



## Immigration and the Demand for Water in England

### Summary

1 Population increase is one of the key drivers influencing the demand for water. The additional 6.3 million people who are expected to live in England over the next 25 years as a result, directly or indirectly, of net international migration, could increase the demand for water by almost 850 million litres a day – equivalent to the amount of water in 340 Olympic sized swimming pools. Without measures to either reduce demand or increase the supply of water, water shortages – or ‘water stress’ – is likely. This is especially true of those parts of England, notably London and the South East, where immigrants to the UK have preferred to settle in the past. Adding to this problem are the challenges to water supply and demand caused by the effects of climate change. Remedying the resulting ‘water stress’ can be achieved by various methods- building new reservoirs or enlarging existing ones, using water more efficiently or continuing to reduce the huge amount of water lost through leakage from water mains by replacing them. All of these measures will be costly to implement, adding to the cost of water that in England is already among the highest in Europe..

### Introduction

2 Water is essential for life, human health and wellbeing and is a vital input needed for agriculture, industry, transportation and many leisure industries. A high quality water system is necessary for a healthy and sustainable natural environment.

3 The demand for water is driven by a number of factors:

- consumer demand, which in turn is influenced by technology, consumer durables – like washing machines and dishwashers
- population growth,
- industrial use of water,
- and not least the extremely large quantities of water, almost a quarter of the supply, which are ‘lost’ through leakage, mostly from water mains.

4 The supply of water is linked to rainfall, which in turn is influenced by climate change; this has been considered one cause of such recent events as the drought that afflicted the South East of England in 2006, and the severe flooding experienced by some regions in 2007. Future climate change impacts, with a greater likelihood of more frequent droughts, are expected to increase ‘water stress’ in many parts of England, including some where pressures from immigration have been most severe. By 2080, some studies project that rainfall in the South East could fall by half in summer, a decline that would not be fully offset by a 30 per cent increase in rainfall in winter which would also be associated with such a change.

## Costs of Infrastructure

5 Provision of a reliable water supply is very costly. In England and Wales there are 21 water service providers, ten of which are responsible for sewage disposal as well. The industry is highly capital intensive and the below ground infrastructure that supports its operations is very extensive – there are over 335,000 km of water mains and over 315,000 km of sewers. As an indication of the sums involved, to replace this and other infrastructure– such as reservoirs, pumping stations etc. - in England alone, would cost around £250 billion, or about on average £12,000 for each household<sup>1</sup>.

## Demand for Water

6 Households are responsible for about half of the public water demand in England (Table 1). About 7 per cent of the water consumed by households is used for cooking and drinking. Far more, almost one third of water used, is for flushing toilets.

Table 1: Use by Sector of Water in the Public Water Supply – England & Wales, 2007

SECTOR	Megalitres/day (Ml/d)	Share of Total Water Supply (%)
Household	7756	52
Non-household	3500	23
Company leakage	2545	17
Customer leakage	873	6
Other	319	2

Source: Ofwat

7 Individual consumption of water in England averages around 150 litres per person per day. Each year, therefore, an individual will directly use around 55,000 litres of water, but only a tiny fraction of this will be actually consumed in drinking or cooking

8 Water tariffs in England and Wales are already among the highest in Europe. The average bill for water (and sewage disposal) in England and Wales was £330 in 2008-09, having increased by 44 per cent in real terms since privatization in 1989. A comparison (Table 2) of water bills in four EU countries published in 2006 showed that water bills in England and Wales were the highest among the four countries compared

Table 2: Water Bills in Four EU Countries - Euros

Country	
England & Wales	95
France	85
Germany	85
Italy	59

Source: Metropolitan Consulting Group: VEWA - Vergleich europaeischer Wasser- und Abwasserpreise, 2006, p. 7 of the executive summary - based on data cited in Wikipedia.

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1 based on OFWAT data on the replacement cost of water company assets

## Water Stress and Climate Change

9 The adequacy of supply of water relative to demand (water stress) varies significantly in different regions of England; in the South and East of England, including London, it is most severe. In these regions, rainfall is comparatively low – London receives less rainfall than cities like Dallas, Istanbul and Rome<sup>2</sup>- and water consumption tends to be higher than elsewhere. As a result of projections made for both demand and rainfall, the South and East regions have been classified as being subject to 'serious' water stress. In the other regions of England, especially Yorkshire and the North of England, pressures on water resources are currently far less severe.

10 Climate change is likely to intensify pressures on water resources in the South East. The South East and East of England already face increasing demand on their water supply. The drought of 2004-06 had to be managed by imposing restrictions – like hosepipe bans – on the use of water. Droughts are forecast to become more common in future years. Under the 'High Emissions' climate change scenario, by the 2080s rainfall in the South East is projected to decrease by around 50 per cent in summer and increase by up to 30 per cent in winter, whereas in the North West it could decline by 30 – 40 per cent in summer and increase by 20 – 25 per cent in winter. Without a reduction in water consumption per head, and better management of water supply – for example, a reduction in leakage – there may well be a worsening of water security, especially in the South East.

