Water Efficiency Fund

Cost benefit analysis of the water efficiency fund

Ofwat

1. Introduction

This is our initial assessment of the likely costs and benefits of the water efficiency fund as presented in our second consultation. The aim of this assessment is to compare the estimated benefits from the water efficiency campaign (WEC) and water efficiency lab (WEL) with the estimated costs of the fund (£100m) between 2025 and 2030.

We have drawn on a review of the available literature on water efficiency interventions, undertaken for Ofwat by Artesia. This sets out the best available evidence to inform our analysis of the benefits of the water efficiency lab. Due to the absence of previous water efficiency campaigns at the scale we are proposing, we needed to make a more detailed assessment of the likely benefits a campaign could bring. We worked with Artesia to develop a calculator, using evidence and expert opinion, to ascribe water savings to a range of different behaviour change interventions. We then constructed a hypothetical campaign in England and Wales before using the calculator to estimate the likely benefits that could be achieved over the five-year period.

We acknowledge that the evidence on the likely effectiveness of different components that could be funded through the water efficiency fund is limited. In addition, there is no directly comparable evidence on the benefits of a large water efficiency campaign in England and Wales such as the one we are proposing. Evidence on the likely benefits delivered through the WEL are also uncertain as we do not yet know what this portion of the fund will support. We envisage it unblocking barriers for the sector and adding value across a range of areas. We do not have direct evidence on the benefits of these outcomes and have instead used benefits from a range of known water efficiency activities as a substitute.

The proposal in the consultation document is that the £100m fund will be split approximately 75:25 between a behaviour change campaign (75%) to operate across England and Wales and a water efficiency lab (25%), to fund a range of innovative projects designed to reduce water consumption.

2. Estimating the benefits of the Water Efficiency Campaign (WEC)

The specific details of the campaign covering England and Wales will depend on how the campaign is structured and organised. We expect that the delivery of the actual campaign will differ from the hypothetical example set out below.

We have estimated the cost of the campaign through engagement with the Government Communications Service (GCS) and review of previous campaigns. We have estimated that targeting one behaviour over one year will cost around £5m. We have profiled this spend over the five years of AMP8; using all the proposed behaviour change interventions in the Artesia calculator and distributing them over the period in phases, loosely grouped by theme as might be done in a real campaign.

The hypothetical behaviour change campaign is not intended to act as a blueprint for the actual campaign and is simply to provide an indication of costs and benefits for the purposes of this assessment.

The Artesia calculator uses a range of information to set out the best available evidence on the impacts of different components of a behaviour change campaign. To estimate the benefits of a campaign, the calculator includes a range of assumptions. These include variables that can be applied across all interventions such as:

1. The total number of households targeted.
2. Estimates for the impact or effectiveness of the entire campaign that can be set at basic, intermediate or exemplar. This covers the percentage (%) of the maximum available saving achieved and the percentage (%) of the audience acting.
3. Individual behaviour changes to be included or excluded in the estimated benefits of the campaign.

The calculator includes the following water saving behaviour change examples:

- Showering (shorter and/or fewer);
- Reduced toilet flushing;
- Turning off the tap when brushing teeth;
- Using a wash basin for washing or shaving;
- Using full loads in a washing machine;
- Using full loads in a dishwasher;
- Reducing outside use;
- Repairing leaky toilets; and
- Repairing dripping taps.

For each of these behaviours, the calculator makes assumptions on:

- The likely percentage of the population it would apply to; and
- The saving available in litres per property, per day.

Potential savings, already adjusted to only apply to the relevant percentage of the population, are then multiplied by the impact score to generate savings in litres per property, per day. These are multiplied by the number of properties targeted to get savings in megalitres per day (Ml/d). Savings in Ml/d are added up for the individual behaviours targeted per year to get savings from the WEC that year. These are then compared against cost in the cost benefit analysis.

Box 1 sets out an example of how the calculator estimates water savings for a given behaviour change, focusing on showering

Example: showering

The calculator assumes that 60% of the population are relevant for this behaviour. People may not be relevant for a range of reasons including:

Some people will have already changed their showering behaviour (reduced shower frequency or duration) due to previous campaigns

Some people may not be able to reduce the time they spend in the shower for a wide and varied range of reasons such as hair washing requirements

Some people may not have a shower and may use a bath instead

To represent this group, the calculator removes 40% of the population from the calculation at this stage.

