

APPENDIX D – Deriving our investment plan

An important stage in the water resources planning process is the identification and evaluation of the range of options we have available to us for managing the supply / demand balance over time.

For this draft WRMP (dWRMP18), we used a screening process to exclude the least feasible options and to allow us to focus on those with the best potential for future development. The most feasible options were then taken forward for a more detailed cost / benefit assessment.

The options appraisal process is at a strategic level and does not preclude the need for further analysis as we implement our plan. This strategic process is not a substitute for the detailed, option appraisal that would be needed to support project design and delivery.

D1. Unconstrained supply/demand options

The first step of our options appraisal process was an initial assessment of the likely need for potential future supply and demand management options. As explained in Appendix C, we are confident that our supply system will remain in surplus for the whole planning horizon, and so we did not need to explore options for increasing our supply capability. Instead, we decided early on in our process that we should focus on options to reduce leakage, improve demand management and improve the resilience of our existing sources.

We formulated a list of potential water efficiency options that could be used to help customers reduce consumption, as summarised in table D1.1. We then assessed which of these options could be taken forward for further development.

Type of scheme	Comment
Align baseline water efficiency activity with wider Severn Trent practice	Increase DVW supply area baseline water efficiency programme to undertake as a minimum the same level of activity already offered to the wider Severn Trent customer base
New buildings Higher specification water efficient fitting as standard	Offer house builders advice on higher specification and more water efficient fittings in homes (A selection of taps, showers, WC, bath, water butts). Alternatively, we could offer a financial incentive/subsidy if there is an extra cost for installing fitting of a higher water efficiency specification.
Distribution of free water saving products	This is a continuation of our current policy to promote and provide water saving devices to all customers. This part of our current offer to meet our statutory water efficiency duty and regulatory water efficiency targets
Domestic audit and retrofit with 3 rd parties	In addition to our own home audit and retrofit programme we will build partnerships with other organisations (e.g. social

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Type of scheme	Comment
	housing and energy efficiency providers) where partners install water efficient devices in customer homes on our behalf
Education	Offering education to children and adults about the need for and benefits of using water wisely is a continuation of our current policy to promote water efficiency information to customers. This is part of our current offer to meet our statutory water efficiency duty and regulatory water efficiency targets
Rainwater harvesting / grey water reuse - retrofit domestic	Install rainwater harvesting / grey water reuse systems in existing domestic properties.
Rainwater harvesting / greywater reuse – new build domestic	Install rainwater harvesting / grey water reuse systems in new build domestic properties.

Table D1.1 - Range of identified demand-side unconstrained options

In addition to these water efficiency options, we considered options to increase the uptake of domestic water metering.

Type of scheme	Comment
Compulsory household metering	Our supply area is not designated an area of serious water stress by the Welsh Government and NRW, and so we do not have legal powers to compulsorily meter household customers. However, we have tested whether such a policy could be cost beneficial.
Targeted accelerated metering programme with 'persuaded optants'	We would proactively install meters at property boundaries on a geographical basis and use the metered data to inform our network management and leakage targeting. We will engage with household customers and inform them whether they could have saved money had they been paying on a metered basis. Water consumption insight would also be used to target water efficiency activity.

Table D1.2 - Options to increase uptake of domestic water metering

D2. Scheme rejection log and the list of feasible options

Having identified the long, unconstrained list of potential options, we then took these through a screening process to identify those that should be excluded from the final plan. We used a series of high level questions that were used to screen out the least feasible options. Where there was an overall negative response to any of the four key questions, the option was screened out, unless there was a compelling reason to take it through to the feasible list.

We shared these screening criteria with the EA and NRW at an early stage and we made some minor adjustments to the screening criteria on the basis of their feedback. At Severn Trent's September 2016 water resources stakeholder forum we shared our options screening approach, the screening criteria we proposed to use and the scope of our Strategic Environmental Assessment. We held breakout discussions on the proposed screening criteria and we sought views on our decision making framework. Following this engagement with regulators and stakeholders, we confirmed the screening criteria shown in Table D2.1 below, and we proceeded with the unconstrained options screening process.

