# Cambridge Water Demand Management Options Updates

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| **Author(s):** | Dave Gough | **Email:** | dave.gough@artesia-consulting.co.uk |
| **Reviewed by:** | Daniele Di Fiore | **Reference:** | AR1536 |

## 1 Introduction

Following our previous project (2551) which produced a suite of demand management options (DMO) in support of Cambridge Water's dWRMP submission in 2021, you have approached us to revisit this work and consider:

- A range of new pathways and scenarios which will reflect updated regulatory targets of the Environment Act and;
- Provide alignment of demand management options for WRMP24.

We have taken the requirements of the new scenarios into account and adjusted targets accordingly to allow further assessment of the capacity of DMOs against new criteria.

We have run the demand management options through our optimiser to produce a least-cost suite of options to achieve the updated regulatory targets for household, non-household and leakage demand reduction.

## 2 PCC Scenarios

In our previous project we considered three PCC pathways in this project, based on low, medium and high levels of ambition for PCC reduction by 2050. In this project we are looking at the following PCC pathway:

**Table 1. PCC pathway**

| Scenario Ref | Name | Description |
|---|---|---|
| **PCC_01** | PCC | 122 l/h/d by 2038, 110 l/h/d by 2050 |

 

# 3 Smart Networks Scenarios

Smart network plans are a key enabler in delivering options in the WRMP. The implementation of smart networks (including household smart metering) will provide a platform for data driven insights, which will enable increased efficiency for PCC, leakage and non-household consumption reductions.

For example, smart meter data will drive greater efficiency for water efficiency home visits, as the properties with most opportunity for saving can be targeted, rather than adopting an unfocused approach based on geographical area.

From our discussions with you, we have explored Smart Networks rollout scenarios in AMP8 and AMP 9, as shown in Table 2.

**Table 2. Smart Network Scenarios**

| Scenario Ref | Name | Description |
|---|---|---|
| **SN_01** | AMP_8 | Smart Network Rollout in AMP 8 |
| **SN_02** | AMP_9 | Smart Network Rollout in AMP 9 |

# 4 Water Labelling Scenarios

Water labelling has been identified as having a significant impact on demand reduction through reduced PCC and although out of Cambridge Water's control, the government has announced that it will introduce water labelling from 2025. However, the extent of a water labelling scheme and its criteria have yet to be finalised

After discussions with Cambridge Water, and with consideration given to the uncertainty around water labelling inception dates, we have used 'low' savings and not 'mid' savings previously applied. We have also agreed with Cambridge Water to provide scenarios which apply a delayed start to the water labelling scheme. Table 3 shows a breakdown of scenarios considered.

**Table 3. Water Labelling Scenarios**

| Scenario Ref | Name | Description |
|---|---|---|
| **WL_01** | WL_with_min_stds | Water with minimum standards (higher impact on demand reduction) |

| | | |
|---|---|---|
| **WL_02** | WL_with_no_min_stds | Water labelling without minimum standards (lower impact on demand reduction) |
| **WL_03** | No_WL | No water label introduced (no impact on demand reduction) |
| **WL_04** | WL_with_min_stds (delayed) | Water labelling with minimum standards start date delayed to 2028/29 |
| **WL_05** | WL_with_no_min_stds (delayed) | Water labelling without minimum standards, start date delayed to 2028/29 |

# 5 Non-household target methodology

After discussions with Cambridge Water, we have identified three different non-household scenarios, which are depicted in the Table 4 below.

**Table 4 – NHH method description**

| Scenario Ref | Description |
|---|---|
| **Method_1** | The target value in 2037 is the base year (2019/20) value reduced by 9%. In 2049/50 the target value is the base year value reduced by 15%. A linear interpolation is used to join these points, with the target remaining constant beyond 2049/50. |
| **Method_2** | The target value is a calculated as a percentage reduction of the baseline. A 9% reduction of the baseline in 2037/38 and 15% in 2049/50. The percentage reduction is linearly interpolated and applied to the baseline, remaining at 15% beyond 2050. |
| **Method_3** | The target value in 2037/38 is calculated as the baseline value subtract 9% of the base year (2019/20) value. The 2049/50 target value is the baseline subtract 15% of the base year value. A linear interpolation is used to join these point, interpolating to a 15% reduction at the end of the timeline (2100) |

# 6 Leakage Scenarios

The Environment Act (Env act) sets a target for water companies to cut leaks by 50% by 2050, from a baseline of 2017/18. To achieve this, Cambridge Water have outlined a glidepath (Scenario 2) with interim targets for the CAM region, but also explored different scenarios depicted below in Table 5.

**Table 5. Leakage Scenarios**

| Scenario Ref | Description |
|---|---|
| **Scenario_01** | 50% leakage reduction by March 2050 (no interim targets) |
| **Scenario_02** | All environmental targets met, including interim |
| **Scenario_03** | 20% reduction by AMP 8, plus Env act targets |
| **Scenario_04** | 50% by 2035 and then sustained |
| **Scenario_05** | 50% by 2040 and then sustained |

# 7 Outputs

We have provided the outputs separately to this report, as markdowns, csv's, and plots. These documents include cumulative and year figures for all options.

