

# Draft Water Resources Management Plan 2024: Annex 15: T100 and Non Household Option Identification Technical Plan

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from  
**Southern  
Water** 

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## 1. Introduction

To ensure our WRMP24 is robust and has the best value mix of activity needed to meet environmental needs and supply security, the final demand forecast is based on hitting a long-term target of 109l/person/day. This is slightly below the national target of 110l/person/day.

As demand reduction is so critical to meeting the environmental and security of supply needs, we do not believe the T100 vision should be extinguished. To reflect this, the optioneering and delivery plan for household demand reduction has retained the long-term ambition of meeting T100.

This Annex sets out that detail. The activities in this annex form the entries in the WRMP tables on demand measures.

This annex includes the work we have undertaken on risk on demand reductions. This, together with other information was used to inform the decision on the final demand forecast of 109l/person/day in this plan.

Through the consultation process, we are keen to seek views on the balance of this approach. In particular if we should plan on meeting T100 alone and the associated delivery risk as we currently understand it, or, as in this Plan, have a demand forecast aligned to the National pcc targets but continue a programme to see if we can confidently achieve the T100 profile allowing the future plans to adjust based on the findings.

This Annex should be read in conjunction with a supporting Annex on the overall delivery plan for demand reduction and a technical write up of smart metering.

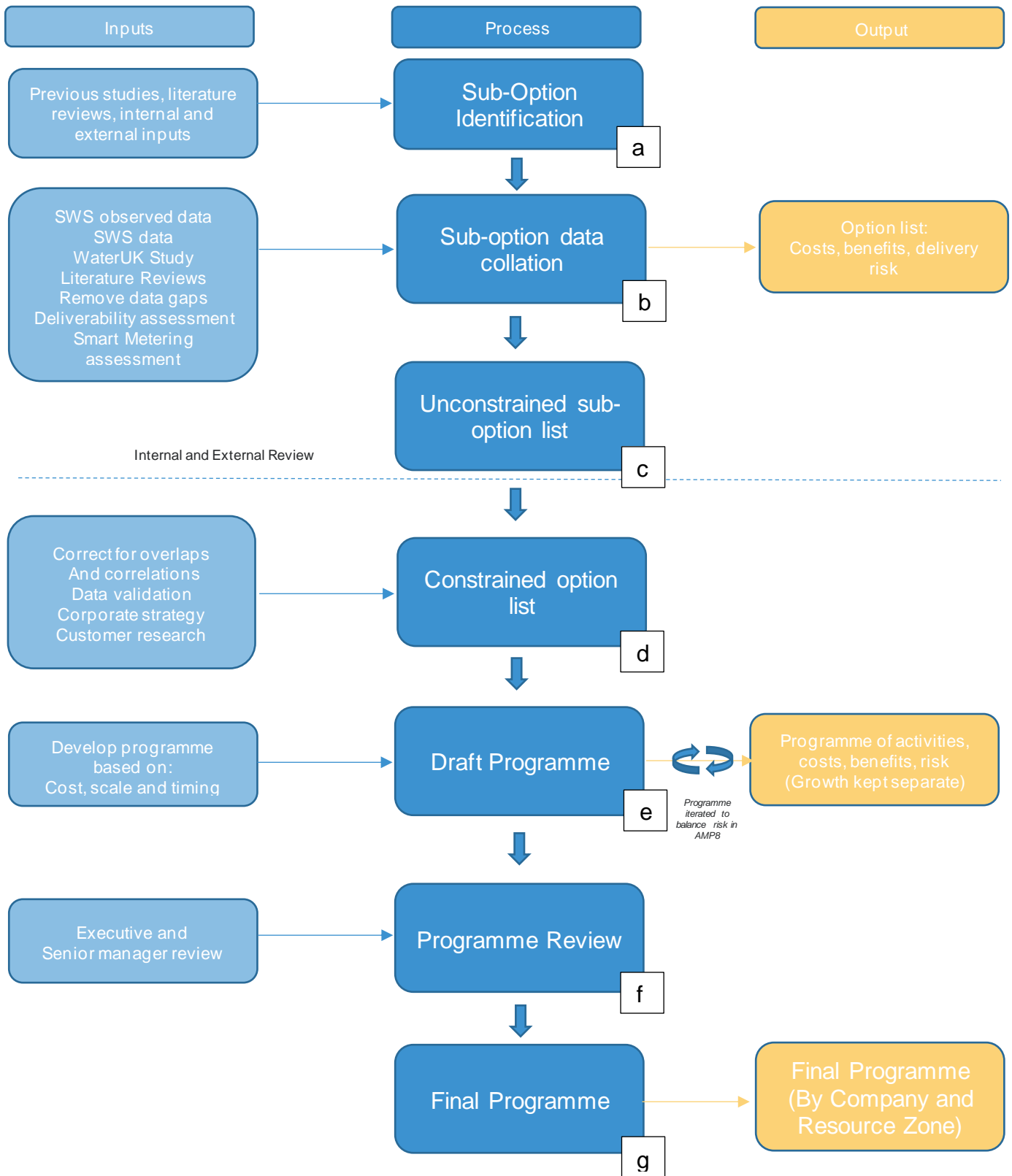
In this Annex the following terms are used:

- l/hd/day = litres per head per day
- l/per/day = litres per person per day
- l/prop/day = litres per person per day

## 2. Overview of the Household Process

We have followed a structured process in the development of the plan. This is set out in Figure 1. The steps undertaken are outlined below.

Figure 2.1 Household Process Overview



### a) Sub-Option Identification

This step identified potential sub-options for reducing household demand. We used the term sub-option because these are later aggregated into an overall feasible option list. These sub-options were drawn together from the following data sources:

- Water UK ‘long-term PCC pathways’ project (2019)
- Artesia “Options identification and analysis for T100 and NF110 pathways” (2021)
- Review of other water company WRMP19 and Annual Review submissions
- Waterwise
- Internal workshop
- External consultant support
- Past WRMP19 and WRSE submissions
- Academic papers

In total, nearly 40 sub-options were identified. A short description is given of each in Table 2.1

**Table 2.1 Option identification Descriptions**

Ref	Sub-Option	Description
T100-AuditA	General Home Audit	Home visit and water audit to reduce wastage and consumption. Installation of water saving devices. Focussed on high water users.
T100-AuditB	General Home Audit (smart meters)	Using data from smart meters to target water efficiency opportunities through a home visit and water audit to reduce wastage and consumption. Installation of water saving devices.  Separate option for every 10k properties audited up to 150k.
T100-Smart	Smart metering	Installation of smart water meters
T100-Tariff	Tariff differentiation	Implementation of seasonal or volume related tariffs. Requires Smart metering as a pre-requisite.
T100 Wasteful	Targeting wasteful behaviour	Communication campaign to raise awareness of water wastage and the opportunities to save water and costs.
T100-Innovation-Scale	Real time feedback	Use of real time feedback on water use to identify water wastage and promote water efficiency. Requires Smart metering as a pre-requisite.
T100-MoveHome	Targeted home move	Use of specific communications campaign and dedicated support for home movers. Aim to promote water efficiency is moving into the region or to look for water efficiency opportunities in the new home.

T100-energy	Linking water use to energy	Communications campaign to link water efficiency to saving money on energy bills. Requires Smart metering needed as a pre-requisite to be most effective.
T100-meteraware	Awareness of metering for behaviour change	Communications campaign to promote metering and raise awareness of what water homes are using to promote a wider behaviour change to save water
T100-goal	Goal setting templates	Use of on-line or app based engagement tools with customers that sets goals on saving water. Use of nudge or other behavioural techniques to support the goal targets. Smart metering needs as a pre-requisite to be affective.
T100-Moneyoff	Money off coupons for water savings devices	Money off coupons that can be redeemed against low water use appliances.
T100-community	Direct funding of community schemes	Provision of a fund to pay for community schemes to save water in the region. Grants given is the community can provide a solid business case on the savings they can achieve.
T100-Leg110	Building regs (110l/hd/day by 2030)	Changes to building regulations for new homes to set a standard of 110l/prop/day
T100-Leg85	Building regs (85/hd/day by 2035)	Changes to building regulations for new homes to set a standard of 85/prop/day
T100-LegAppliance	Appliance change with age	Communication programme or money off coupon programme to promote the changing of old water inefficient appliance for new more efficient ones
T100-LegMandatoryAppliances	Mandatory appliance change (water labelling)	Changes to legislation to a) include a water efficiency labelling on all new goods and b) introduction of new legislation to require new standards on water efficiency
T100-NationalAd	National advertising	National communication campaign to raise awareness of the need for water efficiency and promote the behaviour change on seeing water as a scarce good
T100-LocalAd	Local advertising	Targeted, local communication campaign to raise awareness of the need for water efficiency and promote the behaviour change on seeing water as a scarce good. Communication campaign to over all properties in a 5 year period.
T100-Aware	Awareness building	Communication campaign to raise awareness on why water efficiency is important.
T100-SWSuse	SWS leading by example	Programme of activities to promote the work SWS is doing to reduce its own water use.

T100-Colour-Shower	Colour changing shower heads	Use of colour changing showerheads to a) reduce the time taken in the shower and b) change to low flow shower heads
T100-Hose-restrictor	Garden hose trigger	Promotion of hose triggers to reduce wastage from garden hose use in the garden.
T100-Neighbourhood	Neighbourhood comparisons (Advizzo)	Provision of data to communities on their individual water use. Promotion of water efficiency through both neighbour comparisons and use of incentives (such as vouchers) to reduce water consumption.
T100-Energy2	Disaggregated energy reports	Provision of disaggregated energy consumption reports to show where energy is being used and show how reduction in water usage can reduce energy bills.
T100-Default-Applicances	Default settings on appliances	Communication campaign to promote customers to use the eco setting on appliances rather than the default settings
T100-Default-Toilets	Default single flush on toilets	Communication campaign to promote customers to use the single flush option on dual flush toilets.
T100-Reduce-garden	Reducing garden use	Communication campaign and supporting products and services to reduce garden water use.
T100-LeakyLoo	Leaky loo	Campaign and customer support to reduce waster losses from leaking valves on dual flush and other toilets.
T100-Teeth-Brush	Teeth brushing tap on	Communication campaign to turn taps off when brushing teeth.
T100-Shorter-showers	Shorter showers	Communication campaign to raise awareness on the amount of water used by a shower and promote shorter shower times.
T10-SchoolVisits	School visits	Education programme in primary schools to help school children understand where their water coms from, the challenges faced in the future and the simple actions they can take at home to reduce water use. Acts as an enabler for longer term behaviour change.

**b) Data Collation**

Data for each sub-option was collated where available. This included:

- Description of the initiative
- Water Savings (high, medium, low)
- Cost (high, medium, low)
- Delivery confidence score
  - 1= high confidence to



- 5 = low confidence

Data was drawn from a range of different sources covering SWS internal observed data from past studies through to industry reports and academic papers. All assumptions were recorded. Data was cross referenced to other sources where available to validate the legitimacy of assumptions.

**c) Unconstrained Sub-Option List**

The sub-options and data were collated to produce an unconstrained sub-option list - see Table 2.2 below.

The source of the data is referenced as follows:

- (1) Water UK 'long-term PCC pathways' project (2019)
- (2) Artesia "Options identification and analysis for T100 and NF110 pathways" (2021)
- (3) Review of other water company WRMP19 and Annual Review submissions
- (4) Waterwise
- (5) SWS data or Internal workshop
- (6) External consultant support
- (7) Past WRMP19 and WRSE submissions
- (8) Academic papers
- (9) SWS Smart Metering assessment



**Table 2.2 Unconstrained Sub-Option List Summary**

Ref	Sub-Option	Number props	Saving			Unit	Cost			Unit	Delivery Risk	Source:
			L	M	H		L	M	H			
T100-AuditA	General Home Audit	0-45k	33 (10%)	37 (11.3%)	47 (14.2%)	l/pop/day (%)	£100	£100	£100	Perprop	2	Option: 5 Savings:5 Costs:
T100-AuditB	General Home Audit (smart meters)	0-10k	31	42	53	l/prop/day	£136	£136	£136	Perprop	3	Option: 1, 2 Savings: 1 Costs: 1
		10-20k	26	37	48	l/prop/day	£136	£136	£136	Perprop	3	
		20-30k	21	32	43	l/prop/day	£136	£136	£136	Perprop	3	
		30-40k	16	27	38	l/prop/day	£136	£136	£136	Perprop	3	
		40-50k	11	22	33	l/prop/day	£136	£136	£136	Perprop	3	
		50-100k	6	17	28	l/prop/day	£136	£136	£136	Perprop	4	
		100-150k	6	17	28	l/prop/day	£136	£136	£136	Perprop	4	

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Ref	Sub-Option	Number props	Saving			Unit	Cost			Unit	Delivery Risk	Source:
			L	M	H		L	M	H			
T100-Smart	Smart metering	All	3%	4%	5%	l/per/d (%)	£102m		£160m	£m	3	Option:1,2,5, 7 Savings: 5 Costs:9
T100-Tariff	Tariff differentiation	All	4 (5)	5 (6)	6 (7.5)	% (l/hd/day)	0.5	0.5	0.5	£/prop	3	Option: 1,2,5 Savings: 5 Costs: 1
T100 Wasteful	Targeting wasteful behaviour	100k (10% of properties)	1	1	1	%	200	200	200	£k/yr	4	Option: 2,5 Savings:5, 1 (leaky Loo saving) Costs: 5
T100-Innovation-Scale	Real time feedback	100k (10% take-up)	2	3	4	%	0.5	0.5	0.5	£/prop	4	Option:5 Savings: 5, 8 (Houde (2013) Real time feedback) Costs:5
T100-MoveHome	Targeted home move	-	-	-	-	-	-	-	-	-	-	No data
T100-energy	Linking water use to energy	-	-	-	-	-	-	-	-	-	-	No data
T100-meteraware	Awareness of metering for behaviour change	50k (5% of properties)	0	1.35	2.7	%	0.5	0.5	0.5	£/prop	4	Option: 2, 5 Savings:5, 8 (Schwartz (2013) Energy Awareness) Costs:5

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Ref	Sub-Option	Number props	Saving			Unit	Cost			Unit	Delivery Risk	Source:
			L	M	H		L	M	H			
T100-goal	Goal setting templates	300k (30% take-up)	0	5.5	13.5	l/head/day	1	1	1	£/prop	4	Option:5, 2 Savings: 5, 8 (Womer (2018)) Costs: 5
T100-Moneyoff	Money off coupons for water savings devices	-	-	-	-	-	-	-	-	-	-	No data
T100-community	Direct funding of community schemes	-	0.4	0.6	0.8	MI/d (av)	150	225	325	£k	3	Option:1,2,3 Savings: 3 Costs: 3
T100-Leg110	Building regs (110l/hd/day by 2030)	Growth	-	0.27	-	MI/d	-	-	-	-	3	Option: 1 Savings: 5, 6 Costs: No cost
T100-Leg85	Building regs (85/hd/day by 2035)	Growth	-	3.2	-	MI/d	-	-	-	-	5	Option: 1 Savings: 5, 6 Costs: No cost
T100-LegAppliance	Appliance change with age	-	-	-	-	-	-	-	-	-	-	In demand forecast
T100-LegMandatoryAppliances	Mandatory appliance change (water labelling)	0-250k	1.5	3	4.5	l/hd/day	-	-	-	-	4	Option: 1, 5 Savings: 5, 6 Costs: No cost

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Ref	Sub-Option	Number props	Saving			Unit	Cost			Unit	Delivery Risk	Source:
			L	M	H		L	M	H			
		250k-500k	1.5	3	4.5	l/hd/day	-	-	-	-	4	Option: 1, 5 Savings: 5, 6 Costs: No cost
T100-NationalAd	National advertising	All	0	1	2	l/hd/day	1000	1000	1000	£k	3	Option: 1, 2,4,5,7 Savings: 1,6 Costs: 1, 6
T100-LocalAd	Local advertising	Targeted	0	1	2	l/hd/day	-	200	-	-	3	Option: 1, 2,4,5,7 Savings: 1,6 Costs: 1, 6
T100-Aware	Awareness building	All	-	-	-	-	-	-	-	-	-	Option: 1, 2, 5 Savings: 1,6 Costs: 1, 6
T100-SWSuse	SWS leading by example	-	-	-	-	-	-	-	-	-	-	Option: 5 Savings: - Costs: -
T100-Colour-Shower	Colour changing shower heads	10k	0	10	15	l/hd/day	35	35	50	Each (assume 1 per prop)	2	Option: 3, 4, 5,6 Savings: 5, 6 Costs: 4, 6
T100-Hose-restrictor	Garden hose trigger	10k	1	2	3	l/hd/day	1.69	1.69	1.69	Each (assume 1 per prop)	3	Option: 3, 5,6 Savings: 5 Costs: 4
T100-Neighbourhood	Neighbourhood comparisons (Advizzo)	1.5k	0	2	4	%/prop	25	25	40	£k/1.5k props	2	Option: 1, 2, 3 Savings: 3 Costs: 3
T100-Energy2	Disaggregated energy reports	-	-	-	-	-	-	-	-	-	4	Option: 5 Savings: 8 (4.6% in Kelly (2016))

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Ref	Sub-Option	Number props	Saving			Unit	Cost			Unit	Delivery Risk	Source:
			L	M	H		L	M	H			
												Costs: No costs data.
T100-Default-Applicances	Default settings on appliances	-	-	-	-	-	-	-	-	-	5	Option: 5 Savings: no data Costs: no data
T100-Default-Toilets	Default single flush on toilets	-	-	-	-	-	-	-	-	-	5	Option: 5 Savings: no data Costs: no data
T100-Reduce-garden	Reducing garden use	100k (10% take-up)	5	25	50	l/prop/summer months	-	200	-	Per year	4	Option: 3, 4, 5 Savings: 5 Costs: 5
T100-LeakyLoo	Leaky loo	5k	5	7.5	10	l/hd/day	-	90	-	£/prop	3	Option: 1, 2 Savings: 1 Costs: 1
T100-Teeth-Brush	Teeth brushing tap on	100k (10% take-up)	0.8	1.72	2.64	l/hd/day	40	40	40	£k/yr	4	Option: 5 Savings: 5 Costs: 3
T100-Shorter-showers	Shorter showers	100k (10% take-up)	10	30	50	l/hd/day	200	200	200	£k/yr	4	Option: 5 Savings: 5 Costs: 3
T10-SchoolVisits	School visits	12.5 p.a	0	2	4	l/hd/day	-	125	-	£k/yr	2	Option: 1, 2, 3, 5 Savings: 1 Costs: 5
		25k p.a	0	2	4	l/hd/day	-	230	-	£k/yr	2	Option: 1, 2, 3, 5 Savings: 1 Costs: 5

### Internal and External Review

A series of meeting and workshops were held with Southern Water staff supported by external consultants to review the unconstrained sub-option list. This reviewed:

- Is there double counting of sub-options or sub-option benefits?
- Are there key dependencies between sub-options?
- Are the benefits between sub-options correlated?