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Ref	Screening criteria	Y / N
1	Does the option address the problem?	Y
	a) Is the scale of the option proportionate to the needs of the Water Resources Zone or area where there is a potential future shortfall?	Y
	b) Will the option have a high likelihood of being able to mitigate against future deployable output loss due to climate change impacts or licence changes to existing sources?	Y
2	Does the option avoid breaching any statutory &/or regulatory constraints?	Y
	a) Is the option likely to be acceptable in terms of planning and statutory environmental constraints local to the scheme (e.g. internationally or nationally designated sites), subject to any reasonable mitigation measures?	Y
	b) Does it cause serious damage or deterioration to the WFD water body? (Category 1 and 2 Environment Agency's Achieving Sustainable Abstraction)	Y
3	Is the option promotable / does it meet customer and stakeholder expectations?	Y
	a) Could this scheme have a negative impact on the customer experience at the tap? e.g. supply, pressure, water quality (taste, odour, discolouration), compulsory metering (customer complaints PR09)	Y
	b) Does the scheme compliment other parts of STWL's business plan strategy and deliver wider benefits, e.g. supply resilience, quality and capital maintenance?	Y
	c) Is the scheme likely to be acceptable to local (non-statutory) stakeholder groups, subject to reasonable mitigation?	Y
	d) Does the option avoid customer discrimination or social equity issues?	Y
	e) Does the option clearly represent one of the more favourable development options for this specific source of water?	Y
4	Do we have confidence that the option will succeed?	Y

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Ref	Screening criteria	Y / N
	a) Is the option scalable and operationally flexible to meet changing STWL supply/demand needs?	Y
	b) Is there a high level of confidence that the scheme will be technically feasible?	Y
	c) Is the option resilient under-a range of external future scenarios? (licence reform, water quality, climate change, political & legislative changes)	Y
	d) Could the scheme deliver the benefits without the need for extensive trials, research and development?	Y
	e) Is likely that a Public Water Supply Abstraction licence be secured?	Y
5	Is the proposed scheme subject to Welsh legislation?	Y
	a) Does it satisfy Welsh Government's expectations for new water exports from Wales? (e.g. Future Generations & Wellbeing Act?)	Y
	b) Would the people of Wales be disadvantaged by this option?	Y
6	Should the option be taken through to the Constrained List?	Y

Table D2.1 – Severn Trent Water's screening criteria

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We assessed each of the options on the unconstrained list against these screening criteria, and we recorded our decisions as we progressed through this list. Using this screening and engagement process, we created our scheme rejection log, which summarises the reasons for excluding any scheme options from our list of feasible options. The log also shows the list of feasible options that we took forward for more detailed cost / benefit and SEA appraisal. The high level scheme rejection log and the full list of feasible options can be found in table D2.2.

Scheme Name	Question 1: Does the option address the problem?	Question 2: Does the option avoid breaching any statutory &/or regulatory constraints?	Question 3: Is the option promotable / does it meet customer and stakeholder expectations?	Question 4: Do we have confidence that the option will succeed?	Question 5: Is the proposed scheme subject to Welsh legislation?	Question 6: Should the option be taken through to the Constrained List?	Key Reason for Rejection
Align baseline water efficiency activity with wider Severn Trent practice	N	Y	Y	Y	Y	Y	While there is no supply / demand need to increase baseline activity, it would meet stakeholder expectations for more ambitious plans.
Infrastructure charges	N	N	n/a	N	n/a	N	Option unfavourable. Proposed OfWAT policy would remove opportunity to deliver these schemes.
Compulsory metering programme	N	N	N	Y	Y	N	Option is not valid. We are not in a designated water stressed area so cannot compulsory meter our household customers. DVW meter penetration is already above 60%.
Non Household	N	N	N	Y	Y	N	Option is not valid in Chester. This is a retail activity and need to better understand their plans for this activity as the market develops.

