

WHITE PAPER

The Value of Optimization in Asset Management

A network diagram composed of numerous red circles of varying sizes connected by thin red lines, forming a complex web-like structure that spans across the right side of the page.

**Better decisions to help
utilities balance costs, risks,
opportunities and performance**

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Improving the effectiveness of overall asset management by providing more holistic adjustments is what asset optimization is all about.

INTRODUCTION

ISO 55000 recognizes that effective asset planning enables better decision-making processes to balance costs, risks, opportunities and performance. The discipline of Enterprise Asset Management (EAM) is emerging as a mainstream expectation for many organizations. Those who have evolved their EAM approach over the last several years have reported benefits, including: significant workforce re-engagement, reduction of interdepartmental barriers, and a collective, well-motivated commitment to delivering better value-for-money.¹

But just how is better value-for-money achieved? In a world driven by do-more-with-less, this is an important question for many utilities. British Standards Institution's Publicly Available Specification 55 (PAS 55) advises that organizations should not set asset management objectives without due consideration of the costs so that the best value combination of partial achievements can be determined.

This white paper examines how asset optimization helps improve financial performance for utilities through increased returns on investment and reduced costs, while preserving asset value and ensuring long-term realization of organizational objectives.

MARKET FORCES IN THE UTILITY SECTOR

With such long lasting physical assets, it was not uncommon in the past for utility asset management to have a strong calendar-based approach. Aging infrastructure coupled with recent investments in smart grids (for electric utilities) and pipeline replacements (for gas and water utilities) have led to more proactive approaches based on risk and detailed information about assets and their performance. However, even well-maintained assets will fail when facing temperature variations of well over 100 degrees or laying buried for several decades.

Arguably, utility services are the foundation upon which other critical infrastructures depend. As banks withdraw liquidity from capital markets and utility infrastructure gets even older, the pressure is even greater to make good decisions.

KEY DRIVERS FOR COST-RISK OPTIMIZATION

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| <ul style="list-style-type: none"> • Aging infrastructure • Pressure to keep rates low • Regulatory compliance • Quality of service • Improving investment plans (e.g., for rate cases) • Improving control over customer bills • Improving data quality • Linking outcomes (KPIs) to actions (investment, policy, operations) | <ul style="list-style-type: none"> • Evaluating risk (environmental, economic, social, political) • Monitoring service quality in response to investment decisions • Capturing externalities (e.g. carbon footprint) • Understanding whole life costs – not just upfront capital costs • Adhering to best practices (e.g. ISO 55000) |
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DEFINING ASSET MANAGEMENT

Before discussing the value of asset optimization, a few key terms require definition:

- **Asset** is an item of value owned.
- **Optimization** is an act, process, or methodology of making something as fully perfect, functional or effective as possible.
- **Perfect** means having all *the qualities you want*, rather than making every asset as close to new or to specification as possible.

The Institute of Asset Management (IAM), in collaboration with asset and maintenance organizations worldwide, has categorized asset management into 39 subject areas. Optimization is not part of the title in any of these, but it is referenced in 15 of them. While it may seem difficult to separate management and optimization, optimization is a key piece of improving how asset management is executed. Most interestingly, every subject in the IAM category of Asset Management Decision-Making discusses the importance of optimizing the actions being performed. The message is clear: *you need a clear picture to make good decisions*.

Asset management areas need to be aligned across the organization and across the hierarchies of asset management. This starts with a strategic plan which describes the vision, mission and values; business policies; stakeholder requirements; and the goals and risk management approach of the organization. This strategic outline is then used to perform asset management planning activities which include:

- Asset management policy
- Asset management strategy
- Asset management objectives
- Asset management plans

THE NEED FOR A HOLISTIC APPROACH

The challenge is that as you move to more detailed levels of the approach, the budgets, the authority to take action, and the performance metrics all start to become fragmented by organizational sub-units. While potentially serving to motivate and provide realistic goals for each unit, it starts to undermine the value of a holistic asset management approach. If the decision making is not optimized across business units, or even within business units, the value is diluted when all interactions between the assets and other factors are not adequately considered.

Improving the effectiveness of overall asset management by providing more holistic adjustments is what asset optimization is all about. Doing this requires examining some of the things that get impacted as goals, etc., get divided up as you move through the asset management hierarchy.

