



## Project Summary

### Organization:

Indianapolis Power and Light Company, an AES Company

### Solution:

Utilities and Industrial Asset Performance

### Location:

Indianapolis, Indiana, United States

### Project Objective:

- Minimize power failures in the Indianapolis downtown underground power distribution network.
- Improve data collection and inspection processes for more proactive maintenance and asset performance.
- Implement asset reliability strategies to prioritize work orders and determine asset health.
- Integrate work management processes to accelerate information mobility and optimize decision making.

## Fast Facts

- IPL is a utility providing electricity in downtown Indianapolis and central Indiana.
- IPL used AssetWise to initiate an asset management program to curtail equipment failures.
- The team developed an internal asset management website linked to Bentley's flexible, interoperable software to allow real-time, organization-wide access to asset information.

## ROI

- AssetWise improved the transparency of the network's operations and management.
- Bentley applications made inspections and work order processes more efficient, decreasing network equipment failures from 49 in 2011 to 15 in 2016.

# Asset Criticality Focus Boosts Indianapolis' Power Network

AssetWise Decreased Electricity Grid Equipment Failures by 70 Percent

## A Unique Distribution Network

A commercial and tourism hub, downtown Indianapolis, Indiana strategically located its numerous sports venues, event arenas, and convention center for easy pedestrian access amid city restaurants and hotels to boost the local economy. The city has hosted national sporting events, including several NCAA Men's and Women's Final Four tournaments and the 2012 Super Bowl, and attracts more than 26 million people annually, generating an economic impact of approximately USD 4.3 billion. Therefore, it is vital to the economy of the city that there is a safe and reliable source of electricity.

Indianapolis Power and Light (IPL) is part of the AES global power supply company, which provides electric service in 17 countries across four continents. IPL is an integrated utility with three generating stations and a transmission and distribution network that provides service to more than 480,000 customers in the city of Indianapolis and central Indiana. The power company has a separate downtown network distribution system that serves Indianapolis' central business district, which is approximately 10 square blocks. This separate system in the downtown area supplies power to only 2,600 customers, less than 4 percent of the total system loads, with multiple feeds. The system helps eliminate potential customer interruptions and makes it nearly 100 percent reliable.

## Shifting to an Asset Performance Driven Process

While most utilities invest where there are reliability issues, IPL had almost zero customer interruptions but had other problems that needed attention. The company's complete underground network is made up of 72.2 miles of primary cable encased in concrete ducts, accessible via 1,200 manholes, and 315 transformers housed in 140 network vaults. An extremely asset-intensive network that shares corridors near the second largest steam system in the United States, the network had been experiencing numerous dramatic failures over the past five years. Although they did

not impact customer service, these failures were highly visible and potentially dangerous to millions of city pedestrians and tourists. There had been fires and smoke that could smolder and produce combustible gases, which could launch a manhole cover 30 feet in the air if ignited.

Although IPL initiated a variety of helpful logistical changes, the utility realized that it needed to work smarter and shift its business focus to a more asset-centric approach. This solution required enhancing and accelerating equipment inspections and recording methods as well as improving asset management processes. Having used Bentley's AssetWise Asset Reliability (AssetWise) software to collect indicator data for its generating stations and substations, IPL evaluated the software to improve performance of the downtown network. Considering data collection, asset performance management, and communication, IPL's Transmission and Distribution (T&D) Asset Management group needed a simple interface and flexible, customizable technology capable of integrating and analyzing data from a variety of sources. The group also needed help assessing asset health and risk and generating corrective work orders that could be managed in a collaborative environment accessible to all users to optimize decision making.



*AssetWise manages the asset lifecycle of Indianapolis Power and Light Company's complex electric network.*

*"I have worked with a lot of software systems over the years and the Bentley software is one of the most flexible and configurable that I have ever used. There seems to be no limit to what one can do with the software"*

– Barry Feldman  
Director T&D Asset  
Management, AES/IPL

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## **Digital Data Collection Enhances Inspection Efficiency**

All inspectors used a mobile frame for data collection with built-in business logic. They were guided through the inspection process, being prompted to answer a series of questions regarding a particular asset and take photos of abnormal conditions. Then, the collected information was uploaded to AssetWise, where a calculated indicator was configured to analyze the recorded inspection data and an overall health score was assigned to the asset using predetermined weighted values determined by subject matter experts. IPL configured specific indicators and indicator states for the assets, including manholes, vaults, and network transformers and protectors along the distribution system. To date, the system monitors 300,000 indicators for 20,000 assets. The digital asset data is much easier to share and can be applied across business processes throughout the organization, enabling the health of all assets in the network to be evaluated objectively.

The electronic standard process for collecting and recording the data accelerates and improves quality and efficiency of the entire inspection process. Prior to the digital inspection process, manual inspection was paper-based and relied on judgments made by individual inspectors. If a particular inspector did not have an issue with something, no corrective action was taken. With a streamlined, objective inspection process in place, all assets in the network are being evaluated according to the same criteria within a given asset class and corrective work orders are generated accordingly.

## **Identifying Asset Criticality Enables Strategic Maintenance**

The impact that a particular asset has on the distribution network if it fails determines how critical it is for the asset to function optimally; this is its criticality. Using AssetWise not only enables IPL to track asset health, but it also calculates criticality, risk, and, ultimately, work order priority.

Each asset is evaluated for asset health and criticality based on information that comes from a variety of sources that is

calculated or manually entered by a subject matter expert. Asset health and criticality are reviewed according to specific components within a particular asset class. Then, an asset risk value is calculated, and the asset is scored numerically. This numeric value is then used as a prioritization capability for strategic, proactive maintenance to ensure network assets are safe, reliable, and are operating efficiently. The more components included in the calculation, the more valuable the results are for effective and accurate prioritization and corrective action. This comprehensive approach also demonstrates credibility to regulators and other outside groups.

## **Integrating Work Management Processes Enable Data-Driven Decisions**

To facilitate communication on inspection, work order, and management processes, the T&D organization developed an internal asset management website. The site integrated the company's work management systems with the inspection information and health, criticality, and risk values in AssetWise. Through the website, automatic email notifications allow management and field personnel to be informed of the health and status of critical assets and maintenance programs. This communication optimizes information mobility and collaboration among the different departments for a coordinated, proactive approach to manage the assets of the distribution network. During 2016, 326 website users registered over 87,000 page hits, demonstrating the success of the site and serving as an industry best practice in driving the highest standards in asset management.

IPL's asset management website enables an asset to be viewed, along with all work order and inspection histories, on one screen. All IPL staff, from the COO to field personnel, have access to the same information in real-time. The ability to link AssetWise information to a coordinated and web-based environment drives accurate, data-driven decision making for more proactive asset maintenance and reliable business processes, optimizing operation and management of the downtown distribution network.