Table D2.2 - High level scheme rejection log and feasible options

D3. Our recommended options

D3.1. Leakage reduction

Based on our understanding of regulators’ policy expectations, stakeholders views and consideration of how our wider PR19 improvement plans will deliver associated leakage benefits, we recommend that we adopt a leakage reduction plan that achieves a 15% reduction by the end of AMP8. We will deliver this through a variety of interventions, including efficiency, lead supply pipe replacement and optimising water pressure on our network. Making these leakage reductions without increasing supply / demand expenditure means that we can be confident that the leakage proposed in this dWRMP18 is a cost effective and sustainable long-term solution.

The logic behind our proposed leakage reduction target is as follows:

- Our leakage performance is currently in the top quarter of companies but clearly this would shift if we don’t keep up with other companies’ PR19 ambitions.
- In the absence of a supply / demand driven target, we will take Ofwat’s 15% ambition as our ultimate target.
- To better align with the likely timing of supply pipe adoption and our proactive work on ‘towards a lead free Wales’. Supply pipe adoption will deliver significant leakage benefits, and we estimate that around 25% of leakage is on lead pipes. Even a modest supply pipe replacement in AMP7 would take a big step towards the first AMP’s 7.5% leakage reduction.
- The target builds on our AMP6 distribution service reservoir (DSR) reconfiguration work, and the AMP7 and AMP8 work is looking at reducing pumping and use of pressure management on the pumped network as well as maintenance of the DSRs, which will all have leakage benefits.

Taking the proposed approach over the next 10 years allows us to optimise how we tackle the problem. Supply pipe adoption will provide the most cost effective way of reducing leakage – and the 10 year trajectory allows us to better align the leakage reduction with the likely pace of supply pipe adoption.

The leakage reduction targets proposed in the dWRMP18 are shown in table D3.1.

	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30
Chester	0.0	0.0	-0.1	-0.1	-0.2	-0.3	-0.3	-0.3	-0.4	-0.4
Wrexham	0.0	0.0	-0.2	-0.4	-0.5	-0.6	-0.8	-0.9	-1.0	-1.1
Total	0.0	0.0	-0.2	-0.5	-0.7	-0.9	-1.0	-1.2	-1.3	-1.5

Table D3.1 - DVW dWRMP18 leakage reduction profile (MI/d)

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D3.2 Water efficiency

For AMP 7, we have made a decision to increase our baseline water efficiency programme to undertake as a minimum the same level of activity as we offer our wider Severn Trent customer base. This will ensure we meet our on-going statutory water efficiency duty as well as helping customers reduce their demand for water.

In line with our wider water efficiency programme and our understanding of customer, regulator and Government expectations, we will offer a range of water efficiency services to our customers. We expect the key metrics to deliver on our statutory duty will be:

- Provide information to all consumers on how to save water. This includes maintaining our provision of direct engagement with schools and adult groups and providing information for non-household customers.
- Provide a range of water saving products which are free to customers on request.
- Provide discounted higher value water saving products (e.g. water butts, showerheads).
- Develop links with third parties to form partnerships – internal and external - to take advantage of scheduled visits to promote water efficiency and to retrofit water efficient devices.
- Provide water efficiency advice and access to free water saving devices as part of our free meter optant programme (FrOpt).

In Figure D3.1 below we provide our current expectations of how we will deliver our baseline activity, further explanation of these activities are detailed below. Over time the balance between free products, product installation, and education may change in response to the available opportunities and customer expectations.

