

# FORECASTS OF COMMON PERFORMANCE COMMITMENTS

Report for Yorkshire Water

August 2018



This document provides forecasts for four of the common performance commitments over AMP7. Using three separate approaches, we estimate the potential percentage change in performance levels that could occur in the next price control period. We apply these percentage changes to the shadow reporting / Environment Agency data, to provide forecast levels for the frontier, upper quartile and lower quartile of the performance commitments. These forecasts can be used by Yorkshire Water to inform its performance commitment levels and thresholds for enhanced incentive rates.

At PR19, companies are expected to set four performance commitment levels at no lower than the forecast industry upper quartile (UQ) level. This is the case for: water supply interruptions; internal sewer flooding; pollution incidents; and leakage. In addition, thresholds for enhanced outperformance and underperformance payments will be set relative to the industry frontier and lower quartile (LQ). Within this context, this document provides forecasts of industry performance levels.

We forecast performance using three approaches:

- **Approach 1** generally consists of estimating an autoregressive process using seven years of historical data of company-level performance. The estimated annual percentage change is used to extrapolate company-level performance; and then the change in the frontier, upper quartile and lower quartile are computed. This approach is slightly different for pollution incidents because we have a longer time series of the metric that will be used for PR19.
- **Approach 2** consists of calculating the annual percentage change in frontier, upper quartile and lower quartile of the PR14 performance commitments, and assuming this level of improvement persists in the future.
- **Approach 3** assumes that performance improves at a rate based on total factor productivity estimates.

All of the above approaches are based on the extrapolation of previous trends and assumptions. We have not taken into account factors such as the maximum (best) level technically attainable, the efficient level, or the time required to make further improvements (although conceptually, 'approach 3' should, in principle, address the first two issues to a certain extent). We also have not made assumptions about 'how hard' companies will try to improve performance in the future, or the effects of the PR19 regime.

Drawing our various analyses together, the following table summarises our forecasts for the annual percentage change in the frontier, upper quartile and lower quartile for the four performance commitments (note, leakage has two measures).

Table 1: Annual forecast percentage change in the frontier, upper quartile and lower quartile levels over AMP7

	Approach 1	Approach 2	Approach 3
<b>Supply interruptions</b>			
Frontier	9.6%	0.0%	1.1%
Upper quartile	9.5%	2.1%	1.1%
Lower quartile	7.8%	5.9%	1.1%
<b>Internal sewer flooding</b>			
Frontier	7.6%	1.1%	1.1%
Upper quartile	6.6%	3.6%	1.1%
Lower quartile	5.4%	5.9%	1.1%
<b>Pollution incidents</b>			
Frontier	9.8%	1.6%	1.1%
Upper quartile	9.4%	2.7%	1.1%
Lower quartile	7.2%	5.6%	1.1%
<b>Leakage (per km of mains)</b>			
Frontier	1.5%	0.3%	1.1%
Upper quartile	0.8%	1.1%	1.1%
Lower quartile	-0.9%	1.2%	1.1%
<b>Leakage (per connection)</b>			
Frontier	2.1%	1.6%	1.1%
Upper quartile	1.0%	2.7%	1.1%
Lower quartile	0.1%	5.6%	1.1%

Source: *Economic Insight*

Furthermore, in the following we show what our forecasts mean in relation to Yorkshire Water setting its performance commitments and enhanced incentive rate thresholds. The table below shows the forecast UQ levels (in measures consistent with Yorkshire Water’s performance commitments)<sup>1</sup> over AMP7 based on ‘approach

<sup>1</sup> For example, internal sewer flooding levels are presented in units. Whereas, the underlying calculations are based on properties flooded internally per 1,000 properties, to ensure like-for-like treatment of different sizes companies.

2' – Yorkshire Water's preferred approach. These are essentially the lower bound for Yorkshire Water's performance commitment levels.

Table 2: Forecasts UQ levels based on 'approach 2' (measures consistent with Yorkshire Water's performance commitments)

	2020-21	2021-22	2022-23	2023-24	2024-25
Supply interruptions	00:06:31	00:06:22	00:06:14	00:06:06	00:05:59
Internal sewer flooding	401	386	372	358	345
Pollution incidents	129	125	122	119	116
Leakage (based on per km of mains)	205	203	201	199	198
Leakage (based on per connection)	199	194	190	186	182

Source: *Economic Insight*

The following table shows the forecast 2019-20 frontier and LQ levels based on 'approach 2'. These can be used by Yorkshire Water as the thresholds for enhanced outperformance and underperformance payments. Consistent with Ofwat's methodology, these levels represent our best estimate of what the 'current' frontier and LQ will be at the time of the price control determination.

Table 3: Forecast 2019-20 frontier and LQ levels based on 'approach 2' (measures consistent with Yorkshire Water's performance commitments)

	Frontier	Lower quartile
Supply interruptions	00:01:18	00:19:32
Internal sewer flooding	284	603
Pollution incidents	95	152
Leakage (based on per km of mains)	152	288
Leakage (based on per connection)	190	262

Source: *Economic Insight*

The following sections of this note consist of: background and context; our approach to forecasting performance; and forecast annual percentage changes in the frontier, upper quartile and lower quartile.

## 1. Background and context

The relevant background and context to the work presented in this document is detailed below.

### **For four of the comparative performance commitments, Ofwat expects companies to set performance commitment levels to at least the forecast upper quartile**

At PR19, there will be a mix of common and bespoke performance commitments. Ofwat expects companies to set stretching performance commitment levels based on a range of approaches including, but not limited to: cost-benefit analysis; comparative information; historical information; minimum improvement; maximum level attainable; and expert knowledge.

More specifically, within the 14 common performance commitments, Ofwat identified three that companies will have to set performance commitment levels for that are at least at the forecast industry annual upper quartile level.

*“...for three of the common performance commitments, which have particularly good-quality data and where there is no clear reason why companies should not be achieving the same stretching level of performance, we expect companies to set their commitment levels to at least the forecast upper quartile level in each year of the price control.”<sup>2</sup>*

These three performance commitments are:

- ***water supply interruptions;***
- ***internal sewer flooding;*** and
- ***pollution incidents.***

In addition, Ofwat is challenging companies to set stretching ***leakage*** performance commitment levels that, among other conditions, achieve forecast upper quartile performance – or justify why it is not appropriate.

### **Enhanced payments will be set relative to the current frontier and current lower quartile**

Further to the ‘standard’ incentive rates that will be applied to performance commitments, Ofwat is encouraging companies to propose higher outperformance payments for very high levels of performance. These enhanced outperformance payments will only be applicable to common performance commitments which are based on comparable data (at least the four outlined above, as we understand it). Conditions for enhanced outperformance payments include:<sup>3</sup>

- An enhanced outperformance payment rate must be accompanied by an enhanced underperformance penalty rate for below-standard, poor and unacceptable performance.
- The threshold for an enhanced outperformance payment should be set at the performance level of the current leading company (i.e. the frontier), or preferably

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<sup>2</sup> *‘Delivering Water 2020: Our final methodology for the 2019 price review’.* Ofwat, December 2017, p54.

<sup>3</sup> *‘Appendix 2: Delivering outcomes for customers’.* Ofwat, December 2017, p84-85.

higher (for example, including a forecast improvement in addition to that performance level).

- The enhanced outperformance payment threshold is not dynamic, but set out in advance at PR19. The threshold could be set in advance to increase year by year.
- Ofwat expects that enhanced underperformance penalties would apply at least at the current lower quartile of company performance.

