

SOUTH STAFFS WATER: ESTIMATES OF WATER POVERTY

South Staffs Water is interested in estimates of water poverty across its water supply areas to inform the development of its PR24 Business Plan. In particular, it is interested in understanding the population who may be considered relevant for support through the social tariffs that it offers.

CEPA has been commissioned to run our water poverty modelling suite to estimate water poverty rates in the areas served by South Staffs Water, based on current bills and incomes, and based on bills and incomes for a representative year in AMP8. In this note, we present the resultant estimates. They are consistent with our 2021 study of water poverty levels in 2019/20, conducted on behalf of Water UK.¹ While we have used the same modelling suite and the same methodology as our 2021 study, we have updated assumptions and inputs as necessary under the direction of South Staffs Water.

The remainder of this note is structured as follows:

- In Section 1, we present detailed estimates of water poverty for the areas served by both South Staffs Water and Cambridge Water, at different water poverty thresholds and assuming different income growth assumptions.
- In Section 2, we briefly summarise the methodology we have used to produce these estimates of water poverty, and also document the key inputs and assumptions that have changed from our 2021 study.
- In Section 3, we present descriptive statistics of bills and income and how they evolve over time.

This note is accompanied by a spreadsheet that provides full modelling results.

1. MODELLING RESULTS

Water poverty incidence

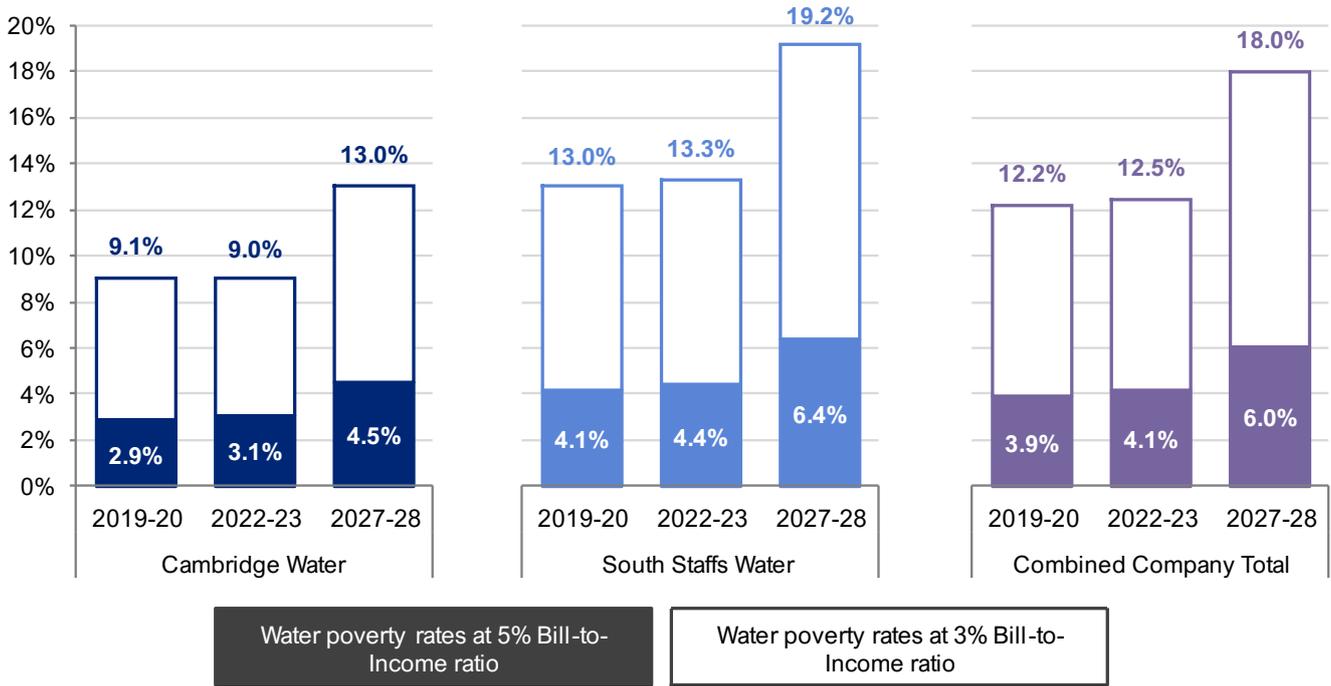
Water poverty incidence with discounted tariffs

In Figure 1 below, we present estimates of water poverty incidence based on existing social tariff interventions, under a 3% bill-income threshold definition of water poverty and a 5% bill-income definition.² While our estimates stay relatively constant between 2019/20 and 2022/23, at both the 5% and 3% bill-to-income ratios, they increase by approximately 45% between 2022/23 and 2027/28. This percentage increase in water poverty incidence for 2027/28 is broadly consistent, for both Cambridge Water and South Staffs Water supply areas, and at both the 5% and 3% bill-to-income ratio definitions of water poverty.