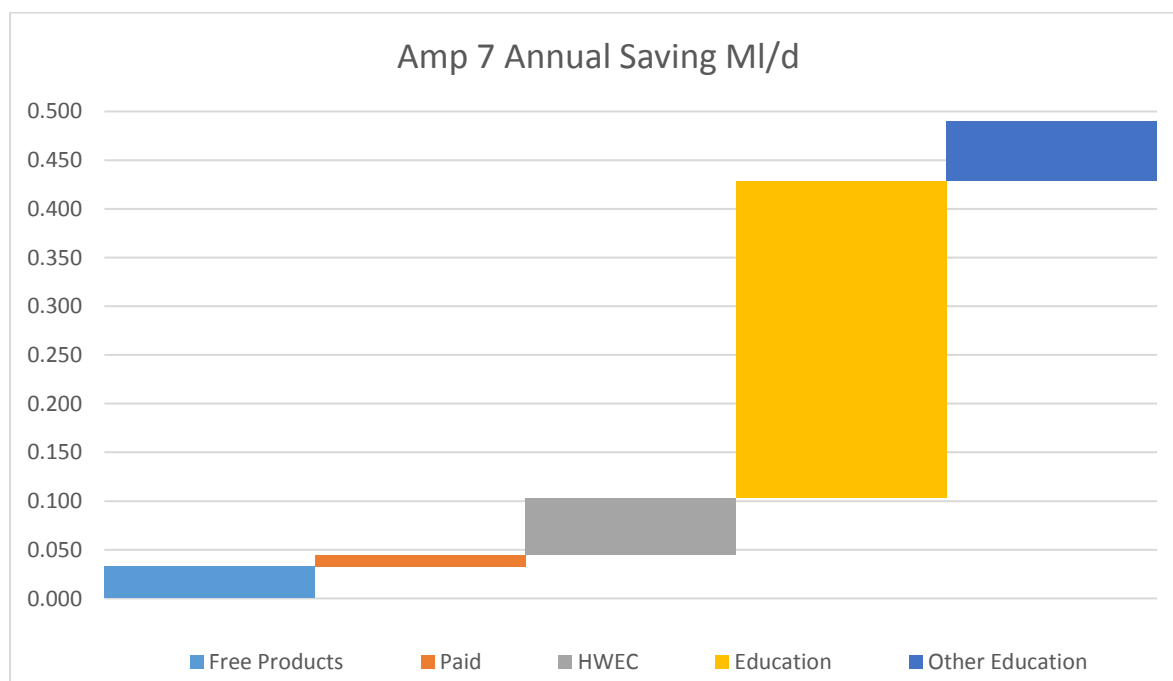


Figure D3.1 - Breakdown of forecast activity in AMP7

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In developing our proposals, we have made reference to:

- Environment Agency (EA) / Natural Resources Wales (NRW) Final Water Resource Planning Guidance.
- Defra Guiding Principles for water resource planning
- Water Strategy for Wales
- Waterwise Evidence Base Reports
- Market Transformation Programme
- Waterwise Water Efficiency Strategy for the UK
- Our own water efficiency programme and, consumption modelling forecasting analysis
- Water Strategy for Wales
- We have also engaged with Environment Agency and Natural Resources Wales.

To inform our dWRMP19, we have assessed the viability of a range of potential water efficiency options building on insight gained from Severn Trent Waters programme:

- providing free products to our household customers on request;
- subsidising higher value water saving products for our household customers;
- carrying out water efficiency audits and install water saving products in the homes of our household customers - Home Water Efficiency Check (HWEC) programme;
- incentives for housebuilders to build new properties to 110 litres per person per or less;
- to work with social housing to carry out water efficiency audits and install water saving products in the homes of social housing tenants;
- to continue to provide education and advice to our household customers on how to use water more wisely;
- rainwater harvesting / water reuse options;
- metering options.

As detailed in appendix C we are confident that our supply system will remain in surplus, however we increasing our baseline demand management programme to reflect the level of service offered to Severn Trent's customers. Options to be included in our new baseline programme are:

Free and paid water efficiency products

We will increase the range of free and paid for water efficiency products offered to customers. The improved product offers will align the levels of service offered to customers in the Severn Trent region

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Home Water Efficiency Audits

We will carry out proactive water efficiency audits and install water efficient products in our customers' homes (HWEC).

The size of the programme is finite and limited by the number of household customers and assumed uptake rates. We have trialled this approach during AMP6 in the Severn Trent area and we currently see an uptake rate of approximately 20% which we expect to be maintained.

