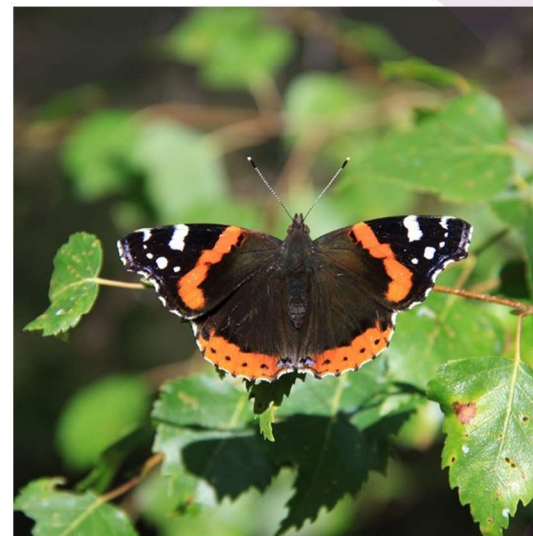


West Country WR - Demand Management Options

West Country Water Resources
Demand Management
WRMP24 Options



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1. Introduction

This report provides an overview of work commissioned by the West Country Water Resources Group (via South West Water) to identify and assess a range of demand management options to support the development of the group's regional resilience plan.

The National Framework for Water Resources¹ requires the completion of regional resilience plans to address long-term regional, inter-regional multi-sectoral water resources management pressures. The expedited process of plan development has had a consequential effect on the need to prepare, design and deliver an accelerated programme of options identification and appraisal not long after the publication of the final WRMP19s.

We understand that West Country Water Resources (WCWR) would like to develop an up to date and ambitious set of demand management options to test within the creation of the regional plan, building on work undertaken in WRMP19, within the region and beyond.

At its core, this workstream requires the delivery of a feasible set of demand management options with information compiled in such a way that they can be compared consistently amongst themselves and with other option types. This will allow wider investment modelling and decision-making processes to generate a "best-value" plan that stands up to a range of pressures and delivers resilience across to household and non-household users or main supply, other independent users and the environment.

Note that options are presented here along with estimates of their potential costs and demand savings, largely acting in isolation. Where there are clear interdependencies, these are flagged in a qualitative way, but a subsequent step is required to bring a preferred suite of measures together to form a demand reduction strategy for the region. Such a step would allow these interdependencies and cross-benefits to be weighed up in the round, ensuring maximum benefit is achieved, while avoiding double-counting of savings.

This round of planning will be subject to a higher degree of scrutiny and external engagement than previous cycles, and the process of generating feasible options and a preferred plan need to be robust and auditable while still allow the region to meet high levels of ambition.

Achieving a long-term surplus in supplies in the region and an ability to export to other regions as set out in the national framework, depends on ambitious demand reductions tied to per capita household consumption and ultimately distribution input.

Engaging and communicating with users on water efficiency and demand management is challenging when there can be a perception of ongoing surplus in the region. Communicating the value of water and the reasons for reducing use to effect behavioural change will be critical. Demand and water availability now and in the future is non-uniform within the region. Targeted approaches and messaging are likely to yield greater benefits. Approaches to delivery are critical.

Metering is already forecast to reach high levels through the planning period. Of course, a review of metering policy will be important, but it does mean that WCWR will need to look to other methods and sectors to achieve larger demand reductions in the long term.

As water users within your region have not typically faced the same degree of water-stress as those in other regions, there are likely to be large potential savings to be achieved amongst the household and non-household customers, and those abstracting water from the environment independently.

¹ EA (2020) Water Resources National Framework: Appendix 2: Regional planning. Available from https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/872222/Appendix_2_Regional_planning.pdf

1.1 Stakeholder engagement

This project has been undertaken with regular contact and opportunities for feedback with members of the Project Steering Group (PSG), which included representatives from South West Water, Bristol Water, and Wessex Water. PSG were able to provide a steer to the breadth of search, approaches used in option screening and selection, and played a key role in agreeing to the final selection of options that were taken forward for a more detailed review of costs and benefits.

In addition to working with PSG, the project team also engaged directly with Waterwise and others leading in policy and delivery within this field. The success of many of the options put forward in this report will depend heavily on the way in which they are delivered, and there is ample opportunity to learn from others already working in this field.

Considering regulator expectations that the wholesale and retail markets collaborate more formally in driving demand reductions in both household and non-household users, the options identification process presented here included a review of measures of relevance to the non-household sector. This presents its own challenges, but is a clear step up from WRMP19 for many companies. Direct contact was made with representatives from Pennon Water in order to help place options in context and open the line of communication that could be pursued as the regional plan, and later as the WRMP24s develop.

1.2 Structure of the report

The report comprises the following structure:

- **Section 2** describes the process undertaken to collate the unconstrained list of demand management options;
- **Section 3** sets out the three-staged process of screening the unconstrained options to form a feasible list of options
- **Section 4** summarises the 30 feasible options that were taken through to option development
- **Section 5** details the development of yearly profiles of projected costs and future demand savings for the options.

The appendices that accompany this written report are in separate files and comprise the Screening Spreadsheet in Appendix A, Option Proforma in Appendix B and Tables of cost and yields for each option in Appendix C.

2. Unconstrained list development

This section details the process undertaken to collate the unconstrained list of demand management options to feed into to the WCWR groups regional plan.

In total two unconstrained lists were created, one with household options and another with non-household options. The goal when collating the unconstrained lists of options was to ensure they encompassed an up to date, ambitious and varied set of demand management options to test within the creation of the regional plan, building on work undertaken in WRMP19, within the region and beyond.

The options identified during the development of the unconstrained list were drawn from wider evidence from both regional and national sources, and challenges unique to the WCWR region and changing expectations of the industry regulators were also considered.

Several sources were consulted during the development of the unconstrained list including:

- Water company existing 2019/ 2020 business plans, including the overall OFWAT review, South West Water business plan, Bristol Water business plan and Wessex Water business plan;
- WRSE water demand options and Portsmouth OA water demand options;
- Review of South West Water, Bristol Water and Wessex Water WRMP's 2019;
- Review of other companies WRMP's (out-with WCWR) Southern Water and Thames Water WRMP's 2019;
- Waterwise newsletters (February 2020 onwards)
- Waterwise water efficiency database publications;
- Artesia (2019) report - The long-term potential for deep reductions in household water demand

The unconstrained list was submitted to the project steering group for sign off prior to screening.

A summary of the option types which fed into the unconstrained list for household and non-household options is presented in Table 2.1.

