

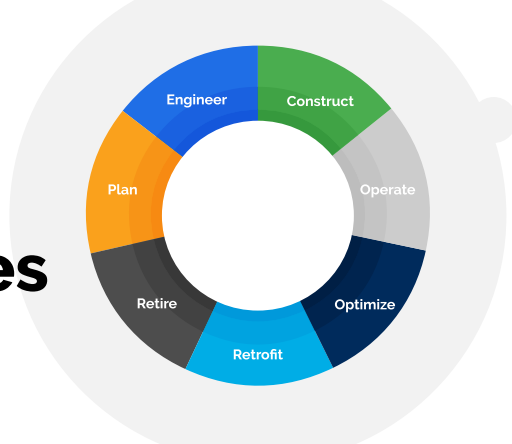


Renewables + Storage

Plan | Optimize | Integrate | Deploy

Project Lifecycle Services

Addressing your critical energy storage needs








Comprehensive Services

Black & Veatch offers a comprehensive set of services that span the life of an energy storage project. From development to construction, our service offerings encompass the wide array of emerging energy storage solutions, including hybrid concepts for renewable generation with storage.

With advanced engineering experience and deep knowledge of diverse power generation and distribution systems, our experts can confidently answer important questions about viability, optimal technologies, safety, maintenance, profitability and more.

Solar + Storage Services by Lifecycle Phase

 Planning	<ul style="list-style-type: none"> Renewable Generation Feasibility Decommissioning/ Repowering Studies 	<ul style="list-style-type: none"> Black-start, peak-shaving energy storage Long Duration Energy Storage
 Development	<ul style="list-style-type: none"> Site Feasibility Interconnection engineering Technology evaluation, conceptual design, optimization 	<ul style="list-style-type: none"> Cost Estimating Permits Support Solar Performance
 Construction	<ul style="list-style-type: none"> EPC, EpC (owner furnished equipment) Construction Only, Construction Monitoring 	<ul style="list-style-type: none"> Balance of System design engineering Commissioning/Testing/Completion Witness
 Financing	<ul style="list-style-type: none"> Solar Performance Modeling Design, Technology, Construction Validation 	<ul style="list-style-type: none"> Contracts Review Operational Reassessments
 Owners Engineer	<ul style="list-style-type: none"> Conceptual Design and Specification to Support Procurement Procurement Services Operation, monitoring, maintenance, optimization, retrofit, repowering, end-of-life retirement 	<ul style="list-style-type: none"> Detailed Design Reference Energy Storage Plants (pilots) Black-start Solutions

Representative Energy Storage Service Projects

Project Size	Application	Project Type
30 MW with 2-4 hours duration (60-120 MWh)	Battery only / Solar with battery	Reference design, layouts, cost estimates
10-100 MW, 4 hour duration (40-400 MWh)	Land use assessment for gas turbine vs solar PV with storage	Feasibility, cost estimate, option benefits
20 MW storage on 600 MW grid	Battery / Flywheel Storage for renewables integration	Engineering, power flow analysis, optimization
10-50 MW, half hour (5-25 MWh)	N-1 contingency reserve, with frequency regulation	Feasibility, site selection, layout, cost estimates
100-1000 MWh of storage	Renewable energy for energy storage in hydrogen	Integrated resource plan for gas utilities



Engineering, Procurement, Construction

Implementing Your Solar + Storage Projects

Fully Integrated Battery Energy Storage Solution (BESS)

Black & Veatch offers a customizable, turn-key battery solution to satisfy quality, safety and functional requirements. With extensive containerization design experience, established relationships with equipment suppliers and flexible Balance of Plant (BOP) capabilities, our integrated solution provides a simplified approach to your energy storage projects.

Black & Veatch: EPC provider for the PacifiCorp Panguitch Photovoltaic Solar and Storage Project in Utah. An example of our hybrid solutions. The project included an integrated battery energy storage system. The project provides a sustainable, resilient approach to powering remote communities.

In alignment with Black & Veatch’s focus on safety, battery systems are designed with multi-layered enhancements including use of modules less likely to heat, integrated air conditioning, early gas release detection and fire prevention, detection and suppression systems.

Deployment

- EPC at utility scale and distributed scale
- Construction: open shop, union
- Turnkey or owner furnished equipment
- Monitoring, operations and maintenance

Representative Energy Storage Deployment Projects

Project Size	Application	Project Type
1 MW, 5 hour duration (5 MWh)	Battery Storage with Solar non-wires alternative	EPC
2 MW/10 MWh, 159 kW/630 kWh, 400 kW/1,600 kWh	Battery Storage for Grid Services	EPC
49 MW, half-hour duration (24.5 MWh)	Battery Storage with Diesel Generators	Detailed Design
>500 MW of >100 individual projects	Behind the meter peak shaving	EpCM
250 kW microgrid (different battery types)	Lithium-ion, zinc based batteries for resiliency evaluation	EPC

Safety differentiators

Black & Veatch offers a comprehensive set of measures that improve the safety of an energy storage project. Below are the tailored safety elements of your battery storage system from Black & Veatch.

Layered Protection

Four points of optimal fire protection mean peace of mind for you and safe operation of your battery energy storage solution.

