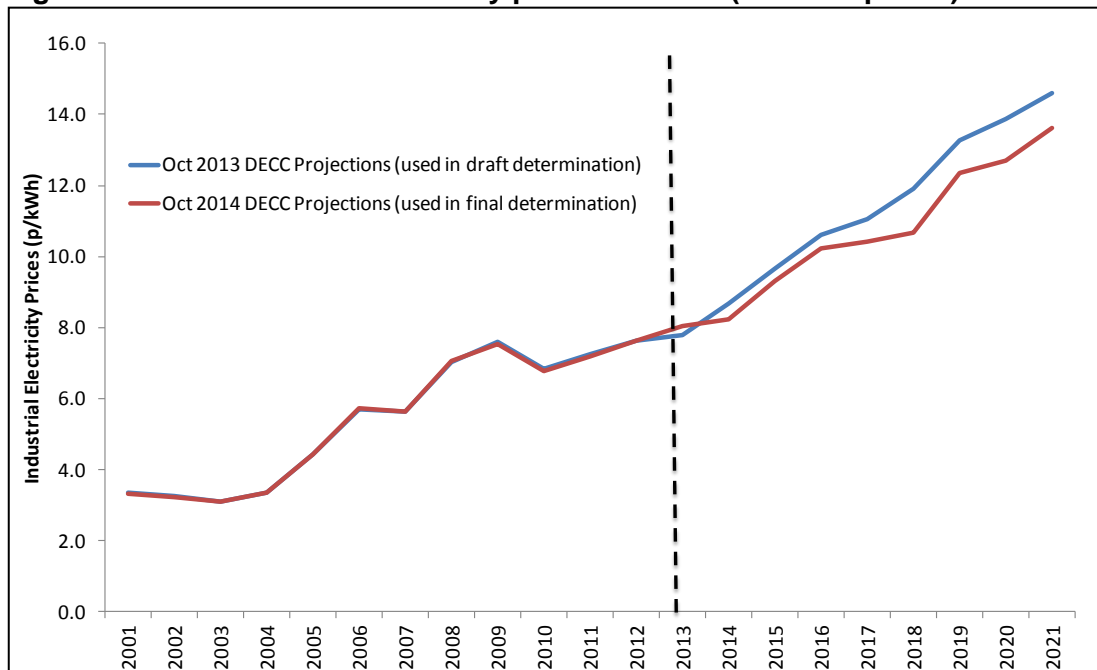
2.6.3 The future of electricity prices for industrial customers is expected to entail large increases above the historical trend. The Department for Energy and Climate Change (DECC) have produced estimates of electricity price growth up to 2035.

2.6.4 Whilst there remains uncertainty around these estimates, DECC's central 'reference' scenario projections are still showing year-on-year increases of a significant magnitude.

2.6.5 Estimations of UK electricity prices for industrial users are detailed below.

¹⁰ Source: Large and average user data is from Department of Energy and Climate Change (DECC), Quarterly Energy Prices – September 2014, Table 3.4.2.

Figure 2.7 – UK industrial electricity price forecasts (Nominal prices)¹¹



2.6.6 The chart shows the expected rise in prices for non-domestic customers. It can be seen that while DECC are forecasting substantial increases in the industrial electricity price during 2015-21, they have lowered their price estimates somewhat in their latest report (October 2014) from what was contained within the previous year’s publication (October 2013) used in our draft determination.

2.6.7 The year-on-year percentage increases are as follows:

Table 2.7 – Industrial electricity price inflation (nominal terms)

Year	Electricity Inflation (%)
2013	5.6%
2014	2.3%
2015	13.3%
2016	9.9%
2017	1.6%
2018	2.6%
2019	15.8%
2020	2.6%

Source: DECC Updated Energy and Emissions Projections 2014

2.6.8 The UR considers these departmental forecasts to be the best available, independent data. However, as these figures are quite volatile over the eight

¹¹ Source: DECC Updated Energy and Emissions Projection 2014

years in question, we have smoothed these input figures into a 6.6% annual increase for each year. This 6.6% figure is in line with the historic average and will have the effect of avoiding large positive and negative swings in the final frontier shift numbers, meaning greater stability in the opex allowance for the company.