# 8 D4 uncertainty

In order to calculate the final plan headroom, you require the uncertainty for the demand management (household and non-household) options, which are fed into the D4 component of headroom.

## 8.1 Option uncertainty estimate

We identified upper and lower uncertainty for each option identified based on available data and information and using expert judgment. The upper and lower uncertainties are detailed in Table 6 below.

Table 6 Upper and lower uncertainty by option

| Reference | Category | Name | Upper uncertainty (%) | Lower uncertainty (%) | Rationale |
|---|---|---|---|---|---|
| **2021-002** | HH | Community RWH | 10 | 20 | some uncertainties on the effectiveness of these programmes |
| **2021-075** | HH | Home retrofit RWH/GWR | 10 | 20 | some uncertainties on the effectiveness of these programmes |
| **2021-076** | HH | Increased media campaigns and school education | 5 | 5 | |
| **2021-077** | HH | New homes standards - voluntary | 3 | 3 | good evidence that these projects can be implemented on new properties |
| **2021-090** | HH | Targeting properties for efficiency audits (with smart metering) | 5 | 5 | good level of industry data around water efficiency audit savings |
| **2021-006** | HH | Water Neutrality (with smart metering) | 10 | 15 | |
| **2021-093** | HH | Community Water Efficiency Scheme (with smart metering) | 8 | 10 | Uncertainty around customer engagement and participation |
| **2021-036** | HH | Housing Associations - targeted programme | 10 | 10 | uncertainty due to unknowns around current status of efficiency at these properties |
| **2021-091** | HH | Targeting properties for efficiency audits (without smart metering) | 8 | 8 | Increased uncertainty due to potential inefficiencies through lack of smart metering impacting effective targeting. |
| **2021-094** | HH | Water Neutrality (without smart metering) | 15 | 15 | |
| **2021-095** | HH | Community Water Efficiency Scheme (without smart metering) | 15 | 20 | uncertainty due to lack of detailed evidence these schemes |
| **2021-096** | HH | Water Efficiency Online Questionnaire and product dispatch | 3 | 3 | good evidence on these campaigns |
| **2021-012** | HH | Household water efficiency programme (Partnering approach, home visit) | 10 | 15 | |

| | | | | | |
|---|---|---|---|---|---|
| **2021 -048** | HH | Innovative tariffs | 10 | 15 | Not a huge amount of data on Tariffs |
| **2021 -013** | NHH | Non-household water efficiency programme (Company led, self-install) | 10 | 15 | |
| **2021 -015** | NHH | Non-household water efficiency programme (Company led, site visit with installation) | 10 | 15 | |
| **2021 -114** | NHH | Retailer Incentive Mechanism | 5 | 15 | Lack of direct evidence on these schemes |
| **2021 -116** | NHH | NHH Enhanced Meter Technology | 5 | 5 | |
| **2021 -121** | NHH | Water Audits Retail - non process (non-SN) | 10 | 15 | |
| **2021 -117** | NHH | Metering of Leftover Commercials | 3 | 5 | good level of industry data around watersavings following meter installation |

## 8.2 D4 component methodology

Taking the other components as an example, uncertainties are represented as a loss of source. It is important that the D4 components follows the same rules.

The demand options are given in terms of a yield, (or water saved). Therefore, the whole bundle of household and non-household options selected in each scenario gives the total yield saved by the company per year. In the previous sections we described how to calculate upper and lower yield for each selected option. Subsequently, we can also calculate the lower and upper scenarios for the whole bundle of selected demand options.

The lower and upper scenarios constrain the amount of water that can be saved, representing the minimum and maximum yield. However, the uncertainties need to be centred around 0, so the first step is to normalise the distributions. The uncertainties need to be thought of as ***losses***. So, if we expect a yield of 7.5, but get 5, we have ***lost 2.5 Ml/d***. Therefore, the maximum loss is 2.5 Ml/d. Similarly, if we expect 7.5 Ml/d and get 11.5, we have ***lost -4.0 Ml/d***, so the minimum loss is -4 Ml/d. It is this negative loss which actually represents the gain in water.

This convention is consistent among the other components and ensures the correct output. One example is given in the following table.

 

Table 7 Example D4 uncertainty

| | Yield (Ml/d) | | | Uncertainties (Triangular distributions centred around 0) | | |
|---|---|---|---|---|---|---|
| | Min | Central | Max | Min | Central | Max |
| D4 Demand options | 5 | 7.5 | 11.5 | -4 | 0 | 2.5 |

Uncertainty in terms of ***loss of yield***

By using the high, low, and central yields for selected demand option bundle, as identified in the option work, we then build a triangular distribution around the central figures. This is consistent with best practice.

## 8.3 Results

The results for the D4 component have been provided as separate excel files, which detail min, max, central (mode) and percentiles for all the scenarios described in this document, with the exception of no water labelling.