

Asset Life Cycle Analysis
Asset Management Strategy

Early Retirement or Run To Fail? Using ALCA to Manage an Aging Infrastructure

The Challenge

A mid-size Midwestern electric company, like many other utilities across the U.S., has an aging infrastructure. Its existing facilities are performing adequately but they will ultimately be at increased risk of failure as they age unless a consistent, analytics-driven asset strategy is put into place now to balance investment in shorter term reliability improvement with longer term renewal of the aging system. Past efforts to renew assets have been inconsistent, often losing momentum as other priorities consumed funding and resources.

Davies Consulting was engaged to work with a core team of operations, finance, and engineering leaders to develop a more robust Asset Management (AM) process. The goal: to develop a long-term, integrated investment strategy and a repeatable, analytics-based and risk-based process for developing AM strategies that ensure reliability and affordability for the foreseeable future.

The Davies Consulting Approach

Davies Consulting worked with the company's core team to establish a priority list of distribution assets to evaluate: poles, power substation transformers, substation breakers, and the 4kV system (which was treated as a single "asset"). The project team then used Davies Consulting's Asset Life Cycle Analysis (ALCA) software to perform an in-depth evaluation of these highest priority assets. ALCA analyzes historical asset failure data against a library of utility-generated failure probability curves for several distribution assets. In addition to the library, ALCA allows the user to input their own company data for more tailored failure curves. Davies Consulting ran ALCA analysis to compare the following four general strategies for each of the priority assets:

- "Run to Failure" (RTF) – assets are only be replaced upon failure;
- "Ideal" – assets are replaced after a set number of years, typically aiming for just prior to failure;
- "Current" – the company continues with its current strategy; or
- "Other" – a mix of RTF and proactive replacing after a certain age which is higher than the average life span of the asset.

The strategies are based on the distinctive attributes of each asset type – balancing short-term efficiencies with long-term reliability concerns and integrating them into an enterprise-wide plan. Since ALCA simulations are based upon utility consortium data, the model produces real-world results that are very useful in utility asset management strategy building, starting at a high level and moving through the organization to asset-specific programs.

In this utility case, ALCA:

- Revealed potential “reliability bubbles” that can occur if asset replacements are put off indefinitely;
- Compared different replacement rates and their respective reliability impacts over time;
- Weighed alternative replacement strategies which address long lead times associated with large, specialized equipment such as transformers and circuits; and
- Exposed overly aggressive asset replacement programs and generated manageable timelines that balance budget, resource, and reliability planning priorities.

The End Result

With the assistance of Davies Consulting, the utility was able to take its ALCA results and:

- develop a strategic process to deal with aging assets,
- promote integration and planning among the different divisions of the utility, and
- begin to shape a proactive asset management culture that will provide the groundwork for future asset evaluations.

ALCA provides a repeatable, consistent means for analyzing risk and failure probability data related to utility assets. As a decision support tool, ALCA can be used to help utilities enhance and adjust AM strategy based on evolving risk profiles and real-world utility data. In this case, the utility employing ALCA has discovered company-wide benefits of analytic-driven asset management, from operations to corporate functions.