When exploring the impacts of changing planned expenditures and asset maintenance and replacement plans, creating a sustainable program of expenditure that does not pose unacceptable risk requires an approach including both organizational and temporal perspectives. Changes in one area often have impacts in other, so the ability to model asset and resource performance, identify alternatives, and understand the sensitivities of various parameters to adjustments, are critical to success.

MAKING HARD DECISIONS EASIER

With limited capital and operational expenditure (CAPEX/OPEX) budgets, utilities need to make hard decisions about where and when to spend their money to maximize returns on CAPEX while optimizing or deferring OPEX. Deterministic and probabilistic techniques can assist utilities to better justify CAPEX and OPEX budgets. They also can model these activities by evaluating business processes, asset condition and asset degradation to generate asset investment plans based on actual and predictive asset performance long into the future. This allows utilities to effectively optimize costs, risks, opportunities and performance.

Big data

In the past several years, enterprises have begun to regard data as a key source of leverage. Advances in technology have driven an explosive growth of data, which is now spread across many repositories and devices. It is therefore critical to find opportunities to better understand a utility's data and data management practices. An expert partner can provide utilities with key insights into how this data can be better secured and made more widely available to drive maximum benefit from applications and optimize business processes.

Business processes

Given that most problems occur in the handoff between sub-processes, the problems that occur at the interface boundaries between processes are often given less priority than the short-term goals of the sub-processes being performed by individual business units. Taking a holistic approach to processes is a key to making sure that asset management line of sight is not broken. Otherwise, intra-process handoff problems can languish for long periods of time leading to little or no improvement. It is important to optimize business processes because it is people who perform asset management, and therefore it is people, and their knowledge, competence, motivation and teamwork that will make a big difference in whether asset management is good or bad. But, this is true only if the organization is making sound (optimized) decisions to start with.

STAKEHOLDER COLLABORATION

Regulators today put a premium on culture and governance, starting with top management. Yet, many asset managers are struggling to come to grips with these attributes.

The asset management system and the ability to leverage it for investment planning will require collaboration among many parts of the organization. This collaboration often involves the sharing of resources. Coordinating these resources and applying, verifying and improving their use should be objectives of the asset management system. It should also promote awareness of the asset management objectives across the whole organization².

BUSINESS AS USUAL IS NOT A OPTION

With aging infrastructure and pressure to control rate increases, business as usual is not an option when it comes to investment planning related to asset management for utilities. Massive investment will be needed to renew and upgrade aging network infrastructure as well as transform today's networks into tomorrow's smart grids.

The demand for utility services, especially for electric companies, is moderating and even declining in much of the developed world. This is partly due to a slower economy, but also due to changes in consumer behavior influenced by stricter efficiency standards, conservation programs, and emphasis on demand management. State and federal regulators that have to approve rate increase requests from utilities are asking for a better integration of all aspects of utility operations. Both regulators and utilities are trying to explore novel approaches toward mutually acceptable solutions. This will continue as regulators look beyond their own jurisdictions to instances of best practice which they will use to compare with filings by their own utilities. Achieving better asset management is certainly more important than ever for utilities.

The current economic and financial constraints can push companies towards a project-by-project perspective, resulting in less emphasis being placed on long-term planning and long-term management strategy.

This is not to question the dedication and ability of utility asset managers. In taking the objectives set by the organization and providing targets for specific parts of the company, many utilities are focusing their planning on resolving short or medium-term problems as many decisions get made in silos. Optimization in these cases is far less effective and in some cases impossible. A global view is necessary to achieve true optimization.

Holistic planning often is more difficult because goals and objectives are not balanced and aligned with corporate objectives. Sometimes related projects are not combined within a portfolio to allow transfer of elements such as risks and costs between projects or tasks for more effective optimization depending on events that occur. The "run to failure" approach is often the way of doing things. The result is that the whole process is not optimized and creates a reactive environment instead of a proactive one. Additionally, planning processes need to be auditable.

More options, more choices

For many utilities, the planning scenarios that are considered are limited in number and the period they cover is relatively short. Trying to do more would generate a workload that could not be absorbed by the planning team. As a result, scenarios are limited arbitrarily to a few carefully documented ones and rarely cover more than 20 years. In order to have a good view of the behavior of an asset family, for example power transformers, one would need to cover at least one lifetime period of that asset family which is much more than 20 years.

