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## **180 years of capital expenditure for equitable and climate resilient water and sanitation in England and Wales**

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### WATER AND CLIMATE RESILIENCE

## 180 years of capital expenditure for equitable and climate resilient water and sanitation in England and Wales

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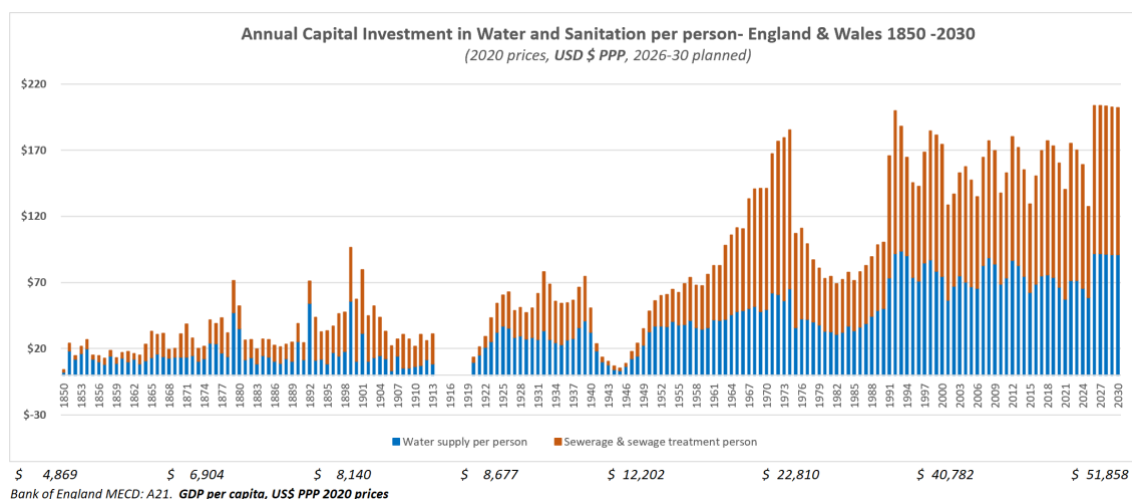
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### Introduction – ‘It only increases ...’

Looking to achieve the earliest possible delivery of SDG 6, and then sustaining that level of service, it might be useful to politicians, civil servants and sector professionals to consider a case study from a high-income country of the long-run capital expenditure required to deliver, maintain, expand and enhance WASH services, with respect to quality of service and increasingly to climate resilience.

The summary result is that in England and Wales, with their own historical variations of economic growth and political commitment, characteristic of all countries, to achieve SDG 6 and to maintain that service and to prepare for future climate change, it has required an average investment of \$79 per person per year, every year (adjusted for inflation - all nominal expenditure adjusted to \$PPP (Purchasing Power Parity), 2020 prices), to achieve, just about, SDG 6 after the first 120 years and to then maintain it, to enhance quality and ensure ongoing and future ‘fitness for purpose’ over the most recent 60 years.

This figure can be broken down into \$32 per person per year average for the first 60 years, ‘Phase I’ of this study mainly delivering SDG 6 to the cities and towns, piped on premises water to most, with early use of sewerage though with some towns using at-scale container based sanitation and ‘omni-processor’ equivalents; for ‘Phase II’, the second 60 years average capital expenditure of \$59 per person per year focused on expanding urban & extending to all rural areas – rural piped on premises being achieved half way through this phase, sewerage for most being achieved at the end, having systematically passed from pit latrines through earth closets to ‘free’ closet pail collection, this being delivered in parallel to the 30 years it took to deliver rural sewerage;



‘Phase III’, this past 60 years, including regulatory business plan requirements to 2030, focusing upon ‘CapManEx’ as well as enhancement capex, at an average of \$145 per person per year for this period of maintaining (perhaps) and ensuring climate resilience (it is hoped).

In addition to Annual Capex per person, figure above, the figures of Total Annual Capital Investment, Capex as a percentage of Gross Domestic Product, and trendlines of water capex compared to sanitation capex all over the 180 year period, are shown in the presentation.

The ongoing challenge is clear. For all the apparent emphasis on ‘CapManEx’ (included here in overall Capex) it is reported that, even with *‘many of our water mains and sewers first built in the 19th century, only 0.2% of sewers and 0.6% of water mains are replaced annually’* (Water UK, 2017).’ With respect to climate resilience, this is to be delivered through the change from planning for a targeted one in 100 years drought risk to one in 200 years risk, expenditure visible in this data to 2030; with a statutory requirement to deliver for a 1:500 year return period by 2039.

## Research approach and sources

The main sources for this study are data from 1920-1977, in Thackray (1977), then from 1989 water regulator Ofwat’s ‘Financial performance and capital investment’ annual reports. Once those ceased it has been necessary to interpolate from Ofwat’s Price Review Final Determinations, plus the companies’ Business Plans for 2026-30. The nineteenth century, years were initially taken from the Public Works Loans Board, subsequently data has been accessed from Harris & Hinde (2019), plus supplementary information.

All expenditure is converted to 2020 prices using the Office of National Statistics long-run inflation statistics, GDP per capita from Bank of England Research Datasets, all GBP 2020 prices converted using the World Bank’s \$ PPP conversion factor. For a full explanation of the research approach and sources, with complete references, please see online at <https://www.franceys.info/suppmaterial>.

## Conclusion – ‘and keeps on needing to increase ...’

From the 20th Century’s low point in 1945, the water sector’s average annual capital investment rose from \$0.2bn to \$9.0 bn in 1974 (2020 prices). Public sector reorganisation and Public Sector Borrowing Requirement limits then reduced that annual investment to an average \$4.3 bn for the next 16 years. In the succeeding 35 years of private provision (including the regulatory requirements to 2025) this figure will have averaged \$8.9bn per year, future business plans estimating \$12.4bn per year to come for 2026-30.

However, the failure of the political and regulatory processes, as evidenced by present public concerns over water and wastewater management resilience, are seen in the pattern of these investments relative to national wealth. From reaching a peak of 1.1% GDP in 1879, averaging 0.54% 1875-1974 (omitting World War years), investment had reached an impressive 0.80% of GDP in 1974, then falling back to a less than useful average of 0.32% during the later public managed ‘70s & ‘80s. The subsequent fall from the much needed 0.5% of GDP at the commencement of the new private funding period to a projected 0.25% of GDP in 2025 (averaging 0.39% over the period), represents the result of regulatory restrictions on tariff increases (based on political guidance), explains both the present state of the sector and the need for additional climate resilience investment.

## Key references

Harris, B. & Hinde, A. (2019) ‘Sanitary investment and the decline of urban mortality in England and Wales, 1817–1914’ *The History of the Family*, Volume 24, Issue 2 (2019) Taylor and Francis.  
Ofwat (1989-2023) Annual reports, Price review determinations & Business Plans, Office of Water Services/ Water Services Regulation Authority, Birmingham.  
Thackray, J. (1977) ‘Problems facing UK Water Authorities: The Planning View’, *Proceedings of Symposium on Water Services: Financial, Engineering and Scientific Planning*, IWES, London  
Water UK (2017) ‘Water 2050: A White-Paper’, Water UK, London.

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