Enterprise Decision Analytics

Maximize the value of your asset portfolio

The world of managing assets and infrastructure is a complex and challenging one.

Organizations need a partner that they can trust to navigate their journey of using analytics with enhanced decision making around asset investment needs and performance.

Enterprise Decision Analytics from Arcadis does all of that and more.

Introduction to Arcadis

Arcadis is wholly dedicated to providing digital technologies to organizations that manage infrastructure and physical assets - enabling the best intervention and investment decisions possible.

Our mission is to address not only the current challenges organizations face – compliance, regulatory, sustainability, resilience – but the future challenges that will come.

Infused with a wealth of rich domain of industry and consulting experience, Arcadis brings the breadth of Arcadis's global presence and expertise in the complete lifecycle of assets.

Unlock the power of data for a more sustainable, efficient, and resilient world.

Our solutions enable customers to maximize the value of their data - using technology to improve asset performance and optimize decision-making.

Across the markets in which we operate, our goal is to solve our customer's problems, enabling them to better understand their asset lifecycle, and help improve reliability, performance, and safety of those assets.

Problems we solve

VISUALIZE

Get a comprehensive view of your assets - status, needs, etc. before making management and investment decisions.

UNDERSTAND

Interpret your data, recognize insights, and test scenarios.

OPTIMIZE

Make the right investments on your assets to make the biggest difference in performance.

PLAN

See the bigger picture and how today's decisions impact long-term performance across the organization.

PROTECT

Mitigate the consequence of today's decisions by creating data-driven plans which will ensure the resilience of assets for future generations.

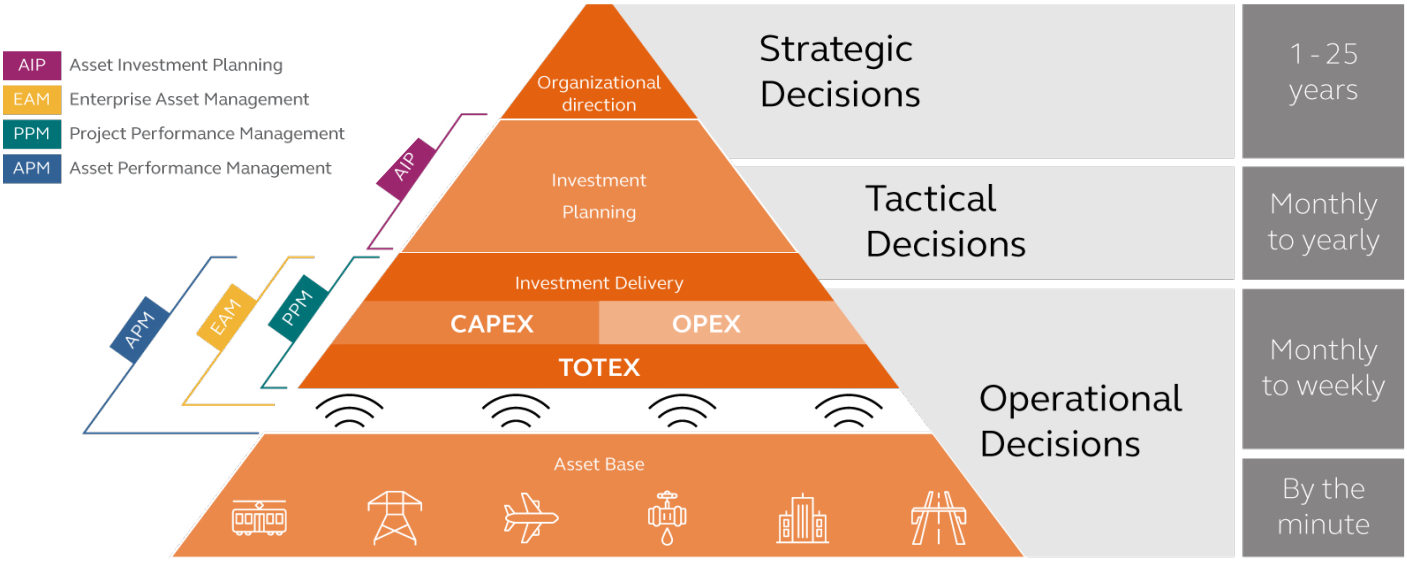
What is Enterprise Decision Analytics?

Arcadis's Enterprise Decision Analytics (EDA) solution is a decision support platform that empowers asset-intensive organizations to better understand their asset portfolios and enable optimal, data-driven decisions that balance and prioritize complex factors for an optimal asset investment plan.

