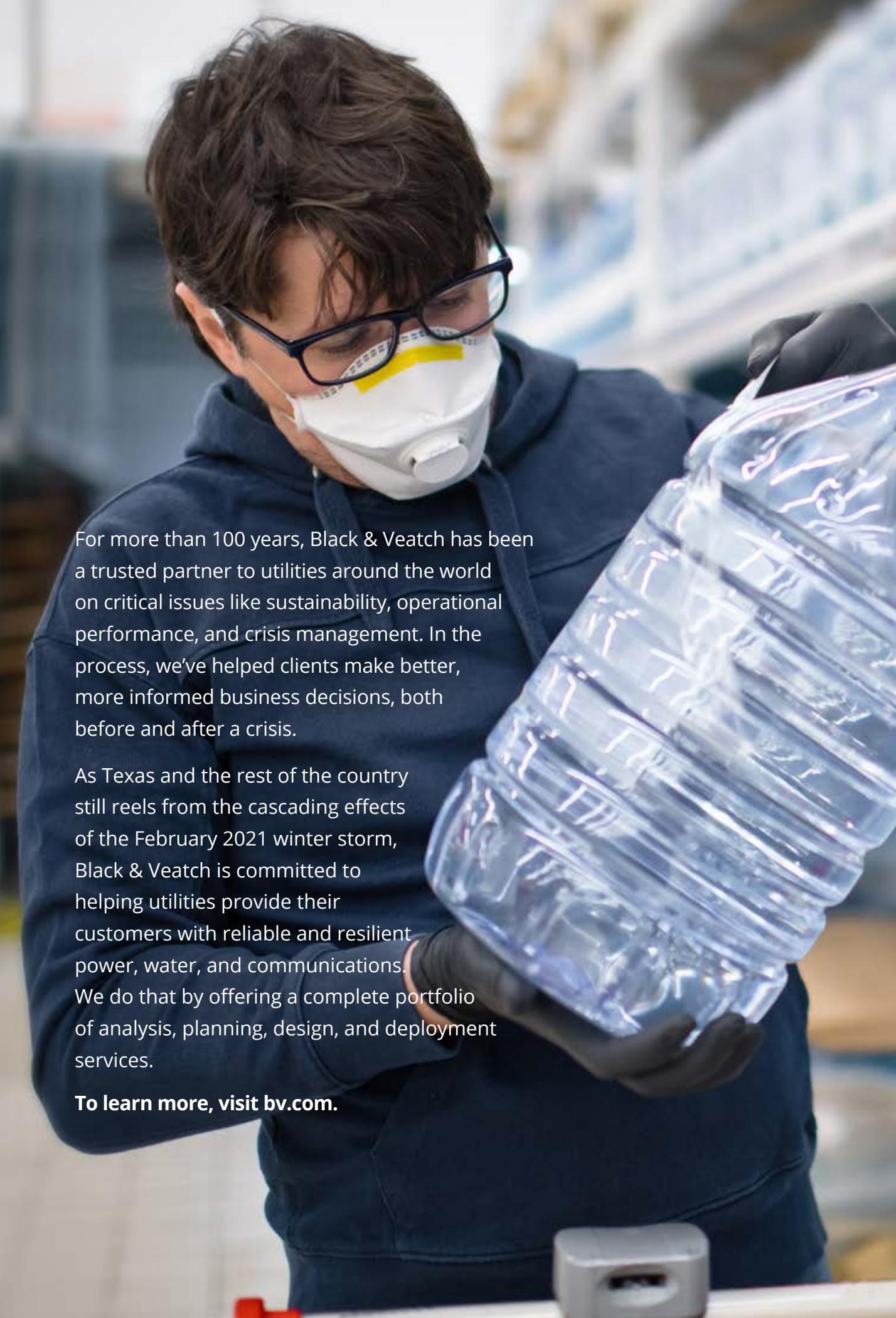




Helping The Lone Star State Rise Again



BLACK & VEATCH



For more than 100 years, Black & Veatch has been a trusted partner to utilities around the world on critical issues like sustainability, operational performance, and crisis management. In the process, we've helped clients make better, more informed business decisions, both before and after a crisis.

As Texas and the rest of the country still reels from the cascading effects of the February 2021 winter storm, Black & Veatch is committed to helping utilities provide their customers with reliable and resilient power, water, and communications. We do that by offering a complete portfolio of analysis, planning, design, and deployment services.

To learn more, visit [bv.com](https://www.bv.com).

Post Event Analysis

In the aftermath of an extreme weather event, independent analysis can help evaluate the utility's response. This 'scorecard' should:

- identify the various factors and sequence of events that affected system operations
- define operating parameters
- identify and evaluate failure causations
- evaluate alternative infrastructure and operating strategies
- provide an event summary and recommended improvements.