Given the above context, this note focuses on forecasting the upper quartile, lower quartile and frontier for the four identified performance commitments.

### **Ofwat has provided some guidance on forecasting the UQ, and expects companies to develop their own approaches**

Ofwat is not prescriptive about precisely how the UQ should be forecasted. In particular, it states:

*“We are not providing guidance to companies on forecasting upper quartile performance so that companies can individually consider what stretching performance will look like in 2020-25 and we can learn from those different approaches.”<sup>4</sup>*

However, the following relevant guidance is provided:

- Ofwat expects companies to forecast appropriate initial service levels for 2019-20, and for these to influence the level of their performance commitments.
- Performance commitments are expected to be set based on annual performance figures, except for per capita consumption (PCC) and leakage, where three-year averages will be used.
- Companies are expected to set performance commitment levels for all five years of the price review period, and projections for at least a further 10 years (20 years for leakage – see below).
- Where there is not a continuous historical time series, companies should use the best information they have available at the time to propose performance commitments based on a percentage change. For example, performance commitment levels could be set at a percentage reduction relative to 2019-20 outturn performance.
- Furthermore, where there is insufficient actual data to set performance commitments that use three-year averages:
  - companies should use back-cast data for 2017-18 and 2018-19, and forecast data for 2019-20, to calculate a three-year average baseline, against which changes can be measured; and
  - companies should use three-year averages from year 1 of the price control onwards, when reporting their performance. In July 2021, for example, companies report 2020-21 data, and back-cast data for 2018-19 and 2019-20, to calculate the three-year average.

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<sup>4</sup> *‘Appendix 2: Delivering outcomes for customers’. Ofwat, December 2017, p54.*

- For leakage, companies are expected to set performance commitment levels that achieve the forecast upper quartile performance in relation to: leakage per property per day; and leakage per kilometre of main per day. If performance commitment levels are not set to achieve the upper quartile, robust evidence and a strong rationale is required. In addition:
  - leakage performance commitments should be set as percentage reduction compared with the baseline three-year average;
  - performance commitment levels could be set at the company-wide or sub-company regional level;
  - companies must provide a performance commitment for five years and projections for leakage levels for a minimum of 20 more years; and
  - companies should justify their leakage performance commitments relative to the minimum level of leakage achievable (Unavoidable Annual Real Losses – UARL) using either the EU definition or the UK-specific definition.

**Limitations in historical data have been recognised, and shadow reporting against standard definitions has started**

At PR14, companies set a number of performance commitments on similar, but not identically defined, metrics. In particular, for five performance commitments, Ofwat compared companies’ performance and calculated the upper quartile. To make this direct comparison, various (sometimes imperfect) adjustments had to be made to the underlying data. Three of the PR14 comparative performance commitments are also PR19 common performance commitments.

Recognising the benefits of standard definitions, Ofwat and companies have begun work on defining, collecting and reporting certain newly standardised metrics. Based on the latest definitions, Ofwat has shared with companies ‘shadow’ reporting data for three of the PR19 common performance commitments for 2016/17 and 2017/18 (this work is also referred to as ‘convergence data’).

The table below illustrates whether each of the performance commitments that this note forecasts was a comparative performance commitment at PR14 and whether a new standardised definition is being applied at PR19.

Figure 1: performance commitment characteristics

	PR14 comparative performance commitment	New standardised metric being defined ('convergence')
Water supply interruptions	✓	✓
Internal sewer flooding	✓	✓
Pollution incidents	✓	
Leakage		✓

Source: Economic Insight

The implications of the above are that:

- For water supply interruptions and internal sewer flooding there is a historical time series (from Ofwat's PR14 assessment and reported performance against performance commitments), but the PR19 performance commitments will be set against a different metric. Ofwat developed an approach to make comparisons between different water supply interruption and internal sewer flooding metrics at PR14.
- For pollution incidents, there is a historical time series available from PR14 and performance against commitments. However, the common measure that will be used at PR19 will include category 1-3 pollution incidents, whereas most of the historical data only reflects category 3 pollution incidents. Nevertheless, there is a five year historical time series of the Environment Agency's measure that will be used for PR19 performance commitments.
- For leakage, whilst it was not a comparative performance commitment at PR14, there is historical data available. The PR19 performance commitments will be set using a new metric, which doesn't precisely align with the available historical data.

## 2. Our approach to forecasting performance

We have forecast performance using three separate approaches that are based on either the historical level of performance improvement or the level of ‘expected’ performance improvement over AMP6. We estimate percentage changes, and then apply these to either the shadow reporting data or, in the case of pollution incidents, data from the Environment Agency.

Our forecasts can be seen as an extrapolation of quantitative performance metrics. Importantly, our forecasts do not explicitly take account of factors such as the maximum (best) level technically attainable, the efficient level, or the time required to make further improvements – although approach 3 does address these limitations to a certain extent. Furthermore, we do not make assumptions about ‘how hard’ companies will try to improve performance in the future, or the effects of the PR19 regime.

However, our forecasts are based on a thorough quantitative and objective analysis based on the best information available to us. There are a multitude of options available in relation to ‘how’ to forecast future performance and the three options that we have chosen give rise to a plausible range of results.

The three forecasting approaches we have used are detailed below.

### 1. Forecast company-level performance based on an autoregressive time series process

This approach forecasts future company-level performance based on previous percentage changes in performance. With the exception of pollution incidents, we use Ofwat’s PR14 approach to comparative analysis and recent performance data. For pollution incidents, we use the Environment Agency data for the number of historical pollution incidents.

We estimate the annual percentage performance improvement using an autoregressive time series approach. This model estimates the ‘best fit’ annual percentage from the time-series of the outturn performance. The econometric model is:

$$y_t = \alpha y_{t-1} + e_t$$

Where  $y_t$  is the performance level achieved in period  $t$ ,  $\alpha$  is the autoregressive coefficient, and  $e_t$  is the random disturbance term. If  $\alpha$  equals 0.9, for example, the model estimates there is an underlying 10% reduction in the time series each year (abstracting from the random noise captured in the disturbance term). We assume that the estimated  $\alpha$  for each company remains constant over the forecast period.

More specifically, for supply interruptions, internal sewer flooding and leakage, our first forecasting approach consists of the following steps.

- Actual performance levels, as measured against companies’ performance commitments, from 2014/15 to 2017/18, are converted into the standardised and normalised measure that Ofwat used at PR14 to undertake comparative analysis. For example, this converts company metrics of sewer flooding incidents into the number of properties that experience sewer flooding.

- The standardised and normalised measures of company performance for 2011/12, 2012/13 and 2013/14 that Ofwat used to set the upper quartile at PR14 are taken.
- The above gives a seven-year time series of Ofwat's PR14 standardised and normalised performance measure for each company.
- An autoregressive coefficient is estimated for each company, as per the model set out above.
- The estimated autoregressive coefficients are applied to each company's 2017/18 performance level and each subsequently forecast performance level up to 2024/25.
- The frontier, upper quartile and lower quartile are calculated based on the forecasts of company-level performance.
- The percentage changes from the above are then applied to the average of the 2016/17 and 2017/18 frontier, upper quartile and lower quartile from the shadow reporting data to give estimated levels. The percentage changes are applied to the average of the last two years, rather than just the last year, to reflect the likely degree of variance around the broader trend. That is, the average is intended to better reflect the 'underlying' performance level, and strip out the annual 'noise' that is apparent in the measures.