The potential saving from reduced showering is estimated as 16.33 litres per property per day in the calculator. This is immediately reduced to 9.80 litres per property per day by removing the 40% who the messaging is not relevant to.

The remaining potential saving is then multiplied by the percentage (%) impact score. The percentage (%) impact score includes both an assessment of the proportion of the maximum saving available that's likely to be achieved when people act and an assumption on the percentage of the audience acting at all.

The proportion of maximum saving available is set as 100% in an exemplary campaign, 50% for an intermediate campaign and 20% for a basic campaign. It is there to recognise that people may only partially change their behaviour and are more likely to fully change their behaviour if the campaign is more effective.

The other part of the impact score represents the proportion that will act at all. This is set at 12% and does not vary across basic, intermediary, and exemplary levels. It recognises that many people (88%) simply will not respond and is based on experience from previous campaigns.

To understand this, it may be helpful to consider a hypothetical scenario with 100 people in a room watching a campaign video about showering. Out of the 100, 40 leave the room immediately as they either already shower efficiently, can't change their behaviour, or use a bath instead. Of the remaining 60, just over seven (12%) will act to change their behaviour. Using an intermediate effectiveness estimate those seven people will each realise half of the

potential savings available by only partially changing their behaviour. So, out of 100 people, 7 will make a change and on average those changes will realise half of the potential savings available.

The calculator runs this calculation for each behaviour with different assumptions applied to each based on evidence and expert judgement. Savings are annual but are set to decay in the cost benefit assessment.

3. Water Efficiency Lab (WEL)

The very nature of the Water Efficiency Lab is to encourage and fund innovative ideas to address high levels of water consumption. For the purposes of this impact assessment, we have used a set of water efficiency interventions drawn from the Artesia literature review to give an indicative assessment of the likely benefits, relative to the costs.

All the interventions included in our assessment of the benefits from the WEL are taken from the Artesia literature review. Our process for selecting which to use was as follows:

1. Interventions were removed that would be out of scope for the WEL. These included policy interventions like water efficiency labelling, behaviour change which is covered by the WEC, meter installation of varying types, options with no ascribed savings or costs and options with very high costs including property level rainwater harvesting and greywater installation.
2. All interventions that had savings based on evidence with a lower confidence level than two were removed as the savings for these were deemed less reliable.
3. The remaining interventions were sorted by cost and then deployed one per year from the most to the least cost effective.
4. Unit costs were used to calculate potential savings from the £5m available each year when the total WEL fund of £25m is profiled evenly across AMP8.

4. Costs and Benefits of the Water Efficiency Fund (WEF)

The tables below present the estimated costs and benefits (water saved) calculated for the WEC and the WEL as proposed in the consultation.

Table 1 is the estimated savings from the WEC by year

Year	Behaviours	Low savings (Ml/d)	Medium savings (Ml/d)	High savings (Ml/d)	Cost (£m)
1	Encouraging efficient use of washing machines and dishwashers	3.68	9.20	18.39	10
2	Encouraging efficient showering, toilet flushing, teeth-cleaning and other wash basin behaviours	15.99	39.98	79.95	20
3	Addressing issues with leaky loos and encouraging efficient outside use behaviours	8.18	20.46	40.92	10
4	Encouraging efficient showering, toilet flushing, teeth-cleaning and other wash basin behaviours	15.99	39.98	79.95	20
5	Encouraging efficient use of washing machines, dishwashers and taps	5.27	13.17	26.33	15

Table 2 is the estimated savings from the WEL by year

Year	Intervention	Savings (Ml/d)	Cost (£m)
1	Home visit with water saving device supply/installation	1.61	5
2	Bespoke water saving kit	1.03	5
3	Supply and installation of singular water saving products	0.88	5
4	Leaky loo find and fix	0.62	5
5	Water saving kit	0.60	5

4.1 Cost-Benefit Analysis

The estimated annual water savings and costs from the WEC and WEL calculations are taken into the cost benefit analysis. The cost benefit analysis applies the costs over the 5 years of the campaign and, based on the estimated effectiveness of the different components as calculated previously, calculates the expected reduction in water consumption in terms of Ml/d saved over a year.