The sub-options were also assessed against their contribution to the overall strategy for customer service and raising awareness of water scarcity in the region and promotion of behaviour change.

The following sub-options were removed from the unconstrained list for the reasons set out below.

**Table 2.3 Sub-Options Removed from Unconstrained Option List**

Ref	Sub-Option	Reason for removal
T100 Wasteful	Targeting wasteful behaviour	Double counting of savings with National and Local Advertising campaigns and Water Audits
T100-MoveHome	Targeted home move	No data.
T100-energy	Linking water use to energy	Double counting of savings with national and Local advertising.
T100-meteraware	Awareness of metering for behaviour change	Double counting of savings with national and local media campaign, and in smart metering benefits comms
T100-Moneyoff	Money off coupons for water savings devices	No data
T100-LegAppliance	Appliance change with age	Already in the baseline demand forecast
T100-SWSuse	SWS leading by example	Savings in Non-HH forecast (for STW use). Communication already in comms campaigns.
T100-Colour-Shower	Colour changing shower heads	Double counting with awareness campaign and product provision
T100-Neighbourhood	Neighbourhood comparisons (Advizzo)	Low scale and poor cost-benefit
T100-Energy2	Disaggregated energy reports	No data
T100-Default-Applicances	Default settings on appliances	No data
T100-Default-Toilets	Default single flush on toilets	No data
T100-Reduce-garden	Reducing garden use	Double counts savings with hose restrictor option
T100-Teeth-Brush	Teeth brushing tap on	Double counts savings with awareness campaign

Ref	Sub-Option	Reason for removal
T100-Shorter-showers	Shorter showers	Overlaps with awareness campaign
T100-SchoolVisits	School visits	Low option removed as not ambitious enough

**d) Constrained Option list**

A detailed summary of each of the remaining sub-options was produced. This recorded all assumptions and validations on the data for each sub-option. This included the addition of carbon costs and benefits. These summaries are given at the end of this Annex.

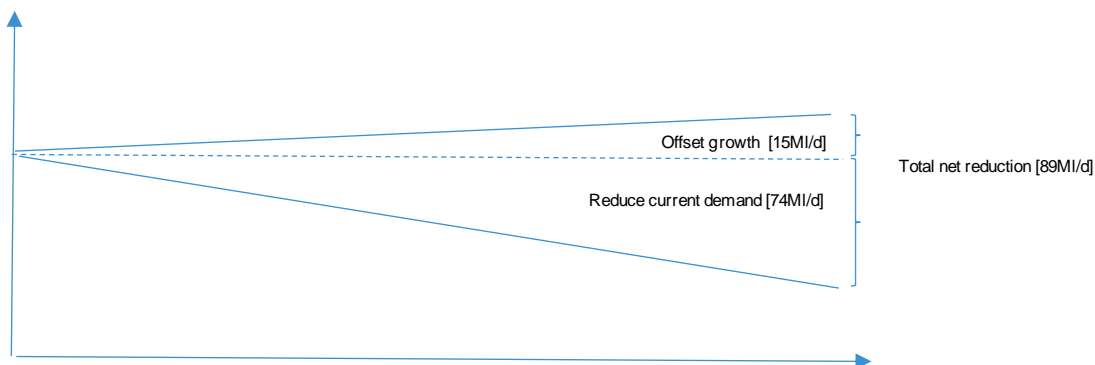
**e) Draft Programme**

A draft programme to meet the T100 target was developed using a triangulation of three pieces of analysis (See Figure 2.2):

- Optimisation – the results of the “Options identification and analysis for T100 and NF110 pathways” (2021)
- Cost-Benefit – the relative unit cost-benefit of each sub-option
- Balancing Short vs. Long-term needs – identifying those sub-options that are needed to develop long-term behaviour change and keep options open for future decisions.

The Draft Programme was developed to balance cost vs. certainty in delivery vs. sequencing to ensure future actions can be effective. The above process was undertaken in twostages:

- Firstly, the plan to reduce demand in the final forecast from the starting HH demand in 2025 to the final demand forecast in 2040. This was a reduction of 74MI/d
- Secondly, a separate programme to offset underlying growth in the baseline forecast. c15MI/d

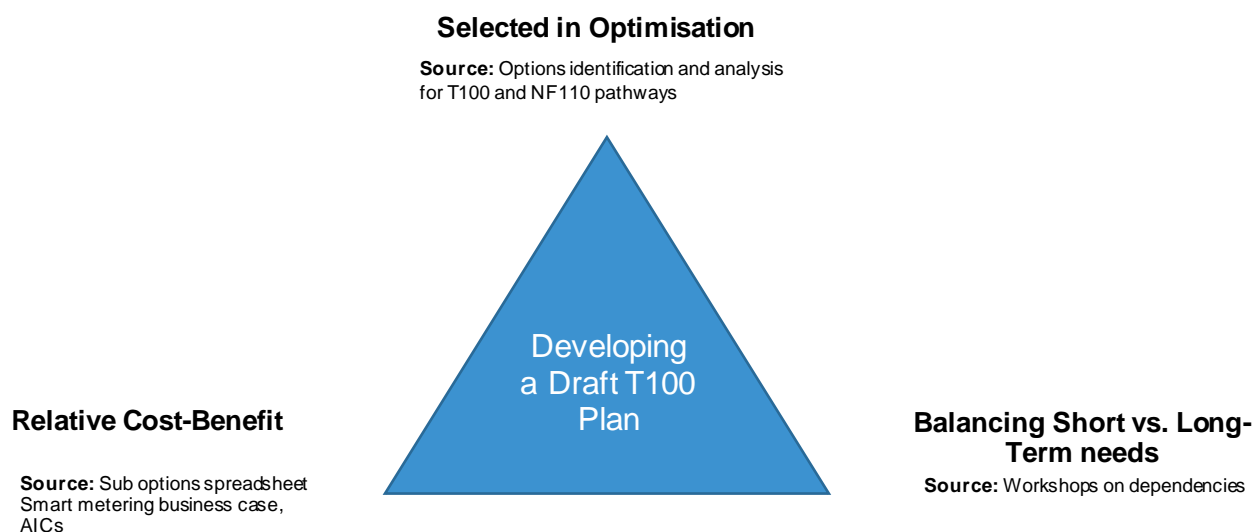


This was to reflect the difference between the activities needed to reduce demand in existing homes and current use vs. new home and change in demand usages

For the former, the activities needed to reduce demand followed an iteration process in AMP8 (2025-2030). This was to ensure the programme initiatives expected out-turn matched the required performance. In contrast, the greater uncertainty and lack of options in the long-term and lack of long-term data meant the plan was not adjusted for delivery risk. A more traditional summation of possible sub-options was used instead.



Figure 2.2 Process for Developing the Draft T100 Programme



The result was a programme that sought to find the best balance overall rather than focus on one single objective over another and balance short and long-term risk. The sub-options in the Draft Programme were then structured into a feasible list under common catalysts heading needed for the behaviour changes on water efficiency - see Table 2.4 – and a growth offset programme. Table 2.5 and Figure 2.3 shows the cumulative benefit of the feasible options included in the Draft T100 programme.

The total Draft Programme had a total demand saving of over 90MI/d made up from 79MI/d of reduced current demand and 15MI/d for growth. It has a total cost of £172m by 2040. The change in direct operational carbon was 32million kg CO<sub>2</sub>e by 2040 from reduced demand. The operational and embodied carbon of the initiatives was 19 and 4 million kg CO<sub>2</sub>e respectively.

The Draft Programme used all the constrained sub-options identified in the feasible list. The WRMP tables were completed based on the feasible option categories termed 'catalysts' plus the growth offset programme.

Two important features of the Draft Programme were:

- Ensuring supply security is met – Figure 2.3 shows the options in AMP8 add to more than the T100 target for the reduction in current demand. It appears to 'over provide' on the demand options. This part of the plan was developed by iterating the options so that the expected out-turn accounting for the confidence of delivery can will meet the T100 target. This was done to ensure that there is confidence in meeting the obligation for maintaining security of supply in Board Assurance and also meet the Defra Direction requirements that "WRMPs must be deliverable, which includes managing the uncertainty faced". This is explored further in the following section on Deliverability Assessment.
- Innovation programme – there were insufficient validated options to meet the total MI/d reduction in demand needed to meet T100 in post c2033. To address potential shortfall, an 'innovation programme' was included as a separate option with assumed savings that it will need to meet. This forms part of an overall approach to assess and validate future demand options and bring them into



a delivery programme and manage the uncertainty faced in the long-term. This programme needs to find c10l/per/day saving by the late 2030s and is a significant part of the programme.

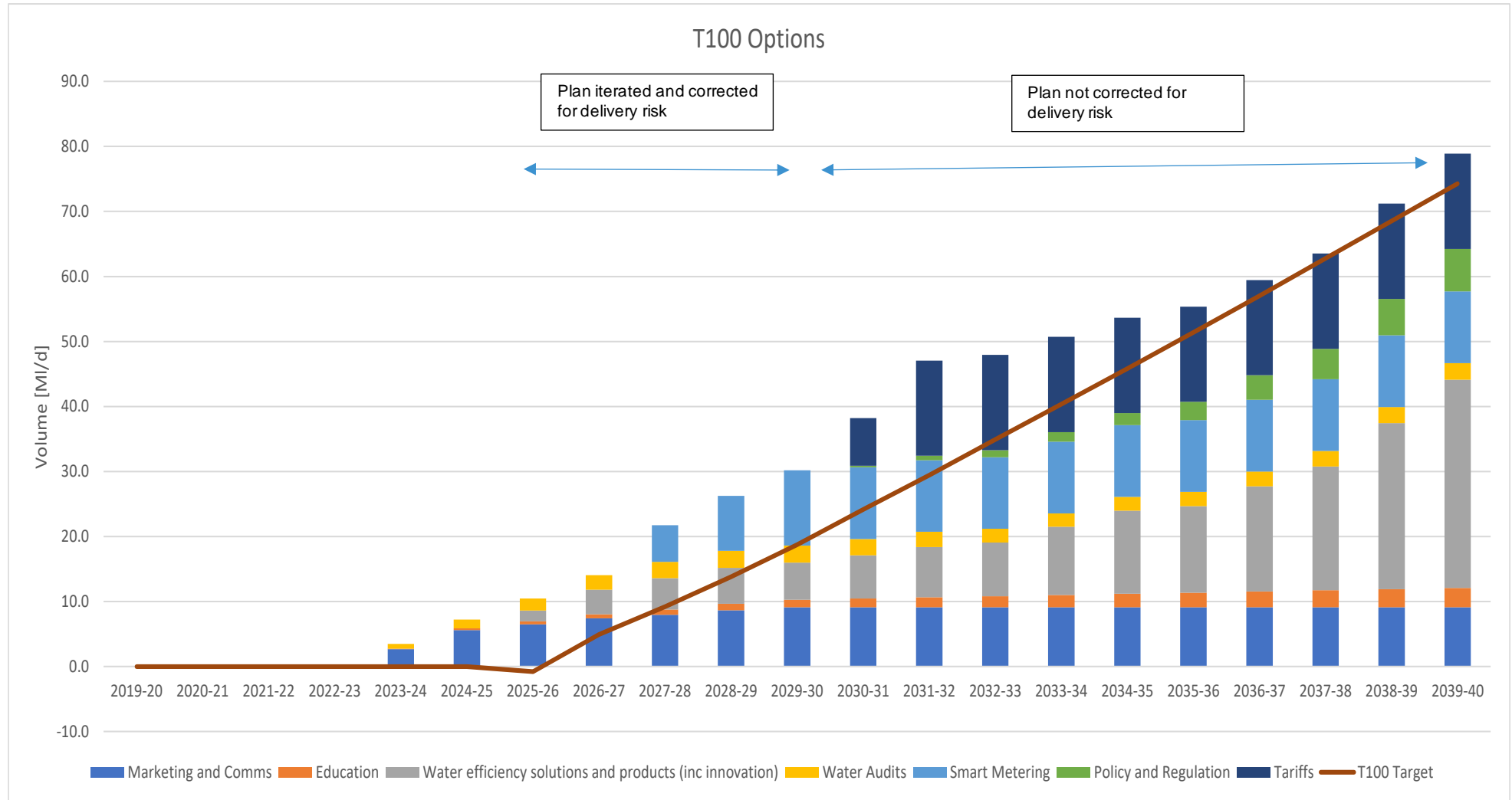
**Table 2.4 Draft T100 Programme Structure**

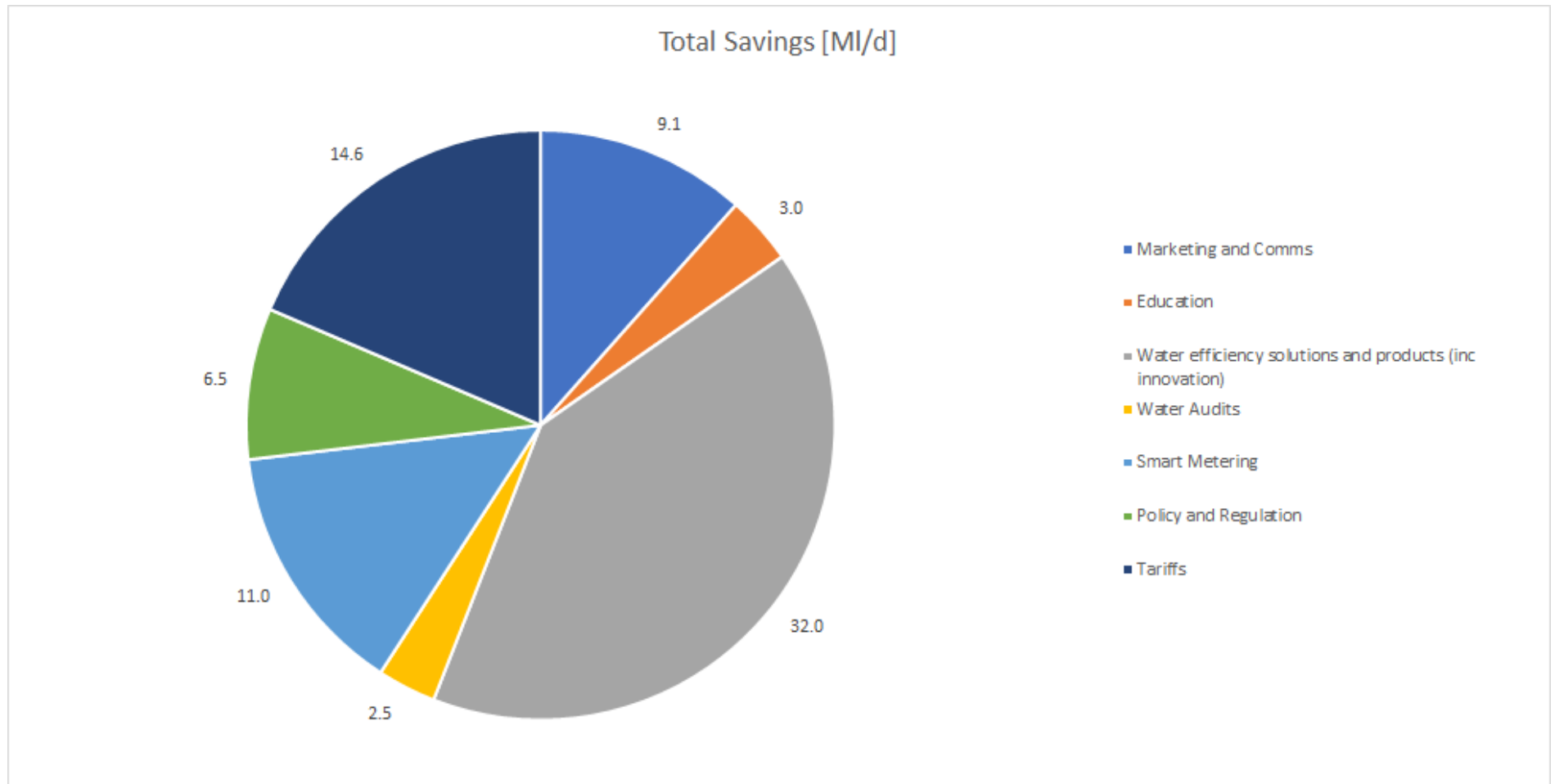
Catalysts/Feasible Option	Sub-Option Included
Marketing and Comms	National advertising Local advertising Awareness building
Education	Schools Visits
Water efficiency solutions and products (inc innovation)	Colour showers/more efficient showers Goal setting templates Supply of products to reduce garden use Leaky loo Innovation programme
Water Audits	General Home Audit General Home Audit (smart meters)
Smart Metering	Smart metering
Policy and Regulation	Building regs (110l/hd/day by 2030) Building regs (85l/hd/day by 2035) Mandatory appliance change (water labelling)
Tariffs	Tariff differentiation
Growth offset programme	N/A

The growth element of the plan was consciously treated as separate. Underlying growth impacts will depend on broader decisions such as water neutrality in planning, the specific type of development as well as the halo effect of the areas such as comms campaigns and the impact of elements like water audits preventing underlying growth in demand in that baseline forecast. By 2040 the forecast increase in baseline demand was 15MI/d across the 14 Resource Zones. However, in the short term the growth is < 3MI/d by 2030 – significantly lower than the reduction in current base demand needed. For the purposes of this Plan it was assumed that this would be delivered due to the broader comms campaigns for the T100 plan and benefits from the other activities that implicitly will prevent underlying growth (e.g. water audits preventing increasing in water losses that would otherwise occur).