Table 2.1 Summary of option types in unconstrained lists (household and non-household)

Option type	Sub-option type	Household	Non-Household
Incentives	Incentives	4	1
Metering	Metering	9	3
Non-potable	Rainwater harvesting	3	4
	Greywater harvesting	1	
	Non PWS - switch to use/increased use of non-potable resource	-	1
	Reclaim industrial wastewater	-	1
	Winter storage support	-	1

Policy related	Policy related	5	-
Research	Research	1	-
Tariffs	Tariffs	12	4
Water efficiency	Water Use Audits	4	7
	Water saving devices	5	-
	Self installation	1	-
	Plumber installation of water efficient goods	1	-
	Partner efficiency goods and installation	5	-
	Advice and guidance	7	3
Water retailer save	Water retailer save	-	1
Total		58	26

3. Screening

A three-stage screening process adopted in order to deliver a set of feasible set of demand management options from the unconstrained list. Following each stage of screening the list was shared with the PSG for sign-off before proceeding.

3.1 Stage 1: Coarse screening

There were four criteria used during the coarse screening as presented in Table 3.1. Each of the criteria was either answered with yes/ no and justification and if an option failed one criteria then it was screened out.

Table 3.1 Coarse screening criteria applied

Screening question	Description
Technical feasibility	Does the option use proven solutions that can be deployed within the WCWR region. Noting that absence of prerequisite systems or infrastructure that could "technically" be developed by WCWR (e.g. updated billing systems) should not cause an option to be screened out at this stage, but such limitations can be referenced within the justification.
Environmental risk	Does the option present unmitigable risk to the environment - Focus here on statutory risks
Delivery	Can the option be associated with an appropriate level of certainty in achieving the level of demand reduction targeted? - Critical here to focus on the appropriate scale of saving targeted. Not all demand options come with large M/d numbers, but when packaged up can be beneficial.
Consistency with regulations and policies	Is the option in line with existing company and regulatory stances and policies.

A summary of the results following the coarse screening is presented in Table 3.2 which shows fourteen household options were screened out and four non-household options were screened out in the initial screening stage. The screening spreadsheet with the complete justification and criteria for screening each option in or out is presented in **Appendix A**.

Table 3.2 Summary coarse fine screening results

Option type	Household		Non-household	
	In	Out	In	Out
Incentives	4	0	1	0
Metering	9	0	3	0
Non-potable	2	2	7	0
Policy related	5	0	-	-
Research	1	0	-	-
Tariffs	2	10	0	4
Water efficiency	21	2	10	0

Water retailer save	-	-	1	0
Total	44	14	22	4

For the options screened-out during the coarse screening stage, there were no options which failed the environmental risk criteria as expected for demand management type options. There were options which failed to pass the technical feasibility, ability to deliver and consistency with regulations and policies criteria. For some of the screened-out options there was more than one criterion it failed to pass. Overarching reasons for screening options out include uncertainty whether the option would generate the necessary savings required, uncertainty regarding customer uptake or motivation for behavioural change, concern that the option would create a negative relationship with customers (particularly when considering tariffs) or negatively impact certain customer groups, and also challenging implementation. Some of the options were identified as requiring universal smart metering roll-out to be implemented first and the current penetration of smart metering roll-out across the WCWR region was identified as a major constraint of certain options being successful and so was screened out at this stage but should be reconsidered following achievement of higher smart metering penetration.

It was considered whether a number of options requiring government driven policy or regulation change should be screened out due to policies not yet being implemented. However, following PSG engagement on the issue it was considered important that the options have the ability to drive large demand reductions they were retained in the list of potential options as a separate "with government intervention" scenario.

3.2 Stage 2: Fine screening

There were ten criteria used during the fine screening as presented in Table 3.3. A RAG approach was adopted for the fine screening against both benefits and disbenefits of each option against the screening criteria. The final verdict on screening an option in/ out following the fine screening process was determined based a qualitative judgement of the disbenefits and benefits assessed for each option.

Table 3.3 Fine screening criteria applied

Screening question	Description
Promotability	Does the option align with regulator and/or customer/stakeholder expectations or regulations?
Alignment to company/regional position	Does the option align with or complement current (or planned) company and regional policy/position?
Environmental	Does the option contribute to environmental enhancement or protection?
Socio-economic	Does the option contribute to or present opportunities for socio-economic benefits? (e.g. supporting vulnerable customers, partnership working, supporting bill affordability)
Flexibility/adaptability	Is the option adaptable to changing circumstances/technology/pressures in the future once implementation has begun?
Scalability	Does the nature of the option present opportunities for implementation at various scales? E.g. if the option could be rolled out quickly or slowly; if the option could be implemented in phases to allow for trials; if the option could be implemented at a local/targeted scale and region-wide.
Regional delivery	Does the option present an opportunity for enhanced or improved delivery if applied at a regional level as opposed to water companies working independently on implementation? E.g. efficiencies in the development of research, materials, IT platforms; opportunities to build regional behavioral changes.

Screening question	Description
Maintaining savings long-term	Can the savings generated by the option be relied upon in the longer-term? E.g. is repeated action needed; do devices need to be replaced; are other changes likely to undo the effects?
Cost	Is the cost of implementation proportionate to the savings likely to be achieved? A high level, qualitative view
Mutual Exclusivities	Is another mutually exclusive option clearly preferred? This is intended to be a high level review and not to replace the more detailed exclusivities assessment which will follow the screening.

A summary of the results following the fine screening is presented in Table 3.4 which shows eleven household options were screened out and seven non-household options were screened out during the fine screening stage. The screening spreadsheet with the complete justification and criteria for screening each option in or out is presented in **Appendix A**.

Table 3.4 Summary of fine screening results

Option type	Household		Non-household	
	In	Out	In	Out
Incentives	3	1	0	1
Metering	8	1	2	1
Non-potable	2	0	3	4
Policy related	5	0	-	-
Research	1	0	-	-
Tariffs	0	2	-	-
Water efficiency	14	7	9	1
Water retailer save	-	-	1	0
Total	33	11	15	7

The benefits and disbenefits of each of option was considered using the RAG scale with a short justification which was considered for the final verdict. The primary reason why most of the options which were screened out at this stage was due to it being considered mutually exclusive with another option which was clearly preferred, but options were also screened out with justification following other criteria including socio-economic reasons like being perceived to benefit only a small set of customers, as well as uncertainty when quantifying customer uptake and therefore savings from such options.

3.3 Stage 3: Prioritisation

Following the fine screening, a final refinement of the options was undertaken by Wood and the PSG to reduce the number of options down to 30.