Based on applied mathematics and the science of optimization, EDA provides a platform for decision makers and enables smarter decisions, providing organizations with optimal investment plans.

Enterprise Decision Analytics is a complete Asset Investment Planning (AIP) solution that is comprised of two core modules – EDA Asset and EDA Portfolio.

Planning across time spans



Industry challenges

Each industry and geography has its own drivers and needs as it relates to asset management. Having a flexible and configurable AIP solution allows Arcadis to cater to all industries, in any geography.

Energy

Rail

Water

Aviation

Buildings

Highway, Road, and Fleet

EDA can handle all linear or vertical assets and is equally capable of optimizing both short- and long-term asset planning with key objectives in mind, while adhering to multiple constraints.

Whether it's maintaining railroad tracks, replacing pipe networks, modernizing the power grid, or planning to reduce your organization's carbon footprint, each sector has its own unique set of requirements when managing their assets – and EDA was purpose-built to handle all of them.

- Failing infrastructure
- Service level sustainment
- Regulatory compliance
- Reliability and safety improvements
- Infrastructure deficit
- Business disruption challenges
- LOS sustainment to citizens
- Replacement of legacy technology(s)
- Federal/state/local reporting legislation
- Speed and flexibility in decision making

How does EDA help?

Empowers **Sustainability** - ability to understand the impact an asset has on avoiding the depletion of natural resources: carbon emissions, water consumption or overall sustainable processes that the organization has in place.

Enables **Resilience** - ability to quickly adapt to new challenges: environmental, climatic and geo-political events, or sociopolitical demands by understanding the profile and lifecycle of your assets.

Improves **Efficiency** - ability to achieve your target objectives with less waste by knowing where, when, and how to make asset investments with the supporting business case as to why.

- More confident business decisions
- Increased investment efficiencies
- Streamlined planning process
- Saved time and resources
- Enhanced performance
- Increased agility and resilience
- Better risk management
- Improved organization and communication
- Evidence-based investment plans

Improved Efficiency

Up to

30%

More value with the same budget

Saved Time

Up to

80%

Reduction in planning and reporting times

Saved Cost

Up to

35%

Average cost reduction

Delivered Result

Up to

20%

Increased project execution accuracy

Overall, **all our EDA customers have realized a full return on investment (ROI)** on their EDA purchase, within the first 1-2 years of enabling the solution.

EDA Asset

Right work, on the right assets, at the right time

EDA Asset enables users to integrate different disparate data sources, build asset models, analyze and optimize the data in order to produce reporting outcomes that are used for operational, tactical and strategic decision making.

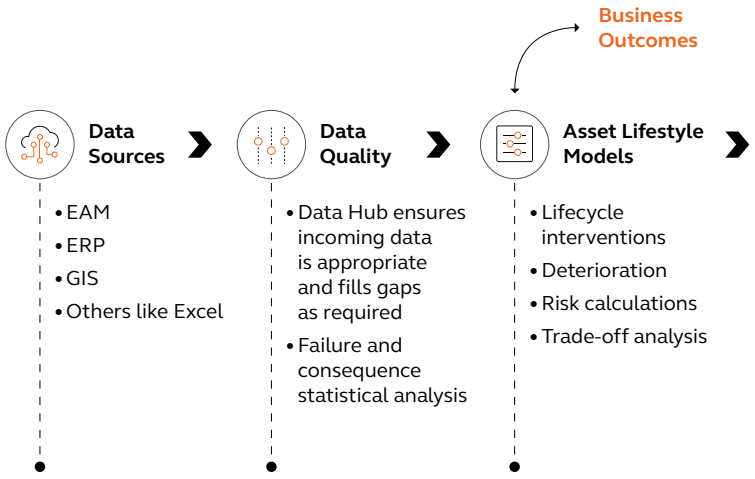
Key Features:

- Highly flexible solution.
- Handles any type of linear or vertical assets.
- Applicable to both short and long-term planning.
- Utilizes Machine Learning, AI and Complex Optimization Solvers.
- Leverages BI Visualization and Reporting.

As a decision support tool, EDA Asset can stand alone or be complemented with EDA Portfolio to develop, prioritize and optimize investment considerations.

EDA Asset is designed to model the lifecycle of assets and enable organizations to better understand the behavior of assets over time, the interventions or activities to conduct to optimize the performance and value of assets and inform both stakeholders and other systems what optimal decisions should be considered.

Enterprise Decision Analytics (EDA)



EDA Asset

EDA Portfolio

Maximizing your return on investment

EDA Portfolio enables multiple projects and portfolios from across the business to be compared against one another for prioritization, by analyzing and comparing project outcomes within a common reporting framework.

