Delivering systematic,
value-optimised decision-making
in all stages of the asset life cycle

THE **SALVO** PROCESS
STRATEGIC ASSETS: LIFE-CYCLE VALUE OPTIMIZATION

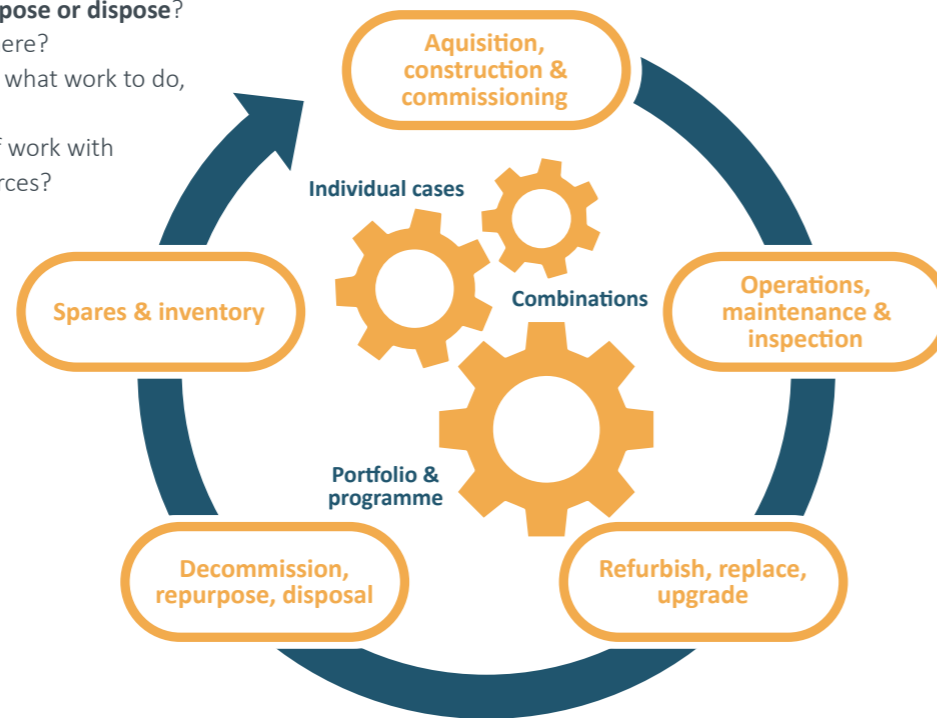**DST** DECISION
SUPPORT
TOOLS

WOODHOUSE
PARTNERSHIP

Best practices, competencies & technology, with consistently-proven business benefits

The necessity and challenge
of asset management decisions

Success in Asset Management depends greatly upon making the right decisions:

- Which **assets to acquire** in the first place?
- What operations, **maintenance and inspection strategies** to adopt?
- Whether to **refurbish, replace or upgrade** (and when)?
- Whether or when to **decommission, re-purpose or dispose**?
- What **spares and inventory** to hold, and where?
- When to schedule a **system shutdown**, and what work to do, in what 'bundles'?
- How to **deliver a programme** or portfolio of work with global commitments and constrained resources?

Aquisition, construction & commissioning

Individual cases

Combinations

Spares & inventory

Operations, maintenance & inspection

Portfolio & programme

Decommission, repurpose, disposal

Refurbish, replace, upgrade

But these decisions are sometimes **subjective, inconsistent and poorly supported** by a robust business case or value justification. Supportive data may be incomplete or unreliable. Short-termism, personality and 'political' interests and conflicting agendas can get in the way. And even if we make a 'good' decision, we are often less good at recording, demonstrating and explaining why it is right.

Of course, we would really like such decisions to be **consistently value-focussed**, evidence-based, rigorous, transparent, repeatable, consensus-accepted, sustainable, understandable and auditable. This is why many organisations are now investing heavily in asset information systems, analytics and **'decision support'** methods.

But why re-invent the wheel? Proven best practices have been researched and developed across most industry sectors, including the essential 'human factors' of culture, collaboration and consensus-building. The SALVO Process is the gold standard for an integrated, customisable approach, that brings together the processes, people and technical aspects in a practical and effective 'framework'.

SALVO
PROCESS
DECISION
MAKING
FRAMEWORK

DST
DECISION
SUPPORT
TOOLS
EVALUATOR SUITE

Why **SALVO** and **DST**?

