



Strategic Optimisation of Leakage Options for Water Resources (SoLow)

Leakage Optimisation

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

Tetra Tech RPS have developed the SoLow tool based around previous RPS tools that have provided tactical leakage optioneering for over a decade. SoLow has been used to support many water companies, large and small, for WRMP24, PR24, and within AMP7 and is a flexible tool that can be tailored to company requirements.

The model utilises DMA level information and data to build resource zone and company level strategic plans.

- Zonal characteristics – Base year property counts, start year leakage, background leakage (BL), NRR, AZNP and MCoW.
- Zonal profiles - Annual projections for property counts, MCoW, WAFU and consumption.
- Development of leakage management options such as ALC, pressure management, mains renewal and trunk main reduction options.
- Policy savings – Zonal cost-benefit relationships of leakage reduction approaches.



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 leakage management policies, along with their cost-benefit relationships.

Leakage management policy optimisation

Setup and running SoLow evolutionary algorithms for scenario-specific short- and long-term leakage reduction benefits, allowing modelled interaction between options, preventing double counting of benefits and accounting for option efficiencies.

Results and reporting

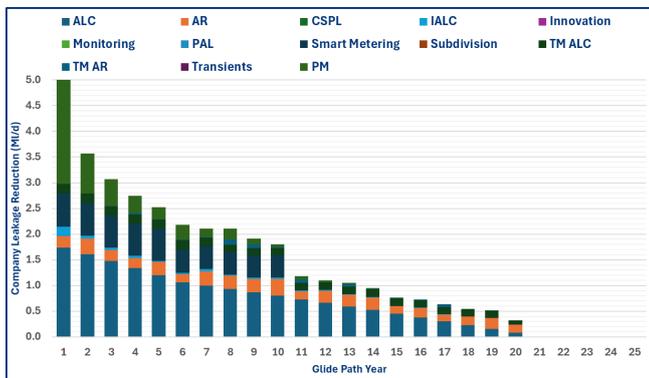
Conduct thorough QA of scenario outputs, review collaboratively, and produce final report with key insights and recommendations along with customisable outputs to meet regulatory submission requirements.

Long-term Model

SoLow consists of a long-term model and optimiser. The long-term model projects leakage levels including the impact of leakage management options and BL, variation in NRR and network growth, ensuring reliable results over the discount period, with a distinction between the total period (typically 80 years) and the shorter glide path, which considers when leakage interventions are applied and is the focus for investment and reduction.

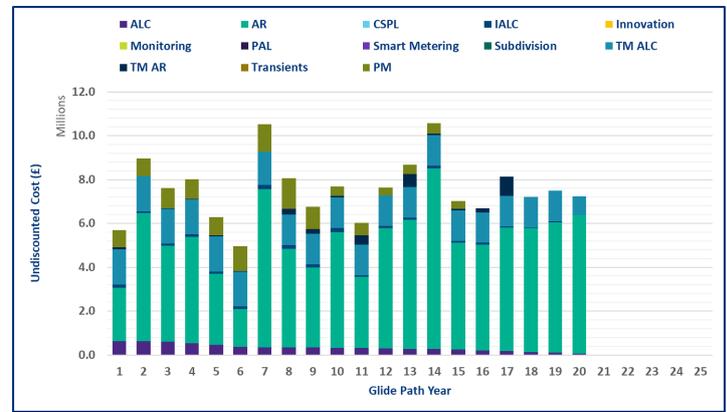
Leakage reduction options can be tailored to a water company's specific requirements, with models adapted to meet needs and, in some cases, new models built to fully encompass specific requirements.

The optimiser uses an evolutionary algorithm to find the least cost strategy from a range of leakage management options. 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.



Leakage is reduced towards background levels, with options selected across the glide path considering the cost saving and efficiencies in later years.

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.
- Structured and thorough methodology provides a reliable evaluation of leakage reduction costs and benefits over a customisable planning period, with long-term accounting for efficiencies, benefits and ongoing maintenance of new leakage levels.
- Environmental and carbon considerations are 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 leakage management schemes.
- The analysis provides an optimal leakage reduction strategy spanning multiple years and encapsulating specified targeting approaches, enabling configuration of SELL or specified target reductions at company or water resource zone level.
- Flexible modelling framework allows further consideration of headroom targets and interaction with supply options and our SoDow model for the optimisation of consumption options.

Summary

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

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