¹ CEPA (2021) Quantitative analysis of water poverty in England and Wales – A report for Water UK. Available at <https://www.water.org.uk/wp-content/uploads/2021/04/Quantitative-analysis-of-water-poverty-in-England-and-Wales.pdf>

² In line with common approaches to assessing water poverty we focus on two thresholds at which a household might be defined as water poor: a 3% and a 5% ratio of bills to income. Throughout this report, we present water poverty rates at a 3% and 5% threshold, i.e. the proportion of households within an area that have bills that make up more than 3% or more than 5% of their disposable income.

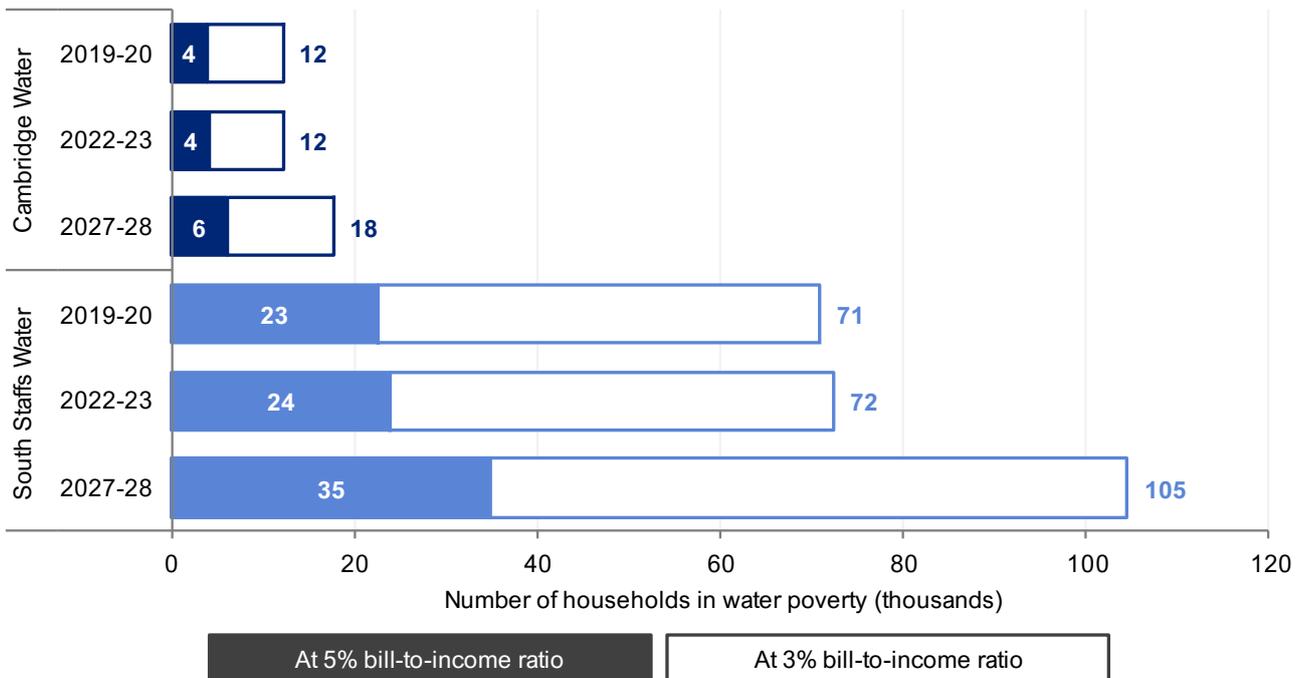
Figure 1: Estimates of water poverty based on existing social tariff interventions.



Source: CEPA analysis of South Staffs Water data

In Figure 2 below, we translate the water poverty rates from the chart above into estimates for the numbers of households in water poverty based on existing social tariff interventions.

Figure 2: Estimates of number of households in water poverty within the South Staffs water supply areas based on existing social tariff interventions.



Source: CEPA analysis of South Staffs Water data

Water poverty incidence without discounted tariffs

In the absence of the social tariff interventions we have modelled, the incidence of water poverty increases, as shown in Table 1. From the table, we can observe the following:

- The reduction in estimated water poverty as a result of social tariff interventions is greater in 2027/28 than it is in 2019/20 and 2022/23.
- The social tariff interventions result in a relatively greater reduction in water poverty within the South Staffs water supply areas than within the Cambridge water supply areas.
- At a 5% bill-to-income ratio threshold, the social tariff intervention is estimated to have reduced water poverty by approximately 30% in 2022/23, and is estimated to reduce water poverty by a similar proportion in 2027/28.