EDA Portfolio is designed to develop, prioritize and optimize asset investment decisions for short-term or long-term programs (OPEX, CAPEX or TOTEX). The solution incorporates a decision-making framework (SMF or Value) against which investments can be scored, a risk register to identify pre- and post- risk of investments, a workflow to progress investment requests through various stages, and a configurable prioritization framework across various asset of business portfolios.

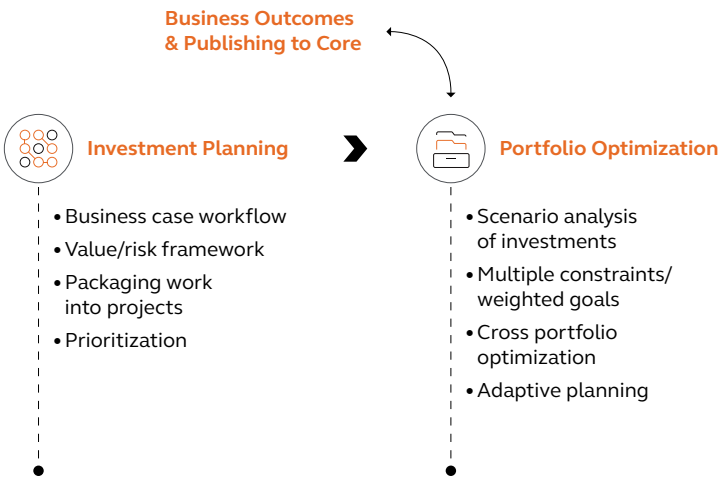
In essence, EDA Portfolio provides the ability to create multi-criteria optimization scenarios in order to provide insights and better-informed decision to key stakeholders, leading to higher return-on-investment efficiencies.

Value Framework or Service Measure Framework

Portfolio optimization looks to prioritize investments across disparate areas of an organisation. To facilitate this, it is necessary that a Value Framework (VF) or Service Measure Framework (SMF) is defined in a such way that investments can be weighted fairly so they can be compared against each other on the same scale.

EDA comes complete with the flexibility to incorporate any SMF and VF alongside an interface to make changes providing that the user has the associated permissions.

The VF can take any form desired by the organization such as a weighted scoring system or a monetized value.



EDA Portfolio

Yorkshire Water

United Kingdom

Yorkshire Water provides the collection, treatment and distribution of water in the county of Yorkshire. The organization needed support to deliver the best possible performance across its multi-million-pound network of underground pipes and complex above-ground infrastructure - with more than 700 water and sewage treatment works, 120 reservoirs, managing and maintaining over 105,000 miles of water and sewerage mains.

The Business Need

Yorkshire water needed to implement a better system to manage its water infrastructure. With so many assets to manage and optimize, the company needed a solution that allowed it to compare investment plans and scenarios from both an economical and climate perspective.

The Approach / Solution

Using Enterprise Decision Analytics (EDA) Arcadis delivered a business-as-usual system to support enhanced service levels throughout the business. As part of the “Decision Making Framework” (DMF) the EDA system was integrated with SAP and other enterprise applications to provide a single asset management process. This end-to-end process covered strategic long-term investment decisions as well as day-today reactive and proactive network activities.

The Results

Through our EDA solution we were able to boost client service levels and enhance customer service. We also worked closely with the client to integrate the platform with its existing methods, allowing for a seamless experience.

Yorkshire Water was able to re-calibrate its business plan on an ongoing business-as-usual basis, setting the foundations and agility needed to exceed its performance commitments. By using 6 capitals thinking the organization understood the positive and negative impacts that its assets and actions have on the wider economic, social and environment in which their customers live.

Aligning proactive and reactive interventions in line with their strategy.

Allowing clear links to be established between asset and operational activities.

Enabling robust investment decisions for its strategic and business-as-usual plans.

Providing innovation and new ways of working that results in more affordable bills for the customers.

FOR YOU. FOR LIFE.
Wessex Water
YTL GROUP

Wessex Water

United Kingdom

Providing water services to over 2.8 million customers across Southwest England, Wessex Water is looking to maintain a leading position within the UK water sector by complying and exceeding regulatory targets, improving sustainability and taking action to provide best value and quality services to customers.

The Challenge

The UK Water Industry is a highly regulated industry that involves large-scale investment.

Wessex's vision was to put in place the processes, tools and roles needed to plan and manage its investment needs based on recorded risk-based evidence, in a single repository and with the ability to prioritize and optimize consistently and repeatedly in alignment with its corporate objectives.

Upon review of Ofwat's draft methodology and associated detailed data tables for PR24 (published July 22), it became evident that Wessex Water required this capability to be implemented to meet their PR24 expectations.