2.7. Rates, bad debt and other costs

- 2.7.1 For the purposes of simplicity, it is assumed that rates, environment agency charges and other costs simply move in line with inflation. This mirrors the previous approach at PC13.
- 2.7.2 This is a pragmatic decision given that it is unclear how any rates revaluations in England and Wales will affect costs going forward or whether proposed penny rate freezes become reality or not.
- 2.7.3 By way of a check, the UR analysed historic rates spend for water companies since 1996-97. Findings suggest average increases slightly above RPI but similar to current RPI percentages for the best companies.
- 2.7.4 For bad debts, an above RPI allowance of 4% per annum is made. Analysis of historic costs shows sizeable changes to doubtful debts, particularly in the recent years of recession.
- 2.7.5 Whilst this situation should ease as the economy recovers, financial strain remains within the business community. This risk has been somewhat accounted for by the additional allowance.

3.0 Productivity

3.1. Total factor productivity

- 3.1.1 Total factor productivity, or TFP, is defined as the ratio of total outputs to inputs. This measure will be impacted by changes to labour productivity and capital investment. In this report, the interest is focused on changes to output which are not affected by the normal inputs.
- 3.1.2 If output increases yet inputs remain the same, this is considered a productivity improvement. This is referred to as technological progress.
- 3.1.3 Within the UK water industry there has been a long history of increasing efficiency. Frontier companies reducing staff and costs while at the same time improving water and effluent quality illustrate this.
- 3.1.4 The previous report in PC13 noted that this is not all due to labour productivity progress or better technology. Rather, the industry has profited from a privatization effect and investing in a large quality programme (increasing inputs).
- 3.1.5 This raises the question as to what level of productivity has there been in the industry once these other effects are removed.

3.2. Water industry productivity

- 3.2.1 In order to avoid the impacts of these other water industry variables, First Economics used comparable TFP information from the EU KLEMS¹² data set. This is data produced since 1970 for EU member states on growth, productivity and technology. The most recent data extends to 2009.
- 3.2.2 In terms of analyzing opex trends this report is interested in:
- Manufacturing sectors where a product is being made;
 - Sectors that are involved in maintaining an asset and transporting goods; and
 - Sectors covering financial, scientific, admin and technical services.
- 3.2.3 These sectors are used as a proxy for the water industry as they cover similar activities. The productivity trends in these industries should help reveal the potential for growth for water and sewage companies.
- 3.2.4 The division of labour for WaSC's (Water and Sewage Companies) and the industries chosen for comparison is detailed in the table below.

¹² EU KLEMS refers to European Union countries productivity levels. The inputs included in the measurement are capital (K), labour (L), energy (E), materials (M) and services (S).

Table 3.1 – WaSC activity and comparable industries

WaSC Activity	% of Opex	Comparable Industry
Water resource and treatment Sewage treatment Sludge treatment and disposal	20%	Total Manufacturing
Water distribution Sewerage network	20%	Electricity, gas & water supply Transportation and storage
General and support Customer services Scientific services Other business activities	45%	Finance and insurance Professional, scientific, technical, admin and support services
EA charges Bad debts Other	15%	-

3.2.5 The comparable industries are similar to those chosen at PC13. The exception is the professional and technical sector, which was not used last time. The productivity trends of the industries in question are given below.