Table 1: Water poverty rates within the South Staffs water supply areas without social tariff interventions

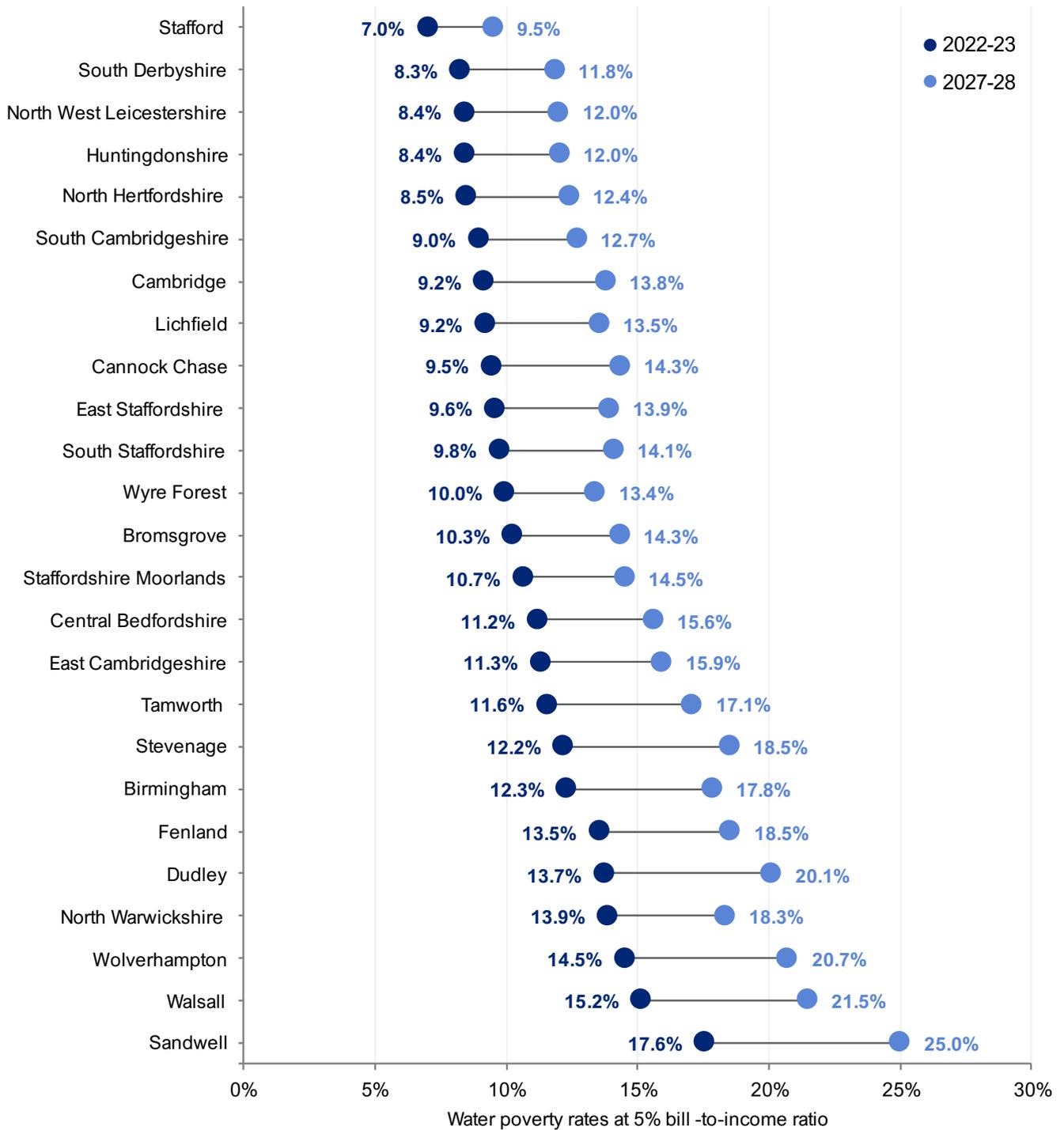
	Water poverty at 5% bill-to-income ratio			Water poverty at 3% bill-to-income ratio		
	2019-20	2022-23	2027-28	2019-20	2022-23	2027-28
Water poverty rates without social tariff intervention						
Cambridge Water	3.1%	3.5%	5.0%	9.4%	9.7%	13.8%
South Staffs Water	5.5%	6.6%	9.0%	16.2%	17.1%	23.6%
Combined	5.1%	6.0%	8.2%	14.9%	15.6%	21.7%
Percentage point reduction in water poverty rates as a result of social tariff						
Cambridge Water	-0.2%	-0.4%	-0.5%	-0.4%	-0.7%	-0.8%
South Staffs Water	-1.4%	-2.2%	-2.6%	-3.2%	-3.8%	-4.4%
Combined	-1.2%	-1.8%	-2.2%	-2.7%	-3.2%	-3.7%

Source: CEPA analysis of South Staffs Water data

Geographic variation

To illustrate the geographic variation in water poverty, we present estimated water poverty rates by local authority in the figure below. In the figure, we show estimates of water poverty at a 5% bill-to-income ratio in 2022/23 and 2027/28. We can see that the change in water poverty between 2022/23 and 2027/28 is not uniform – excluding local authorities where fewer than 5,000 households are served, the increase in water poverty between the two modelled years ranges from 42% in Walsall to 52% in Cannock Chase.