The Solution

EDA Asset was selected for all of Wessex Water's non-infrastructure assets and EDA Portfolio for asset investment planning across all of Wessex Water's project portfolio, including both IT and environmental projects and above ground asset projects created in EDA Asset.

This implementation was a significant task as it required integration with Wessex Water's assets, risk, and financial systems and configuration around their business processes.

The solution was built to support both business planning for the next regulatory submission (PR24) as well as Business-as-Usual (BAU) where the software will look to find additional efficiencies during the 5-year AMP period that Wessex can capitalize on.

The Result

EDA will support Wessex's ability to balance performance, cost, and risk in the most efficient way to determine the TOTEX with the greatest value considering carbon, biodiversity and other wider social and environmental benefits with visualization of their performance commitments (PCs) and outcome delivery incentives (ODIs).

Realized Benefits

Single repository for all investment needs.

Balance performance, cost, and risk with other corporate ESG objectives.

Improved ROI.

"I'm happy to share that all technology aspects are now live, and colleagues are using the new tools and process. This comes as a result of a fantastic collaborative effort from colleagues across WW, Arcadis and Arup. The Build Phase is now complete, and the project has moved into business-as-usual operation.

We have a roadmap in place to guide future enhancements, and I look forward to continuing to work with you as we build our capabilities further."

Neil Wilson, Director of Risk and Investment at Wessex

Severn Trent Water

A true partnership over a 18-year joint journey

Upgraded asset management plan assessment from D to B Grade: Increased revenue of **~£45 million**

Auditable evidence of additional investment requirements on old private sewers (S24): Increased revenue of ~**£40 million**

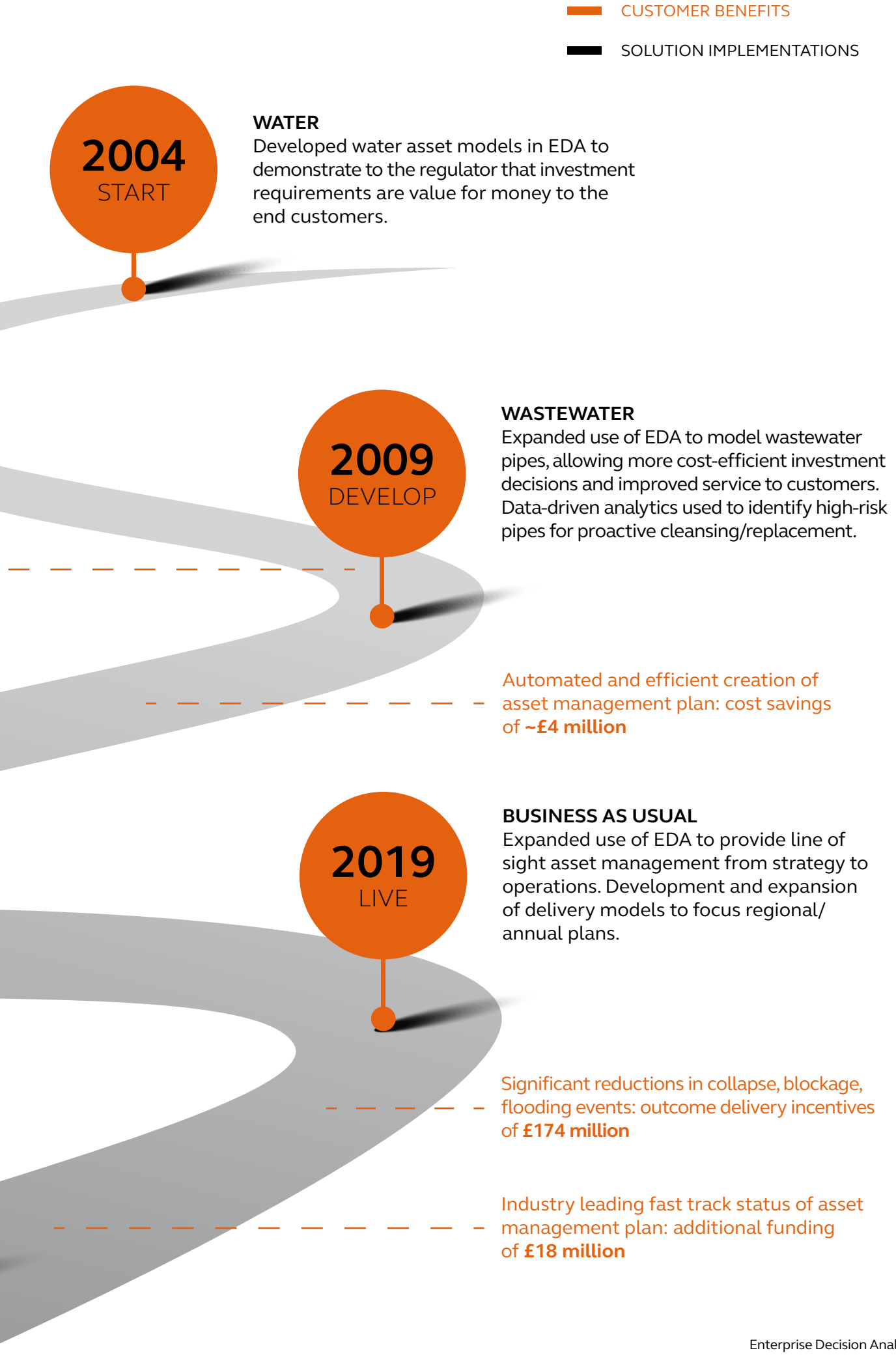
ABOVE GROUND
Further expanded EDA models to include all above ground assets such as pumping stations and treatment works. Providing a risk-based TOTEX optimization to high-consequence critical asset infrastructure.