Table 3.2 – Annual productivity growth from 1990-2009 (%)

Industry	Per annum productivity growth (%)	Average (%)
Total manufacturing	1.65%	1.65%
Electricity, gas & water supply Transportation and storage	0.23% 0.24%	0.24%
Finance and insurance Professional, scientific, technical, admin and support services	1.82% 0.49%	1.16%

- 3.2.6 The growth trends will vary depending on what years are selected to be analysed. The UR has looked at the trend since 1990. This follows on from the First Economics approach at PC13.
- 3.2.7 It seems a logical method in that it covers a full business cycle from either peak-to-peak or trough-to-trough. In this instance, we use data from the 1990's recession to the first year of the recent recession. The true growth trend could be understated if more recent data is used, since there was a notable fall in general productivity in 2009.
- 3.2.8 Applying the data to the water industry gives an expected level of productivity growth as follows.

Table 3.3 – Weighted industry average for productivity

WaSC Activity	% of Opex	Annual Productivity (%)	Weighted Average (%)
Water resource and treatment Sewage treatment Sludge treatment and disposal	20%	1.65%	0.33%
Water distribution Sewerage network	20%	0.24%	0.05%
General and support Customer services Scientific services Other business activities	45%	1.16%	0.52%
EA charges Bad debts Other	15%	-	-
Weighted Average (%)			0.90%

- 3.2.9 The findings are similar to those of PC13. This is despite the fact that the growth trend in some of the proxy industries has changed quite a lot. For instance, it is noteworthy that the finance and professional services sectors have shown much higher levels of growth than was the case in the previous analysis.
- 3.2.10 The conclusion from the analysis is that the expected level of productivity growth in the water industry is 0.9% per annum. This represents a substantial challenge to NI Water.

3.3. Adjustments

- 3.3.1 No adjustment has been made to these findings to account for capital substitution or catch-up efficiency effects. In the absence of any better data, the UR has adopted the position that the two impacts will largely cancel each other out.

3.3.2 As a result, the 0.9% is taken as the long-run target for productivity in PC15.

3.4. Regulatory precedent

3.4.1 Historical precedent may not always be the best tool to use to predict future real price effects. These tend to be subject to future changes that have not been reflected in past data.

3.4.2 Precedent is however useful when considering levels of productivity. Indeed, historical averages provide the main evidence as to what can be expected going forward.

3.4.3 Across many of the regulated industries, companies and authorities will make an assessment as to what level of productivity might be expected. Recent regulatory decisions are shown in the table below.

Table 3.4 – Recent regulatory decisions on productivity

Decision	RPE	Productivity (%)	Frontier Shift (%)
UR – Water & sewerage PC13 (2012)	RPI + 0.7%	-0.9%	RPI – 0.2%
PPP Arbiter – underground infracos, central costs (2010)	RPI +1.5%	-0.7%	RPI + 0.8%
PPP Arbiter – underground infracos, opex (2010)	RPI + 1.2%	-0.9%	RPI + 0.3%
Ofgem – Gas distribution RIIO – T1/GD1 (2012)	RPI + 0.0%	-0.6%	RPI – 0.6%
Competition Commission – Bristol Water referral (2010)	RPI + 0.4%	-0.9%	RPI – 0.5% ¹³
Competition Commission – NIE referral (2014)	RPI – 0.2%	-1.0%	RPI – 1.1% ¹⁴

3.4.4 Across different sectors and networks, productivity assumptions range from 0.6% to 1% per annum. The findings for the water industry in PC15 (0.9%) are towards the high end of this range.

3.4.5 However, the result of our analysis of productivity growth over time aligns with the most recent Competition Commission findings for NIE.

¹³ Whilst the findings in the table reflect the CC analysis, they settled on a target of RPI – 0.25% for the frontier shift challenge.