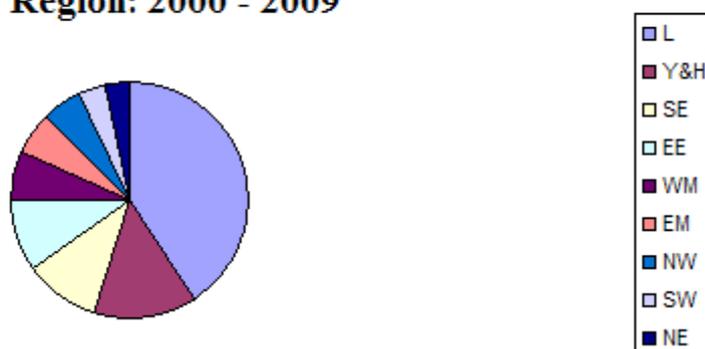
11 Water stress will not be confined to the South East. Under many of the scenarios used to project future needs, Wales, South West and Northern England are likely to see significant shortfalls in supply in the future. In the longer term climate change could have a more significant impact on water resource availability than population growth. Unmet demand is more closely linked to the climate change scenarios than to demand scenarios.

### Pressures from Migration

12 Between 2000 and 2009 net long term international migration into England averaged about 175,000 each year, or 1.7 million in all. The pie chart (Figure 1) below illustrates that roughly sixty per cent of the migrants settled in three water stressed areas – London, which absorbed over 40 per cent of migrants, and the South East and East of England (both 10 per cent).

Figure 1: Immigration by English Region 2000 - 2009

### Share (%) of Net International Migration by English Region: 2000 - 2009



Source: ONS

Additional Demand for Water Caused by Migration

2 See: Environment Agency – Efficiency in Water Resource Management. National Audit Office (NAO) – June 2005. Available at: [http://www.nao.org.uk/whats\\_new/0506/050673.aspx](http://www.nao.org.uk/whats_new/0506/050673.aspx)

13 The Government's most recent population projections, suggest that there will be an additional 6.3 million people in England by 2034/35 as a result of net migration (Table 3 – calculated by subtracting the population total in 2034/35 under the 'Zero Net Migration' variant projection from that in the 'Principal Projection'). How much additional water will be needed? Thames Water estimate that per capita water consumption might be 135 litres a day<sup>3</sup> by 2034/35, giving a total increase in demand of around 850 million litres a day, equivalent to the capacity of almost 340 Olympic sized swimming pools<sup>4</sup>. This does not mean that the amount of water put into the public water supply will need to increase by the same amount, because a significant part of the additional supply required could come from a programme of water mains replacements to reduce the very large amount of water wasted through leakage. However it is supplied – whether through providing additional storage capacity in the form of reservoirs, increasing abstraction of water from aquifers or by reducing leakage in the primary distribution network, there will be a cost to households in the form of increased water bills.

Table 3: Population Projections ('000) for UK and England

Principal Projection	2034/35
UK	72 853
England	61 751
Zero Net Migration Projection	
UK	65 731
England	55 486
Population Increase Caused by Migration	
UK	7 122
England	6 265

Source: ONS – 2010 Population Projections

### Water Stress in London

14 Around 40 per cent of net migration over the decade to 2009 was to London, so there is bound to be an increased risk of shortages, as well as increased water tariffs to finance the necessary measures needed to sustain water security.

15 Thames Water proposes to mitigate water stress by continuing its programme of water mains replacement to bear down on leakage, investing in a number of relatively small-scale schemes to increase supply and expanding the use of water meters. The first two strategies are very costly: to replace a mile of an elderly and leaky Victorian water main costs around £500,000, whilst the National Audit Office in 2005 estimated that the cost of enhancing water supply by one million litres a day was on average around £2 million<sup>5</sup>. These significant additional costs will have implications for customers in the form of increased water bills.

3 The Government aspires to reduce per capita consumption to 130 litres/day by 2034/35 but Thames Water consider a target of 135 litres/ day to be more realistic.

4 The minimum volume of water for an Olympic sized swimming pool is 2500 cubic metres, equivalent to 2.5 million litres.

5 Mentioned in the Waterwise White Paper

9 March 2012

#### Sources of Data

Defra – Future Water. The Government's Water Strategy for England.

<http://www.defra.gov.uk/publications/files/pb13562-future-water-080204.pdf>

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ONS – Population Projection 2010

<http://www.ons.gov.uk/ons/rel/npp/national-population-projections/2010-based-projections/index.html>

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Waterwise White paper.

<http://www.waterwise.org.uk/data/resources/4/final-waterwise-white-paper-june-2010.pdf>