2014
EXPAND

CROSS ASSET
Applied value frameworks to develop an EDA portfolio model, ensuring maximum value to customers through cross asset optimization incorporating social and environmental factors.

INNOVATIONS
Best in class asset health and adaptive planning to ensure resilient plans for uncertain futures. Innovative use of machine learning and AI, including real time water demand and leakage predictions.

2024
EVOLVE


CUSTOMER BENEFITS
SOLUTION IMPLEMENTATIONS
2004
START
WATER
Developed water asset models in EDA to demonstrate to the regulator that investment requirements are value for money to the end customers.
2009
DEVELOP
WASTEWATER
Expanded use of EDA to model wastewater pipes, allowing more cost-efficient investment decisions and improved service to customers. Data-driven analytics used to identify high-risk pipes for proactive cleansing/replacement.
Automated and efficient creation of asset management plan: cost savings of ~£4 million
2019
LIVE
BUSINESS AS USUAL
Expanded use of EDA to provide line of sight asset management from strategy to operations. Development and expansion of delivery models to focus regional/ annual plans.
Significant reductions in collapse, blockage, flooding events: outcome delivery incentives of £174 million
Industry leading fast track status of asset management plan: additional funding of £18 million

Severn Trent Water (STW)

United Kingdom

The Challenge

Severn Trent Water is a water and wastewater-treatment provider in the UK. It serves 4.2 million households and business in the Midlands and mid-Wales and has nearly three million different assets. Determining which assets to invest in, how and when, to deliver the best possible return on investment for shareholders and customers, is a complex problem requiring advanced data analytics. It requires a proven system that must be capable of modelling complex investments as well as capturing risk. Key to achieving this is answering the question: "Does the customer receive value for money?"

One of the more common questions asked about the use of modeling and optimization is how benefits can be proven. After all, the cost savings and service improvements are just theoretical predictions. Only when the technology has been used through a period of time is it possible to look back and prove the benefits.

Having used our decision support technology for over 15 years, Severn Trent Water is a flagship case study on how the committed use of advanced analytics can lead to real, sustainable, tangible benefits for utility organizations.

The Solution

Arcadis provides STW with corporate performance management capabilities by supplying a predictive analytics tool-kit (EDA) and technical support services for STW's infrastructure (linear) and non-infrastructure (vertical) assets. Calculating and forecasting deterioration in assets, costs and service, and optimizing appropriate and timely investment action is fundamental to supporting STW in delivering their corporate vision – using advance machine learning and AI coupled with real-time data to carry out predictive analytics.

The Results

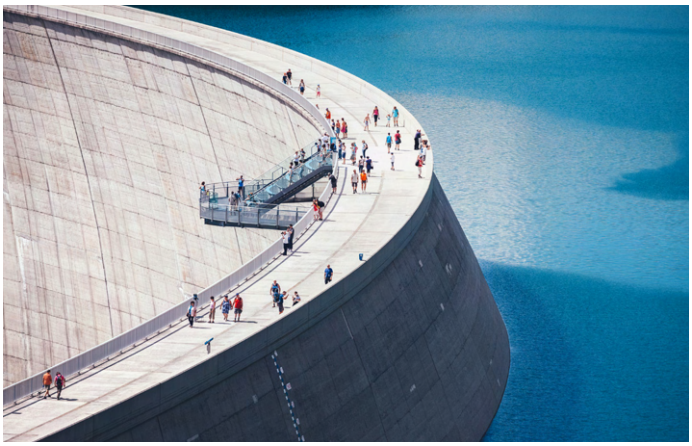
In order to demonstrate value for money to the customer STW developed an industry-leading capability to meet its regulatory obligations for producing its price review and deliver objectives of its corporate strategic vision:

- Provide a continuous supply of quality water.
- Deal effectively with wastewater.
- Respond to customers' needs.
- Minimize carbon footprint.
- Reduced charges.
- Have the right skills to deliver.
- Maintain investor confidence.
- Promote an effective regulatory regime.