Figure 3: Water poverty rates by local authority at 5% bill-to-income ratio

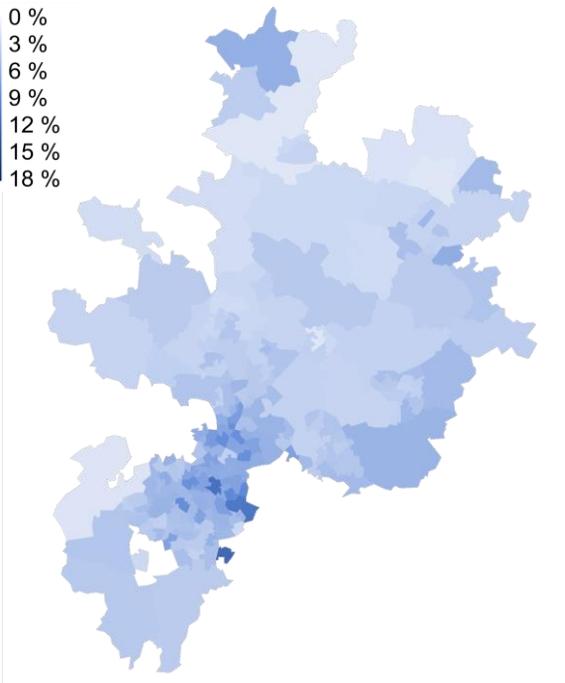
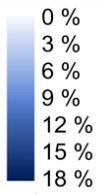


Source: CEPA analysis of South Staffs Water data

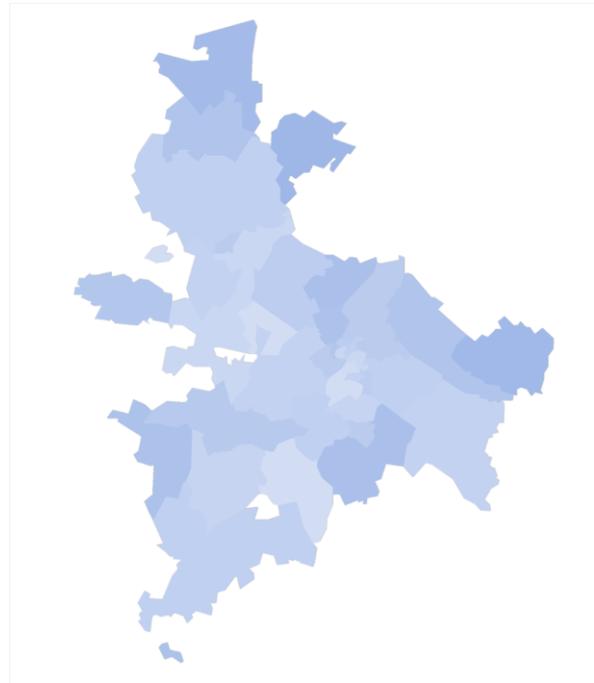
In the figure below, we map how water poverty rates are expected to change between 2022/23 and 2027/28 for the South Staffs water supply areas.