The cost-benefit analysis is based on HM Treasury Green Book principles, and contains several assumptions/features:

- **The model calculates benefits over 10 years from the commencement of the WEF**, i.e. the fund runs from April 2025 through to March 2030, but with benefits extending 5 years after the conclusion of the fund/campaign.
- There is **uncertainty about the longevity of the effects associated with initiatives** in the water efficiency campaign and funded by the water efficiency lab. Previous public campaigns that have been reinforced by legislation/taxation (such as requiring seatbelts, reducing smoking) have seen significant impacts lasting over a long period of time. In the absence of other such levers**, we cannot be certain how long the impacts of the WEF will last**, other than it will range from 0% (all effects terminate after one year) to 100% (all effects last in perpetuity). For simplicity, and in the absence of directly relevant evidence, we have assumed a decay rate of benefits in each year after a specific initiative/element of the campaign/lab has been introduced of 50%. This means that if an initiative reduces consumption by 50 Ml/d in year 1, it will have the effect of reducing consumption by 25 Ml/d in year 2, 12.5 Ml/d in year 3 and so on. However, **if this decay rate is too high then the estimated benefits will be an underestimate**.
- Where the Water Efficiency Campaign reintroduces an element of an earlier aspect of the campaign (i.e. in years 4 and 5), this **tops up any remaining benefits from the earlier components of the campaign to the maximum amount** (depending on the decay rate), **rather than adding a new full impact** onto any remaining benefits to avoid double counting.
- The calculation also assumes that in the first year of the fund, **whatever initiatives are introduced will not deliver their full potential**, to reflect implementation and set-up challenges and an initial learning effect. Again, as with the decay rate we do not have evidence to inform this, so this has been set at 50%.
- The model **discounts all costs and benefits by the HM Treasury Green Book discount rate of 3.5%**, and the costs and benefits are used to generate the Net Present Value.

A particular challenge for this analysis is how to ascribe a value to a litre of water saved/not consumed. There are several potential approaches to producing a £/litre water saved. For the purposes of this cost benefit analysis, we have used an estimate of £1m per Ml/d over a year. This is based on professional judgement, following a review of a range of the data sources identified by Artesia. It is also lower than the typical cost associated with developing new supplies or reducing water demand as observed in WRMPs. A figure lower than the cost of developing alternate supplies seems appropriate because some water saved is likely to remove the need for new investment but this will not be the case universally as some water resource zones will have surplus water.

5. Results

Water companies have included in their PR24 business plans a projected reduction in per capita consumption over AMP8, and the performance commitment level for each company will be finalised in the PR24 Final Determinations. The benefits identified from the water efficiency fund in terms of reduced water consumption should be seen as in addition to any reductions generated by these plans, and could replace some water company underperformance against their performance commitments, should this occur.

Based on applying the medium level of savings impact for the water efficiency campaign as set out in Table 1 above and the initiatives funded through the water efficiency lab we estimate savings in water consumption of 180 Ml/d over 10 years. The time profile of these benefits will vary year-by-year, depending on when specific initiatives are introduced, and the assumptions made around the benefits decay rate. However, under a reasonable set of assumptions, and by valuing a Ml/d of water saved at £1m, this analysis estimates that the Water Efficiency Fund can result in a benefit: cost ratio of approximately 1.8:1, or that for every £1 spent on the water efficiency fund, £1.80 of benefits in terms of reduced water consumption are generated.

These are indicative numbers as they are based on a hypothetical campaign with estimates of the overall impact and longevity. They are presented to give an indication that, given a reasonable set of assumptions, a Water Efficiency Fund can deliver value for money. Should the water efficiency lab generate greater impacts, or if the impacts of the water efficiency campaign are retained longer than assumed, the benefits, and hence the value for money will be higher. If there are wider, indirect benefits, for example if such a campaign raises the profile of water efficiency amongst the public and the media, longer term benefits may be realisable.

Risks to achieving these benefits would include the failure of the campaign to change water consumption behaviours if the low level of take-up occurs and/or the water efficiency lab commissions projects that fail to deliver significant outcomes. If this were to occur, the Water Efficiency Fund would be unlikely to generate a benefit: cost ratio in excess of 1. Ongoing monitoring and evaluation of the schemes will look to mitigate these risks. We will develop our monitoring and evaluation plans and requirements following this consultation exercise.

Ofwat (The Water Services Regulation Authority) is a non-ministerial government department. We regulate the water sector in England and Wales.

Ofwat
Centre City Tower
7 Hill Street
Birmingham B5 4UA
Phone: 0121 644 7500

This document is also available from our website at www.ofwat.gov.uk.

Any enquiries regarding this publication should be sent to mailbox@ofwat.gov.uk.

OGL