Sustainable Development Goals

The Impact

The benefits from using the EDA software have been fundamental to Severn Trent Water's business success. These include a change in planning processes and culture for non-infrastructure assets equating to cost efficiencies of more than 15%, as well as consistently ranking in the upper quartile of the industry and significantly exceeding performance commitments to the regulator. This has resulted in record breaking rewards of >£100 million.



People

- Produce auditable business plans faster and with less errors.
- Move from reactive to proactive asset management.

Planet

- Minimize carbon footprint.
- Increase social and environmental valuation of service.

Profit

- PR04 move assessment from D Grade to B Grade ~£45 million.
- PR09 reduction in CAPEX when moving from draft to final ~£53 million.
- PR09 increase in S24 approved expenditure ~£45 million.
- PR09 assessment of best in class ~£10 million.
- PR14 reduction in spend in developing plan from £5 million to £1 million.
- PR14 industry leading score to support increased investments of £186 million.
- AMP6 performance incentive payments (ODI) ~£150 million.
- Industry leading fast track at PR19 worth £18 million of additional funding.

Scottish Power

United Kingdom

The Business Need

Scottish Power was looking for an asset investment planning solution to support the creation of its business plan for the next price control period (RIIO-ED2) which runs from 2023 to 2028. They selected Arcadis's Enterprise Decision Analytics (EDA).

The Solution

For RIIO-ED2, Scottish Power Networks (SPEN) will determine the optimal intervention portfolio to deliver value for money for customers. A range of constraints and objectives are being utilized to help SPEN understand the impact of different decisions and different constraints on network decision making.

The Result

Arcadis was able to configure an out-of-the -box Enterprise Decision Analytics solution to include the full suite of NARMS assets.

EDA has been deployed to support across a portfolio of investments of ~$300 million with following benefits:

Cost efficiencies of 20% - 35% (up to ~$100 million) depending on the 'what-if' question asked.

Substantial savings (8%-35%).

Reduced planning and reporting time.

N1 (Evonet)

Denmark

Evonet, one of the leading distribution system operators in Scandinavia, needed an enterprise-level solution to take their risk-driven investment planning approach to the next level.

They supply energy to 325,000 homes and companies across Denmark and enjoy one of the lowest customer service interruptions in the industry. But faced with increasing expectations from their shareholders, regulators and customers, Evonet knew that traditional age and condition-based investment plans would no longer be good enough in the long term.

With Enterprise Decision Analytics (EDA) support tool, Evonet was better able to evaluate scenarios to understand risk, performance, and cost implications across sixteen different asset types.

The Challenge

Originally, Evonet's employed the GB Common Network Asset Indices Methodology (CNAIM)* to calculate and forecast risk for Extra-High Voltage (EHV) assets.

While this has served them well in the past, evolving customer needs and stakeholder expectations, together with worsening impacts of climate change, mean that it's time for an upgrade. As their asset network grows bigger and more factors must now be considered to accurately predict and prepare for risks, traditional spreadsheets would no longer suffice.

The Solution

Evonet partnered with Arcadis to take their processes to the next level: making the switch to a fit-for-purpose, enterprise level asset management solution that was fit for both strategic business planning and business-as-usual investment decision-making.

They adapted Enterprise Decision Analytics tool to improve, optimize and future-proof their risk-driven investment planning approach. This enabled Evonet to take bigger, more comprehensive amounts of data to run strategic scenarios and better understand the trade-off between investments and risks. In addition to enhanced cross-asset optimization capabilities, Evonet can also more accurately identify efficiencies to improve performance across the entire network and asset lifecycle.

The Result

With Enterprise Decision Analytics tool, Evonet's reputation as a Denmark energy industry leader is secured. Equipped with best-in-class asset management, they are now well on track to their goal of ensuring a better electrical grid for future generations to come and being a core part of the green transition at affordable costs.

Through this tool, Evonet achieved:

Enhanced cross-asset optimization across asset types.

Better understanding of investment-to-risk trade-off.

Securing a better electrical grid for the next generation.