Making the business case for what to do, when & why

There are many tools and methodologies that help with specific aspects of asset management decisions (e.g. FMEA, RCA, LCC, QRA, RAM modelling). But none of these address the complete end-to-end decision process or provide the business case justification for what to do and when. SALVO brings all these elements together into a systematic 'decision-making framework'.

Based on rigorous research & proven practices

The **SALVO Process** and **DST Evaluator Suite** are backed by a 5-year multi-industry collaboration project, to research and develop best practice methods for asset management decision-making. They are also backed by 10+ years of implementation and continuous improvement, ensuring they remain at the leading edge.

Practical, sophisticated and powerful out-of-the-box capability

- The toolkit enables **immediate usage** and benefits, whatever your starting point:
- Make best use of whatever **asset data and expertise** or 'tacit knowledge' is available
- Quantify **asset whole life costs** and value, including 'intangibles'
- **Monetise risk**, including how risk changes over time
- Combine **advanced mathematics**, decision theory, human factors, business discipline and common sense
- Perform instant, easy **'what if' analysis** of alternative options, timings and scenarios
- **Ensure full transparency** and understanding for all stakeholder groups: technicians, engineers, finance, senior management, investors, customers and regulators

Integrated, collaborative approach

SALVO ensures a team-based approach to decision-making, which forces the right questions to be asked, and builds multi-stakeholder consensus and 'ownership' of conclusions.

Flexible, scalable implementation

- Does not need a large, complex and costly digitalization and implementation project. Training and software licences can be provided from 1 user to Enterprise-wide in phased, benefits-proportional programmes.
- Capable of integration with existing business processes and IT products.
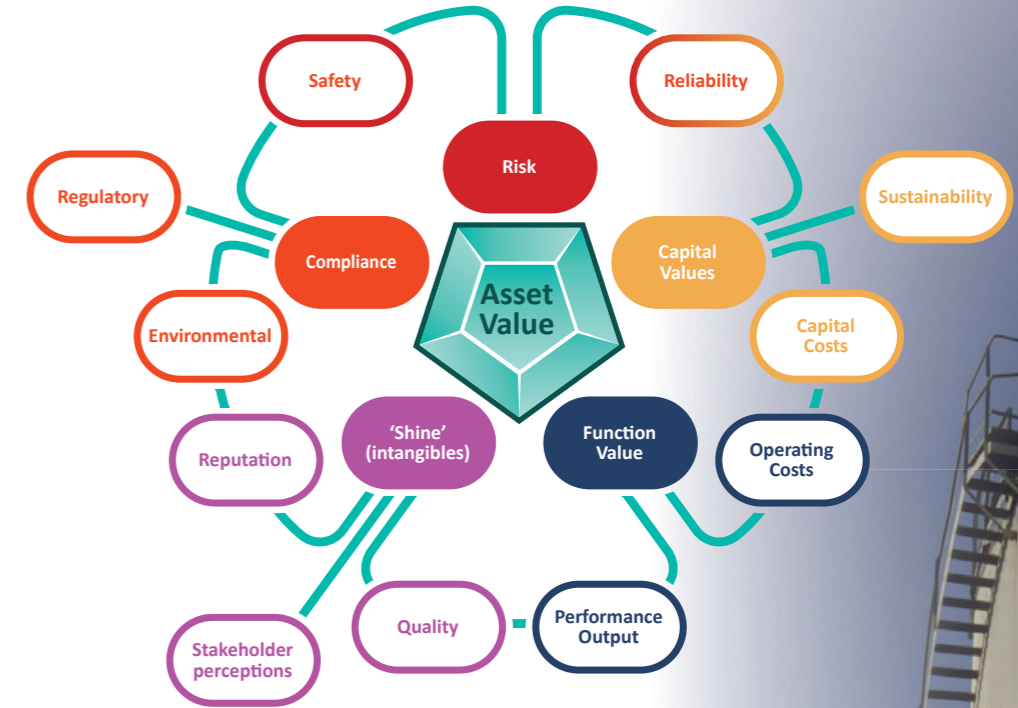
Ongoing support

Full range of training, worldwide support and expert facilitator services, with an active user group through the **Woodhouse Academy's Alumni community**. Opportunities for continual professional development plus input to our innovation and product development programme.