This assumption will be reviewed for the Final Plan, but the scale of growth in the short term means the programme is not sensitive to this assumption.

Figure 2.3 Draft T100 Programme (exc growth Offset Programme of 15MI/d)





**Table 2.5 Selection of Water Efficiency Options in the Programme**

Ref	Catalyst/Feasible Option	Sub-Option	When in the programme				Reason for selection			Commentary
			AMP7	AMP8	AMP9	AMP10	Optimisation	Cost-benefit	Balancing short and long-term needs	
T100-AuditA	Water Audits	General Home Audit	✓						✓	This option has certainty as delivers known savings; programmed early to deliver quick benefits
T100-AuditB	Water Audits	General Home Audit (smart meters)		✓	✓	✓	✓		✓	This option delivers known savings and selected in optimisation analysis
T100-Smart	Smart metering	Smart metering		✓	✓	✓	✓	✓	✓	Smart metering is a lower net cost than maintaining current asset base; early in the programme as it acts as an enabler for longer term actions
T100-Tariff	Tariffs	Tariff differentiation			✓	✓	✓	✓		High cost-benefit; placed late in the programme as needs smart meters to enable the option
T100 Wasteful		Targeting wasteful behaviour								Rejected option. See Table 2.2
T100-Innovation-Scale		Real time feedback								Rejected option. See Table 2.2
T100-MoveHome		Targeted home move								Rejected option. See Table 2.2
T100-energy		Linking water use to energy								Rejected option. See Table 2.2

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Ref	Catalyst/Feasible Option	Sub-Option	When in the programme				Reason for selection			Commentary
			AMP7	AMP8	AMP9	AMP10	Optimisation	Cost-benefit	Balancing short and long-term needs	
T100-meteraware		Awareness of metering for behaviour change								Rejected option. See Table 2.2
T100-goal	Water efficiency solutions and products (inc innovation)	Goal setting templates			✓	✓		✓		Potential high benefit, but placed later in the programme as needs smart metering as an enabler
T100-Moneyoff		Money off coupons for water savings devices								Rejected option. See Table 2.2
T100-community	Non-Household	Direct funding of community schemes	✓	✓	✓	✓	✓		✓	Delivers known benefits so placed early in the programme. Benefits however expected to be non-HH as dealing with allotments or local needs. Benefits therefore included in the non-HH programme
T100-Leg110	Regulation and Policy	Building regs (110l/hd/day by 2030)		✓	✓	✓		✓		Assumed government has in place by 2030
T100-Leg85	Regulation and Policy	Building regs (85l/hd/day by 2035)			✓	✓		✓		Assumed government has in place by 2035
T100-LegAppliance		Appliance change with age								Rejected option. See Table 2.2
T100-LegMandatoryAppliances	Regulation and Policy	Mandatory appliance change (water labelling)		✓	✓	✓		✓		Assumed government has in place by 2030

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Ref	Catalyst/Feasible Option	Sub-Option	When in the programme				Reason for selection			Commentary
			AMP7	AMP8	AMP9	AMP10	Optimisation	Cost-benefit	Balancing short and long-term needs	
T100-NationalAd	Marketing and communication	National advertising		✓	✓	✓	✓		✓	Raises awareness of long-term issues. Assumed in AMP8 following co-ordinated response through the national demand management group
T100-LocalAd	Marketing and communication	Local advertising	✓	✓	✓	✓			✓	Early in programme to target specific areas under water stress
T100-Aware	Marketing and communication	Awareness building	✓	✓	✓	✓		✓	✓	Early in the programme to instigate wider behaviour change for the future. Large potential benefit.
T100-SWSuse		SWS leading by example								Rejected option. See Table 2.2
T100-Colour-Shower	Water efficiency solutions and products (inc innovation)	Colour changing shower heads		✓	✓	✓		✓	✓	Large potential water saving benefit. Early in the programme as known savings and sets longer term behaviour change.
T100-Hose restrictor	Water efficiency solutions and products (inc innovation)	Garden hose trigger/Supply of products to reduce garden use		✓	✓	✓		✓	✓	Large potential saving at peak demand which is beneficial to the environment. Early in the programme to promote behaviour change.
T100-Neighbourhood		Neighbourhood comparisons (Advizzo)								Rejected option. See Table 2.2
T100-Energy2		Disaggregated energy reports								Rejected option. See Table 2.2

Draft Water Resource Management Plan

Annex 15: T100 and Non Household Option Identification Technical Plan

Ref	Catalyst/Feasible Option	Sub-Option	When in the programme				Reason for selection			Commentary
			AMP7	AMP8	AMP9	AMP10	Optimisation	Cost-benefit	Balancing short and long-term needs	
T100-Default-Appiances		Default settings on appliances								Rejected option. See Table 2.2
T100-Default-Toilets		Default single flush on toilets								Rejected option. See Table 2.2
T100-Reduce-garden		Reducing garden use								Rejected option. See Table 2.2
T100-LeakyLoo	Water efficiency solutions and products (inc innovation)	Leaky loo		✓	✓	✓	✓			Selected in optimisation analysis. Early in programme to secure early benefits.
T100-Teeth-Brush		Teeth brushing tap on								Rejected option. See Table 2.2
T100-Shorter-showers		Shorter showers								Rejected option. See Table 2.2
T10-SchoolVisits		School visits	✓	✓	✓	✓	✓		✓	Selected in optimisation analysis. Early in programme to facilitate long-term behaviour change
-	Water efficiency solutions and	Innovation programme		✓	✓	✓			✓	Programme to develop promote further options for the future and reduce uncertainty in programme delivery.

Draft Water Resource Management Plan

Annex 15: T100 and Non Household Option Identification Technical Plan

Ref	Catalyst/Feasible Option	Sub-Option	When in the programme				Reason for selection			Commentary
			AMP7	AMP8	AMP9	AMP10	Optimisation	Cost-benefit	Balancing short and long-term needs	
	products (inc innovation)									
T100-growth	-	Growth offset		✓	✓	✓		✓		The offsetting of growth using the existing T100 actions. By 2030 the baseline growth in demand is <3M/d compared to a total T100 forecast of 30M/d.



## f) Draft Programme Review

The Draft programme was reviewed through internal meetings. The review examined the validity of the underlying data and assumptions, the size, scale and sequencing of activities and the strategic fit with the overall company vision.

The thorough process used to develop the Draft Programme meant there was only minor changes from the review of the Draft T100 Programme:

- Education programme – improved cost estimate to include the materials needed for a schools programme (+£40k p.a)
- Smart metering programme – improved cost forecast with more granular breakdown of installation and IT/network costs.
- Local Advertising campaign – increased reach from 200k to 300k properties p.a. (+£200k p.a.)
- Internal staff time – inclusion of internal staff time to run the T100 programme to ensure full programme costs are captured and costs for an early start for innovation programmes reflecting the long-term need to find more options to reduce demand (+£571k p.a)

All other activity remained unchanged from the Draft Programme.

## 3. Final Household Programme (T100)

Figures 3.1 to 3.3 show the Final Household T100 programme incorporating the changes from the Draft Programme review.

The features of the Final Programme are set out below.

Programme Element	Value
Forecast demand savings (unadjusted for risk) by 2040	
• Reduction for final demand forecast	79MI/d
• Underlying growth reduction	15MI/d
• Total	>90MI/d
Gross Totex (by 2040)	£240m Smart metering = £171m Other T100 options = £69m
Operational cost savings (by 2040)	£21m**
Net Totex	£219
Programme delivery risk score	AMP8 = 2.2 AMP10 = 3.5
GHG (operational and embodied)	23million kgCO2e
GHG saving (from reduced demand)*	-32.2million kgCO2e

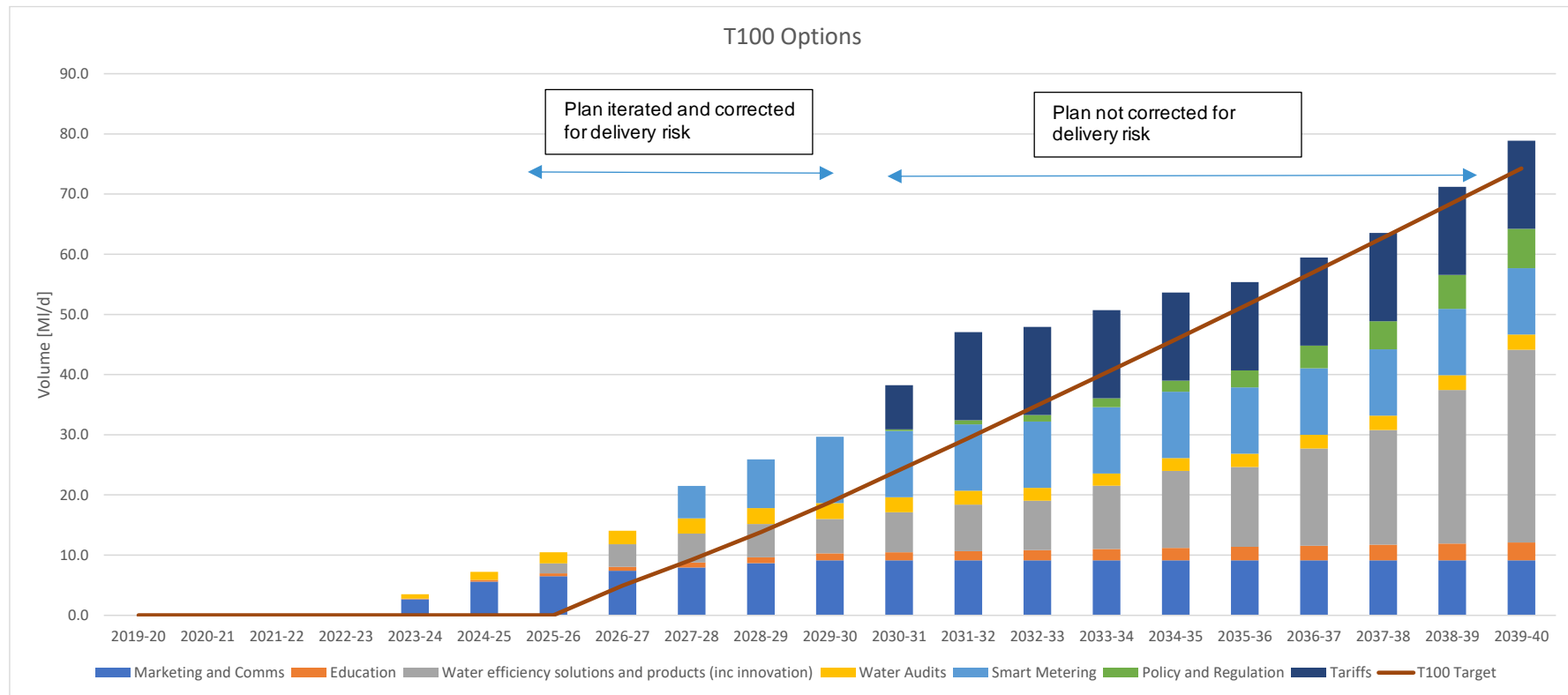
\*The data show the programme is forecast to be net carbon negative meaning the carbon savings are larger than the carbon costs. The GHG savings do not include growth. As the growth is being offset, there is no net benefit to the environment compared to the present day.

\*\*Due to the high energy costs at the time of publication, the operational costs savings are not included in the WRMP tables for the Draft as they may over estimate the long term benefits.

The details of each option are set out in the following section. The smart metering programme is a material component for the T100 programme. A separate Annex provides a detailed assessment of the cost and benefits of the smart metering programme, which is not repeated here.

The Resource Zone profiles to meet the T100 Plan were produced by proportional allocation of the company programme to each resource zone. The proportional allocation is based on the demand reduction needed in each Resource Zone to take demand from the current PCC down to 100l/head/day in each zone compared to the total demand saving. An example for the Hampshire West (HW) Resource Zone is shown in Figure 3.3.

Figure 3.1 Final Household T100 Programme (exc growth offset programme of 15MI/d)



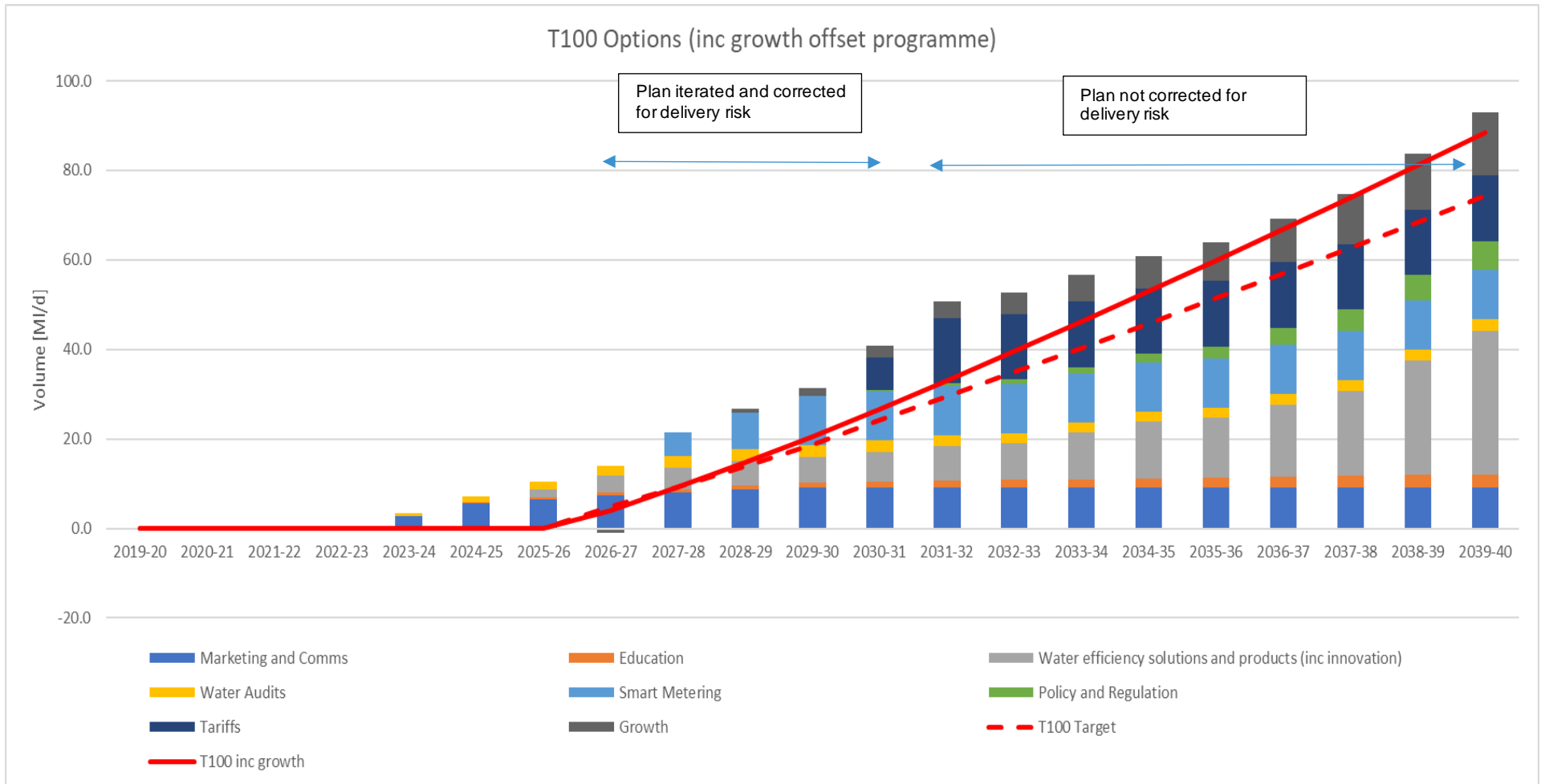
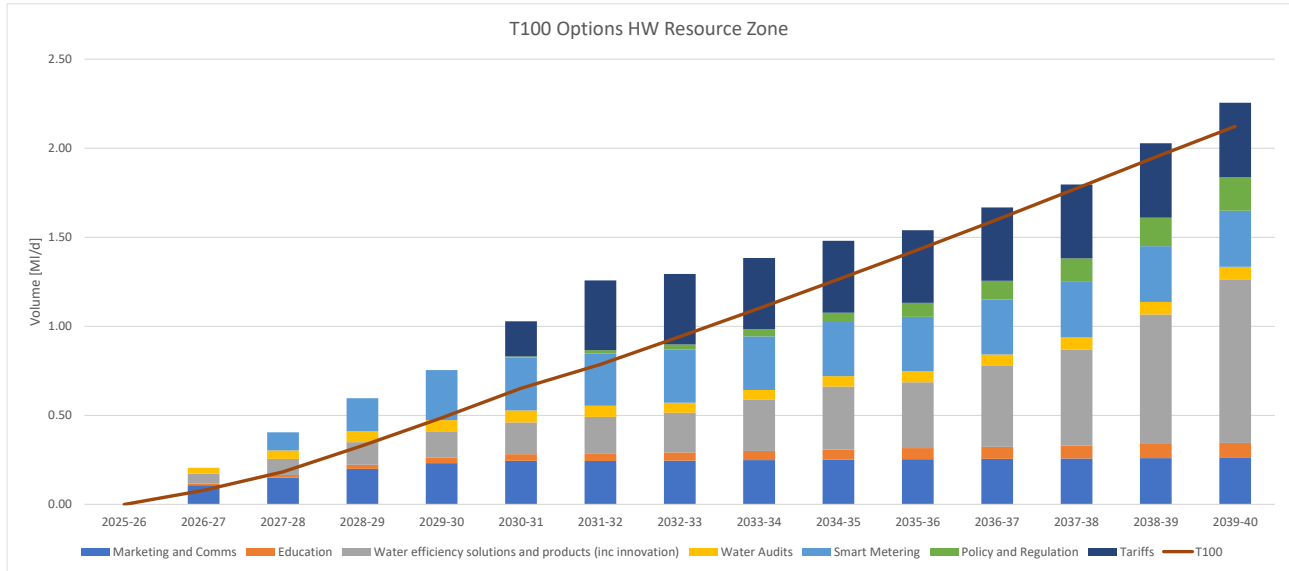


