REDEFINE THE STANDARD BUSINESS OPERATION WITH ASSET360™

ASSET360™ is Black & Veatch’s Smart Analytics platform that captures, integrates and analyzes data to generate actionable information. ASSET360™ provides comprehensive system awareness to utilities, power producers and communities to boost operational performance and sharpen planning insight.

ASSET360™ AND OUR SMART ANALYTICS SOLUTIONS

Black & Veatch is a leader in smart, integrated infrastructure. We cultivate infrastructure IQ through ASSET360™—a cloud-based analytics platform that gathers and integrates numerous disparate data sets from across the digital universe. ASSET360™ analyzes these consolidated data sets to create a holistic view of system performance. Our ASSET360™ platform hosts our Smart Analytics Solutions, which are specific applications with unique functions. Our solutions analyze infrastructure systems, assets and devices to enable more-informed decisions and actions. Customized, user-friendly dashboards and scorecards convey the results, enabling clear-cut operational and planning understanding.

SMART INTEGRATED INFRASTRUCTURE (SII):
Accelerating the convergence of physical infrastructure, communications and data analytics to deliver system-wide synergies and value.
FROM INTEGRATED DATA TO STRATEGIC ACTION

ASSET360™ provides Operational Intelligence (OI) and Adaptive Planning (AP) to fill knowledge gaps and transform data into strategic actions. Our OI and AP Suite of applications provide specific analytic functions, such as strategic options assessment, operational planning, issue management and performance analysis.

Operational Intelligence
Real-time analytics that provide insight into data and operations, enabling clients to understand and improve the day-to-day performance and health of their assets.
- Provides asset monitoring, anomaly detection and diagnostics
- Provides issue analysis, workflow and resolution management
- Facilitates proactive performance analysis

Adaptive Planning
Analytics that combine past and current data with predictive simulations to create, compare and inform complex planning, operational and business decisions.
- Conveys options, risks and impacts of alternate scenarios
- Considers range of cost, compliance and capital in an integrated manner
- Conveys planning interdependencies
- Enables plans to adapt to changing market or regulatory conditions
SIMPLIFY COMPLEX DECISION-MAKING

Black & Veatch’s Smart Analytics Solutions enhance decision-making by analyzing historical and projected data from numerous systems, formats and timescales, which illuminates system interdependencies. ASSET360™ unifies live, static and predicted data streams, linking assets and networks to form a single point-of-truth to simplify complex management decisions. Users can make decisions with a precise understanding of the current situation and of what may unfold down the line.

ENHANCE CROSS-DOMAIN DATA-DRIVEN OPERATIONS

Black & Veatch is a trusted advisor and technology leader in the Water, Telecommunications and Power domains. We are committed to innovation and to our clients’ success, which means we provide data-driven solutions that propel efficiency and resiliency. Repeatedly, across all domains, we have observed our clients’ enhanced day-to-day operations and confident tactical planning with the benefit of newfound insight.

ASSET360™ OI SOLUTIONS DETECTED A 2.5 TO 3% DROP IN LOW-PRESSURE TURBINE EFFICIENCY AT A CLIENT’S MID-WESTERN POWER PLANT. FURTHER INSPECTION IDENTIFIED A FAILING PORT GASKET, WHICH IF LEFT UNDETECTED, WOULD INCREASE FUEL COSTS BY $36,000 PER MONTH AND REDUCE THEIR CAPACITY MARGIN BY 2.6 MW.

Enabled by ASSET360™, our OI Solutions monitor system-wide data to rapidly identify, prioritize and resolve performance and reliability issues before they become costly problems.
Smart Power Generation
Our power generation clients rely on our ASSET360™ AP and OI Solutions to navigate volatile markets, the changing regulatory environment, aging infrastructure and an aging workforce without compromising asset performance or operating margins. Clients use AP Solutions to compare the outcomes of numerous scenarios with varying operating profiles, fuel options, maintenance plans and costs. These comparisons inform our clients of the best compliance strategy that also preserves optimal performance, reliability and cost-efficiency. Similarly, our clients depend on our OI Solutions to help monitor their entire system to rapidly identify and resolve performance and reliability issues before they become costly problems.

Smart Grid
To respond to growing concerns around grid reliability, SII infuses Smart Analytics into grid electric system planning and operation considerations, including engineering performance analysis, asset monitoring and diagnostics, and outage management—the principal concern of utilities. Using ASSET360™, Black & Veatch combs historical outage data to assess the cause, location and impact of previous outages; understand the current risk of outage; and define a cost-effective, optimized management plan toward system hardening.