Table 3.5 Options not taken forward for detailed development, costing and benefit assessment

Option reference	Option brief description	Commentary
NHH_A_006	Business Efficiency Visit (BEV) - water efficiency audit/leakage detection - in person targeted at leisure sector (golf)	This type of measure if being considered in more detail via the collaborative water company project working with the golf and leisure sectors.
NHH_E_002	SMART Online - Water smart online tools and resources.	While other non-HH options are considered here, this measure is viewed as particularly challenging due to the clear remit of the water retailers, to provide billing systems.
NHH_E_003	Business user campaigns	It is assumed that roll out of smart metering would include enhanced billing information and usage data accessibility.
NHH_N_005	Supplementary or alternative non-PWS supply	While this remains a potentially viable option, it is currently generic in nature. Alternative or supplementary supplies would be highly specific to each user and situation. This makes the development of costs of potential demand reduction/offset very challenging.
NHH_E_004	A third party takes ownership for water management of new large scale commercial developments driving down demand by integrating water efficiency and water conservation in to new build .	Limited ability to generate evidence-backed numbers. Bespoke solutions would be needed. In addition, this risks going against the view of the WRNF to alleviate local pressure on water resources.
HH_E_010	Home Efficiency Visits (HEVs) - water efficiency audit - combined with energy efficiency audits	Partnership delivery of HEVs to be considered once only - in this case via HH_E_009. Partnerships deliver reduced costs in visits, but benefits remain the same. The sensitivity testing would then be done via the number of households targeted.
HH_E_014	Water efficiency forming part of the National Curriculum	Assumptions to be similar/covered by standard "school visits" option. The difference would be in scale in receipt of messaging.
HH_E_016	Media campaigns to influence water use	Difficult to distinguish from baseline media campaigns.
HH_E_018	Distribution of water saving information via bills and leaflets	Difficult to distinguish from baseline media campaigns.
HH_E_019	SMART metering App	This is simply a very specific mechanism for improved visibility of usage data to effect changes in behaviour. Smart metering roll out would be expected to come with enhanced access to usage data.
HH_I_004	Community competition	Superseded by HH_E_017 which ultimately targets efficiency comms and engagement at certain groups/communities already. The sensitivity testing

Option reference	Option brief description	Commentary
		of this option would be via number of customers offered, and uptake rates.
HH_P_004	New development standards - water neutrality	Of relevance to aspirational, trial-based schemes, rather than a policy that can be rolled out as a WRMP option. This may be considered as part of the the joint research programme.
HH_R_001	Combined research into reducing water demand	Not quantifiable. A good idea, but not something that we can cost up and generate savings for directly.

4. Option selected for development

The following 20 household (HH) and 10 non-household (NHH) demand options were selected for further detailed profiling and development (Table 4.1). For further details and specifics on option assumptions and key parameters incorporated, see the detailed option proformas ([Appendix B](#)).

Table 4.1 Household demand options selected for further assessment

Option Code	Option Title	Option Description
HH_M_001	Progressive smart metering - automatic switching over WCWR region	Smart meters are installed by water companies at up to 90% of homes. At present only water stressed areas can implement compulsory switching from an unmetered to metered bill. It would require government support.
HH_M_004	Switch all existing dumb meters to smart meters across the WCWR region	All existing dumb meters are switched across to smart meters across the WCWR region. Option does not include houses currently with no meter.
HH_M_005	Targeted switching of dumb meters to smart meters across the WCWR region	Dumb meters to switch to smart meters are targeted. This could be based on areas with the highest unaccountable water, highest water usage, highest leakage. Could be constrained by communications network.
HH_M_006	Selective/targeted new smart metering installation	Smart meters are installed in properties without meters. This could be based on areas with the highest unaccountable water, household high water usage, areas of highest leakage. Could be constrained by communications network.
HH_M_009	Watersmart - customer feedback from metering	This option makes use of customer meter and other data to provide personalised bills and behavioural nudges (e.g. comparisons against local averages).
HH_A_002	Home efficiency visits (HEV) - water efficiency audit with free water efficient device installation - metered	Visits include undertaking a water audit, advice and tailored retrofit of free water efficient devices where required (e.g. leaky loo fix) to households with a meter already installed.
HH_A_003	Home efficiency visits (HEV) - water efficiency audit with free water efficient device installation - New meter	Visits include undertaking a water audit, advice and tailored retrofit of free water efficient devices where required (e.g. leaky loo fix). HEV's are provided alongside the company's ongoing smart meter rollout.
HH_A_004	Virtual Home efficiency visits (VHEV) - water efficiency audit with free water efficient devices	Virtual home use assessment undertaken online. The assessment provides advice, recommendations and actions, and could include sending free water efficiency devices for self-install or a professional plumber visit (e.g. for leaky loo fix).
HH_E_004	Leaky Loos' Wastage Fix: large scale targeted fixes	This option is 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. Water companies 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. Here as a stand-alone option, but could be seen as an add-on the HEV's
HH_E_008	Partnerships/targeting of large/small developers to install water efficient devices	Work in partnership with selected developers to ensure all homes are designed to enhanced water efficiency standards beyond building regulations, through the installation of high efficiency water fittings.

Option Code	Option Title	Option Description
HH_E_009	Home Efficiency Visits (HEVs) - water efficiency audit - local authorities, housing associations etc.)	Visits include undertaking a water audit, advice and tailored retrofit of free water efficient devices where required. Targeted at specific housing stock of local authorities or housing associations. The visits are selected based on high potential for water savings.
HH_E_013	School visits water efficiency programme	This option involves working in partnership with schools across the WCWR region to promote water efficiency. The aim is that education regarding water efficiency starts at an early age and therefore will result in long term demand savings. This would be tailored for children for the different key stages. It would provide lesson plans and material to allow teachers to deliver water efficiency lessons, this would be provided to all schools. This would also be accompanied by a set number of school visits each year (targeted to areas of high water use or demography).
HH_E_017	Water efficiency programmes targeted at specific groups (e.g. community, religious)	A focused water efficiency programme at targeted locations across the WCWR area including advertising, education and other outreach work.
HH_I_001	Targeted incentives scheme – Individual customer / community reward - New metered customers	This option will offer non-financial incentives in the form of shopping vouchers/discounts, prize draws and charity donations to increase awareness and motivation to reduce water use, it will be delivered in association with a reward scheme, such as Greenredeem. The option will include the use of innovative apps and website content, whilst maximising the benefits offered through smart metering data. This will be targeted at new smart metered customers.
HH_N_001	Rainwater harvesting is included in new developments to meet planning conditions - community developments	This option would work with developers to provide a community-wide rainwater harvesting system to provide a non-potable supply for toilets and washing machines for new properties. Water is collected from roof runoff and a sustainable drainage system is created. The collected water goes through a basic level of treatment. Rainwater harvesting is included in the development to meet planning conditions. Potential to replace approximately 30% of household consumption.
HH_N_003	Rainshare - Communities direct harvested rainwater into a centralised shared resource	Work with the Council to identify Rainshare twinning schemes, e.g., where buildings with low demand but which can generate high rainfall yields are located next to buildings or other demands with high non-potable demand (e.g., for irrigating or dual-supply toilet flushing). The rationale behind this option is that the harvested rainwater will replace water that had been or would have been taken from public mains supply.
HH_P_001	Change WC standards	The option is a specific change to water supply fitting regulations to WC's that would prevent future installation of potentially leaky loos. This would include a return to only using siphonic flush water cistern mechanisms.
HH_P_002	Water labelling - with minimum standards	In this intervention water labelling of relevant products is legislated as mandatory and managed by government. The scheme would be operated in association with Building Regulations and minimum standards (i.e., based on changes to The Water Supply (Water Fittings) Regulations 1999). This would mean that only products performing at a baseline level will be allowed on the market and referenced in the Building Regulations. This would require not only the development of the labelling policy but also the development and agreement on the baseline standard and the amendment of the relevant Building Regulations.
HH_P_003	Water labelling - with no minimum standards	In this option water labelling of relevant water using products is legislated as mandatory (for manufacturers and retailers similar to the current energy label regulations) and managed by government. The scheme would be operated in isolation with no specified intensive marketing campaigns and is not referenced in any other government legislation or scheme.
HH_P_005	New home standards - mandatory	The option will require all developers to install water using devices to meet specific standards. These would be aligned to the water labelling minimum standards as highlighted above.