THE **SALVO** PROCESS

The SALVO Process is a 6-step approach to integrate all elements of asset management decision-making.

It starts with the **'top down' identification** and understanding of problems and opportunities, and the viable choices to addressing them. It then enables a **'bottom-up' evaluation** and justification of the best-value individual options and combined activities into an optimal complete portfolio and programme (within global constraints and commitments).

The SALVO 6 step process

Top down

Bottom up

Many 'digitalization' solutions & analytics address these steps for 'decision-support'

1 Identify & prioritise the problems/ opportunities
- Decision **criticality**
- Decision **urgency**

2 Define the problem
- Problem boundaries
- Underlying root causes
- Related cases for improvement

3 Identify potential solutions
- **Asset** interventions e.g. maintenance, modification, renewal
- **Non-asset** e.g. process, mitigation, insurance options

4 Evaluate & optimize timing of discrete options
- **Life cycle cost**/benefit/risk
- **Optimal intervals**/timing
- Premium for **compliance**
- Premium for **shine**
- Cost of **uncertainty**

Here is where DST uniquely supports the actual decision-making and justification for what to do, why and when

5 Evaluate & optimize combinations of interventions
- Optimal **blending**
- Optimal **bundling**

6 Assemble total portfolio & programme
- Capital investment plans, resourcing needs, risk & cost forecasts

DST DECISION SUPPORT TOOLS

Shamrock diagram

Safety — Reliability
Regulatory — Risk — Sustainability
Compliance — Capital Values — Capital Costs
Environmental — Asset Value — Operating Costs
Reputation — 'Shine' (intangibles) — Function Value
Stakeholder perceptions — Quality — Performance Output

The **Shamrock diagram** (above) supports the process of **quantifying competing organisational goals**, resolving trade-offs and identifying optimal compromises.

This elegant and comprehensive framework also helps demonstrate why decisions represent best value.

The overall SALVO Process is independent of the **contributions of specific tools** or technologies. It provides the structured framework and governance for how asset management decisions should be made in an integrated, joined-up manner.
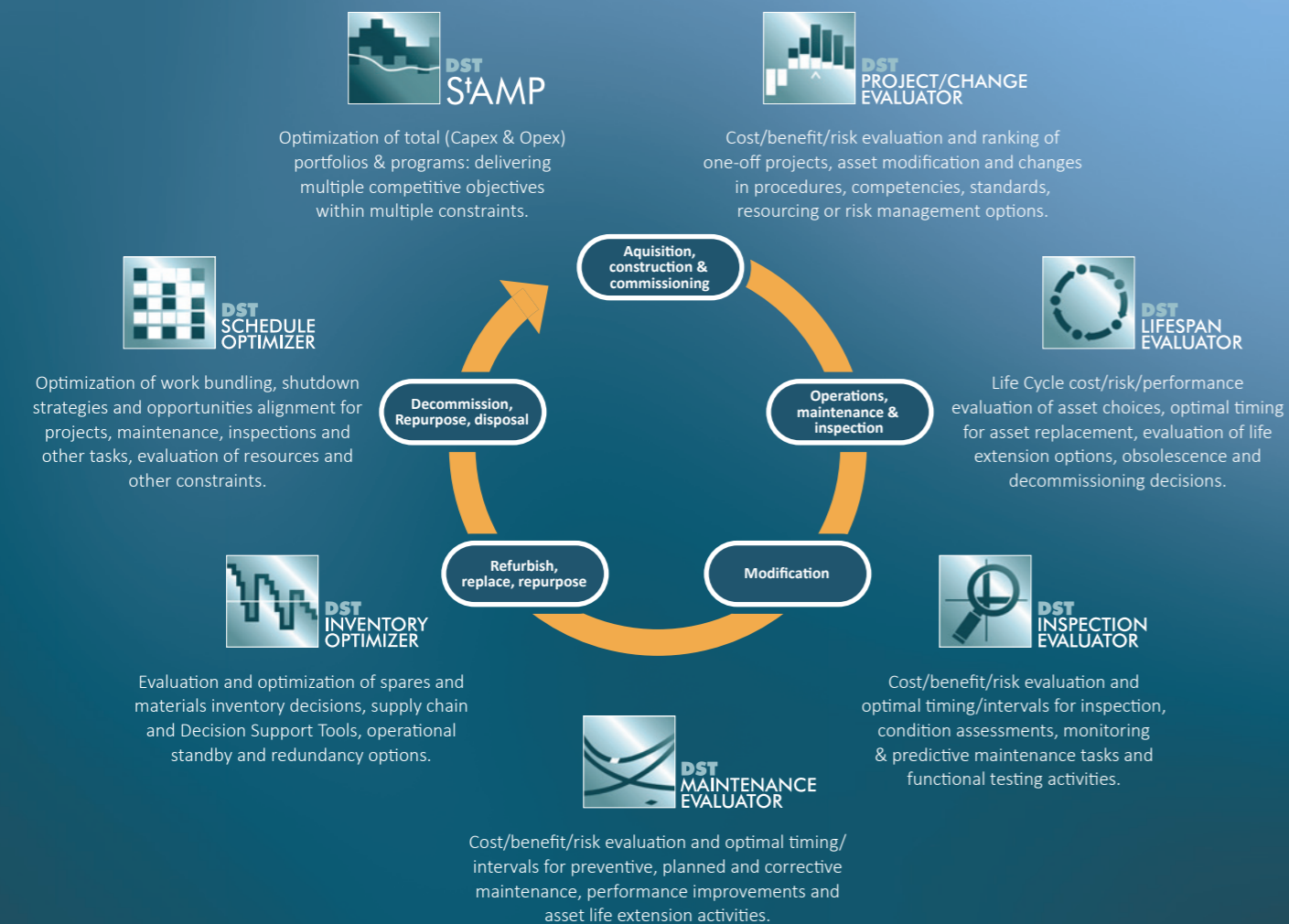
It ensures a focus on **real, optimised value** to the organisation, with methods to clarify what value really means to your organisation, how to quantify it (including risks and intangibles) and manage the inevitable trade-offs.