Figure 3.2 Final Household T100 Programme

			AMP8	AMP9	AMP10	Total
<b>Water Saving</b>	Cumulative savings	MI/d	29.7	53.7	78.9	78.9
	Delivery Risk	nr	2.2	3.2	3.5	-
<b>Costs</b>	Capex	£m	153.4	5.0	0.0	158.4
	Opex	£m	27.1	27.5	27.5	82.0
	Opex Savings	£m	-3.2	-7.5	-10.4	-21.2
			AMP8	AMP9	AMP10	Total
<b>Marketing and Comms</b>	Cumulative savings	MI/d	9.1	9.1	9.1	9.1
	Total Capex	£m	0.0	0.0	0.0	0.0
	Total Opex	£m	10.0	10.0	10.0	30.0
	Total Opex Savings	£m	-1.3	-1.4	-1.4	-4.2
<b>Education</b>	Cumulative savings	MI/d	1.2	2.1	3.0	3.0
	Total Capex	£m	0.0	0.0	0.0	0.0
	Total Opex	£m	1.5	1.5	1.5	4.5
	Total Opex Savings	£m	-0.1	-0.3	-0.4	-0.8
<b>Water efficiency solutions, products and innovation</b>	Cumulative savings	MI/d	5.7	12.8	32.0	32.0
	Total Capex	£m	3.5	0.0	0.0	3.5
	Total Opex	£m	2.6	2.3	2.3	7.1
	Total Opex Savings	£m	-0.7	-1.5	-3.4	-5.5
<b>Water Audits</b>	Cumulative savings	MI/d	2.6	2.1	2.5	2.5
	Total Capex	£m	0.0	0.0	0.0	0.0
	Total Opex	£m	5.0	5.0	5.0	15.0
	Total Opex Savings	£m	-0.4	-0.4	-0.4	-1.1
<b>Smart Metering</b>	Cumulative savings	MI/d	11.0	11.0	11.0	11.0
	Total Capex	£m	149.9	5.0	0.0	154.9
	Total Opex	£m	5.0	5.4	5.4	15.8
	Total Opex Savings	£m	-0.8	-1.8	-1.8	-4.3
<b>Policy and Regulation</b>	Savings	MI/d	0.0	1.9	6.5	6.5
	Total Capex	£m	0.0	0.0	0.0	0.0
	Total Opex	£m	0.0	0.0	0.0	0.0
	Total Opex Savings	£m	0.0	-0.2	-0.7	-0.9
<b>Tariffs</b>	Savings	MI/d	0.0	14.6	14.6	14.6
	Total Capex	£m	0.0	0.0	0.0	0.0
	Total Opex	£m	0.1	0.5	0.5	1.1
	Total Opex Savings	£m	0.0	-2.1	-2.3	-4.4
<b>Growth offset</b>	Savings	MI/d	2.5	8.0	14.9	14.9
	Total Capex	£m				
	Total Opex	£m				
	Total Opex Savings	£m				
<b>Internal Resources</b>	Savings	MI/d				
	Total Capex	£m				
	Total Opex	£m	2.9	2.9	2.9	0.0
	Total Opex Savings	£m				
<b>Totals</b>	Savings	MI/d	29.7	53.7	78.9	78.9
	Total Capex	£m	153.4	5.0	0.0	158.4
	Total Opex	£m	27.1	27.5	27.5	82.0
	Total Opex Savings	£m	-3.2	-7.5	-10.4	-21.2

Figure 3.3 Final Household T100 Programme – HW Resource Zone Example (exc growth)



## 4. Household Deliverability Assessment

The T100 vision is an ambitious programme of demand reduction. This requires a series of actions to fundamentally change behaviours to water use. This behaviour change is not fully within the control of the water company. However, the success or failure of the activity to deliver the benefits is important to understand the deliverability of the programme.

The benefits that do accrue from the demand reduction will determine:

- the level of confidence of the plan to deliver supply security
- the need to accelerate or decelerate water resource development
- what actions are needed now to leave future options or choices open and flexible

To assess the level of risk in the T100 plan, the following analysis were undertaken:

- Assessment of the risk-adjusted demand savings
- High-low assessment of demand savings

Each of these assessments are summarised below. The analysis was done on the main programme for reducing current demand excluding growth. Growth risk will be included for the final plan. However, this is also covered by sensitivity analyses that form the adaptive pathways.

### 4.1 Risk Adjusted Demand Saving Assessment

Each of the sub-options in the T100 plan have different costs and benefits. They also have different levels of delivery confidence reflecting the extent to which they are directly within or outside the company's control and if the sub-option has a known track record for delivery or is an untested option.

As set out in Section 2, a delivery confidence score was assigned to each sub-option. This was done using the following scoring approach:

Delivery Risk	Description	Delivery confidence	Probability of expected benefit
1	High	Strong track record with certain benefits	100%
2	Medium-High	SWS past studies and observed data	90%
3	Medium	Industry studies or SWS calculations	60%
4	Medium-Low	Some industry experience, possible overlap with other initiatives	30%
5	Low	Little or no data validation available	10%

A probability of the benefits of the options being achieved was based on the delivery confidence. Those sub-options which are within the company control and have a track record of delivery have a high probability of achieving the forecast benefits. In contrast those with no track record have a low confidence.

The expected outturn from the T100 programme was then calculated by summing:

*Benefit from the planned option x probability of expected benefit for the delivery risk*

This gave a risk adjusted or 'expected outturn' assessment of the T100 programme. The calculation is assessing what the expected outturn of the programme could be based on the confidence of whether the option can be delivered.

There is a degree of subjectivity in the probability of the expected benefit from each option, however, this process allowed a systematic way to assess delivery risk in a transparent manner.

The results of the analysis are shown in Figure 4.1. The key features of the results are:

- In the short-term, the expected outturn is at or close to the volume of water needed to hit the T100 demand reduction profile.
- In the long-term, the expected out-turn is below the volume of water needed to meet the T100 demand reduction profile.

The stronger performance of the plan in the short-term is consistent with the process through which the plan was developed.

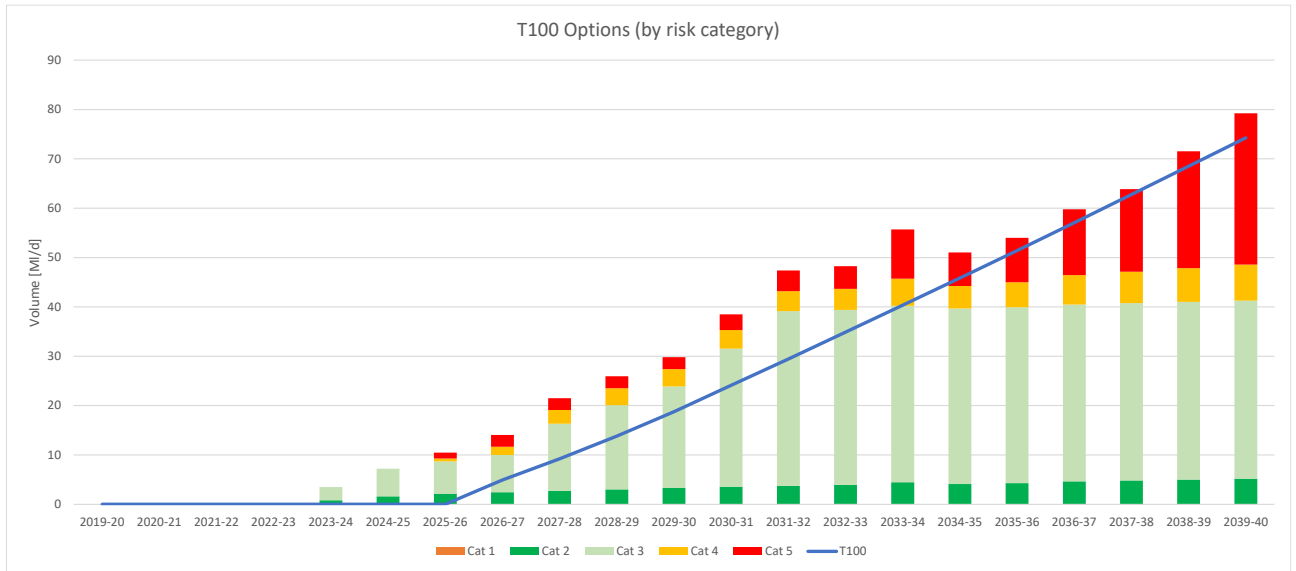
The AMP8 plan was iterated to ensure that risk was addressed and the plan could meet the MI/d required for T100 and supply-security. This is seen in the results that show the expected out-turn should (in the margins of accuracy) meet the T100 MI/d reduction targets.

In contrast, the greater uncertainty and lack of sub-options in the long-term meant the plan was not adjusted for delivery risk. A traditional summation of possible options was used instead. When the expected benefits are assessed this shows the outturn could be in the order of 30-40MI/d lower than the T100 MI/d reduction needed in the long-term. With a forecast population of between 2.5 to 3m in the long-term, the actual outturn

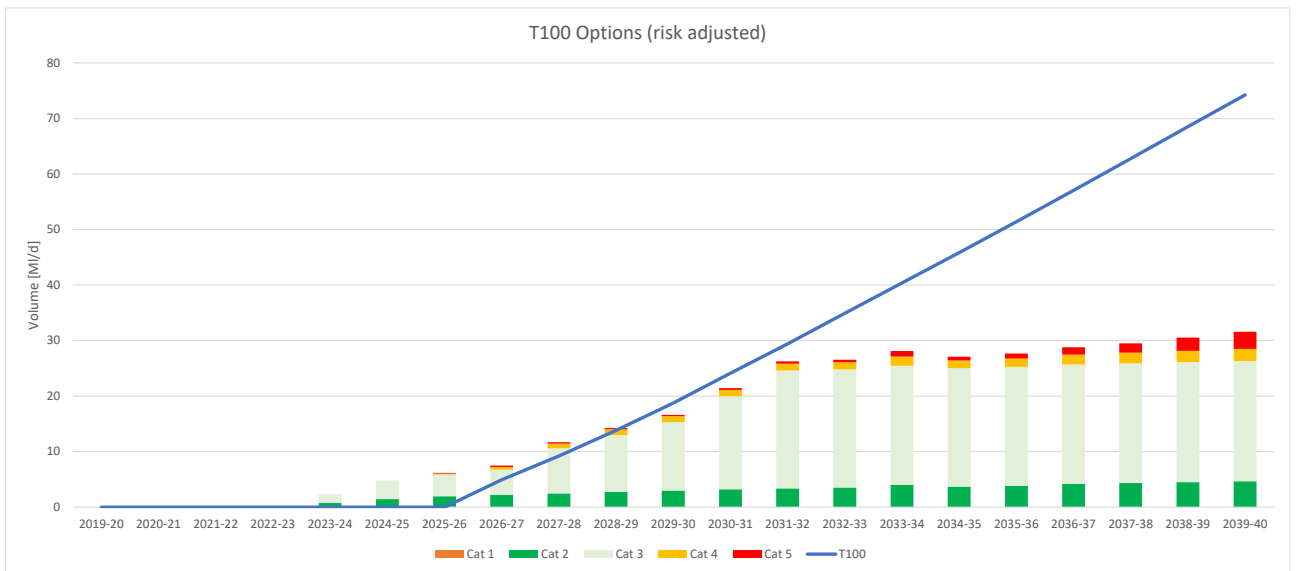
position is more akin to a PCC value of 110l/per/day (since 10l/per/day higher for 3m population is 30MI/d lower demand reduction).

Figure 4.1 Results of Risk Adjusted Household T100 programme (exc growth offset programme)

a) T100 delivery risk category



b) Risk adjusted T100 programme – expected outturn (exc growth offset programme)





## 4.2 High-Low Assessment of Demand Savings

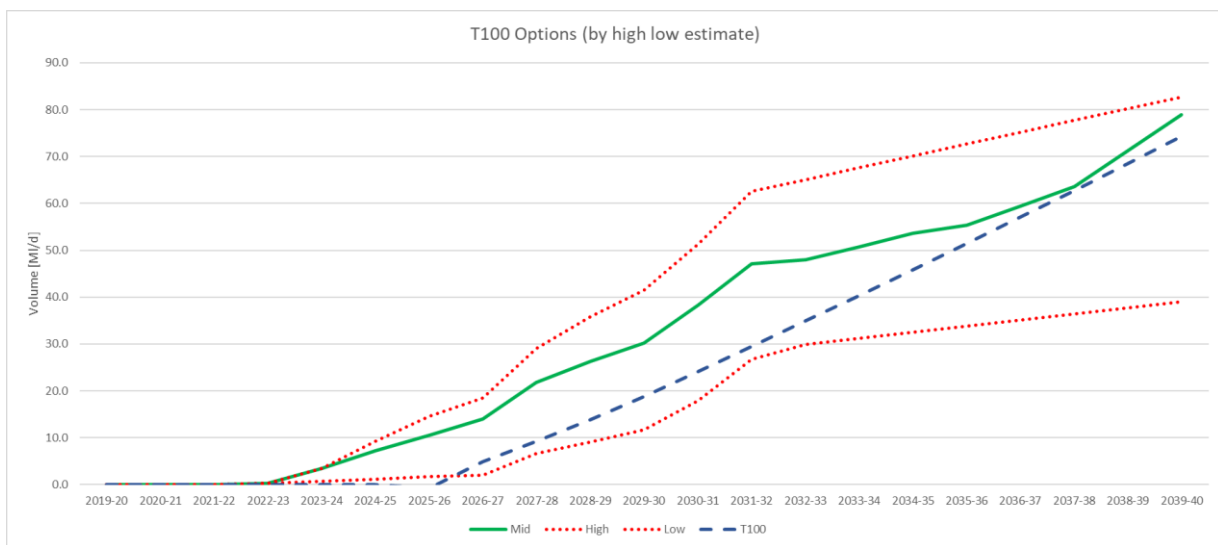
In the data collection for the T100 programme, high-medium-low estimates of the demand savings was collated.

Figure 4.2 shows what the range of demand savings could be in the T100 programme if all sub-options deliver as planned.

The results show that the Programme should at least meet the T100 demand reduction needed in the short term (to 2030). This is consistent with how the plan was developed as it was iterated to ensure the short term options can meet the demand reduction needed.

However, in the long term the low estimate of the benefits show there could be a shortfall of up to 35MI/d compared to the demand reduction needed to hit the T100 target. The low potential long-term outturn reflects that there is more uncertainty on the performance of options in the future.