Figure 4: Estimated water poverty rates at 5% threshold in 2022/23 and 2027/28

Estimated water poverty in 2022/23

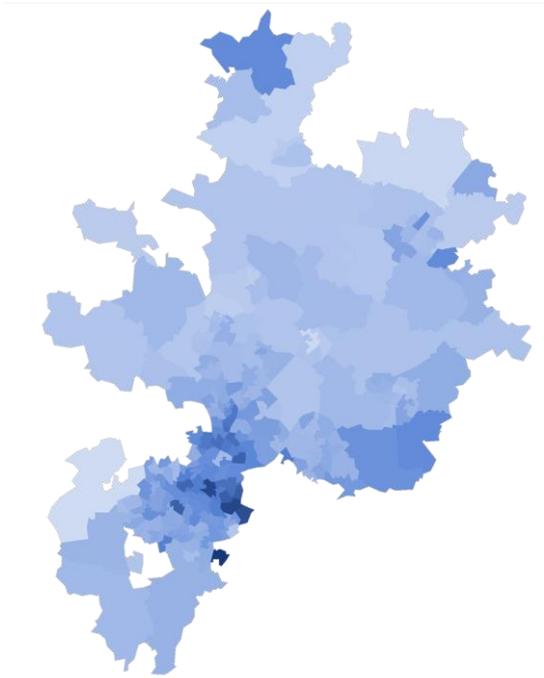


South Staffs Water

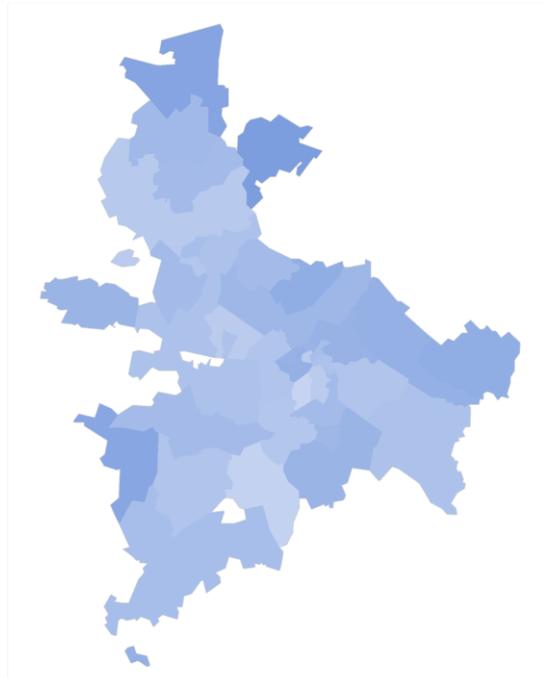


Cambridge Water

Estimated water poverty in 2027/28



South Staffs Water



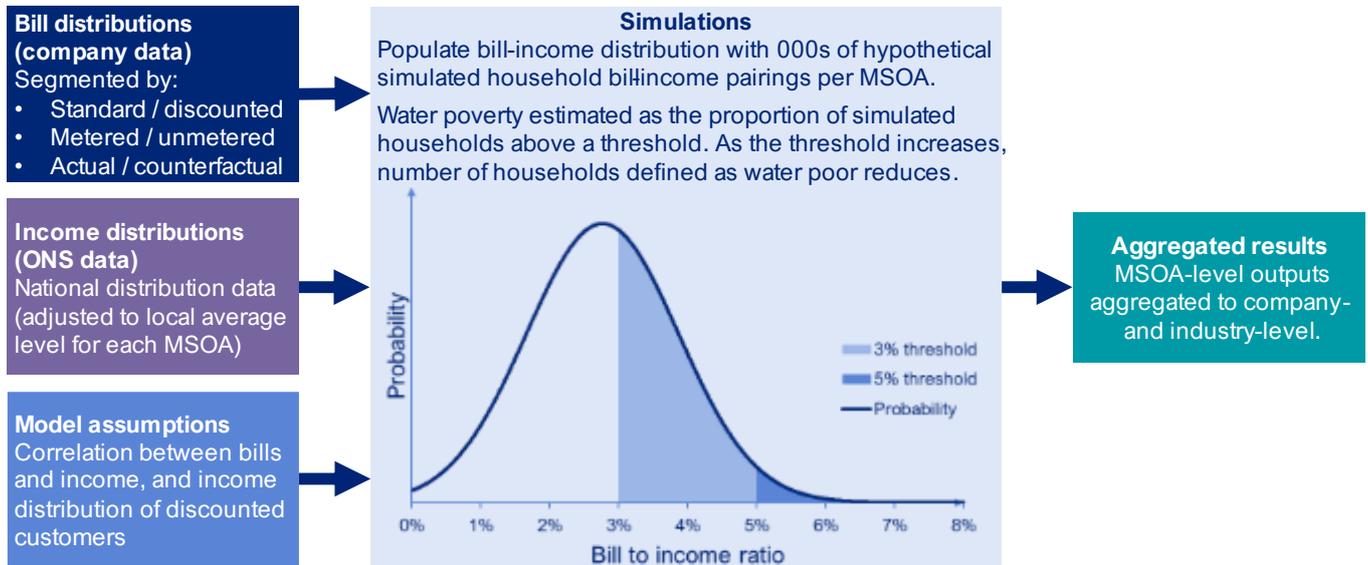
Cambridge Water

Source: CEPA analysis of South Staffs Water data

2. METHODOLOGY

The methodology we have used for these estimates was originally developed on behalf of Water UK, to estimate the rates of water poverty across England and Wales. The methodology is summarised below and presented graphically in Figure 5.

Figure 5: Diagrammatic representation of CEPA's water poverty modelling approach



Source: CEPA

Modelling approach: We have undertaken a ‘top-down’ simulation of water poverty, drawing on *distributions* of bills and incomes, rather than drawing directly on household level data on bills and incomes. This statistical approach produces simulated data of bill-income pairings for a representative sample of households, which are then aggregated to produce local and company-level estimates of the proportion of households in water poverty.

One of the key modelling parameters with this approach is the correlation between bills and incomes, which we base on household level survey data. In line with the 2021 study, we assume a 5% correlation between bills and incomes for metered households, and a 10% correlation between bills and incomes for unmetered households.

Geographic granularity and customer segmentation: We have undertaken our analysis at Middle-layer Super Output Area (MSOA) level, meaning that we estimated water poverty rates separately for each MSOA served by South Staffs Water and Cambridge Water. Each MSOA represents roughly 3,000 households.