For pollution incidents, a similar approach is taken, except:

- Actual performance levels are taken from the Environment Agency's Water Company Performance Reports. These provide a measure for category 1-3 pollution incidents and category 1-2 pollution incidents. We understand these are consistent with the metric that will be used to measure PR19 performance commitments. We use the available 5-year historical time series (2013-2017).
- The number of category 1-2 pollution incidents is subtracted from the number of category 1-3 pollution incidents. This is because no category 1-2 pollution incidents should occur over AMP7.
- We then normalise the measure for each company to the number of incidents per 10,000km of sewer.
- Welsh Water's performance is not reported by the Environment Agency, and therefore we use its pollution incidents performance as reported against its performance commitment.
- The autoregressive forecasting approach as described above is then applied.
- The percentage changes are applied to the average of the 2016 and 2017 frontier, upper quartile and lower quartile performance to give estimated levels.

## **2. Forecast industry levels based on improvements in PR14 performance commitment levels**

In this approach, industry levels are assumed to continue to improve at the rate implied by the improvement in PR14 performance commitment levels over AMP6.

More specifically, our second forecasting approach consists of the following steps.

- Performance commitments for each year of AMP6, along with the 2014/15 'starting level' are converted into Ofwat's standardised and normalised measure used to undertake comparative assessments at PR14.
- The frontier, upper quartile and lower quartile are calculated for the standardised and normalised performance commitments.
- The percentage improvement in the frontier, upper quartile and lower quartile from the 2014/15 starting level to 2024/25, is calculated. The equivalent annual percentage improvement is then calculated.
- This annual percentage improvement is applied to the average of the frontier, upper quartile and lower quartile from the last two years of the shadow reporting data / Environment Agency data to give a forecast levels up to the end of AMP7.

## **3. Forecast industry levels based on total factor productivity**

With this approach, we assume that industry levels will improve at the historic rate of total factor productivity in the water sector.

A recent Frontier Economics report on productivity improvement in the water sector since privatisation finds that total factor productivity averaged 1.0% per year without an adjustment for quality, and 2.1% per year with an adjustment for quality.<sup>5</sup> The difference between these two growth rates (1.1%) is the improvement in quality, holding constant costs and the volume of outputs. We think this figure best reflects the general service improvement that we are concerned with.

More specifically, our third forecasting approach consists of the following step.

- An annual improvement rate of 1.1% is applied to the average frontier, upper quartile and lower quartile of the last two years of the shadow reporting / Environment Agency data to forecast performance levels up to the end of AMP7.

Note, as observed TFP includes both catch up and frontier shift, strictly speaking it reflects the 'average' quality gains that have been delivered by the industry historically regarding service quality. As such, when thinking about its application to forecasting benchmarking performance, this would seem to imply:

- that it most likely 'overstates' the improvement in the 'frontier' over PR19;
- that similarly, it 'may' overstate the improvement in the UQ level over PR19; and conversely
- it may understate the improvement in the LQ over PR19.

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<sup>5</sup> *'Productivity improvement in the water and sewerage industry in England since privatisation'. Frontier report for Water UK, September 2017.*

Another important consideration in relation to using the TFP rate is that it does not reflect variation between different outcome areas. That is, the four outcomes that we are modelling may be further ahead, or further behind, the frontier compared to all outcomes on average – and as such the TFP estimate could be adjusted up or down to reflect where each outcome is relative to the average. Regardless, the TFP benchmark does provide a conceptually helpful ‘anchor point’ to compare the other approaches to – and the differences between this, and other methods, raises important questions that will require further consideration.

### 3. Forecast annual percentage changes in the frontier, upper quartile and lower quartile

In this section we detail, for each of the common performance commitments, how we have estimated the annual percentage change in frontier, upper quartile and lower quartile using approach 1 and approach 2.

#### 3.1 Water supply interruptions

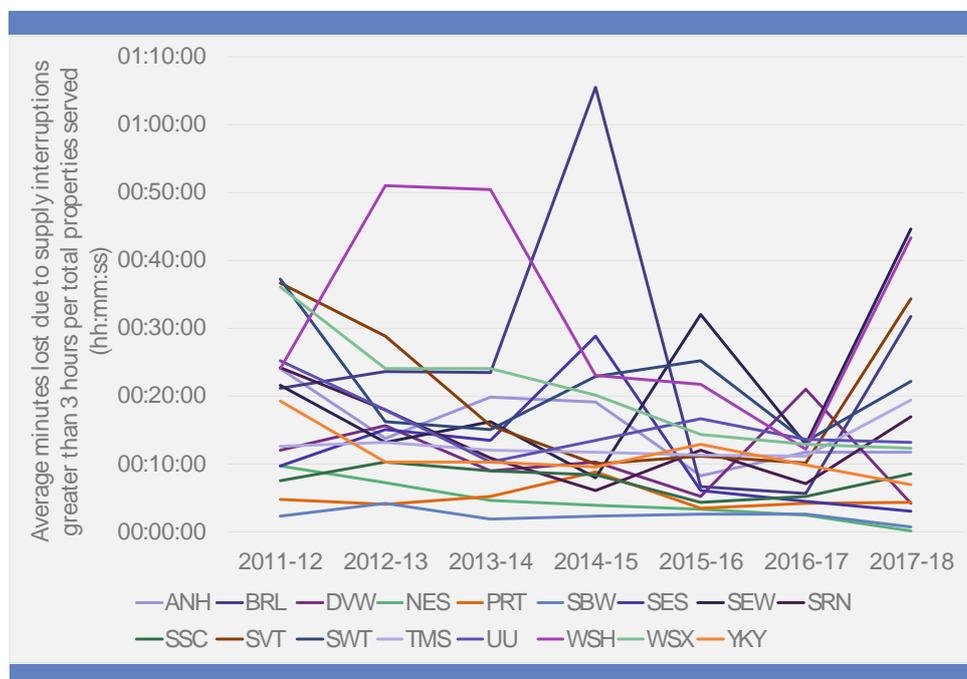
##### Approach 1

The figure below shows the profile of water supply interruptions for each company based on the standardised measure used by Ofwat at PR14 (old definitions) over 2011/12 to 2017/18.

Adjustments to the performance reported by companies include:

- converting all measures to minutes;
- for Bristol Water, converting its measure that is based on all supply interruptions to the comparative definition of supply interruptions of greater than 3 hours (based on the CMA's approach);
- for Thames Water, converting its measure that is based on supply interruptions of greater than 4 hours to the 3 hour definition (based on Ofwat's PR14 approach); and
- in two years where there is a missing data point, the value is assumed based on observations before and (if available) after it.