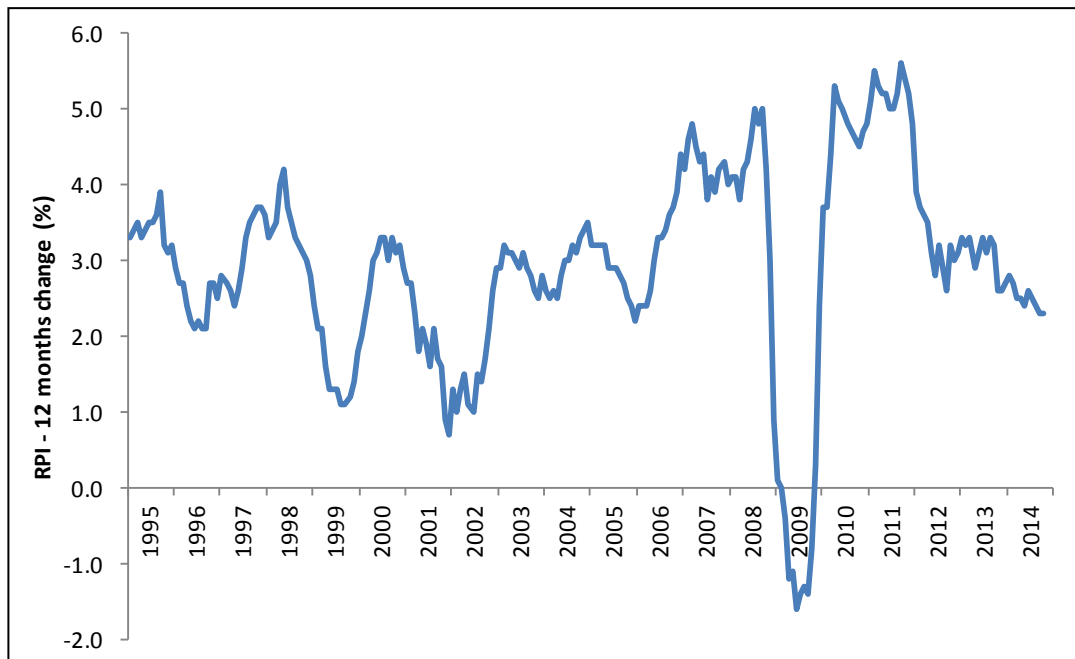
¹⁴ Figures are different for each individual year, but this represents the average position.

4.0 Retail Price Index Projections

4.1. Historic data

- 4.1.1 The final element of the equation relates to inflation. This is measured by RPI, which has long been used in many regulated industries. Historic changes in RPI are given in the figure below.

Figure 4.1 – RPI annual percentage change (monthly data)¹⁵



- 4.1.2 Over the period analysed, RPI has averaged around 3%. In recent years, the trend has been higher because of global demand for raw materials and food among other things, although the index has been falling of late.
- 4.1.3 OBR forecasts in March 2014 had indicated that future growth will be higher than the historic average. This was due to the anticipated increase in interest rates and the knock-on effect to mortgage payments, which are included in RPI.

4.2. RPI forecasts

- 4.2.1 The OBR forecasts of inflation run up to 2018-19. Within their forecasts, they have looked at short-term policy measure impacts such as freezing fuel duty. They have also considered more medium term influences such as house price movements.
- 4.2.2 The latest OBR forecasts (for March 2014) are included in the table below.

¹⁵ Source: Office for National Statistics (ONS).

Table 4.1 – OBR forecasts of RPI percentage changes

Year	RPI Projections (%)
2014-15	2.6%
2015-16	3.3%
2016-17	3.6%
2017-18	3.8%
2018-19	3.9%
2019-20	3.7% ¹⁶
2020-21	3.7% ¹⁷

4.2.3 In the short-term, the projections are quite close to the historic average mentioned above. As PC15 progresses the forecast is for higher inflation. OBR attributes this to the following:

- House prices moving in line with average earnings; and
- Mortgage payments increasing due to expected rise in interest rates.

4.2.4 These figures outlined in Table 4.1 were taken forward as the UR's RPI forecast assumptions for the PC15 draft determination.

4.2.5 For the final determination the UR has reviewed whether the March 2014 OBR RPI forecasts used in our draft determination have been superseded by recent economic developments, especially given the relatively low inflation levels which have been evident of late. Looking at the more recent HM Treasury Comparison of Independent Forecasts from November 2014, we can see that RPI inflation over the medium term is expected to be somewhat lower than what was originally assumed by OBR earlier this year.