We have also segmented customers based on whether they are metered or unmetered, and whether they receive standard tariffs or discounted tariffs. This means we have four separate bill distributions for each MSOA – metered standard, metered discounted, unmetered standard and unmetered discounted. And we have two separate income distributions for each MSOA – an income distribution that more closely reflects that of customers in receipt of discounted tariffs, and a residual income distribution for customers on standard tariffs.

Income definition and income distribution: Our income estimates are based on equivalised disposable (post-tax) income after housing costs in order to reflect the standard of living a household’s income is capable of delivering. We accommodate disability payments for a subset of households in our analysis.

To produce an income distribution for each MSOA, we have used national estimates of the income distribution from the ONS, scaled up and down based on MSOA-level estimates of average income, also from the ONS. We have then split this income distribution into two:

- A ‘truncated’ income distribution for those in receipt of discounted tariffs. The maximum income in this distribution is the social tariff threshold, i.e. no household in receipt of discounted tariffs can have an income higher than the social tariff threshold.

- A 'residual' income distribution for those on standard tariffs. This is the remaining income distribution once the truncated distribution is excluded.

Bill distribution: The distribution of bills for each MSOA has been provided by South Staffs Water.

Modelled years: For this analysis, we have modelled three spot years on South Staffs Water's direction:

- 2019/20, to compare against the estimates from our 2021 study,
- 2022/23 to better understand current rates of water poverty, and
- 2027/28, to understand how water poverty could evolve over AMP8.

A detailed description of our water poverty estimation methodology can be found at <https://www.water.org.uk/wp-content/uploads/2021/04/Quantitative-analysis-of-water-poverty-in-England-and-Wales.pdf>.

For our estimates in this study, we have updated the following inputs and assumptions. These assumptions and inputs have been used under the direction of South Staffs Water:

- **Inflation:** For outturn inflation we use data on CPIH from the ONS,³ and for forecast inflation we use estimates of CPI from the OBR.⁴ This means that forecast CPIH is assumed to be the same as CPI, as a simplifying assumption.
- **Bills data:** We have been provided updated bills data by South Staffs Water for each of the three modelled years.
- **Threshold for social tariff eligibility:** For our 2021 Water UK study, we assumed that eligibility for the social tariff was set at the national low-income threshold at £16,105. This has been updated based on South Staffs Water's own social tariff eligibility threshold, which is currently set at £19,050. We have used this figure for the 2022/23 model run and have assumed that the threshold is adjusted each year in line with inflation.
- **Income estimates by MSOA:** The latest data on household income data for each MSOA is from the 2017/18 financial year.⁵ To update for our three modelled years, we have updated these estimates based on ONS data on mean equivalised disposable income to 2021/22,⁶ and then updated based on OBR forecasts of household disposable income per person from 2021/22 onwards.⁷

³ ONS (2023) CPIH Index (mm23:L522). Available at <https://www.ons.gov.uk/economy/inflationandpriceindices/timeseries/l522/mm23>

⁴ OBR (2023) March 2023 Economic and fiscal outlook – supplementary economy tables, Table 1.7. Available at <https://obr.uk/efo/economic-and-fiscal-outlook-march-2023/>

⁵ ONS (2020) Income estimates for small areas, England and Wales - Financial Year Ending 2018. Available at <https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/earningsandworkinghours/datasets/smallareaincomeestimatesformiddlelayersuperoutputareasenglandandwales>

⁶ ONS (2023) Average household income, UK: financial year ending 2022, Table 1: Timeseries of mean and median equivalised household disposable income. Available at <https://www.ons.gov.uk/peoplepopulationandcommunity/personalandhouseholdfinances/incomeandwealth/bulletins/householddisposableincomeandinequality/financialyearending2022>

⁷ OBR (2023) March 2023 Economic and fiscal outlook, Chart 2.17: Real household disposable income per person. Available at <https://obr.uk/efo/economic-and-fiscal-outlook-march-2023/>

- **Income distribution:** For data on the income distribution, we have used outturn ONS data for 2019/20. For 2022/23 and 2027/28, we have used the most recent outturn year for which data exists, 2021/22.⁸ It is worth noting that the bill distribution has changed significantly between 2019/20 and 2021/22, with the bottom decile being materially poorer in 2021/22 than it was in 2019/20.
- **Incidence of personal independence payments (PIP) by MSOA:** We have used data from the Department for Work and Pensions (DWP) to estimate the proportion of households within an MSOA that receives PIP payments.⁹ For 2019/20 and 2022/23, this is directly derived from the DWP data. For 2027/28, we assume that the proportion of households eligible for such payments stays flat at 2022/23 levels.
- **Size of average PIP payment by MSOA:** Similarly, we have used PIP rates published by the Government, in conjunction with the data from DWP to estimate the size of the average PIP payment in 2019/20 and 2022/23, for each MSOA. For 2027/28, we have then assumed that the average PIP payment will increase in line with inflation.