Table 4.2 Non-Household demand options selected for further assessment

Option Code	Option Title	Option Description
NHH_M_001	Switch all existing dumb meters in Non-HH to smart meters across the WCWR region	Switch all existing dumb meters in Non-HH to smart meters across the WCWR region
NHH_M_002	Targeted switching of dumb meters to smart meters across the WCWR region	Targeted switching of dumb meters to smart meters across the WCWR region
NHH_A_001	Business Efficiency Visits (BEV) - water efficiency audit - in person audit, fix and retrofit, targeted at specific sectors/businesses	Visits to businesses including undertaking a water audit, advice and tailored retrofit of free water efficient devices to bathrooms and kitchens only (not wider process water). Business sectors are targeted based on high potential for water savings. BEV's are undertaken following liaison with Water Retailers. Specific BEV's to be target individual customers through detailed analysis of MOSL data.
NHH_A_003	Business Efficiency Visits (HEV) - leakage detection - in person targeted at specific sectors/businesses	BEV particularly targeted at leakage detection and fix. Targeted where high-water usage would indicate that leakage might be occurring. BEV are undertaken following liaison with Water Retailers. Specific BEV's to be target individual customers through detailed analysis of MOSL data.
NHH_A_004	Business Efficiency Visits (HEV) - process water efficiency audit/leakage detection - in person targeted at agriculture sector	This option specifically targets the agricultural sector and is delivered in partnership with a third party (e.g., FWAG South West, AHDB, NFU). Expert water audit is provided on farm (target of dairy sector), advice and fix is provided to each farm.
NHH_A_005	Business Efficiency Visit (BEV) - process water efficiency audit/leakage detection.	This option provides targeted visits by process engineers to large scale businesses to look at how water use can be reduced on site. The output will be recommendations with indicative cost and efficiencies that could be achieved (solutions could include zero liquid discharge (ZLD), water reuse). This option would also consider any potential for the use of non PWS supplies. Target visits based on MOSL data to a limited number of large-scale water users.
NHH_A_007	Virtual Business Efficiency Visit (VBEV) - water efficiency audit with free water efficient devices	"Virtual business use assessment undertaken online with an online efficiency representative. The assessment provides advice, recommendations, and actions, and could include sending free water efficiency devices for self-install or a professional plumber visit (e.g., for leaky loo fix).
NHH_E_001	Sector specific water efficiency advice e.g., partnerships with holiday rental companies Airbnb.	The development of a central website/customer engagement dashboard website to provide information on water efficiency campaigns and online tools for customers to engage with that provide water efficiency advice (e.g., water calculators - effectively acting as a self-audit) and wider resources. This could be extended to allow customers to login to their accounts to look at real time water use from Smart meters: advice would then be more tailored.
NHH_N_001	Rainwater harvesting is included in new developments to meet planning conditions - commercial/public sector developments -single or multiple	This option would work with developers to provide rainwater harvesting systems to provide a non-potable supply for use within the new commercial properties. Water is collected from roof runoff and a sustainable drainage system is created. The collected water goes through a basic level of treatment. Rainwater harvesting is included in the development to meet planning conditions.
NHH_N_006	Reuse treated wastewater effluent as an alternative supply. This reclaimed water could be used for industrial/commercial use rather than potable water (drinking water).	Reuse treated wastewater effluent from industrial customers is used for supply to industrial customers. This reclaimed water could be used for industrial/commercial use rather than potable water.

5. Costing and development

This section details the development of yearly profiles of projected costs and future demand savings for the options that passed the fine screening stage.

Following the fine screening exercise, 20 household (HH) and 10 non-household (NHH) options were carried forward for detailed profiling. This approach involved developing yearly cost and demand savings profiles for each option over a 25-year planning horizon (2025-2050) at a company level, before being combined into regional totals. A 25-year planning horizon was selected in order to align with the statutory minimum planning period designated in company Water Resources Management Plans (WRMPs).

The approach required three main components to be combined in calculation in order to derive the yearly profiles. These three components were:

- The company base data (i.e., values of average metered PCC, numbers of metered HHs and NHHs, occupancy rates etc., all taken directly from each water company's planning tables).
- A list of key parameters / key lookups (i.e., uptake rates and PCC saving percentages expected from the various options, as well as associated opex and capex costs etc., all of which could be applied universally across the different companies for the corresponding options)
- A list of key assumptions (i.e., assumptions defining how the options are calculated, regarding items such as the option roll out timeframes, the expected success rate of the options (in terms of the likelihood of options being taken up by customers) and the assumed duration of savings etc., all the option base assumptions were approved by Bristol, Wessex, and South West Water following WCWR group discussions)

The parameters and assumptions agreed for each option, as well as the full option descriptions, are detailed in the option proformas (see [Appendix B](#)). The primary source of data for the unique option parameters was that of the Artesia (2019) Report², however where alternative data has been used to support individual values, this has been referenced in the appropriate option proformas.

Option profiles were generated to three scenarios (low, mid and upper) to give a range of expected costs and demand savings based on low to high expectations of the individual option's uptake and success rates. For the household option calculations, South West Water is broken down into the four zonal areas of Bournemouth, Colliford, Roadford and Wimbleball. Whereas for the non-household options the calculations are carried out across the company as a whole. For the full option profiles and full details of the calculations see [Appendix C](#) and [D](#).