NHS
The Leeds Teaching Hospitals
NHS Trust

Leeds Teaching Hospitals NHS Trust

United Kingdom

Leeds Teaching Hospitals NHS Trust, is a local hospital (trust) in Leeds, the United Kingdom's fourth largest city that serves more than 1 million people locally and provides regional specialist care for up to 5.4 million people.

The Challenge

Facing increasing backlog and capacity pressures, construction costs and overdue building maintenance, Leeds Teaching Hospitals NHS Trust needed a way to better examine these concerns to understand investment priorities and ultimately ensure that services and operations are efficiently managed to meet patient and regulatory expectations.

In the wake of COVID-19, medical facilities needed to accommodate a growing and sustained number of patients and patient care while also remaining operational. Access and availability of facilities, personnel, and resources needed to reduce the backlog of maintenance requests while also being cost-efficient. Using optimization and prescriptive analytics provides a real understanding to support and inform strategic investment decision making.

The Solution

Leeds Teaching Hospitals implemented Arcadis's custom-built Enterprise Decision Analytics solution to help it make better and more cost-effective decisions, obtain greater clarity and consistency of their assets, and manage its data with ease and in a secure way. Thanks to the solution's modular capability, integrations with other corporate systems can be made to allow for best practice asset management processes.

The Result Arcadis's EDA solution transformed how Leeds Teaching Hospitals NHS Trust identifies essential vs. non-essential investments which allowed the hospital to make critical decisions faster, optimize its asset management, and identify investment priorities. Through this data-driven approach, decisions around demolition and rationalization of estates can be more easily justified, allowing for a more comprehensive estate strategy.

The hospital was also able to set up different scenarios in the system by changing investment levels in backlog maintenance. Now, it can confidently plan and have a more proactive approach to how they operate and prioritize tasks.

Achieved 20% efficiency through optimization.

Improved collaboration between stakeholders.

Reduced backlog, risks and carbon footprint.

DC Government

United States

The Business Need

DC Government (DC Gov) was tasked with assessing the size and scope of the capital infrastructure gap of the District, but it faced several critical challenges:

- Creating an accurate inventory of the number and condition of all District-owned assets;
- Estimating their related costs of repair or replacement;
- Assessing future capital infrastructure needed to support continued growth of the city;
- Understanding which capital projects might be funded through the use of public-private partnerships or other non-traditional financing sources;
- Determining the future capital needs of the Washington Metropolitan Area Transit Authority (Metro).

$14 billion

Asset Portfolio:
Roads, Bridges, Parks, Fleet (Buses, Police, EMS, Fire), Facilities, IT Equipment

The Solution

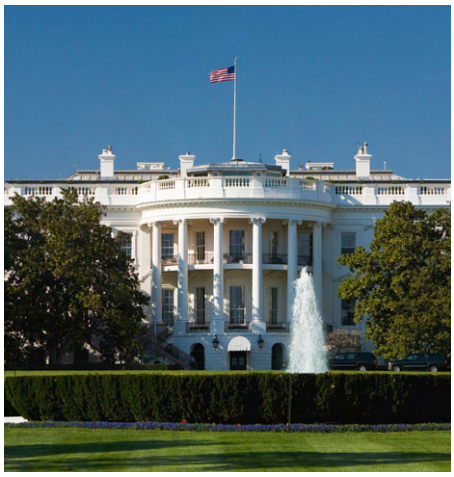
In 2021, Arcadis began working with DC Gov to deploy our asset investment planning solution, Enterprise Decision Analytics (EDA). The project includes the prioritization and optimization of decisions across its diverse network of assets, including network infrastructure (roads and bridges), vehicles, buildings, and schools.

EDA will be used to help DC Gov understand the health and reliability of its assets. By using EDA's predictive capabilities, DC Gov will be able to quickly understand the impact of different factors on asset deterioration and identify where its budget will be best spent to minimize failures, reduce maintenance backlog and ensure DC Gov's key internal and external KPIs are met.

Through EDA's 'what-if' scenario modeling capabilities, EDA will help DC Gov identify the best use of its budgets over the next 6 years as well as to provide dashboards and reports required to support the business. The team at DC Gov will be trained on the solution and a small team will be educated to be 'expert' users, able to add new models, change model parameters, create new scenarios, add new data sets, create and manage data scripts – ensuring any new information or changes can be quickly incorporated by the team.