**Figure 4.2 High-Low Range of T100 Demand Savings (exc growth offset programme)**



## 4.3 Interpretation of the Results

The two analyses are two different, but complementary, assessments of delivery risk in the programme.

The high-low analysis implicitly assumes all feasible sub-options in the plan are delivered and the only uncertainty is on the expected benefit.

The risk adjusted demand assessment is calculating what the expected outturn benefit might be based on the confidence of the feasible sub-option being delivered. It reflects the extent to which the delivery of the options is fully within, or outside, of the company's control and knowledge of the benefits that may be achieved.

Taking both analyses together, the following observations are drawn:

Short-term (to 2030)

- The plan should deliver the demand reductions needed in the short-term
- Including fewer options in AMP8 in the Final Programme options runs the risk of not achieving the demand savings needed. The results show the apparent 'over provision' of options is needed to manage the delivery risk.
- If the mid-point of the demand savings were to be achieved, the savings would offset some long-term risk – early investment in options is a low regret choice.

Medium- to-long-term (post 2030)

- There is significant scope for benefits to be lower than planned in the medium-to-long-term
- The shortfall could be expected to be 30-40Ml/d by 2040 in a worst case scenario
- The underlying data show this is principally driven by the innovation programme which is profiled to meet the gap between the known options and the demand reduction needed.
- A shortfall of c30-40Ml/d is equivalent to meeting a pcc target of 110-115L/person/day by 2040.

To manage the strategic risk this long-term shortfall could pose to the supply-demand balance this plan includes a planning forecast target of 109l/p/d pcc target. This balances the demand uncertainty with the need for the plan to be deliverable in the medium to long-term to achieve the environmental needs and supply-security. For delivery, the activities in the T100 plan are maintained in the short term as it allows the programme to decide at WRMP29 on if the planning assumption should revert to 100l/p/d.

## 5. Summary of each Household T100 option

### Marketing and Communication

Ref	T100-NationalAd			
Initiative	National Advertising Campaign			
Description	Funding to support an annual national advertising campaign to promote the awareness of the need for water efficiency. This would be a programme akin to the 'Love Water' campaign and would align with the National Demand Management Steering Group. The campaign is assumed to have a single reach that is maintained through the process. In contrast the local campaign is assumed to reach all customers over time due to its targeted approach.			
Confidence on delivery	3 (Med)			
Total Saving	0 to 1.4Ml/d		Period	Annual from 2025
Assumptions	Low	Med	High	Source
Saving	0l/head/day	1.5l/head/day	3l/head/day	1.4 to 6.9 l/head/day - WaterUK Water Efficiency Report 2019. (Ref: <a href="https://www.water.org.uk/wp-content/uploads/2019/12/Water-UK-Research-on-reducing-water-use.pdf">https://www.water.org.uk/wp-content/uploads/2019/12/Water-UK-Research-on-reducing-water-use.pdf</a> ) Figures reduced by 50% to prevent overlap with local awareness campaign.
Cost	£1,000,000 p.a	£1,000,000 p.a	£1,000,000 p.a	National campaign cost of £2.1/prop/year ( <a href="https://www.water.org.uk/wp-content/uploads/2019/12/Water-UK-Research-on-reducing-water-use.pdf">https://www.water.org.uk/wp-content/uploads/2019/12/Water-UK-Research-on-reducing-water-use.pdf</a> ). With c1million properties would give a cost to Southern of c£2m/year. Assume a 50% efficiency to £1m p.a. on average. Cost carries on to maintain the saving.
Reach	1,000,000 properties per annum. Assumed all properties are targeted with 20% changing behaviour to calculate the Ml/d saving			
Conversion rate	20% (factored into properties that change behaviour)			(Ref: <a href="https://www.water.org.uk/wp-">https://www.water.org.uk/wp-</a>

				content/uploads/2019/12/Water-UK-Research-on-reducing-water-use.pdf)
<b>Decay rate</b>	None, as on-going programme			
Corrected for possible overlaps	Yes, saving shared with local programme to prevent double counting			
<b>Validation</b>	Source	SWS assumption valid		<b>Pre-requisites</b>
Savings	<a href="https://www.water.org.uk/wp-content/uploads/2019/12/Water-UK-Research-on-reducing-water-use.pdf">https://www.water.org.uk/wp-content/uploads/2019/12/Water-UK-Research-on-reducing-water-use.pdf</a>	Yes. Could be higher but need to prevent double counting with other initiatives.		None
Costs	<a href="https://www.water.org.uk/wp-content/uploads/2019/12/Water-UK-Research-on-reducing-water-use.pdf">https://www.water.org.uk/wp-content/uploads/2019/12/Water-UK-Research-on-reducing-water-use.pdf</a> WCWRG 2018 programme cost £80k for 1 month (c£1m p.a.)	Yes. Post 5 year costs may reduce if material can be re-used		Requires all companies to agree to a programme
Conversion rate	SWS Water Audit take-up rate 20%	Yes		None

Ref	T100-LocalAd			
Initiative	Local Advertising Campaign			
Description	Campaign areas prioritised resource zones and targeted based on network resilience, PCC forecasts & reputations benefits. A range of content designed for each channel with a seasonal targeting approach. Messaging agreed and multichannel campaign developed with actionable tips to bridge the gap between ENGAGE, EXPLAIN and ASSIST. Compared to the National Campaign this targeted approach is assumed to reach ALL properties. In contrast the National Campaign is only considered to hit a proportion of properties.			
Confidence on delivery	3 (Med)			
Total Saving	0 to 7.2		Period	Annual from 2023/24
Assumptions	Low	Med	High	Source
Saving	0l/head/day	1.5l/head/day	3l/head/day	1.4 to 6.9 l/head/day - WaterUK Water Efficiency Report 2019. (Ref: <a href="https://www.water.org.uk/wp-content/uploads/2019/12/Water-UK-Research-on-reducing-water-use.pdf">https://www.water.org.uk/wp-content/uploads/2019/12/Water-UK-Research-on-reducing-water-use.pdf</a> ) 50% of savings assumed to prevent overlap with national campaign.
Cost	£600,000 p.a for 300,000 properties	£600,000 p.a for 300,000 properties	£600,000 p.a for 300,000 properties	Assume £2/prop/annum. Cost carries on to maintain the saving.
Reach	All properties in 5 years have been targeted. Equal to 200,000 p.a.			Assume all properties targeted over the AMP
Conversion rate	75% (factored into properties that change behaviour)			<a href="https://www.water.org.uk/wp-content/uploads/2019/12/Water-UK-Research-on-reducing-water-use.pdf">https://www.water.org.uk/wp-content/uploads/2019/12/Water-UK-Research-on-reducing-water-use.pdf</a>
Decay rate	None, as on-going programme			
Corrected for possible overlaps	Yes, saving shared with national programme to prevent double counting			
Validation	Source	SWS assumption valid		Pre-requisites
Savings	<a href="https://www.water.org.uk/wp-content/uploads/2019/12/Water-UK-Research-on-reducing-water-use.pdf">https://www.water.org.uk/wp-content/uploads/2019/12/Water-UK-Research-on-reducing-water-use.pdf</a>	Yes, if taken in conjunction with the national programme		National programme

<p>Costs</p>	<p><a href="https://www.water.org.uk/wp-content/uploads/2019/12/Water-UK-Research-on-reducing-water-use.pdf">https://www.water.org.uk/wp-content/uploads/2019/12/Water-UK-Research-on-reducing-water-use.pdf</a> WCWRG 2018 programme cost £80k for 1 month (c£1m p.a.)</p>	<p>Yes. Post 5 year costs may reduce if comms material can be re-used</p>		
<p>Conversion rate</p>	<p>SWS Water Audit take-up rate 20% <a href="https://www.water.org.uk/wp-content/uploads/2019/12/Water-UK-Research-on-reducing-water-use.pdf">https://www.water.org.uk/wp-content/uploads/2019/12/Water-UK-Research-on-reducing-water-use.pdf</a> rate of 50% take-up rate</p>	<p>Optimistic</p>		<p>None</p>

Ref	T100-CommsAware			
Initiative	Awareness raising campaign			
Description	Clear and engaging campaign focusing on the why behind water efficiency. Awareness should be the basis on which to build behaviour change and comms content. A starting saving in 2024 and then the comms costs are maintained each year thereafter to maintain the focus. Awareness raising campaign via targeted door drop and email promoting water efficiency in reaction to hot weather and lockdown driving up demand. Long-term multi-channel campaign highlighting financial, social and environmental benefits planned to run across the AMP.			
Confidence on delivery	3 (Med)			
Total Saving	0 to 7.2		Period	Annual from 2023/24
Assumptions	Low	Med	High	Source
Saving	0l/head/day	10l/head/day (8%)	15l/head/day (12%)	Based on reducing shower use - as a proxy. Other savings may also be a benefit. Assume reduction in time from 5 to 4 mins (10litres) or low flow shower head reduces by 2-3l/min (so 10-15l for a 5 min shower). Note- micro component data in WRMP24 has personal washing at 50l/per/day for measured and 99l/per/day for unmeasured. A saving range of 0 to 10 to 15l/per/day is assumed.
Cost	£400,000 p.a	£400,000 p.a	£400,000 p.a	£400k annual comms campaign (100k per month radio campaign for 4 months a year)
Reach	All customers (1,000,000 properties) with take-up of 200,000 properties over ( a 20% conversion rate)			Assume all properties targeted
Conversion rate	20% (factored into the reach)			<a href="https://www.water.org.uk/wp-content/uploads/2019/12/Water-UK-Research-on-reducing-water-use.pdf">https://www.water.org.uk/wp-content/uploads/2019/12/Water-UK-Research-on-reducing-water-use.pdf</a>
Decay rate	None, as on-going programme			
Corrected for possible overlaps	No.			
Validation	Source	SWS assumption valid		Pre-requisites

Savings	<p><a href="https://www.waterwise.org.uk/knowledge-base/waterwise-product-awards-2017/">https://www.waterwise.org.uk/knowledge-base/waterwise-product-awards-2017/</a> - saving of 21l/shower per person</p> <p>Artesia Project 2486 for Southern Water –Media campaign and education programme total savings c6MI/d</p>	High. Possible overlap with the other comms programmes.		None
Costs	<p>Increased media campaign and schools programme £2.1/prop/yr</p> <p><a href="https://www.water.org.uk/wp-content/uploads/2019/12/Water-UK-Research-on-reducing-water-use.pdf">https://www.water.org.uk/wp-content/uploads/2019/12/Water-UK-Research-on-reducing-water-use.pdf</a></p> <p>WCWRG 2018 programme cost £80k for 1 month (c£1m p.a.)</p>	Yes.		None
Conversion rate	SWS Water Audit take-up rate 20%	Yes		None



## Education

Ref	T100-SchoolVisit			
Initiative	Education programme			
Description	Educational talks (schools and groups and Water Efficiency events. Aim to raise awareness and the importance of water efficiency to ensure water supplies and the environment are sustainable in the future. School children will be the future bill payers and can also take home the messages to parents. This engagement sits alongside areas such as smart metering to help homes and families understand the context behind which these initiatives reside. We Are Futures: Currently engaged to create water efficiency course content and other mechanisms for embedding T100 values at an early age.			
Confidence on delivery	2 (low-Med)			
Total Saving	0 to 3Ml/d		Period	Annual from 2023/24
Assumptions	Low	Med	High	Source
Saving	0l/head/day	3/head/day	6l/head/day	Based on the assumption of no benefit, half a toilet flush per day and 1 toilet flush per day per person. Whilst wider benefits may accrue these could double count with the overall comms campaign.
Cost	£300,000 p.a	£300,000 p.a	£300,000 p.a	SWS. (4x £50k p.a. FTE that can cover in pairs 25 schools/week over 40 weeks + admin support 2x @£30k p.a.+ £40k p.a. for equipment)
Reach	50000 properties per year with 25,000 properties having changed usage (total reach c400k by 2040 or c40% of property base with changed usage)			1000 schools per year, 50 pupils per class
Conversion rate	50% (factored into the reach)			<a href="https://www.water.org.uk/wp-content/uploads/2019/12/Water-UK-Research-on-reducing-water-use.pdf">https://www.water.org.uk/wp-content/uploads/2019/12/Water-UK-Research-on-reducing-water-use.pdf</a>
Decay rate	None, as on going programme			
Corrected for possible overlaps	Yes. Benefit reduced to remove overlap with comms campaign			
Validation	Source	SWS assumption valid		Pre-requisites
Savings	1.4 to 6.9l/per/day with 25 to 50% take up gives benefit of 0.35 to 3.5l/per/day ( <a href="https://www.water.org.uk/wp-content/uploads/2019/12/Water-">https://www.water.org.uk/wp-content/uploads/2019/12/Water-</a>	Yes		None

	UK-Research-on-reducing-water-use.pdf) 271k properties to deliver 1.31M/d is a per property benefit of approx 4.8l/prop/day or 2l/per/day (Artesia for WRSE Medium_WE_Scenario.xls)			
Costs	£2.1/yr/prop <a href="https://www.water.org.uk/wp-content/uploads/2019/12/Water-UK-Research-on-reducing-water-use.pdf">https://www.water.org.uk/wp-content/uploads/2019/12/Water-UK-Research-on-reducing-water-use.pdf</a>	No Programme cost lower		None
Conversion rate	25-50% <a href="https://www.water.org.uk/wp-content/uploads/2019/12/Water-UK-Research-on-reducing-water-use.pdf">https://www.water.org.uk/wp-content/uploads/2019/12/Water-UK-Research-on-reducing-water-use.pdf</a>	Yes		None

## Water Audits

Ref	T100-AuditA			
Initiative	High User Water Audits			
Description	Programme of household water audits targeted at high users. Involves identification of possible high users and contacting the homeowner to arrange a home visit. The home visit will be undertaken and provide a) advice on water efficiency b) provision of water saving products and c) solving any water wastage issues e.g. leaking taps. A total of 45,000 audits over three years)			
Confidence on delivery	2 (low-Med)			
Total Saving	0 to 2Ml/d		Period	2022/23-2024/25
Assumptions	Low	Med	High	Source
Saving	33l/prop/day (-10%)	37l/prop/day (-11.3% saving)	47l/prop/day (-14.2%)	SWS analysis. Savings are the average % saving in the first year after a water audit from the period 2015-2019. Then converted to a property saving (e.g. 11.3% x occupancy x average pcc)
Cost	£100/audit	£100/audit	£100/audit	Based on an average cost of £100/property
Reach	45,020 (22/23 – 11,468, 23/24 – 16,776, 24/25 – 16,776)			RPS/cenergist programme 08/07/22
Conversion rate	None needed. (but assume only 10% of households will take on an audit)			RPS/cenergist programme 08/07/22
Decay rate	Yes. Assume saving reduces by 20% after 5 years			<a href="https://www.water.org.uk/wp-content/uploads/2019/12/Water-UK-Research-on-reducing-water-use.pdf">https://www.water.org.uk/wp-content/uploads/2019/12/Water-UK-Research-on-reducing-water-use.pdf</a>
Corrected for possible overlaps	Part. Reduction over time to reflect diminishing returns. Only covers 20% of property base to prevent double counting of other benefits.			
Validation	Source	SWS assumption valid		Pre-requisites
Savings	<b>UU water audit study - 66-85l/prop/day</b> ( <i>United Utilities Home Audit Project (2008) – Waterwise</i> ) <b>Water UK 22-41/prop/day</b> ( <a href="https://www.water.org.uk/wp-content/uploads/2019/12/Water-">https://www.water.org.uk/wp-content/uploads/2019/12/Water-</a>	Yes		None

	<p><i>UK-Research-on-reducing-water-use.pdf</i></p> <p>SWS analysis of Aqualogic 28l/prop/day March 2017</p> <p><b>RPS/cenergist quote 08/07/22 – 55l/pop/day</b></p> <p>SWS Analysis of Aqualogic data – 42.7 av (36-56)</p>			
Costs	<p><b>UU - £100/visit</b> (<i>United Utilities Home Audit Project (2008) – Waterwise</i>)</p> <p><b>Water UK – £102/visit</b> (<a href="https://www.water.org.uk/wp-content/uploads/2019/12/Water-UK-Research-on-reducing-water-use.pdf">https://www.water.org.uk/wp-content/uploads/2019/12/Water-UK-Research-on-reducing-water-use.pdf</a>)</p> <p><b>WRMP24 - £136/visit</b> (Artesia Medium_WE_Scenario.xls)</p>	SWS cost potentially low		None
Conversion rate	<p><b>WaterUK 5-20%</b> - <a href="https://www.water.org.uk/wp-content/uploads/2019/12/Water-UK-Research-on-reducing-water-use.pdf">https://www.water.org.uk/wp-content/uploads/2019/12/Water-UK-Research-on-reducing-water-use.pdf</a>)</p>	Yes		None