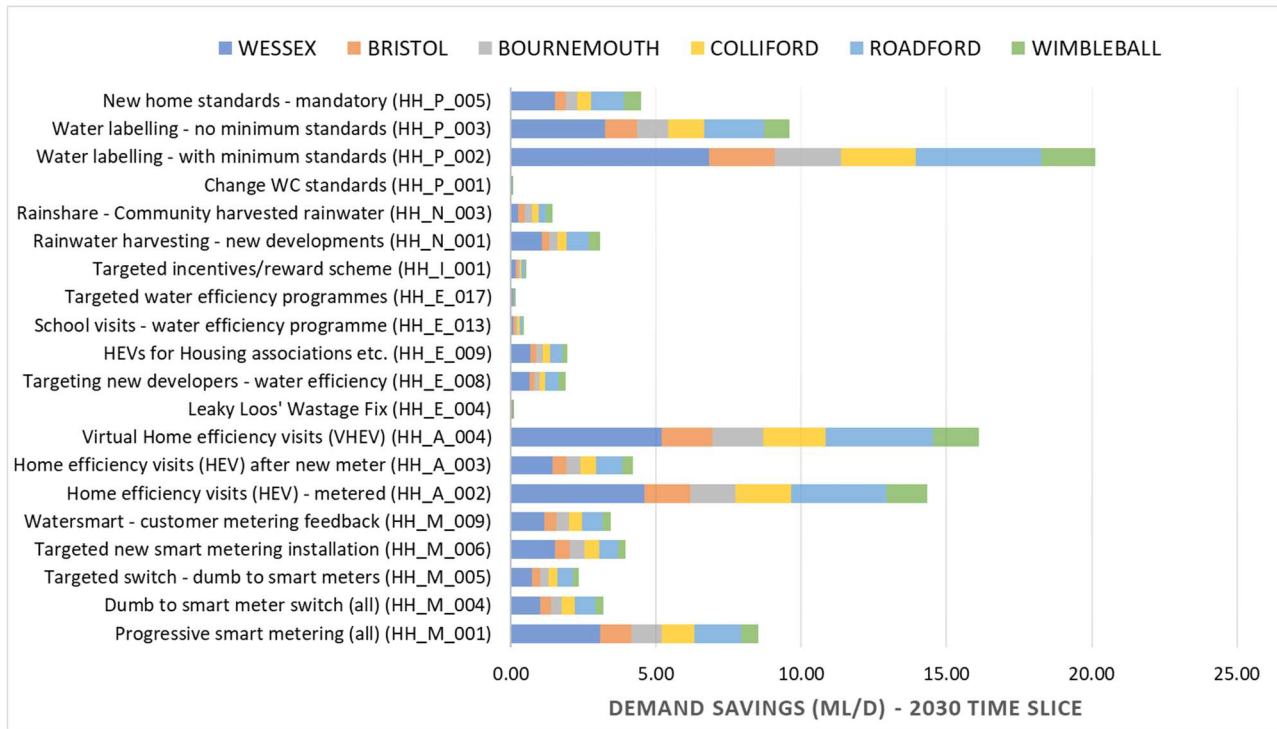
5.1 Summary of Results – Household Options

The following results show a comparison of the 20 household options (see [Table 4.1](#) for the full list of options). 25-year cost and demand saving profiles were generated for each option at the water company level and then combined into total regional costs/savings.

The total demand savings expected from each household option taken at a time slice of 2030 under the upper scenario, is shown in [Figure 5.1](#). Totals are given at as a combined regional value and also broken down by company/zone. See the full household option demand profiles spreadsheet in [Appendix C](#) for results of the alternative scenarios at alternative future time slices.

² Artesia (2019) Water UK, Pathways to long-term PCC reduction. <https://www.water.org.uk/wp-content/uploads/2019/12/Water-UK-Research-on-reducing-water-use.pdf>

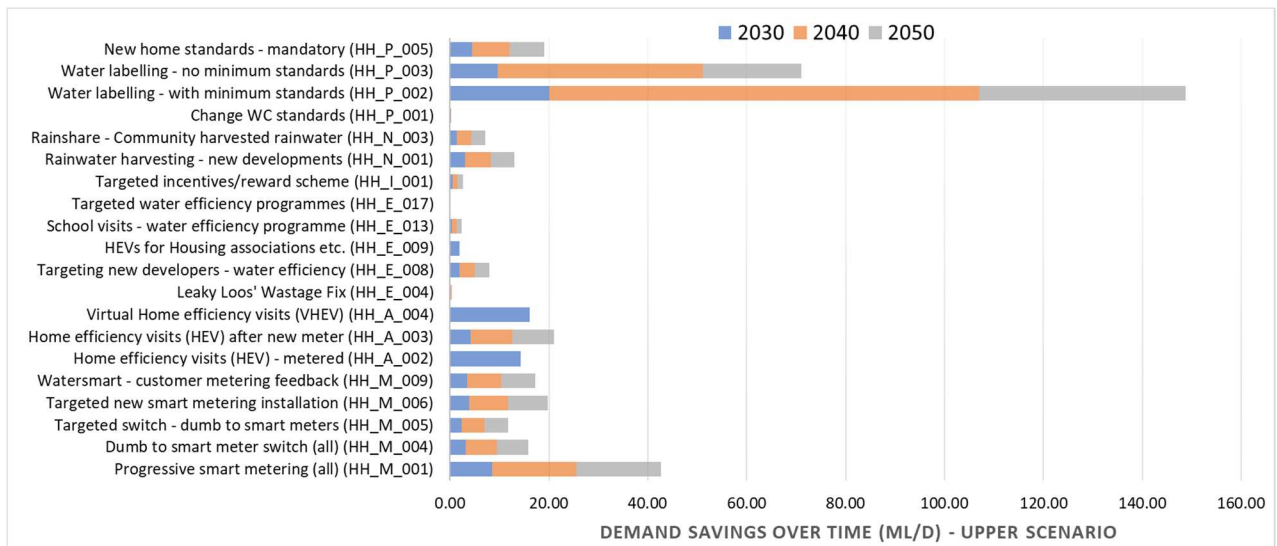
Figure 5.1 Demand savings expected by 2030 for household options under the upper scenario



From Figure 5.1 it can be seen that ‘Water labelling – with minimum standards’ has the potential to provide the greatest demand savings (or demand reduction) by 2030 if administered. This is followed by ‘Virtual home efficiency visits’, standard ‘Home efficiency visits’ and ‘Progressive smart metering’, all of which have the potential to provide significant reductions in regional demand.