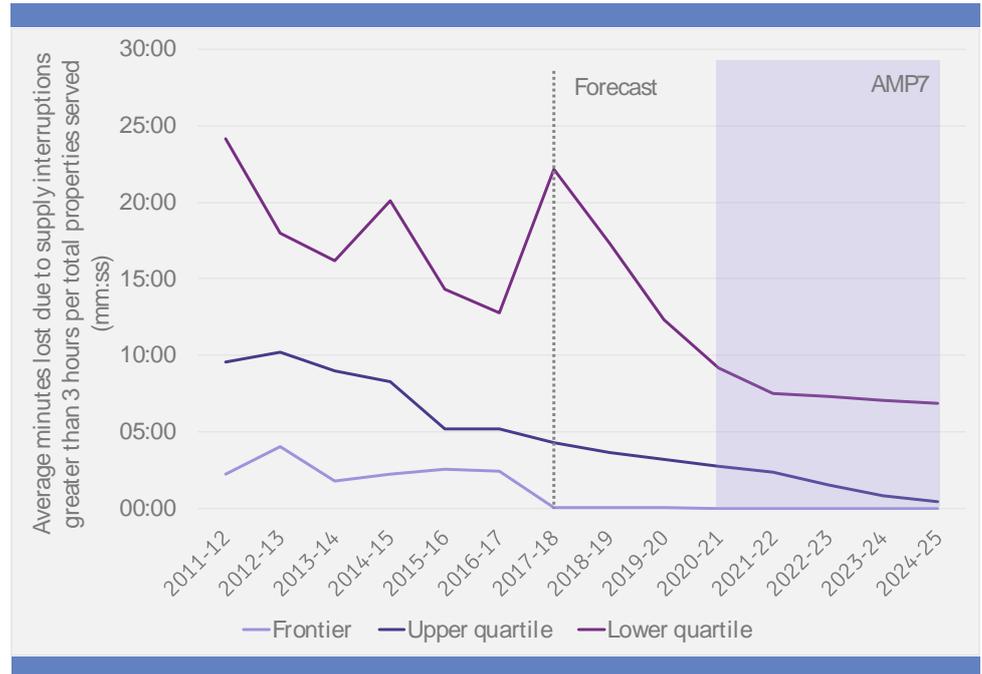
Figure 2: Standardised historical supply interruptions performance (old definitions)



Source: Economic Insight analysis

Projecting forward the performance of each firm, based on an estimated autoregressive process, gives rise to the forecasted frontier, upper quartile and lower quartile shown on the following chart.

Figure 3: Approach 1 – standardised forecast supply interruptions (old definitions)



Source: Economic Insight analysis

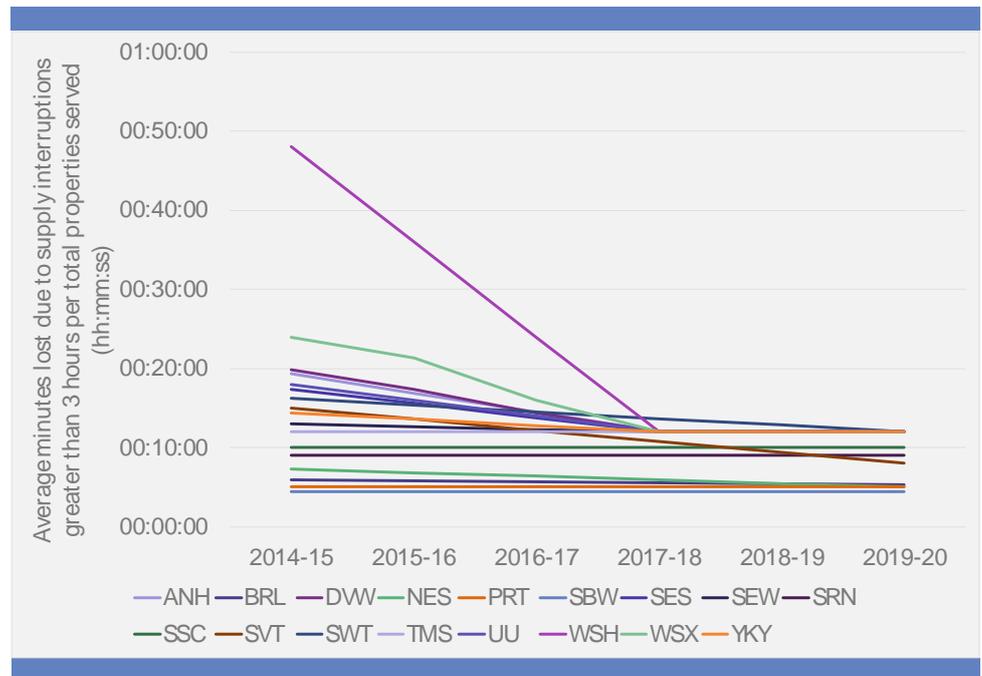
These forecasts suggest that the supply interruption performance measures will decrease annually by the following amounts:

- » Frontier 9.6%
- » Upper quartile 9.5%
- » Lower quartile 7.8%

## Approach 2

The standardised PR14 performance commitments, along with the 2014/15 starting level, are shown below. Similar adjustments are made to the underlying data as per approach 1.

Figure 4: Standardised PR14 supply interruptions performance commitments and starting levels (old definitions)



Source: Economic Insight analysis

The above performance commitments are such that the following annualised percentage improvements would be made from 2014/15 to the end of AMP7:

- » Frontier 0.0%<sup>6</sup>
- » Upper quartile 2.1%
- » Lower quartile 5.9%

<sup>6</sup> Bournemouth Water has the best starting level. Its performance commitment is to maintain that level, which is also the best performance commitment in all years of the AMP.

### 3.2 Internal sewer flooding

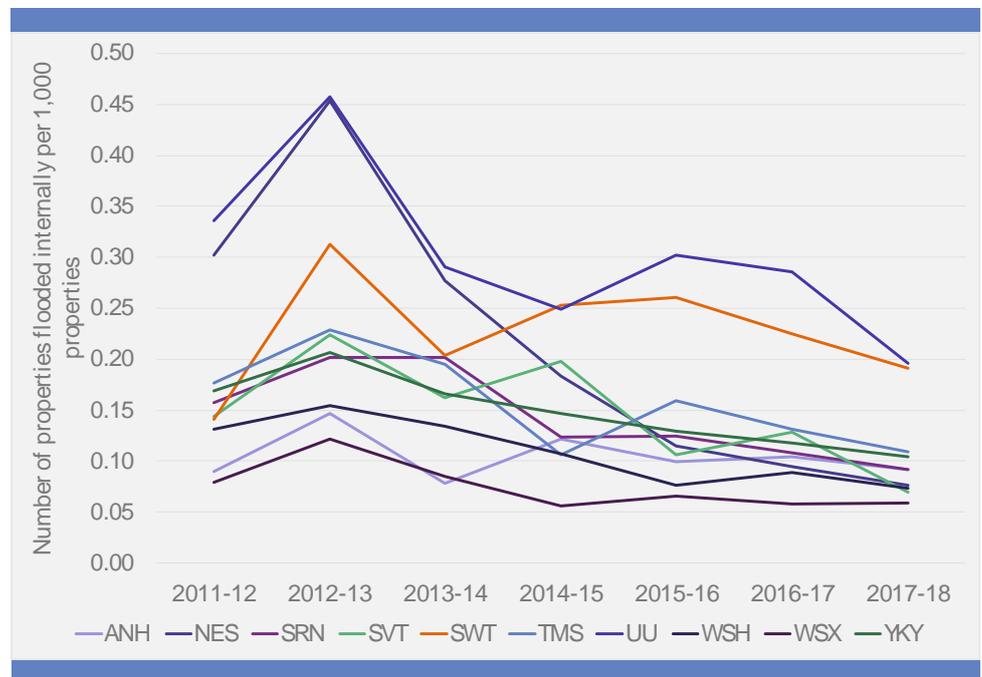
#### Approach 1

The figure below shows the profile of internal sewer flooding performance for each company based on the standardised measure used by Ofwat at PR14 (old definitions) over 2011/12 to 2017/18.

