



No. 2 in a series on leveraging the value of data-driven building services.

# HOW TO USE DATA FOR OUTCOME-BASED BUILDING SERVICES

*Data allows building owners to develop specific outcomes for their facilities and their businesses*

**T**raditional preventive maintenance is intended to pay back its cost with increased reliability and efficiency while extending the life of building systems. Most businesses view such maintenance as a necessary cost—pay something now to avoid paying more later.

But that is a very low bar for a maintenance plan. Strategies that leverage data and analytics pay back much more because they do more with the equipment and technology already installed in a facility. These strategies support chosen business outcomes, which are then confirmed by key performance indicators (KPIs). In this scenario, the maintenance strategy supports a facility that is a business asset rather than a mere expense.

To implement an outcome-based maintenance plan, owners and facility managers follow a four-step process with their service provider.

## 1. Develop specific, unique outcomes and KPIs for your business.

While all businesses want to reduce their business costs and increase facility uptime, every business also has more specific goals. These fall into a variety of categories, including building system performance, energy management, financial return, sustainability, and compliance with codes and certification.

For example, a sustainability outcome for an office building might be to achieve certification for LEED Operations and Maintenance; an aligned KPI might be to track energy usage with the ENERGY STAR procedure. A compliance outcome for a life science research center might be to meet OSHA requirements; an aligned KPI would then monitor the number of compliance issues that arise and the time necessary to remedy them. (See table below of sample outcomes and KPIs for various facility

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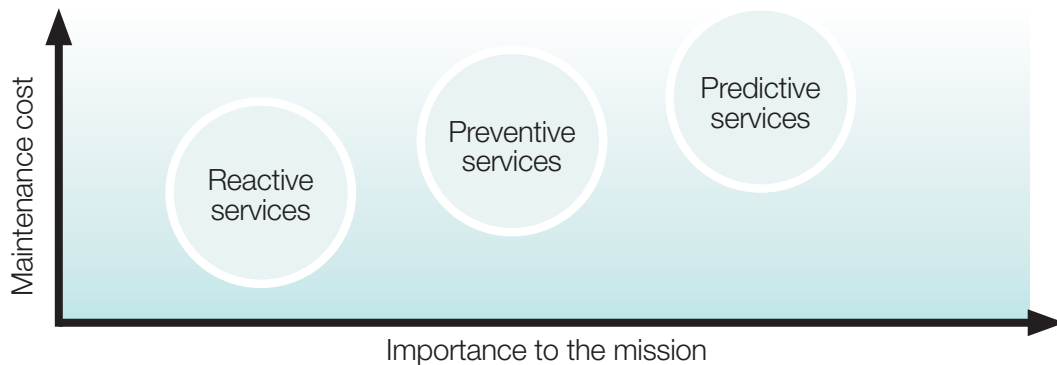
## STEPS TO DEVELOP AN OUTCOME-BASED STRATEGY

The examples below demonstrate possible outcomes and KPIs for various building types. Every business develops its own goals and outcomes based on its mission, facilities and staffing resources.

1. Business Goals	2. Outcomes	3. KPIs
<u>Higher Ed Facilities:</u>		
Recruit and retain students and faculty	Develop healthy, secure facilities with an open environment	Track number of complaints, false alarms and security incidents
<u>Commercial Office Buildings:</u>		
Meet energy efficiency and sustainability goals	Achieve building certification (e.g., LEED, BOMA 360) and compliance with energy mandates	Monitor ENERGY STAR scores, procurement savings and utility bill savings
<u>Data Centers:</u>		
Improve uptime and reliability	Extend uninterrupted operations and enhance security	Track uptime and response time, ratio of first-time fixes to callbacks, and hours to repair
<u>Healthcare:</u>		
Make continuous improvements in ROI	Extend life of equipment; improve operational efficiencies and staff productivity	Measure uptime and equipment life, energy cost per bed, and staff training hours

## DEPLOY THE RIGHT MAINTENANCE FOR THE EQUIPMENT

To manage maintenance costs efficiently, the service deployed should be based on the importance of the equipment to the mission. The more important the equipment to the mission, the more efficient predictive service becomes.



types.) Over time, these outcomes and KPIs will change as a business updates its goals.

### 2. Collect the corresponding data.

Valuable data for analytics is already available in many of your existing facilities systems, such as building automation systems (BAS) and computerized maintenance management systems (CMMS) as well as other applications. It can be sent through the cloud to a single analytics engine. These analytics can be mapped to the measurement of specific KPIs. Service agreements can incorporate these components and more clearly demonstrate outcomes as compared to the more traditional agreements that can only report on service schedules and provide inspection checklists. The traditional method measures the service providers' efforts but not their results.

For more on traditional building services vs. data-driven services, see [THE UNTAPPED POTENTIAL OF DATA IN BUILDING SERVICES](#).

### 3. Analyze the data for actionable insights.

The service provider analyzes the data, then quantifies outcomes and KPIs in regular reports to building owners. The owners are able to recognize inefficiencies and potential problems, identify actions to take, and ensure that their chosen outcomes are met.

### 4. Align the right mix of services with your outcomes.

Working with their service provider, owners can determine the most cost-effective mix of services—reactive, preventive or predictive—that is aligned with their chosen outcomes.

Each of the three maintenance services has different costs to perform, with reactive having the lowest cost, predictive the highest, and preventive in the middle. (See graph above.) Reactive maintenance is essentially a run-to-fail approach, while preventive maintenance performs actions based on a preset time schedule. Predictive maintenance involves taking actions based on measurements of actual system operation and degradation.

The U.S. Department of Energy estimates a 12-18% cost savings for preventive maintenance over reactive maintenance, and an 8-12% cost savings for the predictive strategy over the preventive.<sup>1</sup>

A reactive, run-to-fail approach is appropriate for some equipment; for example, lighting in a basement storeroom. In contrast, mission-critical equipment requiring predictive services is proactive and involves continuous monitoring. Examples include air-handling units (AHUs) for hospital operating rooms and AHUs for manufacturing floors where incorrect indoor temperature results in defective product. In these two cases, the AHUs would likely have KPIs mapped to them for data analytics and equipment monitoring.

When an outcomes-based approach is combined with the right mix of maintenance services, owners maximize the return on their facility investments. ■

<sup>1</sup>U.S. Department of Energy, *Operations & Maintenance Best Practices: A Guide to Achieving Operational Efficiency, Release 3.0*, sections 5.3-5.4, [www.energy.gov/sites/prod/files/2013/10/f3/omguide\\_complete.pdf](http://www.energy.gov/sites/prod/files/2013/10/f3/omguide_complete.pdf)

### For more information on the value of data-driven building services, click on other articles in this series.

- 1 [No. 1 – THE UNTAPPED POTENTIAL OF DATA IN BUILDING SERVICES](#)
- 2 [No. 2 – HOW TO USE DATA FOR OUTCOME-BASED MAINTENANCE](#)
- 3 [No. 3 – UPROOT COSTLY INEFFICIENCIES IN BUILDING SYSTEMS](#)

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