



Strategic Optimisation of Demand Options for Water Resources (SoDow)

Consumption and Demand Optimisation

Optimisation of consumption reduction strategies across various options is an expansive problem to tackle, relying on a large amount of data which becomes exponentially more complex to optimise as a reduction targeting strategy.

Tetra Tech RPS have developed the Strategic Optimisation of Demand Options for Water Resources (SoDow) building on our successful support across the industry in strategic optimisation of leakage options for water resources (SoLow) for over a decade.

The model is flexible and can utilise DMA level information and data to build resource zone and company level strategic plans.

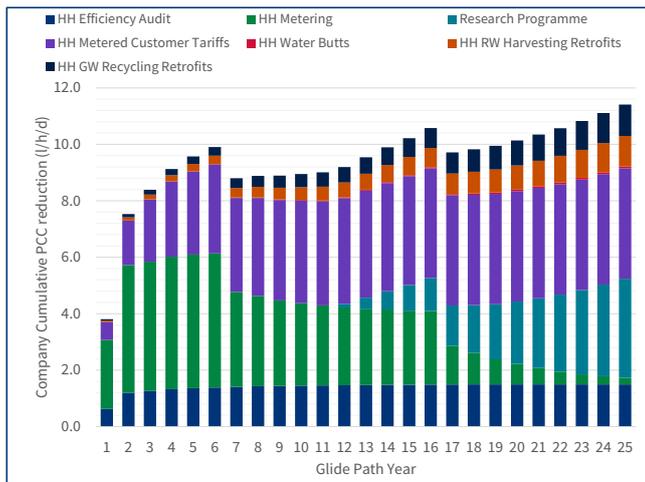
- Zonal profiles – Household and non-household consumption, property and population projections and MCoW.
- Development of consumption management options including water efficiency, customer audits, metering and rainwater harvesting.
- Policy savings – Zonal cost-benefit relationships of consumption reduction approaches.
- Environmental and carbon considerations accounted for within options and optimisations

Task	Description
Scenario configuration	Specifics of optimisation such as targeted reductions (including zonal, end of AMP, long-term), constraints, period, sensitivity testing and additional assumptions.
Data collection, QA and validation	Gather key information for zonal base data and profiles for different demand policies, along with their cost-benefit relationships and dependent interactions.
Demand management policy optimisation	Setup and running SoDow evolutionary algorithms for scenario-specific short- and long-term consumption reduction benefits, allowing modelled interaction between options, preventing double counting of benefits, and enabling option efficiencies. Conduct thorough QA of scenario outputs, review collaboratively, and produce
Results and reporting	final report with key insights and recommendations along with customisable outputs to meet regulatory submission requirements.

Long-Term Model

SoDow consists of a long-term model and an optimiser. The long-term model utilises demand forecast projections and an evolutionary algorithm to find the least cost strategy from a range of demand management policies. A wide range of specified constraints can be applied at company and/or resource zone level, informed by the planning scenario. Each scenario is optimised separately, and the scenario details are defined by the water company to ensure all criteria are met. This can include meeting reduction targets by specific years and capping reduction measures at specific levels to ensure reductions can be achieved in practice.

Consumption reduction options can be tailored to a water company's specific requirements, with models adapted to meet needs and, in some cases, new models built to fully encompass specific requirements drawing on industry information and best practices.



The impact of reduction policies to both household and non-household consumption are modelled, available water supply network growth, interaction of options and long term maintenance of benefits are accounted for to ensure reliable results over the optimised period, with a distinction between the total period (typically 80 years) and the shorter glide path, which considers when demand policies are applied and is the focus for investment and reduction.

The primary project deliverables will comprise summaries for each specified scenario, accompanied by a technical report. Customisable outputs are available to meet company and regulatory requirements.

Key Benefits

- Robust and customisable outputs are produced that can be utilised by water companies for regulatory reporting, providing the detail required for review by regulators.
- This structured and thorough methodology provides a reliable evaluation of consumption reduction costs and benefits over both short and long-term planning periods.
- Accounts for efficiencies, benefits and ongoing maintenance of new consumption levels in to the long term.
- Environmental and carbon considerations accounted for.
- Results are presented in a detailed, user-friendly summary that allows stakeholders to review and compare the cost-benefits of various committed and uncommitted demand management schemes.
- The analysis provides an optimal demand reduction strategy spanning multiple years and encapsulating specified targeting approaches, enabling configuration of specified target reductions.
- Flexible modelling framework allows further consideration of headroom targets and interactions with supply options and our SoLow model for the optimisation of leakage options.

Summary

Understanding the requirements and potential for consumption reduction across the network helps water companies effectively prepare and plan for the AMP cycles, increasing the robustness of their business plan and providing a clear picture of targets and aims to share with the wider business. It also ensures a transparent business plan is provided to the regulator.

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