Various adjustments are made to the underlying data, including, as per the approach used by Ofwat at PR14:

- removing an estimate of flooding related to transferred assets; and
- adjusting measures to be based on properties per year, rather than incidents per year.

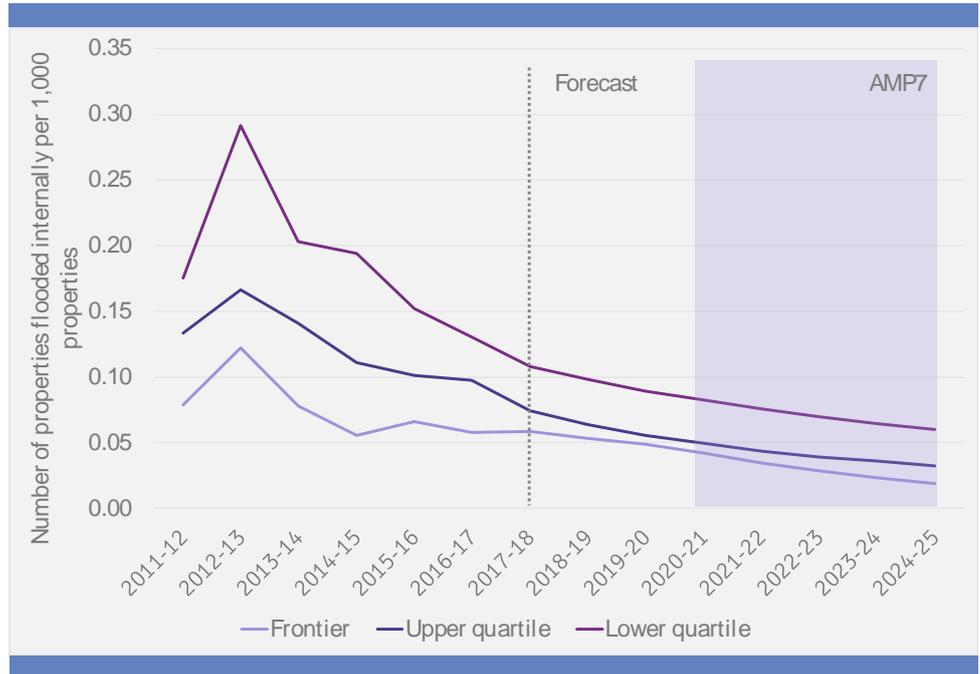
Figure 5: Standardised historical internal sewer flooding performance (old definitions)



Source: Economic Insight analysis

Projecting forward the performance of each firm, based on an estimated autoregressive process, gives rise to the forecasted frontier, upper quartile and lower quartile shown on the following chart (which is based on the old definitions).

Figure 6: Approach 1 – standardised forecast internal sewer flooding (old definitions)



Source: Economic Insight analysis

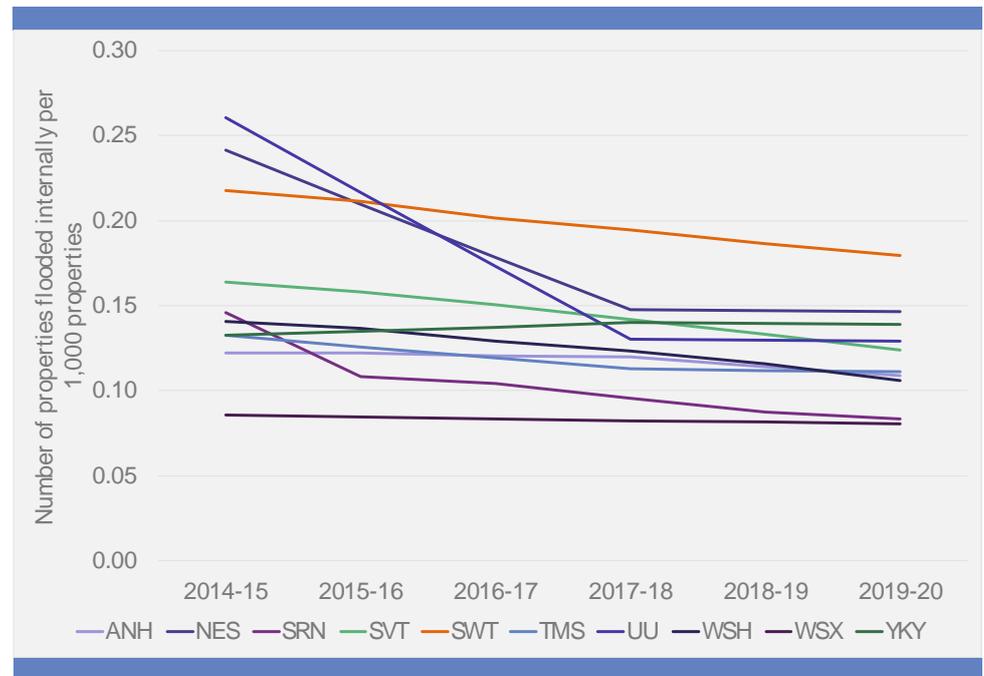
These forecasts suggest that the supply interruption performance measures will decrease annually by the following amounts:

- » Frontier 7.6%
- » Upper quartile 6.6%
- » Lower quartile 5.4%

## Approach 2

The standardised PR14 performance commitments, along with the 2014/15 starting level, are shown below. Similar adjustments are made to the underlying data as described under approach 1.

Figure 7: Standardised PR14 internal sewer flooding performance commitments and starting levels (old definitions)



Source: Economic Insight analysis

The above performance commitments are such that the following annualised percentage improvements would be made from 2014/15 to the end of AMP7:

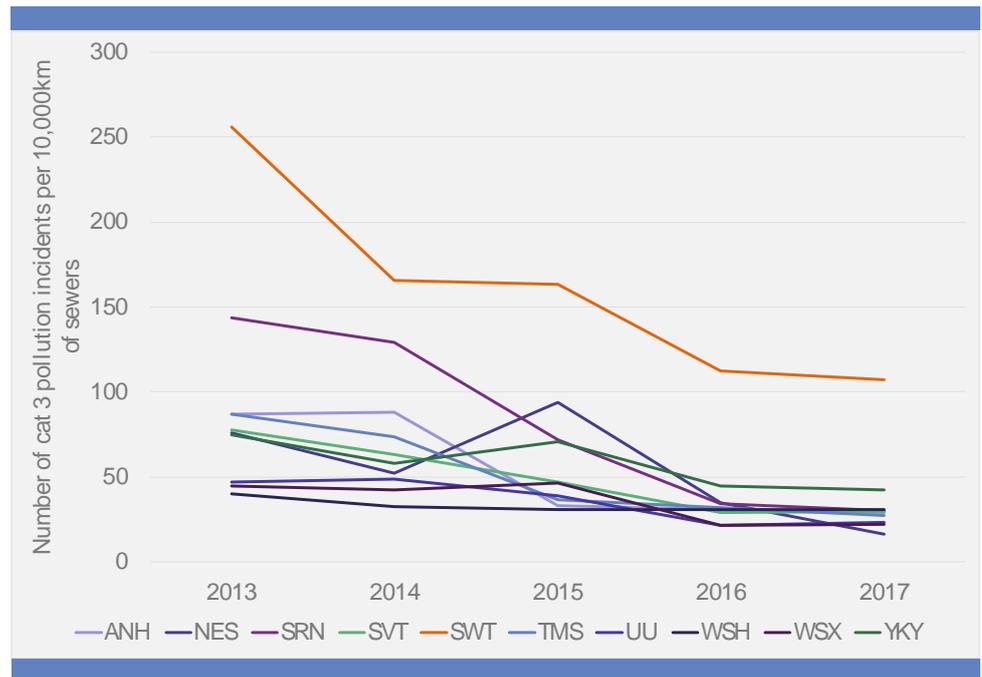
- » Frontier 1.1%
- » Upper quartile 3.6%
- » Lower quartile 5.9%

### 3.3 Pollution incidents

#### Approach 1

The figure below shows the profile of pollution incidents performance for each company based on the normalised measure of category 3 pollutions, which is based data from the Environment Agency. Figures for Welsh Water are based on its reported performance against its performance commitment, as it is not included within the Environment Agency data.