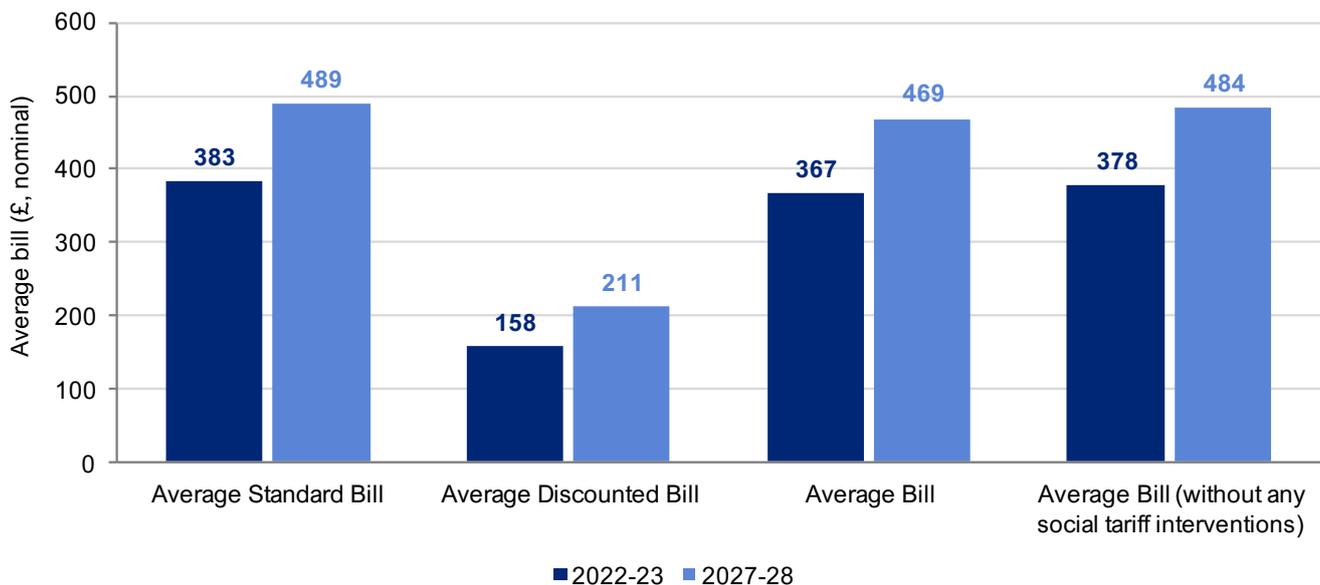
3. DESCRIPTIVE STATISTICS

In this section, we present some summary statistics that contextualise the results we observe above.

Bills

In Figure 6 below, we present the changes in average bills between 2022/23 and 2027/28 as forecast by South Staffs Water. In absolute terms, the average standard bill is expected to increase by more than the average discounted bill. In relative terms, standard and discounted bills are expected to increase by the same percentage at Cambridge Water between 2022/23 and 2027/28 though at South Staffs Water, discounted bills are expected to increase by proportionately more than standard bills.

Figure 6: Change in average bills between 2022/23 and 2027/28



Source: CEPA analysis of South Staffs Water data

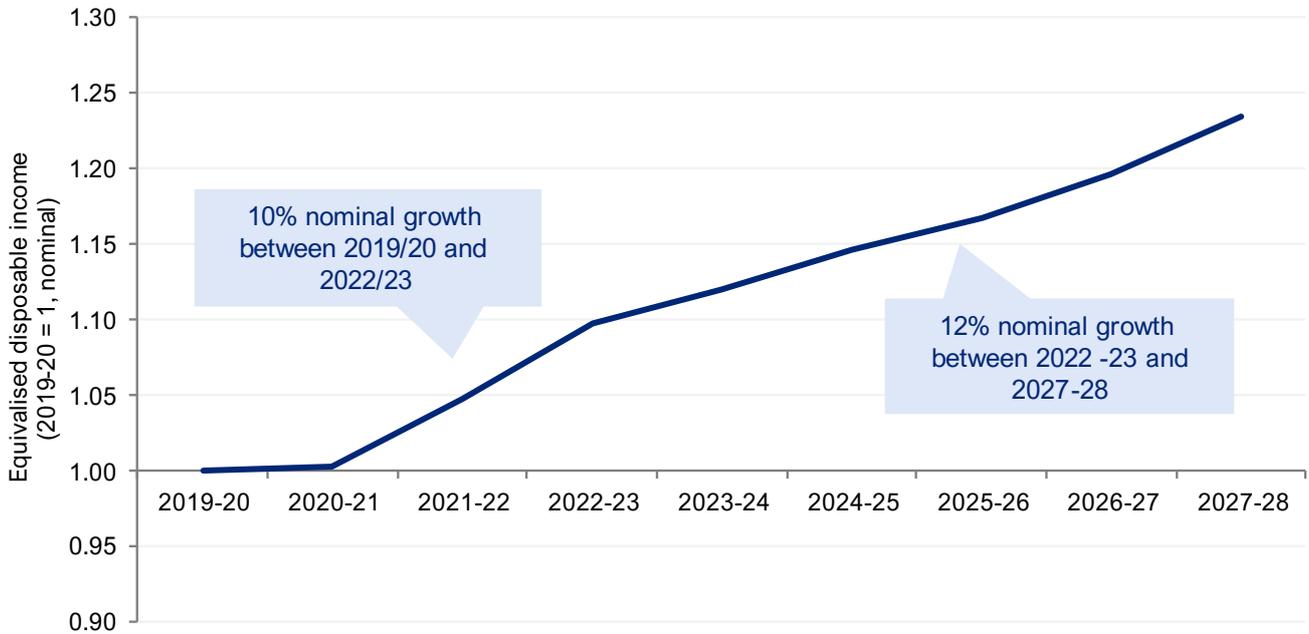
⁸ ONS (2023) Effects of taxes and benefits on UK household income, Table 2b: Average household incomes, taxes and benefits (£ per year) of all individuals by equivalised household disposable income decile group. Available at: <https://www.ons.gov.uk/peoplepopulationandcommunity/personalandhouseholdfinances/incomeandwealth/bulletins/theeffectsofaxesandbenefitsonhouseholdincome>