A SOUTHERN POWER GENERATION CLIENT RELIES ON ASSET360™ AP SOLUTIONS TO ENSURE MERCURY AND AIR TOXICS STANDARDS (MATS) COMPLIANCE. OUR AP TOOLS BUILD AND EVALUATE VERY COMPLEX STRATEGIES AT AN UNPRECEDENTED LEVEL OF DETAIL ALLOWING OUR CLIENT TO DETERMINE TACTICAL STEPS TO MEET AIR QUALITY STANDARDS WHILE MAINTAINING OPTIMAL PERFORMANCE, RELIABILITY AND COST-EFFICIENCY.
Black & Veatch’s Smart Analytics Solutions help Water domain clients clearly visualize leaks and target meter replacement.

A MEDIUM-SIZED WATER UTILITY CLIENT USES ASSET360™ TO EVALUATE AREAS OF WATER LOSS. IMPLEMENTING THE RECOMMENDED MODIFICATIONS WOULD ENABLE THEM TO REDUCE WATER LOSSES FROM APPROXIMATELY 72 TO 40 GALLONS PER CONNECTION PER DAY.

Smart Water Utilities

Water demand is growing alongside population growth, which places great pressure on already constrained water systems. Smart Analytics offers solutions to address water scarcity, increase efficiencies in water use, and reduce energy consumption in water system operations. Black & Veatch’s ASSET360™ helps water utilities leverage technology and data gained through smart meters, sensors, advanced modeling or geospatial water mapping. The data from these and other technologies are connected, integrated and made interoperable to create a data-driven system that more intelligently manages water resources, energy expenditures, treatment processes and collection systems. Over 200 water and energy utilities have incorporated ASSET360™ solutions and are already saving money and operating with enhanced reliability and insight.
**Smart Communities**

Black & Veatch focuses on the foundation of all Smart Community functions—the convergence of analytics, physical infrastructure and communications. At this junction, communities can build greater levels of resilience into the systems that deliver its essential services of energy, water, communications, and transportation. ASSET360<sup>™</sup> applications further this process by helping communities develop readiness, responsiveness and revitalization as cornerstones of their resilient community. Without Smart Analytics, city systems would run inefficiently, and citizens would endure poor water utilization, increasing water restrictions, and greater energy use, which could lead to climbing carbon emissions and more frequent power outages. Citizen satisfaction could dwindle. Through ASSET360<sup>™</sup> and integrated infrastructure, communities can improve system efficiencies, integrate resource management, and achieve greater citizen engagement through Smart Applications, such as information kiosks, adaptive street lighting and smart transportation.

**RESILIENCE**

*(Adapted from The Resilience Dividend: Rodin, 2015)*

<table>
<thead>
<tr>
<th>READINESS</th>
<th>RESPONSIVENESS</th>
<th>REVITALIZATION</th>
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<tbody>
<tr>
<td><strong>Analytics Role:</strong></td>
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</tr>
<tr>
<td>■ Monitor performance</td>
<td>■ Locate disruptions and failures</td>
<td>■ Preserve critical resources</td>
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<tr>
<td>■ Reveal system interconnections</td>
<td>■ Improve speed/quality of operational response</td>
<td>■ Inform infrastructure investments</td>
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<tr>
<td>■ Improve system efficiency</td>
<td>■ Improve community outreach</td>
<td>■ Reduce GHG emissions</td>
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<tr>
<td><strong>Community Solution Example:</strong> Water leak detection and demand projection</td>
<td><strong>Community Solution Example:</strong> Electrical outage identification and management</td>
<td><strong>Community Solution Example:</strong> Energy storage planning</td>
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**“OUR SOLUTIONS ARE AMPLIFYING EFFICIENT OPERATIONS, REGIONAL SUSTAINABILITY AND CITIZEN QUALITY OF LIFE IN SEVERAL CITIES NATIONWIDE.”**

—FRED ELLERMEIER, VICE PRESIDENT, SMART INTEGRATED INFRASTRUCTURE

**SMART ANALYTIC SOLUTIONS FOR THE FUTURE**

ASSET360<sup>™</sup> is the hub of a sustainable operational and planning process that power plants, utilities, and communities can integrate easily into their existing infrastructure. Contact us to develop an operating and planning platform that imparts superior decision-making insight. Visit bv.com/sii to learn more how ASSET360<sup>™</sup> provides comprehensive system awareness, boosts operational performance and sharpens planning insight. Follow us on Twitter @BVSII.
BUILDING A WORLD OF DIFFERENCE®

Black & Veatch is an employee-owned, global leader in building critical human infrastructure in Energy, Water, Telecommunications and Government Services. Since 1915, we have helped our clients improve the lives of people in over 100 countries through consulting, engineering, construction, operations and program management. Our revenues in 2014 were US $3 billion. Follow us on www.bv.com and in social media.

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