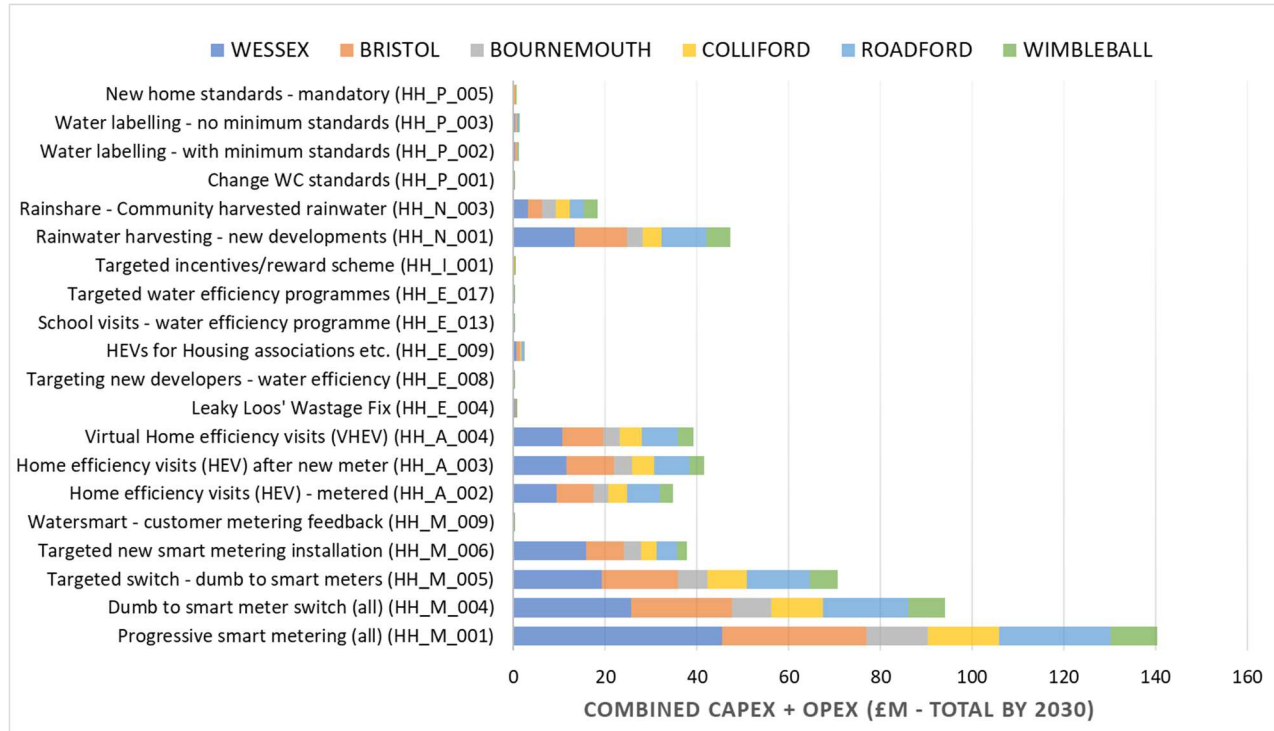
By 2050, ‘Water labelling – with minimum standards’ continues to provide the most demand reduction potential (see Figure 5.2), providing it is successfully carried out in line with the assumptions given in the Artesia (2019) report. ‘Progressive smart metering’ then follows the water labelling options in demand reduction potential by 2050, assuming a progressive and consistent roll out over the planning horizon across the whole region. Some of the options have a targeted roll out for just the first AMP period and as such peak in demand saving by 2030 (see the complete option proformas in Appendix B for full details).

Figure 5.2 Demand savings projected over planning horizon for household options under the upper scenario



The projected costs of the options (capex + opex) are tallied for each year in the 25-year planning horizon and then totalled for given time slices in the future. The total projected cost of the household demand options by 2030 is shown in Figure 5.3.

Figure 5.3 Total costs (capex + opex) projected by 2030 for the household options under the upper scenario



It can immediately be seen that the 'Water labelling' options, shown to provide the most demand reduction, also have some of the lowest associated costs to the water companies. This is due to these options being a legislated mandatory change to reduce water inefficient products and as thus would be managed and paid for by the government. 'Progressive smart metering' on the other hand is shown to be the most expensive, due to the significant capex and opex costs inherent to a large-scale advanced metering programme.

Several of the household options are shown to be low cost to the water companies, as well as showing reasonable demand saving potential (see Figure 5.1). This identifies them as being potentially cost-effective and worth consideration if a combination of low cost – low demand reduction options is a potentially preferred strategy.

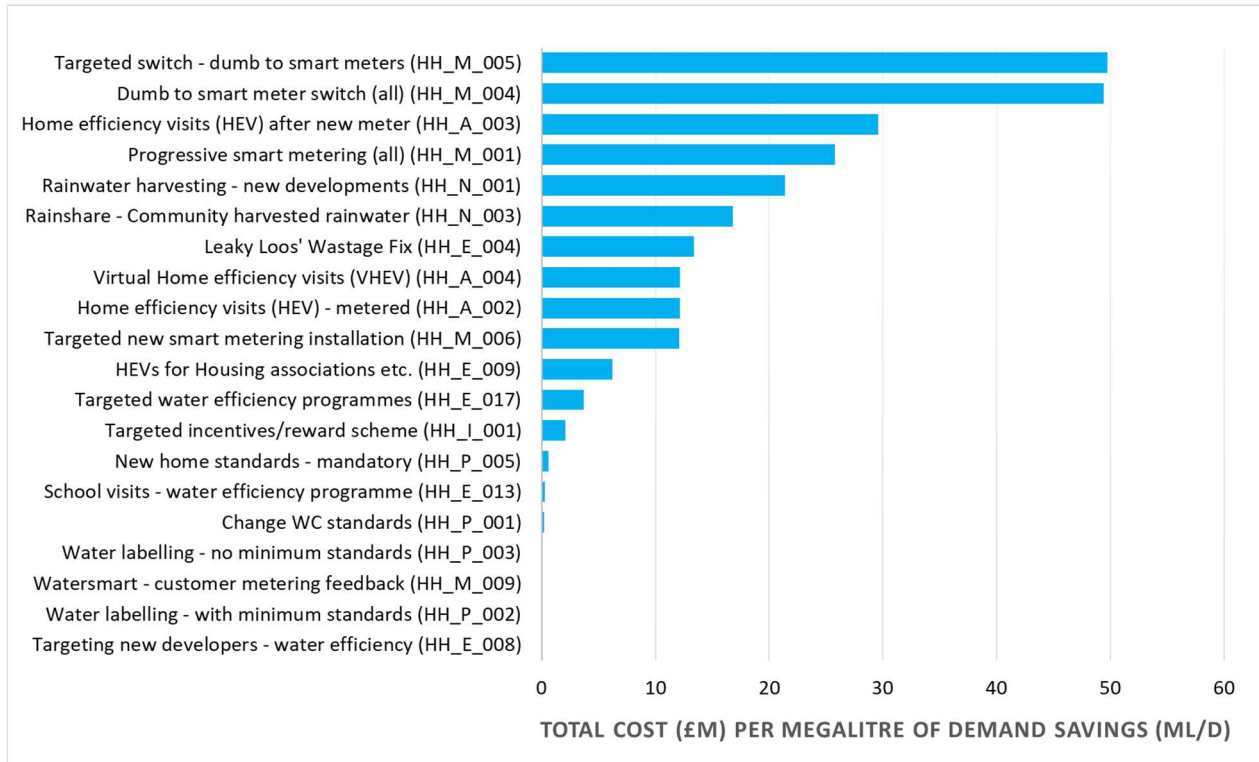
5.2 Cost Effectiveness - Household Options

The cost-effectiveness of the options can be calculated by dividing the cost of each option by its demand reduction value for a given year in the planning horizon. This effectively gives the cost required (in £ Millions) to produce 1 megalitre of savings by a given year. Figure 5.4 displays the options ordered by cost-effectiveness for the upper scenario by the end of the planning horizon (2050). The options at the bottom of Figure 5.4 are the most cost-effective.