Customer education

We will continue to engage and educate customers on how to use water wisely. Over time, opportunities to retrofit water efficient devices will reduce. Engagement and education to promote behaviour change will become increasingly important to help customers reduce their demand for water.

D3.3 Metering

Our previous Water Resource Management Plans have set out an ongoing approach to household metering that has been led by customer demand for the free meter option. This has resulted in a meter penetration of 59%. We are proposing to continue this approach for AMP7 and beyond.

D3.4 Other options

In addition to the options discussed above, we are also considering other actions within the context of the WRMP which will have wider benefits for the environment and our customers while providing long-term best value. We are keen to look for opportunities to collaborate with neighbouring water companies and other key stakeholders to deliver against the Welsh Government's well-being goals and embrace their vision for the sustainable management of natural resources.

As a water resource need is not the main driver for these actions, they have not been passed through the screening criteria and will be costed out through the development of our PR19 Business Plan. However, as there is a clear link to water resources planning we will set out a brief overview of them below.

Maintenance and improvements programme for impoundment reservoirs

We have eleven impoundment reservoirs, all situated within our Wrexham WRZ. The yield assessment carried out as part of the Aquator modelling – described in Appendix A – indicated that there may be greater inflows into the reservoirs catchments than is currently captured in the reservoirs. These altered flows could be caused by natural changes to the environment or man-made developments within the catchments, which would be out of our control, but we also believe that reinstating a pro-active maintenance programme for leats and reservoir infrastructure will improve capture rate of inflows.

The reservoir engineers within Severn Trent and Dee Valley are pulling together an investment programme for the next AMP. The main focus of the programme will be compliance with reservoir safety legislation but we will work closely with them to ensure that the wider benefits to water resources and the environment can also be achieved.

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Investigating source of taste and colour issues at impoundment reservoirs

Historically, there have been seasonal limitations to abstraction from some of our impoundment reservoirs due to increased manganese and occasional algal blooms. This can cause increased levels of taste and colour in the water, making it more expensive to treat and having the potential for water quality complaints if it is not treated sufficiently. To avoid these issues, we currently restrict the amount of water taken from these sources at the affected times, giving us less flexibility over our water resources.

Therefore, we intend to investigate the cause of the increased manganese and identify whether there are any solutions available at catchment level to remove the taste and colour at source. This would reduce treatments costs and also give us access to these sources throughout the year, providing additional resilience in our water resources.

The nature of the investigation and associated costs will be considered as part of development of PR19.

D4. Greenhouse gas emissions

Our company approach to greenhouse gas emissions

Greenhouse Gas (or 'carbon') emissions contribute to climate change and need to be reduced. Dee Valley Water's total operational emissions are 8.4 ktCO₂e per year, driven primarily by the use of electricity to treat and pump water to our customers. On top of this, there are emissions in the supply chain from outsourced maintenance and construction activity.

Our long term aim is to reduce carbon emissions, in a way which provides value for our customers. Considering the carbon in our planning processes is a key way to do this.

The price we and others, pay for energy and environmental taxes mean that there is an increasingly close link between cost and our carbon impact. These costs are increasing as the UK moves to a low-carbon economy. So aside from our commitment to play our part in reducing emissions, impact on our customers' bills is a key reason to focus on carbon emissions.

We consistently track and project our operational emissions in line with Government guidance using the UKWIR Carbon Accounting Workbook for calculating operational greenhouse gas emissions¹. We publish this information annually in our annual performance report.

Carbon impacts of the water resource management plan

We have estimated the operational carbon emissions impact of the supply and demand measures outlined in the dWRMP18.

The baseline operational emissions for water supply activities was calculated using the most recent final version of the UKWIR Carbon Accounting Workbook (version 11, April 2017).

- Changes to the baseline emissions have been estimated based on the projected changes to the overall distribution input, which represents planned levels of leakage and demand (for example due to growth or water efficiency measures). These factors influence the energy requirement to pump and treat water and hence affect carbon emissions.
- Changes to the energy efficiency of our operations and our renewable energy generation from water services assets have *not* been included. These measures are discussed further below.
- Changes to the emissions intensity of grid electricity has *not* been included.