SWS Data used for water audit savings

Highlighted savings were used for the low-med-high range of possible savings

Visit and Fitted Products																				
Year of Visit	Meter Count	Baseline Avg Ltrs Per Person Per Day	Y1 Avg Ltrs Per Person Per Day	Y2 Avg Ltrs Per Person Per Day	Y3 Avg Ltrs Per Person Per Day	Y4 Avg Ltrs Per Person Per Day	Y5 Avg Ltrs Per Person Per Day	Y6 Avg Ltrs Per Person Per Day	Y1 % Var to Baseline	Y2 % Var to Baseline	Y3 % Var to Baseline	Y4 % Var to Baseline	Y5 % Var to Baseline	Y6 % Var to Baseline	Static >> Y1 Obs	Y2 Obs	Y3 Obs	Y4 Obs	Y5 Obs	Y6 Obs
	<b>14,215</b>	<b>156.658</b>	<b>138.942</b>	<b>137.984</b>	<b>137.067</b>	<b>132.039</b>	<b>129.276</b>	<b>125.057</b>	<b>-11.3%</b>	<b>-11.9%</b>	<b>-12.5%</b>	<b>-15.7%</b>	<b>-17.5%</b>	<b>-20.2%</b>						
2015	122	147.130	131.087	123.819	127.980	120.422	128.368	125.057	-10.9%	-15.8%	-13.0%	-18.2%	-12.8%	-15.0%	122	122	122	122	122	121
2016	2,781	145.990	130.953	128.020	123.760	128.505	129.316		-10.3%	-12.3%	-15.2%	-12.0%	-11.4%		2,780	2,777	2,775	2,772	2,768	1,618
2017	3,603	151.153	134.937	130.314	136.526	135.162			-10.7%	-13.8%	-9.7%	-10.6%			3,603	3,601	3,596	3,592	1,540	2
2018	3,480	165.940	142.451	147.378	148.575				<b>-14.2%</b>	<b>-11.2%</b>	<b>-10.5%</b>				3,480	3,476	3,474	2,269	3	0
2019	4,229	161.002	144.945	143.754					<b>-10.0%</b>	<b>-10.7%</b>					4,228	4,222	2,231	3	0	0

Visit Only																				
Year of Visit	Meter Count	Baseline Avg Ltrs Per Person Per Day	Y1 Avg Ltrs Per Person Per Day	Y2 Avg Ltrs Per Person Per Day	Y3 Avg Ltrs Per Person Per Day	Y4 Avg Ltrs Per Person Per Day	Y5 Avg Ltrs Per Person Per Day	Y6 Avg Ltrs Per Person Per Day	Y1 % Var to Baseline	Y2 % Var to Baseline	Y3 % Var to Baseline	Y4 % Var to Baseline	Y5 % Var to Baseline	Y6 % Var to Baseline	Static >> Y1 Obs	Y2 Obs	Y3 Obs	Y4 Obs	Y5 Obs	Y6 Obs
	<b>6,159</b>	<b>156.913</b>	<b>141.447</b>	<b>140.277</b>	<b>138.151</b>	<b>133.935</b>	<b>128.950</b>	<b>125.673</b>	<b>-9.9%</b>	<b>-10.6%</b>	<b>-12.0%</b>	<b>-14.6%</b>	<b>-17.8%</b>	<b>-19.9%</b>						
2015	87	148.226	128.654	125.394	126.345	123.679	126.648	125.673	-13.2%	-15.4%	-14.8%	-16.6%	-14.6%	-15.2%	87	87	87	87	87	85
2016	1,023	142.671	132.509	130.044	126.138	131.690	129.146		-7.1%	-8.9%	-11.6%	-7.7%	-9.5%		1,023	1,022	1,022	1,022	1,021	563
2017	1,312	150.771	137.425	133.071	137.706	136.378			-8.9%	-11.7%	-8.7%	-9.5%			1,312	1,310	1,306	1,304	589	2
2018	1,553	164.990	144.140	147.236	147.120				-12.6%	-10.8%	-10.8%				1,553	1,551	1,548	882	2	0
2019	2,184	161.877	146.644	145.041					-9.4%	-10.4%					2,184	2,183	1,175	1	0	0



Ref	T100-AuditB			
Initiative	Water Audits (smart metering)			
Description	Programme of household water audits targeted using information from smart meters to highlight high water users or opportunities for water savings. Assuming a total of 10,000 audits a year starting from the commencement of the smart metering programme in 2025/26. Possible savings are assumed to decline over time by 2l/person/10,000 property to reflect diminishing returns and prevent overlap with savings from the smart meter programme assumptions itself. The final level of savings is on average 3l/person/day.			
Confidence on delivery	3 (Med) – to 2030 4 (med-high) – post 2030			
Total Saving	To 1.2Ml/d		Period	2025/26 onwards
Assumptions	Low	Med	High	Source
Saving	29l/prop/day (13l/head/day)  With 2l/head/day reduction every 10,000 properties audited	42l/prop/day (17.5l/head/day)  With 2l/head/day reduction every 10,000 properties audited down to a baseline of 3.5l/per/day	53l/prop/day (22l/head/day)  With 2l/head/day reduction every 10,000 properties audited	<a href="https://www.water.org.uk/wp-content/uploads/2019/12/Water-UK-Research-on-reducing-water-use.pdf">https://www.water.org.uk/wp-content/uploads/2019/12/Water-UK-Research-on-reducing-water-use.pdf</a>  Reduction of 2l/per/day per 10,000 properties. This is based on the assessment that 10% of customers are high users (from Mosaic data) so by the time c100-150k properties are audited then all high user benefits will be exhausted.
Cost	£100/audit	£100/audit	£100/audit	Based on an average cost of £100/property for current audits
Reach	Annual - 10,000 p.a. Total – 150,000			Assumption
Conversion rate	None needed. (but assumes 10-15% of all households will take on an audit)			Assumption
Decay rate	None assumed as smart meter data will give customers info on water use and a permanent behaviour change.			Assumption
Corrected for possible overlaps	No.			
Validation	Source	SWS assumption valid		Pre-requisites
Savings	RPS/cenergist quote 08/07/22 – 55l/pop/day SWS Analysis of Aquabgic data – 42.7 av (36-56)	Yes Average may be a slight under-estimate (c4l/prop/day if only		Smart meters are installed

		focussing on high users), however a programme of this size		
Costs	<p><b>UU - £100/visit</b> (<i>United Utilities Home Audit Project (2008) – Waterwise</i>)</p> <p><b>Water UK – £102/visit</b> (<a href="https://www.water.org.uk/wp-content/uploads/2019/12/Water-UK-Research-on-reducing-water-use.pdf">https://www.water.org.uk/wp-content/uploads/2019/12/Water-UK-Research-on-reducing-water-use.pdf</a>)</p> <p><b>WRMP24 - £136/visit</b> (Artesia Medium_WE_Scenario.xls)</p>	SWS cost potentially low		None
Conversion rate	<p><b>WaterUK 5-20%</b> - <a href="https://www.water.org.uk/wp-content/uploads/2019/12/Water-UK-Research-on-reducing-water-use.pdf">https://www.water.org.uk/wp-content/uploads/2019/12/Water-UK-Research-on-reducing-water-use.pdf</a>)</p>	Yes		None

## Smart metering

Ref	T100-Smart			
Initiative	Smart Metering Rollout			
Description	Full rollout of Smart Metering to all household customers.  Key facts below. For full evidence – see separate business case write up.			
Confidence on delivery	3 (Med)			
Total Saving	8.27-13.29MI/d		Period	Delivery: 2025/26-2029/30 Benefits: from 2027/28
Assumptions	Low	Med	High	Source
Saving	3%	4% (11.03MI/d)	5%	Baringa 20220810 and Baringa 09092022
Cost	-	Capex = £154.9m (to 2040) Opex = £15.8m (to 2040)	-	SWS/Baringa 09/09/2022. Total opex and capex proportionally allocated based on AMP8 meter installs (c95% HH; 5% non-HH)
Reach	983k installs (see below)			Baringa 09092022
Conversion rate	None needed.			None
Decay rate	None			None
Corrected for possible overlaps	No			
Validation	Source	SWS assumption valid		Pre-requisites
Savings	<b>Universal metering</b> - 12-22% of PCC <i>(<a href="https://www.water.org.uk/wp-content/uploads/2019/12/Water-UK-Research-on-reducing-water-use.pdf">https://www.water.org.uk/wp-content/uploads/2019/12/Water-UK-Research-on-reducing-water-use.pdf</a>)</i> SWS analysis of	Yes (with c10% reduction from existing metering, 4% from smart metering, 1-2% from comms programme savings consistent with total benefits)		None
Costs	-	-		None
Conversion rate	N/A	-		None

Meter install profile

All AMP8 meters are AMI installs. HH meters is the total meter installs less non-HH

		AMP-7		AMP-8				AMP-9				
		2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
<b>1. Smart Meters Installed per year</b>												
HH												
AMR		-	98,107	135,025	141,203	163,693	81,601	-	-	-	-	-
VMR		-	60,868	60,868	60,868	60,868	60,868	-	-	-	-	-
New Dev		12,000	12,000	12,000	12,000	12,000	12,000	-	-	-	-	-
Unmetered		14,432	-	-	-	-	-	-	-	-	-	-
Sub total		26,432	170,975	207,893	214,071	236,561	154,469	-	-	-	-	-
NHH		-	7,868	9,695	10,001	11,114	7,051	-	-	-	-	-
Total		26,432	178,843	217,588	224,072	247,675	161,520					
<b>2. Costs</b>												
Smart asset (€m)	CAPEX	0.9	10.0	12.3	12.7	14.1	9.0	0.0	0.0	0.0	0.0	0.0
HH		0.9	9.5	11.8	12.1	13.5	8.5	0.0	0.0	0.0	0.0	0.0
NHH		0.0	0.5	0.6	0.6	0.7	0.4	0.0	0.0	0.0	0.0	0.0
Network Infrastructure (€m)	OPEX	0.0	0.6	1.2	1.7	2.4	2.8	2.8	2.8	2.8	2.8	2.8
HH		0.0	0.6	1.2	1.7	2.4	2.8	2.8	2.8	2.8	2.8	2.8
NHH		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Install Costs (€m)	CAPEX	3.2	13.8	17.0	17.5	19.5	12.4	0.0	0.0	0.0	0.0	0.0
HH - Metered Replacement		0.0	13.1	16.2	16.7	18.5	11.8	0.0	0.0	0.0	0.0	0.0
HH - New Developments Install		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
HH - Unmetered Install		3.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
NHH Replacement		0.0	0.6	0.8	0.8	0.9	0.6	0.0	0.0	0.0	0.0	0.0
FTE+IT Costs (€m)	CAPEX	0.1	8.1	5.2	1.7	1.6	1.6	1.0	1.0	1.0	1.0	1.0
Meter Reader Costs (€m)	OPEX	0.7	0.3	-0.2	-0.7	-1.3	-1.7	-1.7	-1.7	-1.7	-1.7	-1.7
OPEX (€m)		0.7	0.9	1.0	1.0	1.0	1.1	1.1	1.1	1.1	1.1	1.1
HH		0.7	0.9	1.0	1.0	1.0	1.1	1.1	1.1	1.1	1.1	1.1
NHH		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CAPEX (€m)		4.2	31.9	34.6	31.9	35.2	22.9	1.0	1.0	1.0	1.0	1.0
HH (all FTE/IT)		4.2	30.8	33.2	30.5	33.6	21.9	1.0	1.0	1.0	1.0	1.0
NHH (no FTE/IT)		0.0	1.1	1.4	1.4	1.6	1.0	0.0	0.0	0.0	0.0	0.0
<b>3. Annual Benefits</b>												
Leakage Savings (ML/d)		-	-	-	3.54	5.30	7.24	7.24	7.24	7.24	7.24	7.24
PCC Savings (ML/d)		-	-	-	5.37	8.03	10.97	10.97	10.97	10.97	10.97	10.97



## Regulation and Policy

Ref	T100-Leg110			
Initiative	Building Reg to 110l/p/d			
Description	Change to building regulation to set a mandatory standard of an average of 110l/per/day as the average water consumption in a new home. Assume this is delivered through government setting the standards. Assumed to follow with a change to 85l/h/d.			
Confidence on delivery	4 (Med-Low)			
Total Saving	0.24MI/d		Period	2030/31-2034/35
Assumptions	Low	Med	High	Source
Saving	0.24MI/d	0.24MI/d	0.24MI/d	SWS. Calculated as the saving from the baseline forecast to a 110l/p/d value. (see below)
Cost	-	-	-	Assume no cost as in Building Regs.
Reach	107,000 population over 5 years			SWS growth forecast
Conversion rate	-			
Decay rate	None			
Corrected for possible overlaps	None			
Validation	Source	SWS assumption valid		Pre-requisites
Savings				
Costs				
Conversion rate				

Ref	T100-Leg85			
Initiative	Building Reg to 85l/p/d			
Description	Change to building regulation to set a mandatory standard of an average of 85l/per/day as the average water consumption in a new home. Assume this is delivered through government setting the standards. Assumed to follow a change to 110l/h/d in 2030			
Confidence on delivery	5 (Low)			
Total Saving	2.88MI/d		Period	2034/35 onwards
Assumptions	Low	Med	High	Source
Saving	2.88MI/d	2.88MI/d	2.88MI/d	SWS. Calculated as the saving from the baseline forecast to a 85l/p/d value. (see below)
Cost	-	-	-	Assume no cost as in Building Regs.
Reach	111,000 population over 5 years			SWS growth forecast
Conversion rate	-			
Decay rate	None			
Corrected for possible overlaps	None			
Validation	Source	SWS assumption valid		Pre-requisites
Savings				
Costs				
Conversion rate				

Calculation

The following tables sets out the estimated saving. Changes in growth numbers would not materially affect the change in benefit in MI/d.

Year		30/31	31/32	32/33	33/34	34/35	35/36	36/37	37/38	38/39	39/40
New build properties - population	000's	22.846	21.384	18.946	21.432	22.385	22.394	22.348	22.040	22.091	22.361
New build properties - MI/d	MI/d	2.58	2.41	2.13	2.40	2.50	2.49	2.48	2.44	2.44	2.47
Building regs, 110 l/h/d 2030	l/h/d	110	110	110	110	110	110	110	110	110	110
Building regs 85 l/h/d 2031-2040	l/h/d						85	85	85	85	85
Building regs, 110 l/h/d 2030	MI/d	2.51	2.35	2.08	2.36	2.46	2.46	2.46	2.42	2.43	2.46
Building regs 85 l/h/d 2031-2040	MI/d						1.90	1.90	1.87	1.88	1.90
Building regs, 110 l/h/d 2030 benefit	MI/d	-0.07	-0.06	-0.04	-0.04	-0.04					
Building regs 85 l/h/d 2031-2040 benefit	MI/d						-0.59	-0.58	-0.57	-0.57	-0.57

Ref	T100-LegMandatoryAppliance			
Initiative	Mandatory Water Labelling of Appliances			
Description	Introduction of mandatory labelling and legislation on white good appliances to reduce water use. Assumed to come in from 2030 as a package along with building regs.			
Confidence on delivery	5 (Low)			
Total Saving	3.42Ml/d		Period	2030 onwards
Assumptions	Low	Med	High	Source
Saving	1.5l/head/day	3l/head/day	4.5l/head/day	SWS. Saving based on current average pcc microcomponent use of 30l/head/day for dish washing and clothes washing (WRMP24). Then assume new devices will save as follows: Low = 5% medium = 10% high = 15%
Cost	-	-	-	Assume no cost as legislation
Reach	50,000 properties p.a. for ten years			If an appliance last on average 10 years ( <a href="https://inthewash.co.uk/washing-machines/how-long-do-washing-machines-last/">https://inthewash.co.uk/washing-machines/how-long-do-washing-machines-last/</a> ) Then all appliance replaced in 10 years So a replacement rate of 100,000 per year As a conservative estimate and to prevent double counting of replacement of existing low use appliances, assume 50%, or 50,000 per year.
Conversion rate	Reach			
Decay rate	None			
Corrected for possible overlaps	Yes			
Validation	Source	SWS assumption valid		Pre-requisites
Savings	Appliance life spans of 6 years - <a href="https://inthewash.co.uk/washing-">https://inthewash.co.uk/washing-</a>	Yes		

	<p>machines/how-long-do-washing-machines-last</p> <p>benefits - Wateruk water efficiency study has benefit over 5 years of between 1.3 to 3.8l/person/day between mandatory and no mandatory standards.</p> <p><a href="https://www.water.org.uk/wp-content/uploads/2019/12/Water-UK-Research-on-reducing-water-use.pdf">https://www.water.org.uk/wp-content/uploads/2019/12/Water-UK-Research-on-reducing-water-use.pdf</a> (Table 6)</p>			
Costs		-		
Conversion rate	See above	yes		

