

# Price and Behavioural Signals to Encourage Household Water Conservation in Temperate Climates

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**KEYWORDS:** Increasing block tariffs; behavioural interventions; water conservation

## BACKGROUND

- There are growing pressures on our water resources. The UK in general and the south-east/east of England in particular, faces an increasing risk of drought over the next 50 years. The reliance on increasing supply in order to meet water demand has encountered ever-greater challenges due to the economic and environmental costs involved and has created political opposition to the further exploitation of resources.
- The increasing penetration of water meters in the UK enables water utilities and policymakers to use demand-side measures, involving both price and non-price tools, to promote water conservation to households.
- Using a single high price to constrain demand raises distributional and political challenges. Increasing block tariffs (IBTs) have been proposed as a potential solution, balancing incentives for water conservation with an equitable distribution of costs across households. While the wider literature on water demand estimation has been surveyed extensively, no one has brought together the analysis on IBT introductions.
- An alternative approach that may side-step affordability concerns is to use non-price conservation interventions. In particular, using behavioural interventions to correct for market failures has increased in popularity over the past 20 years. Assessment of these policies are increasingly carried out through natural or constructed experiments.
- Compared to some jurisdictions already experiencing regular drought conditions, the use of these tools in the UK has been modest and there is a general lack of evidence on how tariffs and behavioural signals interact in temperate locations.

## METHODOLOGY

- We discuss the potential attractiveness of using IBTs to conserve residential water consumption and the potential challenges in designing and implementing IBTs, taking account of consumers' decision-making. We then survey the insights from previous introductions of IBTs in other developed countries that are already facing a high drought risk.
- We survey the literature on information-based behavioural interventions in residential water markets, and aim to uncover: which types of information are more likely to be effective in stimulating water conservation, how they interact both with each other and with the pricing mechanisms, their impact on poorer households, and how persistent any effects are.
- We assess whether these insights are generalizable in the UK setting, taking account its temperate climate, regulatory context and consumer engagement.

## KEY FINDINGS

- Despite being theoretically attractive, IBTs face challenges due to their complexity - they involve multiple inter-related choices, including the number of blocks, the size of each

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block, the price of each block and the time period over which consumption is measured. Such challenges are further aggravated by consumers' uncertainty regarding their demand and tariff structures.

- While IBTs are common in the US, Spain, Portugal and Australia, they are usually adopted jointly alongside a number of non-price tools in the event of severe droughts. The mixed evidence regarding the effects of IBTs suggests good knowledge of households' water demand by their socio-demographic characteristics is crucial to the success of IBTs. However, this condition is difficult to achieve.
- Similar to IBTs, the effects of behavioural interventions are likely to depend on local water scarcity and household profiles, and caution is needed when drawing lessons from existing experiments. In particular, because of the very limited number of information-based water conservation experiments involving truly randomized control trials, no robust general conclusions emerge; although, social comparative feedback appears to be a good candidate.
- In the UK, where there is no immediate extreme water stress, household consumers appear to have low awareness of water conservation. Since water bills are typically small relative to household income, consumer engagement is low. The limited evidence on the price sensitivity of UK water demand suggests the magnitude of price increases required to reduce water use significantly may be politically challenging. Meanwhile accurate and regularly updated household data for the design of IBTs are not currently available in the UK.
- The relative difficulty of introducing IBTs in the UK increases the attractiveness of non-price interventions to constrain water use. Also, attitude-led behavioural interventions that highlight the importance of water conservation to households may help to 'set the scene', prior to the introduction of IBTs, especially in the absence of drought conditions, and enable UK utilities to learn how to maximise the effectiveness of delivering water conservation messages to households.

## POLICY ISSUES

- Our findings suggest that an essential first step for residential water conservation in the UK is to research to understand a locality's water consumers and their water demand, and in turn help consumers to understand their (i) water prices, (ii) water consumption, and (iii) the need to conserve water. That many UK households have an unmetered water supply presents challenges both for gaining this understanding of demand and producing an evidence base around behavioural interventions.
- Even where households possess meters, the limited evidence suggests households have very inaccurate perceptions of water prices and consumption, with any knowledge reflecting bill totals (average prices) rather than marginal prices.
- UK policymakers have expressed concern about how to ensure affordability and equity for high-occupancy, low-income households facing IBTs. Before IBTs can be introduced without significant downside risks, there is a requirement for high quality UK data at the regional level on: water consumption by income group, the relationship between household size and consumption and the proportion of high water users.
- While IBTs could be trialled in particular regions, there must be some doubt about the political viability of substantially raising water prices in only some parts of the country. In contrast to the US, Spain and Australia, regional government is limited in the UK and historically there has been significant aversion to 'postcode lotteries', i.e. geographic variation in service provision. Also, with the UK's privatised monopolist water utilities, IBTs might lead to increased profitability and that is likely to face significant public opposition.
- Frequently, behavioural interventions are assessed in small experimental studies assessing the quantity of water saved but, for policymaking, the critical knowledge relates to any challenges to large scale deployment and whether the water saving is achieved at a lower cost than through alternative non-price interventions.

## SUGGESTED CITATION

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