The most cost-effective option by 2050 is shown to be 'Targeting new developers – water efficiency'. This option involves working in partnership with selected developers to ensure all homes are designed to enhanced water efficiency standards beyond building regulations, through the installation of high efficiency water fittings. The next most cost-effective options are the 'Water labelling' schemes and 'Watersmart', which is a customer feedback add-on to the smart metering roll out, and thus would require such a

programme to first be established. If a smart metering programme is to be employed, a universal (progressive) programme rolled out across the whole region is shown to be more cost-effective than a targeted switch. For the full analysis of option cost-effectiveness to the different scenarios at different time slices see [Appendix C](#).

Figure 5.4 Cost-effectiveness of household demand options – upper scenario by 2050

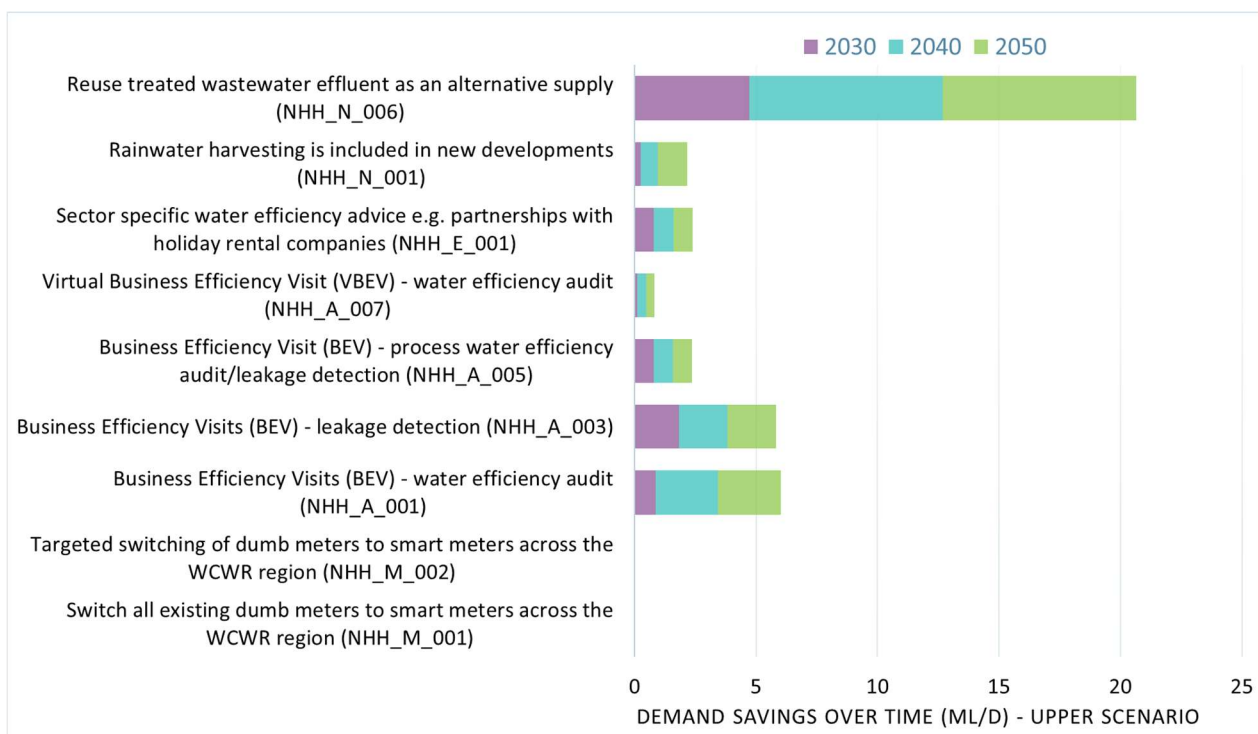


5.3 Summary of Results – Non-Household Options

Annual profiles of demand savings and capex/opex costs were developed for the ten non-household (NHH) options (see Table 4.2 for the full list of options). High-level assumptions were used to characterise each option, full details of which are available in Appendix D. Similarly, to the household options, each option was projected over a 25-year planning horizon and, where suitable, varied to three scenarios (low, mid and upper) to give a range of results reflecting the low to high expectations of the individual option's expected uptake and success rates.

The projected demand savings over time for each option under the upper scenario is shown in Figure 5.5. It should be noted that the two metering options (NHH_M_001 and NHH_M_002) are currently indicating no demand saving/reduction, this is due to them currently being classified as a precursor to follow on options, which then in turn would allow smart data/information options to be applied in the future to reduce demand levels and improve identification of leaks. Option NHH_A_004 (Agricultural sector BEV's) is also not currently included, due to it only having undergone qualitative assessment to date (see Appendix D for full details).

Figure 5.5 Demand savings projected over time for non-household options under the upper scenario