### Water Efficiency Products and Services (including innovations)

Ref	T100-ShorterShower			
Initiative	More Efficient Showers			
Description	Personal washing makes up approximately 30% of household water use. This is a programme of activity to promote more efficient use of water in the home in all washing activities. A combined programme of the provision of water efficient shower heads plus an accompanying company support and communications programme. The programme is assumed to continue every year.			
Confidence on delivery	4 (Med-low) – to 2030 to reflect overlap with other initiatives			
Total Saving	0 to 3.6Ml.d		Period	2025/26-2028/29
Assumptions	Low	Med	High	Source
Saving	0 l/p/d	10l/per/day	15l/per/day	Real-time feedback on shower use will reduce time spent showering. Assume reduction in time from 5 to 4 mins (10litres) or low flow shower head reduces by 2-3l/min (so 10-15l for a 5 min shower). Note - micro component data in WRMP24 has personal washing at 50l/per/day for measured and 99l/per/day for unmeasured. A saving range of 0 to 10 to 15l/per/day is assumed.
Cost	£250k p.a.	£350k p.a.	£500k p.a.	Low = £25/prop Med = £35/prop <a href="https://www.savewatersavemoney.co.uk/water-efficiency-tips-advice/view/82/water-efficiency-showerheads.html">https://www.savewatersavemoney.co.uk/water-efficiency-tips-advice/view/82/water-efficiency-showerheads.html</a> High = Hydrao colour changing shower head @ 50 Euros/each
Reach	100,000 over 3 years from 1,000,000 properties contacted			Assume all properties targeted over 3 years.
Conversion rate	10%			Assumption
Decay rate	None assumed as smart meter data will give customers info on water use and a permanent behaviour change.			Assumption
Corrected for possible overlaps	Yes. Assuming only 10% of customer engage to prevent overlap with other initiatives.			
Validation	Source	SWS assumption valid		Pre-requisites

Savings	<p><a href="https://www.waterwise.org.uk/knowledge-base/waterwise-product-awards-2017/">https://www.waterwise.org.uk/knowledge-base/waterwise-product-awards-2017/</a> - saving of 21l/shower per person medium - 10% 9 Tiefenbeck, V., Goette, L., Degen, K., Tasic, V., Fleisch, E., Lalive, R., &amp; Staake, T. (2016). Overcoming salience bias: How real-time feedback fosters resource conservation. Management science, 64(3), 1458-1476</p> <p>high - 20% 9 Tiefenbeck, V., Goette, L., Degen, K., Tasic, V., Fleisch, E., Lalive, R., &amp; Staake, T. (2016). Overcoming salience bias: How real-time feedback fosters resource conservation. Management science, 64(3), 1458-1476</p>	Yes		Comms campaign
Costs	<b>SWW - £50/shower</b> (Hydrao colour changing showerhead campaign)	Yes		None
Conversion rate	<b>WaterUK 25-50%</b> for comms campaign and education - <a href="https://www.water.org.uk/wp-content/uploads/2019/12/Water-UK-Research-on-reducing-water-use.pdf">https://www.water.org.uk/wp-content/uploads/2019/12/Water-UK-Research-on-reducing-water-use.pdf</a>	Part. 10% adopted to prevent overlap with other initiatives		None

Ref	T100-Hose-Resrtictor			
Initiative	Supply of products to reduce garden water use			
Description	Provision of hose triggers, water butts and other products to reduce water wastage and use in the garden. Although garden use on average is low, in the summer per capita consumption increases by at least 30l/per/day for measured customers (130l/per/day to 160l/per/day). The increase is higher for unmeasured customers. Much of this is due to garden watering. Reducing the peak water demand helps reduce environmental and water supply-stress during the summer. Programme would need to sit within the overall comms strategy on water efficiency.			
Confidence on delivery	2 (med-high)			
Total Saving	0 to 0.56M/d		Period	2025/26-2029/30
Assumptions	Low	Med	High	Source
Saving	0 l/prop/day	5.6l/ prop/day	5.6l/prop/day	A hosepipe can uses 1000l/hour or 6l/min. Assume that it can save 50% through only using water when needed. Peak PCC is 30l/head/day higher and mainly from garden watering as 75% saving is 22.5l/per/day. If the summer is ¼ of the year then the expected saving of 5.6l/per/day on average.
Cost	£650k	£650k	£650k	Cost of 1x hosepipe restrictor @£1.69 (savewater save money cost) + 1x200l water butt £48 delivered for 1 in 10 customers (savewater save money bulk supply cost )
Reach	100,000 over 5 years from 1,000,000 properties contacted			Assume all properties targeted over 5 years.
Conversion rate	10%			Assumption
Decay rate	None assumed as smart meter data will give customers info on water use and a permanent behaviour change.			Assumption
Corrected for possible overlaps	No.			
Validation	Source	SWS assumption valid		Pre-requisites
Savings	5.5l/prop/day (Essex-and-Suffolk-Water-2016_Save-a-Bucket-Load-2016-1.pdf (waterwise.org.uk))	Yes		Comms campaign

Costs				None
Conversion rate	A third uptake: Essex-and-Suffolk-Water- 2016_Save-a-Bucket-Load- 2016-1.pdf (waterwise.org.uk)	Yes, possibly low but not in conjunction with other initiatives		None



Ref	T100-LeakyLoo			
Initiative	Supply of products and services to promote fixing of leaky loos			
Description	An intervention to find and fix leaky loos using data from metered customers, and through awareness campaigns and initiatives for unmetered customers. Customers would be able to identify leaky loos using simple measures such as leak strips or drops of food dye in the cistern. SRN would then arrange for repair or replacement of the faulty cistern mechanism at no cost to the customer. The effectiveness of this intervention will be proportional to smart meter penetration, as smart meter data will indicate which households have high levels of continuous flow.			
Confidence on delivery	3 (med)			
Total Saving	0.9-1.74MI/d		Period	2025/26-onwards
Assumptions	Low	Med	High	Source
Saving	5 l/head/day	7.5l/head/day	10l/head/day	SWS Bluewave team
Cost	£1.35m	£1.35m	£1.35m	£45/property based on install cost of £90 for Ecobeta for 20% of homes (other 80% pay themselves)
Reach	5,000 p.a.			Assume all properties targeted over 5 years.
Conversion rate	None			Assumption
Decay rate	None assumed as smart meter data will give customers info on water use and a permanent behaviour change.			Assumption
Corrected for possible overlaps	No.			
Validation	Source	SWS assumption valid		Pre-requisites
Savings	3-6l/h/day (Pathways to long-term PCC reduction (water.org.uk)) Thames Water – 400l/day	Part (some studies show 400l/day losses so could add a significant saving)		Comms campaign
Costs	£87/prop (Pathways to long-term PCC reduction (water.org.uk))	Yes, but could be done with all the customers paying		None
Conversion rate	10-50% (Pathways to long-term PCC reduction (water.org.uk))	Yes, possibly low but not in conjunction with other initiatives		None

<b>Ref</b>	T100-Goal-Template			
<b>Initiative</b>	Supply of goal setting templates to promote behaviour change			
<b>Description</b>	Providing resources for customers to set their own water saving goals. Create a downloadable goal-setting template that customers can download from the SW website. Measure interest and downloads. Requires Smart Metering as the enabler to give customers the information needed.			
<b>Confidence on delivery</b>	4 (med-low)			
<b>Total Saving</b>	3.8-9.2MI/d		<b>Period</b>	2030/31-onwards
<b>Assumptions</b>	Low	<b>Med</b>	High	<b>Source</b>
<b>Saving</b>	0 l/head/day	5.5l/head/day	13.5l/head/day	SWS Bluewave team
<b>Cost</b>	£0.6m	£0.6m	£0.6m	£2/prop/yr (Pathways to long-term PCC reduction (water.org.uk))
<b>Reach</b>	30,000 p.a. for 10 years (300k total)			Assumption of 1/3 of properties take up post smart metering install
<b>Conversion rate</b>	30% of all customers. Included in the reach			Assumption
<b>Decay rate</b>	None assumed as smart meter data will give customers info on water use and a permanent behaviour change.			Assumption
<b>Corrected for possible overlaps</b>	No. Possible overlap with water audits.			
<b>Validation</b>	Source	SWS assumption valid		<b>Pre-requisites</b>
<b>Savings</b>	Personal Incentives - 1.4-6.9l/h/day (Pathways to long-term PCC reduction (water.org.uk))	Yes, but possible high		Comms campaign, Smart Metering
<b>Costs</b>	-	-		None
<b>Conversion rate</b>	Personal Incentives – 25-50% (Pathways to long-term PCC reduction (water.org.uk))	Yes		None

Ref	T100-Innovation			
Initiative	Innovation programme pipeline of initiatives			
Description	<p>This is a programme of initiatives to develop, test and deliver solutions to reduce water use in the future. This activity forms the ideation/experimentation part of the overall delivery programme:</p> <p>Ideation/Experimentation -&gt; delivery initiatives -&gt; monitoring</p>			
Confidence on delivery	5 (Low)			
Total Saving	Up to 24M/d		Period	2025/26-onwards
Assumptions	Low	Med	High	Source
Saving	-	2025-2030 = 1l/head/day 2031-2033 = 1.5l/head/day 2033-35 = 3l/head/day 2036-38 = 5l/head/day 2039-40 = 10l/head/day	-	Saving needed from innovation to meet T100 target (excluding allowance for delivery risk)
Cost	-	£300k p.a. (excludes full delivery cost in AMP8 as other initiatives should be sufficient to meet target)	-	Assume x2 staff@£50k p.a. + £200k for project development p.a. or £1m per AMP.
Reach	All properties – 1,000,000 p.a.			None
Conversion rate	None needed.			None
Decay rate	None			None
Corrected for possible overlaps	No			
Validation	Source	SWS assumption valid		Pre-requisites
Savings	Unconstrained list shows range of possible initiatives that could be scaled or developed to feed the ideation/experimentation pipeline	Part Long-term savings may be overlap with other initiatives.		Need to develop options in AMP8 to feed the AMP9 plan
Costs	-	-		

Conversion rate	N/A	-		None
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## Tariffs

Ref	T100-Tariffs			
Initiative	New Tariffs using smart meter data			
Description	<p>Applying differential tariffs such as a summer/winter tariff or a rising block tariff to deliver a dual benefit of reducing water wastage and reducing bills.</p> <p>Pre-requisites: pre-installation of smart meters in the 2025-2030 period and the lead in communications campaign.</p>			
Confidence on delivery	3 (Med)			
Total Saving	11.7-17.6MI/d		Period	Build: 2027/28-2029/30 Live: from 2027/28
Assumptions	Low	Med	High	Source
Saving	4% (4l/head/day)	5% (6l/head/day)	6% (7l/head/day)	SWS Bluewave team Saving based on pcc of 122l/h/day by 2030
Cost	£1.5/hh set-up £0.1/hh/yr ongoing	£1.5/hh set-up (£1.5m set-up) £0.1/hh/yr ongoing	£1.5/hh set-up £0.1/hh/yr ongoing	<a href="https://www.water.org.uk/wp-content/uploads/2019/12/Water-UK-Research-on-reducing-water-use.pdf">https://www.water.org.uk/wp-content/uploads/2019/12/Water-UK-Research-on-reducing-water-use.pdf</a>
Reach	1,030,600 installations			Baringa
Conversion rate	None needed.			None
Decay rate	None			None
Corrected for possible overlaps	No			
Validation	Source	SWS assumption valid		Pre-requisites
Savings	<p><b>Innovative tariffs - 2-4-6l/head/day</b> (<a href="https://www.water.org.uk/wp-content/uploads/2019/12/Water-UK-Research-on-reducing-water-use.pdf">https://www.water.org.uk/wp-content/uploads/2019/12/Water-UK-Research-on-reducing-water-use.pdf</a>) SWS analysis of</p>	Yes, slightly high		Smart meter install Lead in Communication Campaign
Costs	<p><b>WRMP24 - £2.2m set-up costs</b> (Artesia Medium_WE_Scenario.xls)</p>	Yes, slightly low		Smart meter programme

Conversion rate	N/A	-		None
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### Growth Offset Programme

Ref	T100-Growth			
Initiative	Programme to offset growth in demand			
Description	<p>The baseline demand forecast (v9) has an increase in demand between 2025 to 2040 of approximately 15MI/d, This is driven by new development but also assumptions on the changes in water consumption patterns and impacts such as climate change. To meet T100 this underlying growth needs to be offset. The impact of growth will depend on other factors such as the extent to which new development is water neutral and the halo effect of the other initiatives such as water audits, preventing the increase itself occurring. For the purposes of this plan we assume that the extensive comms campaigns together with the range of initiatives that reduce wastage offset the underlying trends in demand.</p> <p>The change in growth varies by resource zone. Some zones show an underlying decrease in demand, and others an underlying increase.</p>			
Confidence on delivery	3 (Med)			
Total Saving	Up to 14MI/d by 2040		Period	From 2025/26
Assumptions	Low	Med	High	Source
Saving	-	Up to 14MI/d by 2040	-	Change in baseline demand forecast v9 from 2025/26 to 2039/40
Cost				
Reach	All resource zones			-
Conversion rate	None needed.			-
Decay rate	None			None
Corrected for possible overlaps	No			
Validation	Source	SWS assumption valid		Pre-requisites
Savings	-	-		-
Costs	-	-		-
Conversion rate	-	-		-

## 6. Comparison to June 22 Draft WRMP Household T100 Plan

The June 22 Draft WRMP included initial profiles of the options in the T100 Plan. Table 6.1 shows a comparison of the options in the June Plan and this update. Key points in the comparison are:

- The Oct 22 submission includes all the initiatives in the June 22 submission
- The savings from the initiatives are similar with the following exceptions:
  - i) The Oct 22 Plan includes a larger communications and education campaign to promote behaviour change extensively in the plan
  - ii) The Oct 22 plan includes a smaller home visit programme due to the expected diminishing returns on audits and the potential for double-counting benefits with other options
  - iii) The Oct 22 plan has higher benefits from Tariffs driven by a higher starting PCC

**Table 6.1 Comparison of T100 Options included in June 22 vs Oct 22 Draft WRMP**

Option in June 22 Draft WRMP	June 22 Saving by 2040	Oct 22 Saving by 2040
SW-001 Community rainwater harvesting	0	0
SW-003 Full smart metering with hourly data	9.49	11.00
SW-004 Home retrofit rainwater harvesting/grey water recycling	0	0
SW-005 Targeted home visits (without smart metering)	0	1.7
SW-006 Increased media campaigns and school education	4.46	12.1
SW-007 Individual and community incentives	0.82	3.76
SW-008 Leaky loo find and fix (without smart metering)	0.06	1.4
SW-009 New homes standards (voluntary)	0	3.1
SW-010 Targeted home visits (with smart metering)	21.89	3.5
SW-011 Innovative tariffs	6.58	14.7
SW-014 Community water efficiency scheme	13.47	In non-HH
SW-018 Watersmart	3.29	In SW-007

## 7. Non-Household Demand Reduction Plan

We have developed a non-household demand reduction programme. However, due to the time needed for the WRSE modelling, this is not incorporated into the Non-household demand forecasts for this plan or the WRMP Tables.

However, details of the plan are set out below. This will be refreshed and incorporated into the revised Draft WRMP following modelling with WRSE in December 2022.

### 7.1 Planned Demand Savings

Regulatory policy is to deliver a 9% reduction in non-household demand. The savings are planned to run from 2025 to 2037.

The profile of savings that will be needed are set out below.

**Table 7.1 Planned Non-Household Demand Reduction Profile**

Year	% Saving Per Annum	Average MI/d Saving Per Annum	Total MI/d Saving per Annum
2025/26	0.75%	0.44	0.88
2026/27	0.75%	0.44	0.88
2027/28	0.75%	0.44	0.88
...			
2036/37	0.75%	0.44	0.88
2027/38	0	0	0
<b>Total Programme</b>	<b>9%</b>	<b>10.53</b>	<b>10.53</b>

### 7.2 Non-Household Demand Reduction Programme Options

Recognising the non-household demand is in a competitive market, the options for the demand reduction programme were developed to promote market based approaches. It also reviewed options that could be extended from the household T100 programme to re-use learning and options to reduce Southern Water's own water use.

The demand reduction options were constructed from the following data sources:

- MOSL Water Efficiency Sub-Group 2019/20 Report
- Ofwat Requirements for the Bid Assessment Framework
- Liaison with Retailers
- Southern Water Customer First Programme
- Extension of options from the T100 programme for Households
- Review of other Water Company Plans and best practice

A shortlist of options was created. These were as follows:

#### Market based options



- Community Based Water Efficiency Fund – An annual fund administered by Southern Water into which communities can ‘bid in’ for grants to undertake water efficiency projects.
- Bid Assessment Framework Fund – an annual fund administered by Southern Water into which retailers can bid in for grants to undertake water efficiency projects for their customers.
- Water recycling fund – an annual fund administered by Southern Water into which companies or retailers can bid in for funding to replace potable water for treated effluent where this is deemed safe to do so. This would be used for sectors such as golf courses (to water grass), washing commercial vehicles (e.g. buses) or road cleaning where potable water is not needed.

The use of a “fund based” option was chosen as it overcomes market barriers as follows:

- the low margins for retailers meaning large upfront payments can create cash flow restrictions
- the lack of access to capital for the customer to invest in solutions to make the savings in water use
- the low marginal cost of water that makes the pay back for water efficiency often too long – especially for small businesses.

Specific projects for individual customers or market segments was not adopted as the preferred approach for the options for the programme. This is because the retailers and market mechanisms should reveal the efficient demand reduction targeting needed.

#### Options extended from the household T100 Programme

- Smart metering for non-household customers and support future tariff mechanisms,
- Communication programme targeted for various non-household customer segments,
- Tariff and incentive mechanisms to reward savings and proportionately charge high users, and
- Reducing Southern Water Sewage Treatment Work use – programme of work to reduce the volume of potable water used in Southern Water’s own Sewage Treatment works.

These additional options were included for consideration in the programme and give a ensure overall strategic alignment across the household and non-household demand reduction programmes.

### **7.3 Non-Household Demand Reduction Programme**

A description of each option was developed. These are set out in the following pro-forma.