⁹ DWP Stat X-Plore (undated) PIP Cases with Entitlement. Available at: <https://stat-xplore.dwp.gov.uk/>

Income

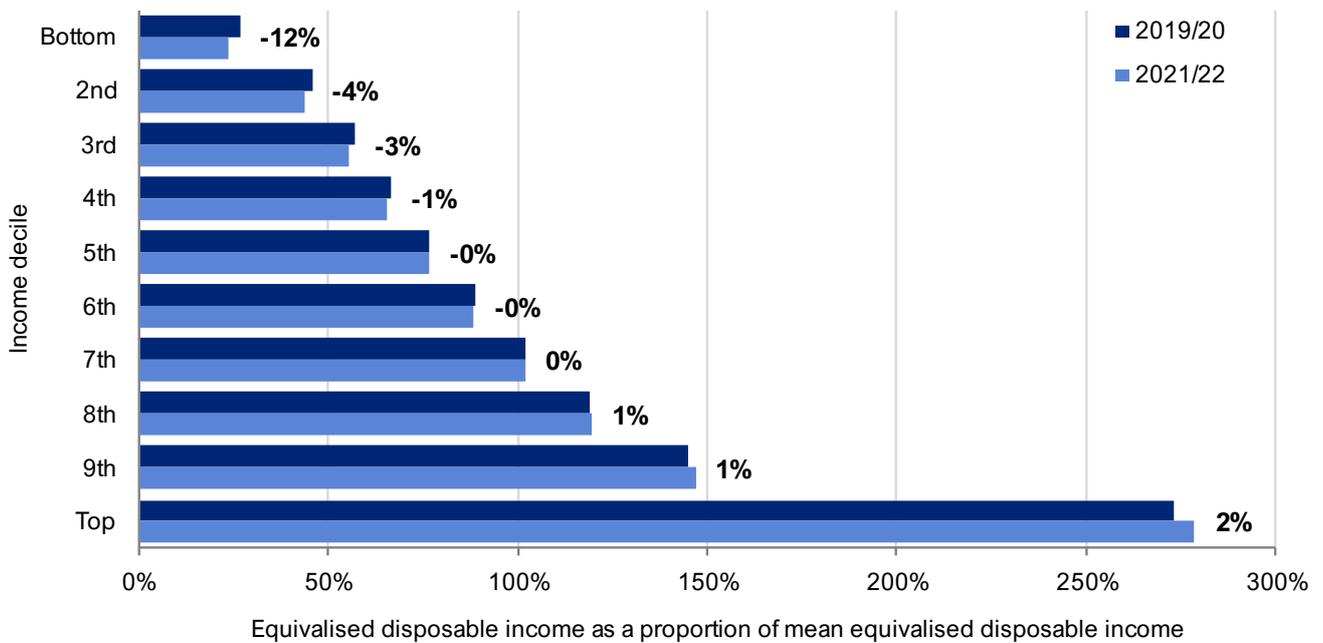
In Figure 7 and we present the forecasts of disposable income growth used in our modelling, and in Figure 8, we present the income distribution used in our modelling.

Figure 7: Growth in disposable income from 2019/20 to 2027/28 (nominal)



Source: CEPA analysis of ONS data and OBR forecasts

Figure 8: Change in equivalised disposable income by decile between 2019/20 and 2021/22



Source: CEPA analysis of ONS data

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