The Black & Veatch team can work with all critical stakeholders to establish baseline criteria, perform field and desktop studies (including hydraulic studies if required) to evaluate key interconnections for interim emergency operations.

System & Asset Risk Analysis

As climate change increases the likelihood of severe, historic weather events, utilities must proactively assess their vulnerabilities and take appropriate, aggressive steps to harden their assets and bolster reliability. Utility infrastructure will continue to be tested by extreme weather; objective evaluation, robust action, and long-term planning must become part of the operational mindset.

Black & Veatch can analyze power and water assets to determine which systems are most vulnerable during extreme weather events, and can adapt one-dimensional risk scenarios to account for multi-dimensional risks to co-dependent infrastructure...risks that carry low probability but high impact. In the process, we help asset owners and operators identify modifications and upgrades that can help improve the asset's ability to withstand extreme weather events. This analysis can also determine whether or not the asset's design meets resiliency needs.

Market Structure and Analysis

Black & Veatch can provide the knowledge and insights into the policy, finance, and ESG impacts of the new Texas landscape. We can examine how shifts in market structures or financial instruments will recast asset value, dispatch capability, and other critical factors that can help craft a regulatory scheme that works for all Texans.

As Texas works to restructure its electricity market, Black & Veatch can help you with:

Capacity Market Studies. The Texas grid will change. State government and regulators likely will demand more control over capacity expansion considering a range of capacity markets from centralized planning (like California) to competitive markets (like PJM/MISO).

Integration of ERCOT into WECC and EI. The federal government and regulators likely will demand stronger interconnections between ERCOT and other grids and, as a result, more control over the ERCOT market.

Disputes/Investigations/Defense of Commercial Situations. Bankruptcies are already underway, and more will almost certainly be filed. Small municipalities and other load-serving entities will seek refunds of extreme prices paid, and will need support with respect to market prices, plant failures vs. active withholding, and more.

Power Procurement. If and to the extent the state gains control over procurement, it will need assistance in leading and oversight of capacity procurement, much like California did after the 2001 energy crisis.

Resilience Planning & Implementation

Winterization. The recent weather event affecting Texas consumers has highlighted the need for utilities to fully assess their facilities and assets, and to identify critical upgrades that can improve reliability during weather events and other natural disasters.

By analyzing all aspects of the operation, including process, mechanical, electrical, instrumentation, security, and maintenance, we can prioritize the risks most applicable to your facility, identify areas most prone to failure, and develop solutions that mitigate or eliminate the exposure.

Power Redundancy Evaluation and Recommendations. Distributed energy resources can be a sustainable, resilient, and cost-competitive component of a well-prepared grid...but achieving these benefits requires a complex plan. From strategic planning and market development to consulting, engineering, procurement, and construction, our team can help facilitate the most effective implementation of distributed energy resources.

Alternative distributed energy resource source evaluations. As the Texas event proved, balancing traditional baseload assets and intermittent renewable energy sources is essential for resilient grid operation. Black & Veatch can help determine if microgrids, distributed solar, battery storage, electric charging programs, or other added generation can be integrated into critical human infrastructure for water, telecommunications, GOCs, and commercial centers, reducing the system's vulnerability to extreme weather events.

Conceptual Project Design Development. In addition to identifying asset-specific resiliency items, thorough evaluation may determine a need for additional Mw of power. Black & Veatch can develop conceptual project designs in natural gas, solar, wind, and battery storage; these designs can include project layouts, schedules, cost estimates, and overall constructability and integration of the proposed system into the current owner portfolio.

Data Analytics and Modeling

Black & Veatch's M&D service can deploy Asset 360, our data analytics software, to provide early warning of potential issues...including those associated with extreme weather conditions... before they become costly problems. Deployment typically takes about eight weeks, requires very little personnel involvement, and covers all major equipment. Existing data collected by the plant system is leveraged by the M&D software for root cause and failure mode analysis during previous extreme events. Case studies involving freezing conditions and other unplanned events can also be provided.

In addition to advanced data analytics, Black & Veatch can offer power and water companies a 'digital twin'...a powerful digital representation of physical assets that can provide historical, current, and predictive analysis in near real-time. Using both information technology and operations technology, the twin is in constant communication with its physical counterpart, allowing operators to simulate a wide range of weather and other scenarios to help guide determining real-world decisions.

Using multiple internal and external data sources, in combination with predictive analytical techniques, digital twins offer utilities the ability to accurately model the effects of extreme weather across the asset base, and allow for the virtual testing of various steps to mitigate the effects of extreme weather. The result is detailed, data-driven asset planning that not only helps power and water companies prepare their asset base in advance of weather events, but also helps utility personnel better handle these events as they occur.

