# Capgemini

# CAPGEMINI HELPS SCOTTISH WATER TO TRANSFORM WASTEWATER TREATMENT

## Remote monitoring and data-driven insight improves efficiency, reduces costs, and enhances compliance

Scottish Water provides drinking water to 2.46 million households and 150,000 business customers. Every day it supplies 1.34 billion liters of drinking water and takes away 847 million litres of wastewater from customers' properties for treatment before returning it to the environment. This final part of the process, wastewater handling, is highly energy intensive, consuming 53% of the total energy and is responsible for 71% of Scottish Water's carbon footprint. It also constitutes an asset base that accounts for approximately 60% of the organization's small value capital.

Wastewater processing is a key focus of Scottish Water's drive to achieve cost savings and efficiency via an ambitious transformation program, with the objective of achieving net-zero carbon emissions by 2040. Its 'Exemplar Wastewater Treatment Works' program enables the company to take significant step towards that by granting access to new and existing operational data from across Scottish Water's infrastructure, connecting it via Internet of Things (IoT) sensors and other devices. This was intended to provide near real-time data and reduce the reliance on site visits, which would lead to a considerable saving as 600 samples are gathered each day from across Scottish Water's 1,800 treatment works.

## Overview

**Client:** Scottish Water

**Sector:** Energy and Utilities

**Region:** United Kingdom

### Client Challenge:

Scottish Water had little access to connected data from its large wastewater treatment sites, relying on inefficient, manual processes that made it hard to optimize assets, resulting in high energy consumption, increased chemical spend, reduced asset lifespan and compliance risk. Decision making was often slow, hampered by a lack of timely insight and a largely reactive maintenance approach - increasing downtime and driving up asset costs.

### Solution:

Working with Capgemini, Scottish Water achieved real-time access to operational data using a combination of existing infrastructure and new 'Internet of Things' sensors and devices that enabled asset optimization to reduce energy consumption, emissions, incident severity, and cost of asset interventions, while increasing asset life and reducing chemical and operational spend.

### Benefits:

• End-to-end site performance visibility
• Remote site management
• Access to real-time data for analysis and control
• Energy performance monitoring at an asset level
• Condition monitoring of critical assets
• Ability to intervene earlier in the asset failure lifecycle
• Ability to predict and prevent issues before they impact customers and the environment

## Building momentum from a Minimum Viable Product

In collaboration with Scottish Water's operational teams, Capgemini initially worked to deliver a Minimum Viable Product (MVP) via a small-scale deployment at the energy company's Laighpark Paisley site, which serves 111,000 people and consumes 4.2 Gwh of energy per year. Over a ten-week period, the partners connected all critical site telemetry signals and increased sample frequency for visualization in mobile and desktop applications. Enhanced access to telemetry data had an immediate impact, with potential critical failures being flagged up to 3.75 hours quicker than previously detected via callouts.

This early success created significant momentum for a further extension of the program's capabilities to include condition monitoring of inlet screw pumps, asset-level energy sub-metering, Hach Real-Time Control (RTC) integration, final effluent monitoring, and weather integration. The Exemplar mobile application and desktop portal are now live on 17 of Scottish Water's biggest wastewater treatment sites, providing operators with instant access to critical information.

The wider roll-out of connected telemetry across Exemplar sites gives operators visibility of the key metrics needed to better understand performance and make decisions to optimize the site remotely, reducing the need for site visits, manual inspections, and readings. The application also enables the identification of critical assets that require re-starting after a power failure, reducing service interruptions and compliance risk.

## Data drives quality

Connecting data didn't simply deliver the benefits of a less labor-intensive process. The increased frequency of monitoring was significant as it enabled samples to be taken across a 24-hour period, whereas samples were previously often taken once a day at the same time. This has revealed times of day or event-related incidents, such as increased rainfall, when the site's output has been outside consent levels. Thus, not only did the new near-real-time data increase efficiency, it improved compliance and quality. In the first few weeks of deployment at Laighpark, the solution led operators to detect and investigate final effluent turbidity spikes, which was something that would have been missed previously or taken much longer to discover.

The concept behind the Exemplar program was to work with Scottish Water to deliver technology built around its day-to-day operational needs and challenges. The approach was based on starting small and delivering capability iteratively, learning and then scaling across Laighpark and further sites as each innovation proved its value.

Work is currently being undertaken to expand the information available on the application via the integration of data captured with condition and energy monitoring devices, final effluent monitors, and RTC, giving operators a single source of truth for real-time insight into how their sites operate and where efficiencies can be gained. The growing volume and variety of data have also paved the way for the ongoing development of bespoke analytics that will drive intelligent notifications via the application to alert its users when certain conditions are met, be they related to compliance, anomalous energy use, or deteriorating asset condition. The continuous capture of data will set Exemplar up to grow these analytical services in sophistication, as more and more is learnt from patterns observed from new data points.

![Capgemini logo]

## Delivering more than financial benefits

• **Reduced compliance risk** – ability to view real-time final effluent compliance metrics, coupled with better visibility and understanding of the "whole system" process will reduce risk of compliance breaches.

• **Business modelling and scenario planning accuracy** – more detailed and accessible information will feed into system models and data sets, increasing the accuracy and reliability of system and asset portfolio modelling.

• **Investment modelling accuracy** – improved asset data will allow for a better understanding of the true lifecycle of assets and enhance the accuracy of investment planning modelling.

• **Workforce engagement** – operators will have better, faster, and easier access to key information, providing them with the tools to perform their roles more effectively.

• **Operational knowledge transfer** – within the application, a 'comments' functionality allows operations to transfer knowledge relating to tasks, assets, or sites, helping to create a digital audit trail of information and moving away from having knowledge siloed in operators' heads.

• **Nitrous Oxide emissions** – better and more optimized aeration will allow for more stable dissolved oxygen levels, helping to minimise the impact of N2O.

## A connected vision for the water industry

As Scottish Water continues to roll out its connected asset technology at additional sites, it is apparent that the platform developed with Capgemini can be scaled across the business to encompass water treatment, pumping stations, and the wider network. However, the size and impact of the water industry, both in the UK and globally, means that this Exemplar model opens up the possibility for worldwide, industry adoption to deliver much greater benefits in alignment with a broader water sector transformation.

> *This is a complex program of works and is a critical part of our digital transformation journey, helping transform our wastewater business and drive a step-change in operational performance. It will allow us to make better operational decisions, be more efficient and drive significant benefits, particularly in relation to energy consumption and responsive asset failures. As our primary delivery partner, Capgemini has been instrumental in driving this transformation."*

**Joyce Gray**
**WW Business Manager**

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