¹ Carbon accounting in the UK Water Industry: methodology for estimating operational emissions, report no 08/CL/01/5

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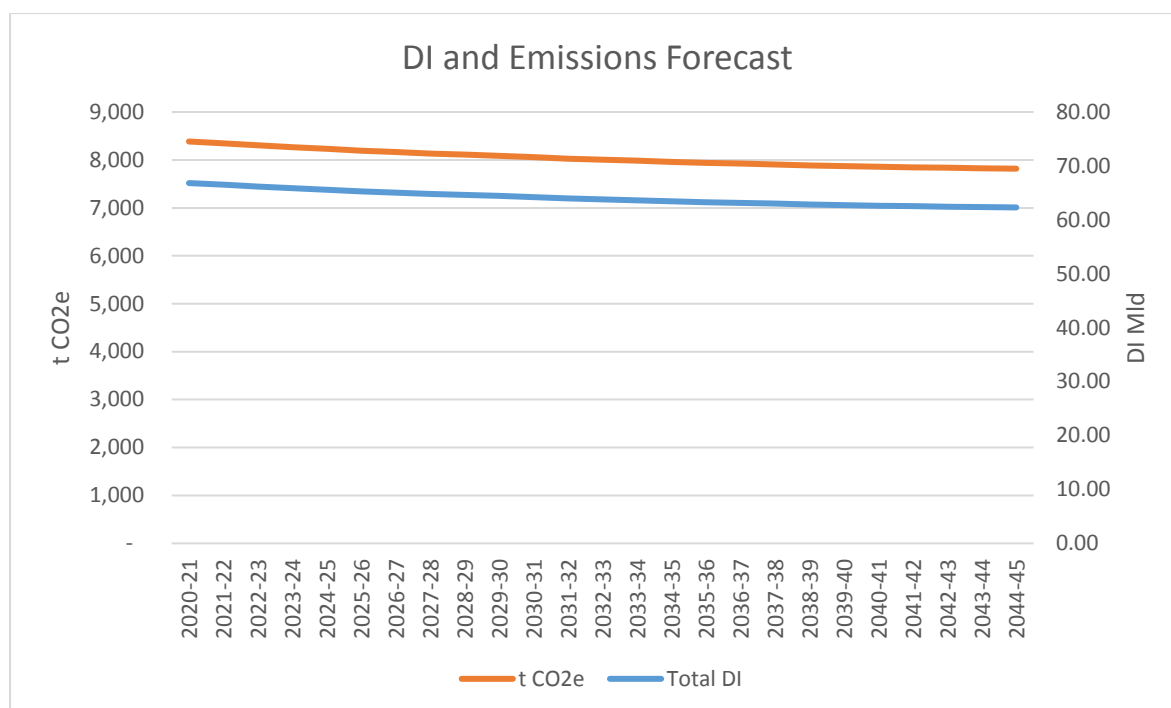


Figure D4.1 - Relationship between distribution input and greenhouse gas emissions

The projected impact from this is a small reduction in our annual operational emissions. The net change is 560 t CO₂e less per year, by the end of the WRMP19 period.

Taking into account the effect of a continuing national move to lower-carbon energy as projected by Government, our total emissions and emissions intensity may decrease significantly more than this over time, as the majority of our emissions result from our consumption of grid electricity.

Measures to reduce our carbon impact

The schemes set out in the dWRMP18 to ensure we can meet the future demand for water form only part of our overall investment plans. Our wider investment plans, and the estimated carbon impacts of these schemes, will be set out in more detail in our next business plan.

93% of our company emissions come from grid electricity consumption – primarily pumping water. We are currently reviewing the energy efficiency of our pumping assets and, based on this information, will decide whether efficiency could be improved by operational change or spend to save investment. Spend to save investment to be investigated could include pump replacement and refurbishment, pump monitoring and control optimisation.

Other measures to reduce our carbon emissions include improving our transport efficiency and research into better ways to manage our process emissions.