DECISION SUPPORT TOOLS

Decision Support Tools (DST) are a complete, modular software suite that provide an unrivalled range of technical, financial, risk and strategy optimisation facilities.

The tools are designed to **facilitate and support multi-disciplinary teams** to make over 40 different types of asset management decisions, using any available mix of data, expert knowledge and uncertain assumptions. They enable **rapid (real time) evaluation** of different choices to discover the best value option and combinations of what to do, when. Just as importantly, they also demonstrate **'why'** that solution is optimal (in language, numbers and graphics that both technical and financial audiences can understand).

DST S'AMP
Optimization of total (Capex & Opex) portfolios & programs: delivering multiple competitive objectives within multiple constraints.

DST PROJECT/CHANGE EVALUATOR
Cost/benefit/risk evaluation and ranking of one-off projects, asset modification and changes in procedures, competencies, standards, resourcing or risk management options.

DST SCHEDULE OPTIMIZER
Optimization of work bundling, shutdown strategies and opportunities alignment for projects, maintenance, inspections and other tasks, evaluation of resources and other constraints.

DST LIFESPAN EVALUATOR
Life Cycle cost/risk/performance evaluation of asset choices, optimal timing for asset replacement, evaluation of life extension options, obsolescence and decommissioning decisions.

(Cycle diagram labels:)
- Aquisition, construction & commissioning
- Operations, maintenance & inspection
- Modification
- Refurbish, replace, repurpose
- Decommission, Repurpose, disposal

DST INVENTORY OPTIMIZER
Evaluation and optimization of spares and materials inventory decisions, supply chain and Decision Support Tools, operational standby and redundancy options.

DST INSPECTION EVALUATOR
Cost/benefit/risk evaluation and optimal timing/intervals for inspection, condition assessments, monitoring & predictive maintenance tasks and functional testing activities.

DST MAINTENANCE EVALUATOR
Cost/benefit/risk evaluation and optimal timing/intervals for preventive, planned and corrective maintenance, performance improvements and asset life extension activities.

The tools are quick to implement, highly flexible and widely proven to deliver a near-instant return on investment; ALL implementations have been self-funding within the first 6 months.