The Benefits

- The District now has one of the highest bond ratings - state or local governments - in the country. It can borrow more money, at a cheaper rate, and use those additional funds for the unfunded capital needs.
- A complete asset inventory, with current condition assessments presents the District a baseline of its multi-billion dollar portfolio, by which future decisions can be made based on evidence and objectivity, as opposed to the traditional 'boardroom brawls'.
- EDA enables the annual production of the long-range Plan submitted to Mayor and Council as a roadmap for the next 6 years of capital expenditures.



Network Rail

United Kingdom

Implementing Digital Solutions to support Network Rail's Intelligent Infrastructure Vision.

The Business Need

A Decision Analytics platform was required to power Network Rail's next generation of asset and workforce planning.

The Solution

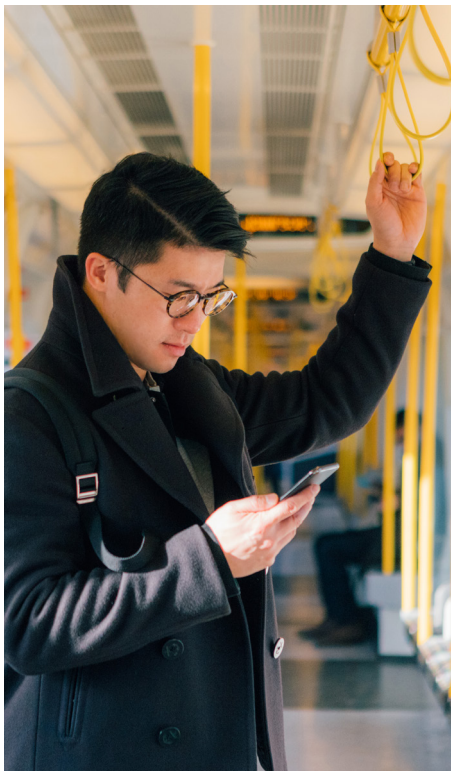
Arcadis with our EDA platform was selected as the preferred supplier by Network Rail and its IT partner. Starting in January 2021 and having already successfully completed the high-level designs, we began working as "one-team" with Network Rail to successfully implement the solutions utilizing an agile approach to delivery.

Asset Lifecycle Planning will deliver an integrated, strategic asset management planning system that has the capability to optimize investment plans across asset disciplines, based on a common value framework of service measures. ALP will provide Network Rail a single platform to create and optimize its work, holistically alongside all assets, routes, and regions. The key objectives of ALP are:

- Align long-term asset management strategies with the short-term delivery plans, resources, and access,
- Provide information to help forecast future strategic demands for resources, machinery, materials,and access,
- Produce live, multi-discipline and cross-functional plans which arein a tailored (for route/region) and consistent format,
- Provide information from the work bank to accurately forecast engineering access requirements,
- Optimize the asset intervention trade-offs (renew/maintain/ enhance) based on different parameters (e.g., safety, performance, cost, sustainability),
- Produce an optimized, live work bank that takes account of a range of factors including affordability, deliverability, access, resource constraints, corporate objectives etc.

Work Planning and Scheduling will enable the workforce, using technology, to efficiently plan and deliver Network Rail's commitments through an optimized industry leading maintenance regime. WPS will revolutionize work planning and its key objectives are:

- Move to more proactive work planning and away from reactivity.
- Allow planners more time to make safer planning decisions,
- Reduce the amount of time it takes to create a plan,
- Reduce the amount of time it takes to re-plan following unexpected changes,
- Allow maintenance units to negotiate better access,
- Measure and influence the stability of the work plan.



We hope you have enjoyed the information presented on the Enterprise Decision Analytics offering, and how our customers are using the technology to realize significant value on their asset portfolio and their business processes. I encourage you to reach out to your regional representative or myself to hear more about how EDA can help your organization maximize value throughout your asset management journey.

Rob Corazzola, P.Eng
Global Sales Director – Enterprise Decision Analytics
Rob.Corazzola@arcadis.com

About Arcadis

Arcadis is the world's leading company delivering intelligence-driven sustainable design, engineering, and consultancy solutions for natural and built assets. Now bringing together the digital capabilities, products and solutions of Arcadis IBI Group and Arcadis Gen under a single Arcadis umbrella, we are on a mission to empower our clients worldwide with the data-driven insights they need to navigate today's challenges and address tomorrow's uncertainties with confidence and agility. Collectively, we bring an enhanced commitment to supporting digital transformation across every industry in which we operate.

As Arcadis, we stand together as more than 36,000 architects, data analysts, designers, engineers, project planners, water management and sustainability experts, all driven by our passion for improving quality of life.

www.arcadis.com

Arcadis. Improving quality of life

To find out more about how EDA can help your business and to see the solution in action, contact us at eda@arcadis.com

Find out more at www.arcadis.com