For the purposes of this Draft Plan, the non-household programme was developed by an aggregation of the options to meet the policy target savings needed.

The programme did not seek to optimise or balance the programme for risk. This will be done for the next WRSE update. The data here therefore is intended to give an overview of the components of the future non-household programme.

The programme options are summarised in Table 7.1.

The information for the smart metering benefits was taken from the smart metering programme. This is given in the accompanying smart metering technical annex 16.

The non-household programme includes demand reduction for Sewage Treatment Works (STWs). This demand is not strictly a non-household demand but is accounted for under water taken legally billed. However, it is included in this section as it is not a household demand.

The Sewage Treatment Use reduction programme was included based on a 50% reduction in current demand over the 2025-2030 period. This is equal to a 5Ml/d saving at a forecast cost of £0.9m.

**Table 7.1 Summary of Non-Household Demand Reduction Programme**

a) Cumulative Savings [Ml/d NYAA]

Option	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31	2031-32	2032-33	2033-34	2034-35	2035-36	2036-37	2037-38
Community Based Water Efficiency Fund	0.15	0.45	0.75	1.05	1.35	1.65	1.95	2.25	2.55	2.85	3.15	3.45	3.60
Bid Assessment Framework	0.15	0.45	0.75	1.05	1.35	1.65	1.95	2.25	2.55	2.85	3.15	3.45	3.60
Water Recycling Fund	0.15	0.45	0.75	1.05	1.35	1.65	1.95	2.25	2.55	2.85	3.15	3.45	3.60
Smart metering*	0	0	0	0	0	0	0	0	0	0	0	0	0
Comms campaign	0.5	1	1	1	1	1	1	1	1	1	1	1	1
Tariffs	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Total Non-HH</b>	<b>0.95</b>	<b>2.35</b>	<b>3.25</b>	<b>4.15</b>	<b>5.05</b>	<b>5.95</b>	<b>6.85</b>	<b>7.75</b>	<b>8.65</b>	<b>9.55</b>	<b>10.45</b>	<b>11.35</b>	<b>11.8</b>
<b>Target Profile Non-HH</b>	<b>0.44</b>	<b>1.32</b>	<b>2.20</b>	<b>3.08</b>	<b>3.96</b>	<b>4.84</b>	<b>5.72</b>	<b>6.60</b>	<b>7.48</b>	<b>8.36</b>	<b>9.24</b>	<b>10.12</b>	<b>10.53</b>
STW Use	0.50	1.50	2.50	3.50	4.50	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
<b>Total (All)</b>	<b>1.45</b>	<b>3.85</b>	<b>5.75</b>	<b>7.65</b>	<b>9.55</b>	<b>10.95</b>	<b>11.85</b>	<b>12.75</b>	<b>13.65</b>	<b>14.55</b>	<b>15.45</b>	<b>16.35</b>	<b>16.8</b>

\*for this plan no savings are currently assumed for non-HH smart metering awaiting further analysis

**Draft Water Resource Management Plan**

**Annex 15: T100 and Non Household Option Identification Technical Plan**

b) Costs [£k]

<b>Option</b>	<b>2025-26</b>	<b>2026-27</b>	<b>2027-28</b>	<b>2028-29</b>	<b>2029-30</b>	<b>2030-31</b>	<b>2031-32</b>	<b>2032-33</b>	<b>2033-34</b>	<b>2034-35</b>	<b>2035-36</b>	<b>2036-37</b>	<b>2037-38</b>
Community Based Water Efficiency Fund	112.5	112.5	112.5	112.5	112.5	112.5	112.5	112.5	112.5	112.5	112.5	112.5	112.5
Bid Assessment Framework	500	500	500	500	500	500	500	500	500	500	500	500	500
Water Recycling Fund	500	500	500	500	500	500	500	500	500	500	500	500	500
Smart metering (capex only)	1295	1404	1284	1421	902	50	50	50	50	50			
Comms campaign	100	100	100	100	100	100	100	100	100	100	100	100	100
Tariffs	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Total Non-HH</b>	<b>2507.5</b>	<b>2616.5</b>	<b>2496.5</b>	<b>2633.5</b>	<b>2114.5</b>	<b>1262.5</b>	<b>1262.5</b>	<b>1262.5</b>	<b>1262.5</b>	<b>1262.5</b>	<b>1212.5</b>	<b>1212.5</b>	
STW Use	180	180	180	180	180	-	-	-	-	-	-	-	-
<b>Total (All)</b>	<b>2687.5</b>	<b>2796.5</b>	<b>2676.5</b>	<b>2813.5</b>	<b>2294.5</b>	<b>1262.5</b>	<b>1262.5</b>	<b>1262.5</b>	<b>1262.5</b>	<b>1262.5</b>	<b>1212.5</b>	<b>1212.5</b>	

<b>Ref</b>	<b>Non-HH-Community</b>			
<b>Initiative</b>	<b>Community Based Water Efficiency Fund</b>			
<b>Description</b>	An annual fund administered by Southern Water into which communities can 'bid in' for grants to undertake water efficiency projects. An annual budget would be set and communities would approach Southern Water with options for reducing water use. These would be assessed for their cost-effectiveness and strength of business case. Grants would then be given if the submissions met the required standards.			
<b>Confidence on delivery</b>	3 (Med)			
<b>Total Saving</b>	0.3MI/d p.a.		<b>Period</b>	2025/26-2026/37
<b>Assumptions</b>	Low	<b>Med</b>	High	<b>Source</b>
<b>Saving</b>		0.3MI/d p.a.		South West Water Community Fund (2021/22)
<b>Cost</b>		£112.5 k p.a.		<i>South West Water Community Fund 2021/22 - £75k delivered 59MI or 0.2Mld.</i>
<b>Reach</b>	-			None
<b>Conversion rate</b>	-			None
<b>Decay rate</b>	None			None
<b>Corrected for possible overlaps</b>	No			
<b>Validation</b>	Source	SWS assumption valid		<b>Pre-requisites</b>
<b>Savings</b>	See source			
<b>Costs</b>	See source			
<b>Conversion rate</b>	N/A			

<b>Ref</b>	<b>Non-HH-BAF</b>			
<b>Initiative</b>	<b>Bid Assessment Framework</b>			
<b>Description</b>	An annual fund administered by Southern Water into which retailers can bid in for grants to undertake water efficiency projects for their customers. The bids would be assessed on their relative cost-effectiveness and strength of case as per the current published Southern Water Bid Assessment Framework – Appendix 2 criteria.			
<b>Confidence on delivery</b>	4 (Med-Low)			
<b>Total Saving</b>	0.3MI/d p.a.		<b>Period</b>	2025/26-2026/37
<b>Assumptions</b>	Low	<b>Med</b>	High	<b>Source</b>
<b>Saving</b>		0.3MI/d p.a		Based on 1/3 of the annual saving needed
<b>Cost</b>		£500 k p.a.		50% of the household water audit cost p.a. in 22/23 (£1.1m for 0.4MI/d)
<b>Reach</b>	-			None
<b>Conversion rate</b>	-			None
<b>Decay rate</b>	None			None
<b>Corrected for possible overlaps</b>	No			
<b>Validation</b>	Source	SWS assumption valid		<b>Pre-requisites</b>
<b>Savings</b>	See source	Most non-HH will be like households. Cost is lower but will promote competition in the market.		
<b>Costs</b>	See source			
<b>Conversion rate</b>	N/A			

<b>Ref</b>	Non-HH-Recycling			
<b>Initiative</b>	Water Recycling Fund			
<b>Description</b>	An annual fund administered by Southern Water into which companies or retailers can bid in for funding to replace potable water for treated effluent where this is deemed safe to do so. This would be used for sectors such as golf courses (to water grass), washing commercial vehicles (e.g. buses) or road cleaning where potable water is not needed. This would sit alongside the Bid Assessment Framework. This is to allow specific focus on reducing the use of potable water where non-potable supplies could be used.			
<b>Confidence on delivery</b>	3 (Med)			
<b>Total Saving</b>	0.3MI/d p.a.		<b>Period</b>	2025/26-2026/37
<b>Assumptions</b>	Low	<b>Med</b>	High	<b>Source</b>
<b>Saving</b>		0.3MI/d p.a		Based on 1/3 of the annual saving needed
<b>Cost</b>		£500 k p.a.		<i>50% of the household water audit cost p.a. in 22/23 (£1.1m for 0.4MI/d)</i>
<b>Reach</b>	-			None
<b>Conversion rate</b>	-			None
<b>Decay rate</b>	None			None
<b>Corrected for possible overlaps</b>	No			
<b>Validation</b>	Source	SWS assumption valid		<b>Pre-requisites</b>
<b>Savings</b>	See source			
<b>Costs</b>	See source			
<b>Conversion rate</b>	N/A			

<b>Ref</b>	<b>Non-HH-STW</b>			
<b>Initiative</b>	<b>Reducing Southern Water Sewage Treatment Workuse</b>			
<b>Description</b>	Programme of work to reduce the volume of potable water used in Southern Water's own Sewage Treatment works. SWS has 370 STWs of which 128 are in the water operating area. Total water taken unbilled per year is 13.8MI/d in APR21 of which STW use is 10MI/d. This programme would look to reduce consumption by 50%, or 5MI/d			
<b>Confidence on delivery</b>	2 (Med)			
<b>Total Saving</b>	5MI/d		<b>Period</b>	2025/26-2029/30
<b>Assumptions</b>	Low	<b>Med</b>	High	<b>Source</b>
<b>Saving</b>		5MI/d		South West Water, WRMP19
<b>Cost</b>		£900,000 (0.9m)		South West Water, WRMP19. £0.5m for 2.8M/d. So 5M/d @£0.9m
<b>Reach</b>	-			None
<b>Conversion rate</b>	-			None
<b>Decay rate</b>	None			None
<b>Corrected for possible overlaps</b>	No			
<b>Validation</b>	Source	SWS assumption valid		<b>Pre-requisites</b>
<b>Savings</b>	See source			
<b>Costs</b>	See source			
<b>Conversion rate</b>	N/A			



Ref	Non-HH-Comms			
Initiative	Non-Household Water Efficiency Campaign			
Description	A programme of water efficiency messaging to non-household businesses. To raise awareness and benefit of water efficiency and how Southern Water can help support businesses reduce their water consumption.			
Confidence on delivery	3 (Med)			
Total Saving	1MI/d		Period	2025/26-2039/40
Assumptions	Low	Med	High	Source
Saving		1MI/d		Assumption of 1% saving, rounded to 1MI/d
Cost		£100k p.a.		Based WCWR radio media campaign in 2028 of £80 for 2 months. Assumes a 3 month campaign each year
Reach	-			None
Conversion rate	-			None
Decay rate	None			None
Corrected for possible overlaps	No			
Validation	Source	SWS assumption valid		Pre-requisites
Savings	WaterUK 2018 Pathways to Reducing PCC media campaign range 1-5%	Yes, but lower end.		
Costs	See source			
Conversion rate	N/A			

<b>Ref</b>	Non-HH-Smart			
<b>Initiative</b>	Smart Metering of non-HH premises			
<b>Description</b>	The installation of AML meters to non-HH premises to give detail on water use and help promote water efficiency and act to act as an enabler for future tariffs.			
<b>Confidence on delivery</b>	3 (Med)			
<b>Total Saving</b>	N/A		<b>Period</b>	2025/26-2029/30
<b>Assumptions</b>	Low	<b>Med</b>	High	<b>Source</b>
<b>Saving</b>		N/A		Specific non-HH benefits to be assessed
<b>Cost</b>		£6.5m		Specific non-HH benefits to be assessed
<b>Reach</b>	45,700 properties in AMP8			Baringa/SWS Smart Metering v1.14
<b>Conversion rate</b>	-			None
<b>Decay rate</b>	None			None
<b>Corrected for possible overlaps</b>	No			
<b>Validation</b>	Source	SWS assumption valid		<b>Pre-requisites</b>
<b>Savings</b>	See source			
<b>Costs</b>	See source			
<b>Conversion rate</b>	N/A			

<b>Ref</b>	<b>Non-HH-Tariffs</b>			
<b>Initiative</b>	<b>Non-Household Innovative Tariffs</b>			
<b>Description</b>	The implementation of tariffs to promote more efficient water use or changes to when water is used to reduce both the demand for water and reduce water stress at peak demand periods. Robust data is not available for this option. It is included in the programme as a marker for future delivery. This option needs to be considered in the context of the wider non-HH market which is looking to simplify the number of wholesale tariffs in the market			
<b>Confidence on delivery</b>	4 (Low-Med)			
<b>Total Saving</b>	N/A		<b>Period</b>	2030/31-2039/40
<b>Assumptions</b>	Low	<b>Med</b>	High	<b>Source</b>
<b>Saving</b>		N/A		No robust data available
<b>Cost</b>		N/A		No robust data available
<b>Reach</b>	-			None
<b>Conversion rate</b>	-			None
<b>Decay rate</b>	None			None
<b>Corrected for possible overlaps</b>	No			
<b>Validation</b>	Source	SWS assumption valid		<b>Pre-requisites</b>
<b>Savings</b>	N/A			Requires implementation of Smart Meters in AMP8
<b>Costs</b>	N/A			
<b>Conversion rate</b>	N/A			

## 8. Carbon Costing

Carbon was costed for household demand reduction programme from the following three metrics:

- Embodied Carbon – carbon emissions embedded in the delivery of an asset
- Operational Carbon (delivery) – carbon emissions operational activity to deliver the option
- Operational Carbon (Water Saving) – carbon emissions from the reduced volume of water produced

The total carbon was calculated as the sum of each component as follows:

*Total carbon = [embodied carbon] + [operational carbon for the years of install] + [operational carbon water saving for cumulative water saved]*

The carbon data used is set out below.

Reference	Description	Value	Unit	Source
A	Travel	0.19469	kgCO2/km	(1)
B	Composite meter or water saving devices	1.60875	kgCO2e/property	(1)
C	Hot	8100	kgCO2e/MI	(1)
D	Mileage for installation (0.27 x Properties)	24	miles/property	(1)
E	Km for Installation (0.27 x properties)	38.616	km/property	(1)
F	Carbon per MI/d water produced	129.56	kgCO2e/MI/d	(2)
G	Local Comms campaign	778.8	KgCO2/300k prop	(3)

(1) Artesia (2021) 'Options identification and analysis for T100 and NF110 pathways'

(2) Southern Water (2022), APR 2021/22, Table 11a

(3) Assume 4,000km pa. per 300k properties @ 0.19469

As the non-household demand reduction programme was not included in the demand forecasts, the carbon impacts have not been calculated for this Plan.

Table 8.1 presents the total carbon savings for each option.

The net carbon impact of the programme is an overall saving of 9.1 million kg CO2e. This carbon cost excludes the growth offset programme. This is because by offsetting the growth the demand does not occur, therefore the carbon savings relative to the start year never occur.

Table 8.1 Carbon Impacts of the Household T100 Demand Reduction Programme [mKg Co2]

Catalyst	Option	Water Saved (cumulative)	Properties [total]	Embodied Carbon	Operational (delivery)	Operational (water saved)	Total
		(1)	(2)	(=B x (2) )		(=F x (1) x 365 )	
Marketing and Comms	T100-NationalAd	10.4	N/A	-	-	-0.49	-0.49
	T100-LocalAd	49.5	300k p.a.	-	0.01	-2.34	-2.33
					[Gx15years]		
	T100-Aware	79.2	200k p.a.	-	0.01	-3.75	-3.74
					[Gx15 years x200/300]		
Education	T100-schoolvisit	26.1	1000 p.a	-	0.29	-1.2	-0.91
					[A x 100km x 1000 x 15 years]		
Water Audits	T100-AuditA	27.1	45k	0.07	0.34	-1.28	-0.87
					=(2) x A x E		
	T100-AuditB	13.5	150k	0.24	1.12	-0.64	0.72
					=(2) x A x E		
Smart Metering	T100-Smart	134.8	1044k	1.68	7.72	-6.38	3.02
					=(2) x A x E*		
Tariffs	T100-Tariff	139.2	-	-	-	-6.58	-6.58
Reg and Policy	T100-Reg110	2.03	-	-	-	-0.096	-0.10
	T100-Reg85	8.7	-	-	-	-0.4	-0.4

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Catalyst	Option	Water Saved (cumulative)	Properties [total]	Embodied Carbon	Operational (delivery)	Operational (water saved)	Total
	T100-LegMandatoryAppliances	18.0	-	-	-	-0.85	-0.85
Products and Services (inc Innovation)	T100-ColourShower	32.2	100k	0.16	0.75	-1.52	-0.61
					=(2) x A x E**		
	T100-Hoserrestrictors	7	100k	0.16	0.75	-0.33	0.58
					=(2) x A x E**		
	T100-LeakyLoo	10.1	75k	0.12	0.56	-0.48	0.20
					=(2) x A x E**		
	T100-goal	19.8	-	-	-	-0.94	-0.94
	Innovation	104.4	1000k	1.6	7.52	-4.94	4.18
					=(2) x A x E**		
<b>Total</b>				<b>4.03</b>	<b>19.07</b>	<b>-32.22</b>	<b>-9.2</b>

\*Although meters will be installed on an area basis, a per property total calculation is used to reflect that other IT infrastructure will be needed to be installed in the field