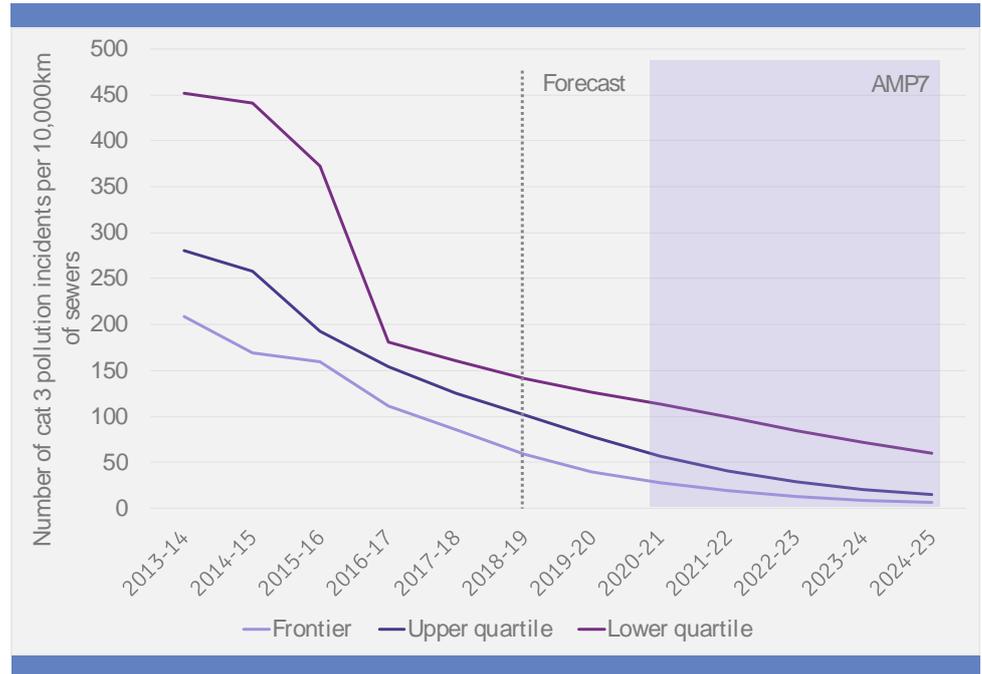
Figure 8: Standardised historical pollution incidents performance



Source: Economic Insight analysis

Projecting forward the performance of each firm, based on an estimated autoregressive process, gives rise to the forecasted frontier, upper quartile and lower quartile shown on the following chart.

Figure 9: Approach 1 – standardised forecast pollution incidents



Source: Economic Insight analysis

These forecasts suggest that the pollution incidents performance measures will decrease annually by the following amounts:

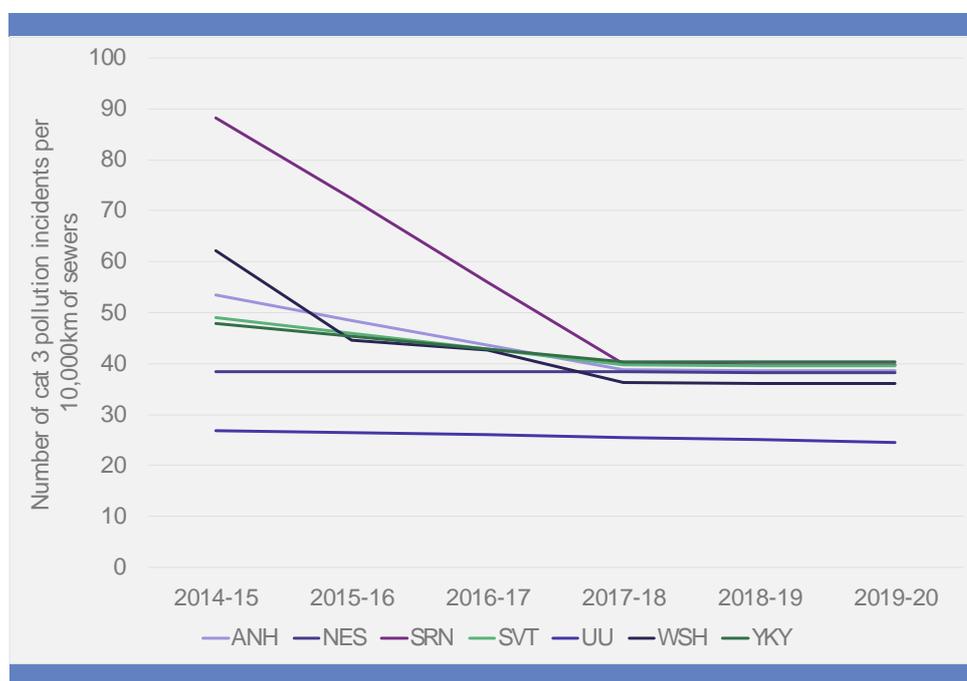
- » Frontier 9.8%
- » Upper quartile 9.4%
- » Lower quartile 7.2%

## Approach 2

The standardised PR14 performance commitments, along with the 2014/15 starting level, are shown below. Three companies have been excluded from this analysis because their performance commitments are set and reported based on a different metric, and there is not an established method for adjusting them to a comparative metric. These companies are:

- South West Water, which uses category 3 and 4 pollution incidents;
- Thames Water, which uses category 1, 2 and 3 pollution incidents; and
- Wessex, which uses the EA's Environmental Performance Assessment standing.

Figure 10: Standardised PR14 pollution incidents performance commitments and starting levels (old definitions)



Source: Economic Insight analysis

The above performance commitments are such that the following annualised percentage improvements would be made from 2014/15 to the end of AMP7:

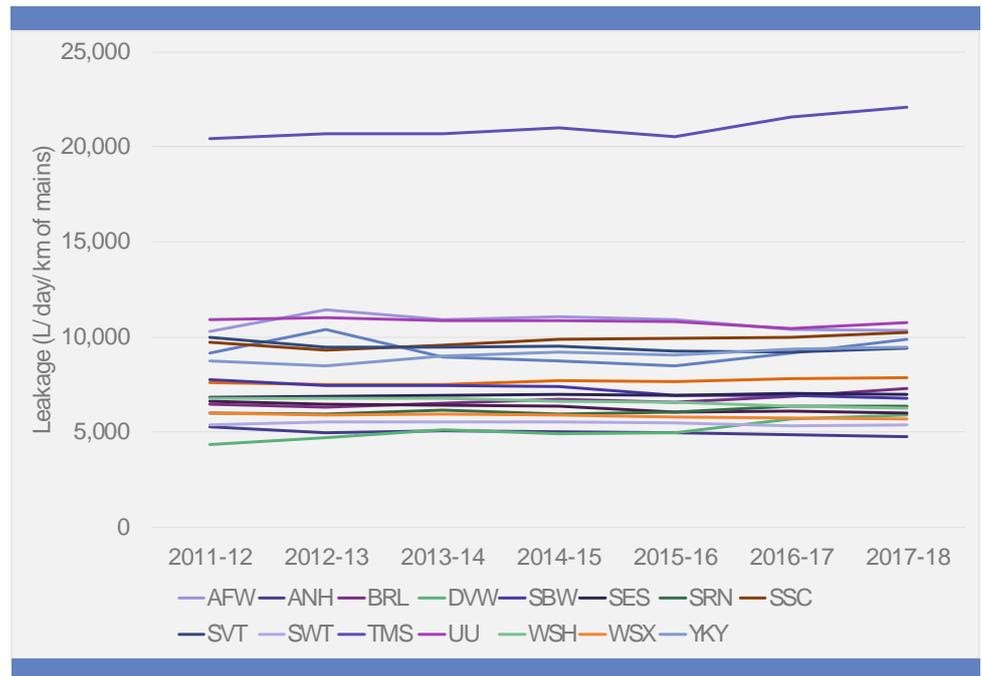
- » Frontier 1.6%
- » Upper quartile 2.7%
- » Lower quartile 5.6%

### 3.4 Leakage

#### Approach 1

The figure below shows the profile of leakage performance for each company over 2011/12 to 2017/18, based on the current definitions used for performance commitments, and normalised by km of mains. Minor adjustments have been made to the underlying data to take account of, for example, the units used and missing data. Data has also been aggregated to the company level i.e. where companies report leakage at a regional level this has been added together.

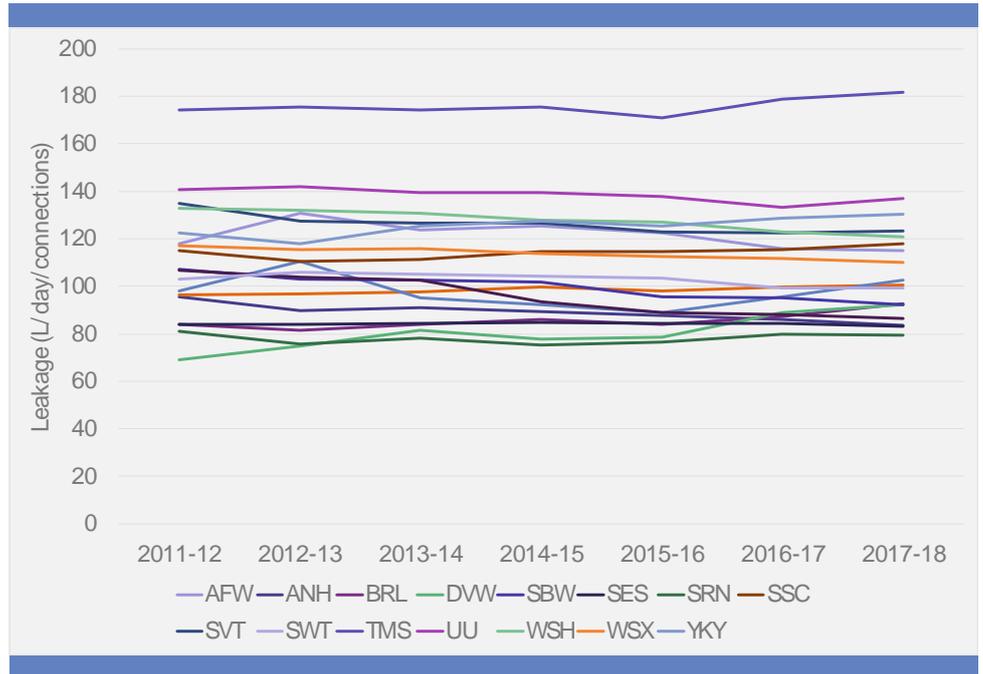
Figure 11: Standardised historical leakage per km of mains performance (old definitions)



Source: Economic Insight analysis

Similarly, performance is shown normalised by number of connections in the following figure.

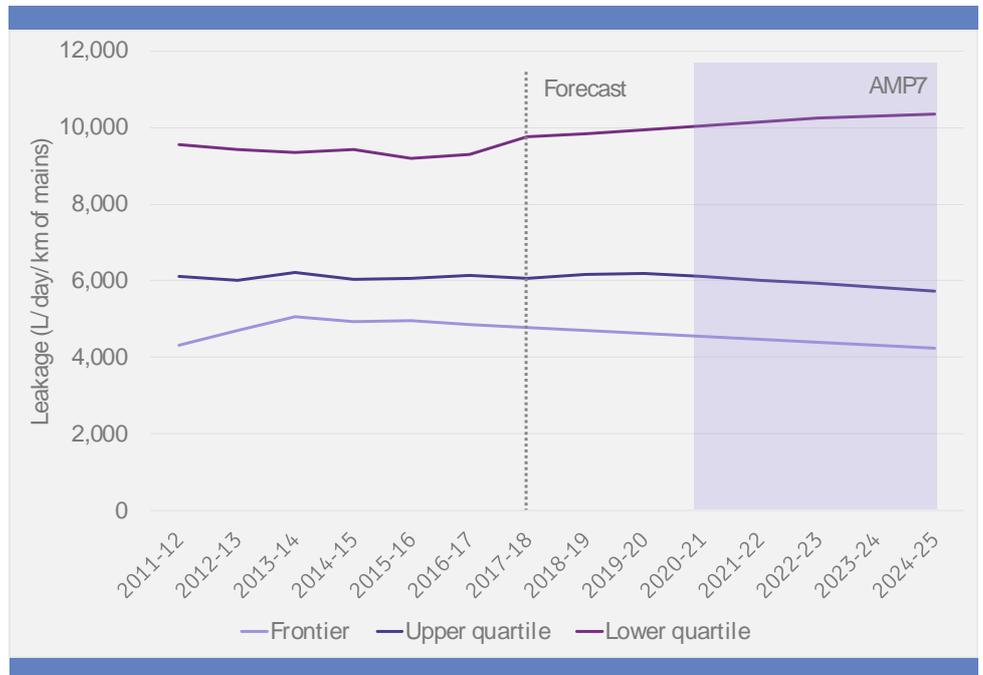
Figure 12: Standardised historical leakage per connection performance (old definitions)



Source: Economic Insight analysis

The company level performance for both normalised measures of leakage are projected forward based on an estimated autoregressive process, as is shown on the following charts.