4.2.6 For the purposes of this analysis therefore, the UR considers that it would be prudent to use the more recent HM Treasury published figures as they better reflect the current modest economic and inflation outlook. For the remaining years of PC15, the figure of 3.2% is used. This also means our more recent updating of power price inflation is aligned with the more recent inflation forecasts. Consistency of view across the various nominal price forecasts and that for RPI is a key requirement of a robust frontier shift analysis.

4.2.7 As the independent forecasts are in calendar year terms, it is necessary to align each calendar year forecast to a financial year of PC15. For example, we assume the calendar year of 2015 will align to 2015-16 financial year. Our assumptions for RPI in our PC15 frontier shift analysis are given below.

¹⁶ UR assumption at draft determination.

¹⁷ UR assumption at draft determination.

Table 4.2 – Independent Forecasts for RPI

Year	RPI Projections (%)
2014-15	2.5
2015-16	2.4
2016-17	3.2
2017-18	3.4
2018-19	3.2
2019-20	3.2 ¹⁸
2020-21	3.2 ¹⁹

4.2.8 The figures above will therefore be taken forward into our final determination frontier shift calculations.

¹⁸ UR assumption for final determination

¹⁹ UR assumption for final determination

5.0 Frontier Shift Conclusions

5.1. Frontier shift calculation

5.1.1 Combining the results of input prices, inflation and productivity gives the updated targets for PC15 frontier shift.

Table 5.1 – Frontier shift calculations (%)

Nominal Price Change (%)	PC13		PC15					
	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21
Labour	2.5	1.7	2.5	3.7	3.7	3.9	4.0	4.0
Equipment	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Chemical	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Power	6.6	6.6	6.6	6.6	6.6	6.6	6.6	6.6
Rates	2.9	2.5	2.4	3.2	3.4	3.2	3.2	3.2
Bad Debt	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
EA Charges	2.9	2.5	2.4	3.2	3.4	3.2	3.2	3.2
Other	2.9	2.5	2.4	3.2	3.4	3.2	3.2	3.2
Weighted Input Prices (%)	3.3%	2.9%	3.2%	4.0%	4.0%	4.0%	4.1%	4.1%
RPI	(2.9%)	(2.5%)	(2.4%)	(3.2%)	(3.4%)	(3.2%)	(3.2%)	(3.2%)
Productivity	(0.9%)	(0.9%)	(0.9%)	(0.9%)	(0.9%)	(0.9%)	(0.9%)	(0.9%)
Frontier Shift (%)	RPI-0.5%	RPI-0.5%	RPI-0.1%	RPI-0.2%	RPI-0.4%	RPI-0.1%	RPI-0.1%	RPI-0.1%

Figures may not sum due to rounding

- 5.1.2 The analysis indicates an additional real terms challenge in all of the years assessed; however, in the latter stages of the price control period frontier costs are expected to move only slightly below the level of inflation.
- 5.1.3 Whilst it is likely that input prices will rise (most notably electricity costs), it is expected that companies will be well enough compensated by RPI.
- 5.1.4 Combined with anticipated productivity growth this results in a moderate real reduction in allowed opex each year, varying between RPI-0.1% to RPI-0.5%. Over the eight years, the UR's analysis of the frontier shift averages around RPI -0.2%.
- 5.1.5 For sake of completeness and as a sense check, the UR has compared these final frontier shift numbers, which are based on a hypothetical England and Wales frontier company, with its own internal analysis of what a fully efficient

frontier company would experience in Northern Ireland (given current circumstances and assuming NI Water was at the frontier of the water industry).

- 5.1.6 By using the input weights which NI Water included in its consultation response, but coupling this with the UR's assessment of likely local inflation forecasts for the company (such as on labour), it is the case that NI Water are not at a detriment overall by our continued frontier shift approach compared to their preferred alternative (as discussed in Section 2.1 above).