As a result of optimization techniques, various alternate scenarios can be explored to see how accelerating maintenance budgets may reduce short-term risk, or how delaying asset replacements in the short term due to reallocating funds may impact long-term organizational goals.

Last but not least, the evaluation of risk is often performed less rigorously than it could be. The approach is based more on the perception of things instead of solid, well known and efficient processes. If the relationship between decisions and the associated risk is not established clearly, the potential impacts of those decisions remain unknown (using spreadsheets). Different operational, tactical and strategic solutions are a significant benefit of an optimized approach. Remembering that risk is the impact of uncertainty and that uncertainty is a result of deficiency of information, bringing these data into a single tool and allowing them to be optimized together improves the overall planning and risk management processes.

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BENEFITS OF OPTIMIZATION

Optimization of risk, cost and process performance with respect to determining asset investment planning should be a strategic objective of every utility. The benefits include but are not limited to:

- **Financial analysis and integrated asset management planning for targeted service levels**—This approach will generate the best economic scenario that achieves the desired level of service under any budgetary and capacity constraints.
- **Better risk management**—The risk in decision-making will be lower as the decision maker will be informed of the probability of making the right decision at the right time. The risk associated with meeting commitments will also be reduced through better insight into the probability of achieving target service levels.
- **Coordinated and global view of all assets**—The asset manager gains a holistic view into the past to project into the future, taking into consideration the past, actual and future condition of the asset, maintenance and investment policies, historical and forecasted asset behavior, and the relationship between all of these elements. The asset manager is able to better understand the relationship between the budget, asset failure risk and service levels since risk management and financial analysis can be applied to infrastructure asset management.
- **Optimized decision processes**—Probabilistic and/or deterministic models are used to create decisions that are not arbitrary or unrelated, but instead are based on combinatorial criteria. Therefore, the decision making process and criteria are more transparent and fully auditable. Decision-making is based on documented criteria that are applied through an auditable model as opposed to personal and often subjective judgment. Decision making will pass from reactive to proactive.
- **Operations and maintenance**—These are a big part of asset management, and a holistic approach permits the use of integrated inspection, maintenance and investment policies.

- **Business case**—Provides strong arguments to justify the required investments before the regulator.
- **Scenario comparison**—A large number of scenarios can be quickly and easily produced and compared to identify the highest probability of meeting goals such as having the lowest present value investment requirements, preserving asset base value, improving reliability etc. The period covered by those scenarios can also be much longer.

BENEFITS BY ROLE

Senior management

- Validation that annual infrastructure investment amounts are sufficient to assure sustainability
- Identification of the required investments to maintain or achieve new targets in service levels
- Justification for the regulator of the required investments sums
- Compilation of an expert knowledge base from key employees

Asset managers and project engineers

- Measure impact of current annual investments on service levels
- Identify the projects that are the most relevant to be fulfilled in the short term
- Help develop a consistent rationale to justify the required sums relating to network in order to maintain expected service levels
- Standardize decision making and communication between stakeholders

Treasury officials

- Identify clearly the necessary annual investments to ensure assets sustainability
- Allow implementing better borrowing strategies
- Assess impacts on the utility's long term debt load

HOW CGI CAN HELP

Sophisticated decision optimization that delivers risk, predictive and condition-based maintenance strategies is critical to asset investment performance. CGI's Intelligent Asset Optimization portfolio offers solutions for utilities to improve asset management and investment analysis with advanced financial modeling to facilitate a risk-based approach to strategic asset investment planning.

Contact CGI to learn how we can help you address your asset investment planning challenges. Our experts are available to explore the issues and review how your existing solutions can help as a part of the overall solution. We can help you to network with CGI clients who have seen similar challenges—and solved them.



ABOUT CGI

Founded in 1976, CGI is a global IT and business process services provider delivering a portfolio of industry-centric software solutions coupled with high-quality business consulting, systems integration and outsourcing services. With 68,000 professionals in 40 countries, CGI has an industry-leading track record of on-time, on-budget projects.

We partner with utilities across the globe to provide the knowledge and expertise to enable automation of the industry's best practices for enterprise asset and resource optimization.

For more information about CGI, visit cgi.com/utilities or email us at info.util-sol@cgi.com.