Figure 13: Approach 1 – standardised forecast leakage per km of mains (old definitions)

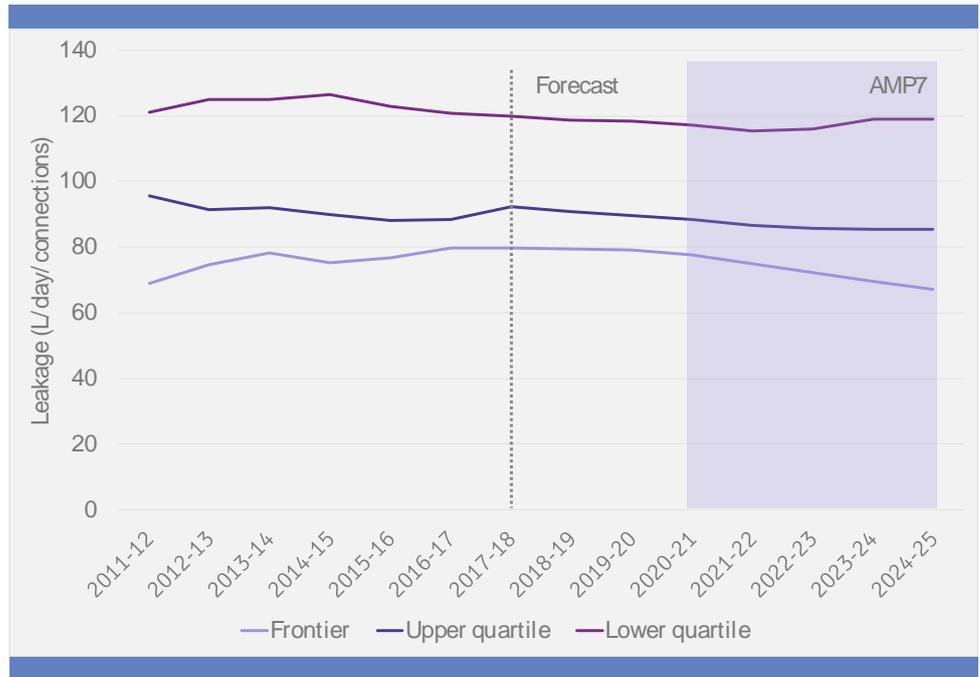


Source: Economic Insight analysis

These forecasts suggest that the leakage per day per km of mains will decrease annually by the following amounts:

- » Frontier 1.5%
- » Upper quartile 0.8%
- » Lower quartile -0.9%<sup>7</sup>

Figure 14: Approach 1 – standardised forecast leakage per connection (old definitions)



Source: Economic Insight analysis

These forecasts suggest that the leakage per day per connection will decrease annually by the following amounts:

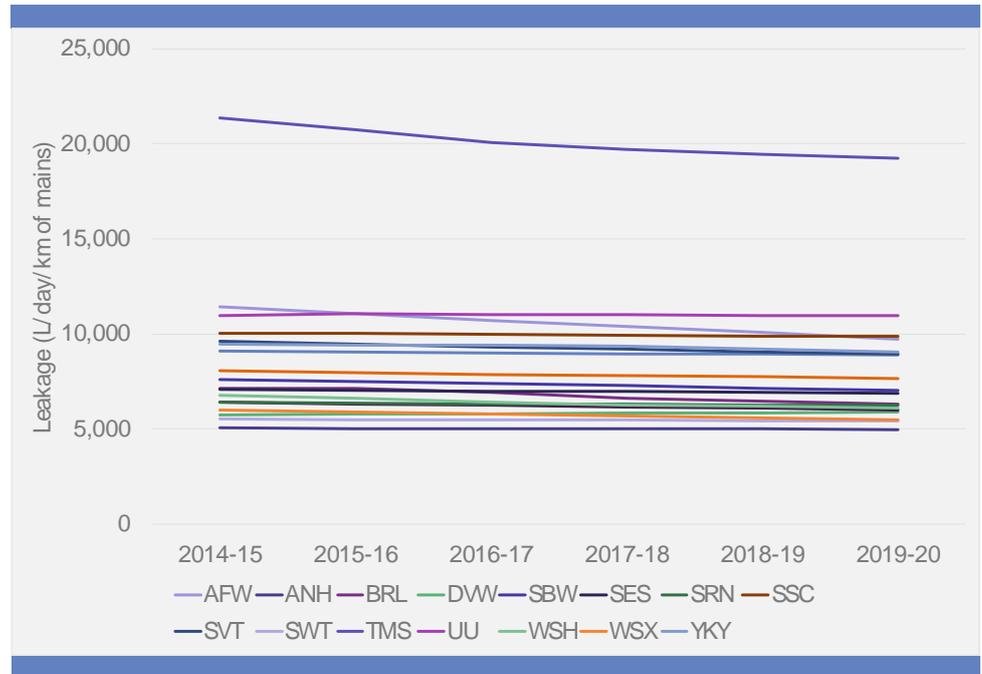
- » Frontier 2.1%
- » Upper quartile 1.0%
- » Lower quartile 0.1%

<sup>7</sup> This is equivalent to an increase of 0.9% per annum in leakage.

## Approach 2

The standardised PR14 performance commitments, along with the 2014/15 starting level, are shown below. Similar adjustments have been made to the underlying data as described above for approach 1.

Figure 15: Standardised PR14 leakage performance commitments and starting levels per km of mains (old definitions)

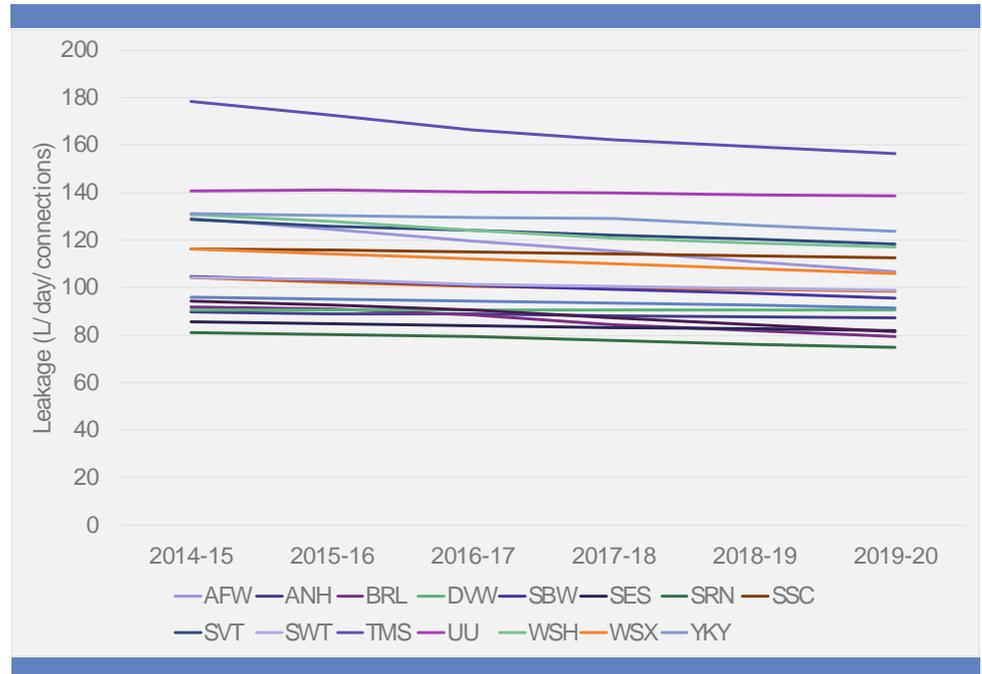


Source: Economic Insight analysis

The above performance commitments are such that the following annualised percentage improvements would be made from 2014/15 to the end of AMP7:

- » Frontier 0.3%
- » Upper quartile 1.1%
- » Lower quartile 1.2%

Figure 16: Standardised PR14 leakage performance commitments and starting levels per connection (old definitions)



Source: Economic Insight analysis

The above performance commitments are such that the following annualised percentage improvements would be made from 2014/15 to the end of AMP7:

- » Frontier 1.6%
- » Upper quartile 2.7%
- » Lower quartile 5.6%

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