WOODHOUSE ASSET MANAGEMENT ACADEMY

iAM | iAM endorsed TRAINER | iAM endorsed ASSESSOR

Getting started

We offer:

Expert facilitators, pilot studies and analysis services

Call us in when you need to do specific studies: our team of **qualified SALVO Expert Facilitators** can help you to resolve individual issues, or a batch programme of studies (such the optimal programme of asset investments). Or try out the methods in a **'Doctor's clinic'** session to explore and evaluate a sample of your current real issues, opportunities, and decisions. This style of **'taster'** study can help you to gauge the scope for improvement and quantify the business impact of improving such decision-making across your organisation and in different stages of the asset life cycles.
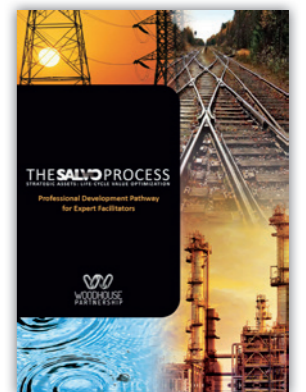
Education & Training

The **Woodhouse Asset Management Academy** supports our SALVO Process education, competency assurance and certification. We can help you to build in-house capabilities and skills for optimal decision-making and asset strategy development, including **'train-the-trainer'** and certified Expert Facilitators.

WOODHOUSE PARTNERSHIP

The Woodhouse Partnership exists to help clients deliver greater value, consistently and sustainably. With 30 years of success and experience in most industry sectors, we hold firm to our core values:

Innovation
We pioneer the standards that others follow. We are open-minded lateral-thinkers, able to identify and resolve new problems with new solutions.

Flexibility
We adapt and combine solutions to suit each client's needs, context and culture. Our approach is always pragmatic, realistic, and effective.

Personal
Our clients benefit from effective transfer of knowledge and development of their staff skills and capabilities. We will earn your respect, trust and loyalty.

Experienced
Our team provides unrivalled first-hand experience in all aspects of asset management; in almost all industries, regions & cultures.

Visit **www.twpl.com** to find out more

Our **track record**

"We have been using the SALVO Process and supportive DST software to update and improve maintenance strategies for our electricity network assets. We chose DST and the SALVO Process because they can integrate with our existing business processes. These features, plus having qualified and knowledgeable experts guiding us through the implementation stages, have proved to be a winning combination in our decision-making."

Sam Gibson, Investment Strategy Manager (Stations), Northern Ireland Electricity Networks

"The SALVO Process has helped us to identify and demonstrate the optimal timing of asset replacements and the optimal frequency for maintenance interventions. The outputs from SALVO are key components of our 'Asset Master Plans': we are now in the best place we have ever been."

Geoff Aitkenhead, Asset Management Director, Scottish Water

"We have worked with The Woodhouse Partnership for a number of years calling them in to help with the strategic management of our assets and the optimisation of asset life cycle interventions for higher availability and extended life. One such example is for sewage treatment inlet screens where failure rates have more than halved and unavailability reduced as a result. Their application of the SALVO Process and Decision Support Tools, along with a hands-on approach, make them stand out and deliver results which are transparent and fully understood by the business. Whenever we have worked together we have found The Woodhouse Partnership engaging and insightful."

Jon Wright, Area Performance Manager, Wessex Water

"Determining the timing for the renewal of signalling interlockings as they approach life expiry was critical for the business. These are high-value assets and we needed a robust methodology to enable us to analyze the costs and risks and identify the optimum replacement timings. The SALVO/LCO process and DST suite of tools developed by Woodhouse allowed us to undertake this assessment and provide the necessary assurance that we were looking for. The process and tools cover a wide variety of decision types, so we are using them for decision support in many areas of asset management planning."

Steve Tijou, Asset Strategy Manager, Signals and Control Systems, Sydney Trains, Australia

"The Woodhouse Partnership asked the right questions to quantify the knowledge of our engineers, with the support of Decision Support Tool (DST) software, into well-motivated and transparent business cases. As a direct result, we were able – and confident – to reprioritize the capital program. Several projects were postponed and others were pulled forward. The approach was innovative and highly appreciated by all stakeholders."

Kathleen Switten, Asset Performance Engineer, SABIC Geleen, Netherlands

"We were facing the apparently urgent replacement for obsolete equipment to the order of tens of millions of pounds. With SALVO we were able to reduce this by 60% and renegotiate support arrangements for the foreseeable future.."

Christine Pretorius, Industrial Engineering, Sasol Synfuels, South Africa