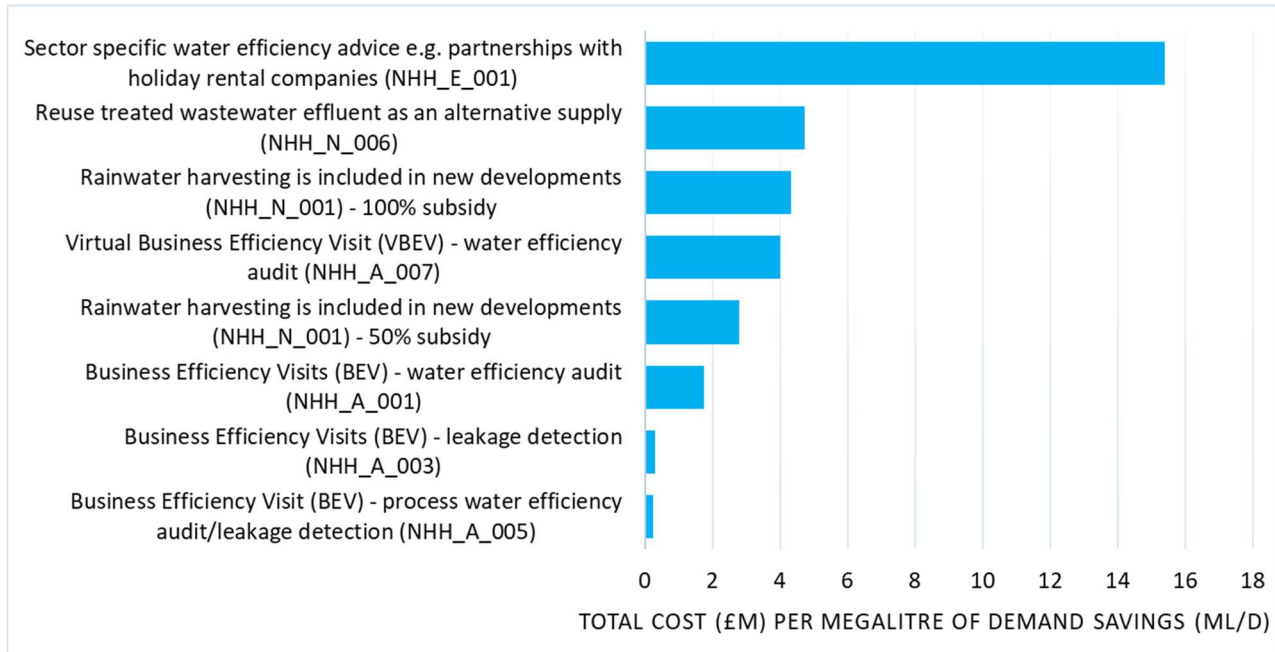
The 'Reuse of treated wastewater' option is projected to provide the most significant demand savings (Figure 5.5). This option currently assumes that two of the largest industrial water users in each water company area are fitted with appropriate wastewater reuse facilities (see Appendix D for full details), leading to potentially significant demand savings if applied across the region. Following this the various 'Business efficiency visit (BEV)' options provide the most substantial demand saving potential.

5.4 Cost Effectiveness – Non-Household Options

Analysing the cost per megalitre of demand reduction provided determines the cost-effectiveness of each option. The cost-effectiveness of the non-household demand options under the upper scenario by 2050 is shown in Figure 5.6. Options to the bottom of the figure are more cost-effective i.e., lower cost per megalitre of water saved. The two metering options as well as option NHH_A_004

(Agricultural sector BEV's) are again not included here, as their demand saving potential is currently unspecified.

Figure 5.6 Cost-effectiveness of non-household demand options – upper scenario by 2050



The NHH options 'BEV – process water efficiency audits (NHH_A_005)' and 'BEV - leakage detection (NHH_A_003)' are shown to be the most cost-effective options (Figure 5.6). The option 'Sector specific water efficiency advice e.g., partnerships with holiday rental companies (NHH_E_001)' is the significantly least cost-effective option assessed, given the current agreed assumptions and parameters used to define it, so is potentially one not to prioritise. The option 'Reuse treated wastewater effluent as an alternative supply (NHH_N_006)', is the next least cost-effective, however is worth consideration due to its significant demand saving potential (illustrated in Figure 5.5).



Appendix A Screening spreadsheet





Appendix B

Proformas





Appendix C

Final tables Household Options

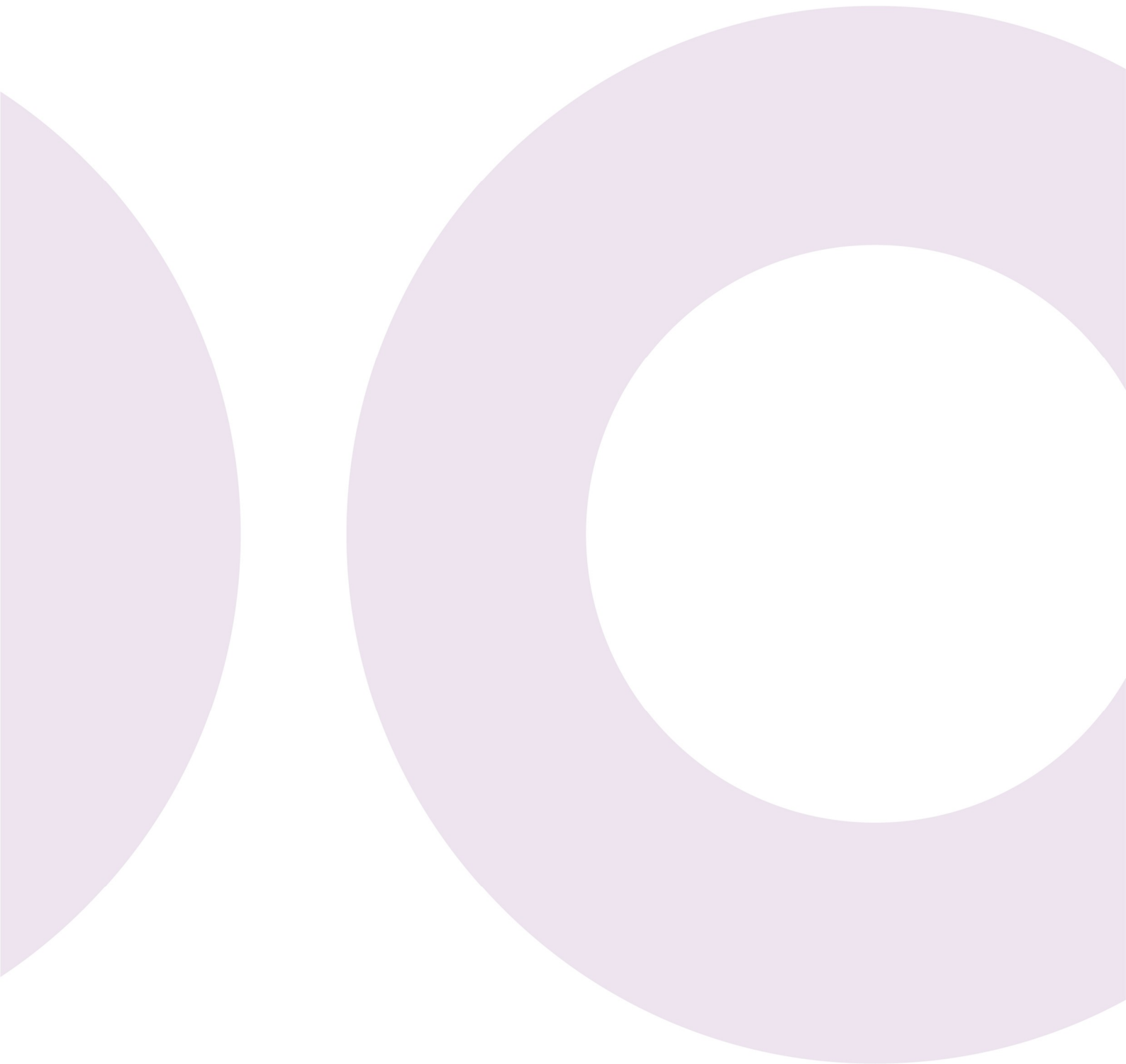




Appendix D

Final Tables Non-Household Option





wood.

