



# Hydropower & Hydraulic Structures

We help you to get the best project for your infrastructure investment.



**BLACK & VEATCH**

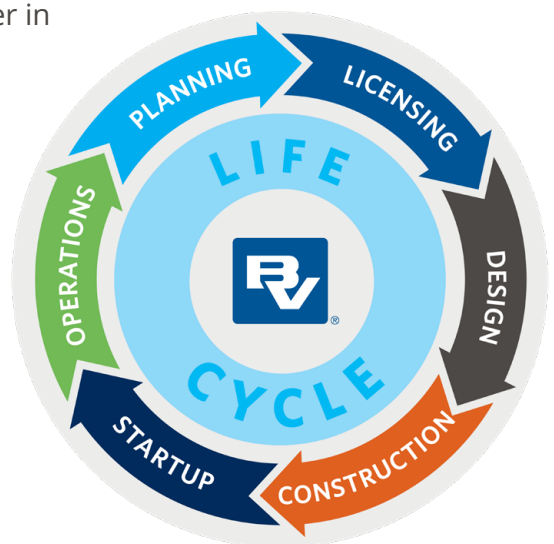


Fueled by our dual expertise in both water and energy, we've produced results on more than 500 projects and 64,000 megawatts in hydropower design.

## Single-Source Hydropower Services Aligned Across Project Life Cycle

Black & Veatch is a uniquely qualified, global leader in power, water and renewable energy solutions. Clients worldwide have looked to us for hydropower solutions for more than a century. We offer a comprehensive suite of hydropower and hydraulic structures services aligned with the life cycle of your project. These single-source solutions allow you to focus on your enterprise while we handle and solve complex hydropower infrastructure issues.

Our team genuinely cares about you, and we strive to help you maximize your hydropower investment and its role in your renewable energy portfolio. Our focus on caring and understanding, combined with our services and capabilities, enable a streamlined path to project success.



***It's life cycle hydropower solutions – made easy.***



# Hydropower Service Areas

- Feasibility studies
- Facility assessments
- Due diligence support
- Environmental studies
- Engineering services: rehab and new hydro
- Hydrology and hydraulic structures
- Generator fitness-for-service and uprate studies
- Planning, design and construction
- Construction management
- Startup and commissioning
- Operations & maintenance
- SCADA, automation and controls



**Tiger Creek Low Level Outlet Inspection**  
*Amador County, CA*



**Merwin Fish Passage, Ariel, WA**



**Twin Falls Hydropower Redevelopment**  
*Iron Mountain, MI*

## BV Illuminates the Path to Project Success

At Black & Veatch, the path to success in hydropower & hydraulic structures projects is a combination of our industry expertise and a culture of caring. We:

- Bring industry leadership along with robust project management skills.
- Possess full hydropower project life cycle capabilities and services.
- Listen to our clients to truly understand.
- Share your goals and drivers.
- Deliver the best quality project for your infrastructure investment.



# Hydropower Capabilities

## Asset Management



Hydropower has a significant quantity of critical assets with long life cycles. Our team works to identify operational risks through equipment condition and consequence assessments, and then develops short- and long-term risk mitigation strategies, including operational adjustments and capital improvement plans.

## Hydropower Plant Engineering



This team supports conventional hydroelectric projects that are typically greater than 5 MW in installed capacity and is also responsible for rehabilitation and modernization of hydroelectric generating units and associated balance-of-plant auxiliary equipment.

## Hydraulic Structures



We assist clients with operational reliability to keep systems operating harmoniously. These services include engineering of spillways, intakes, outlet works, flumes, canals and sluiceways.

## Pumped Storage and Large Pumping Plants



We support any project where pump turbines or large pumps are involved. We have provided global pumped storage-related hydroelectric services for more than 25 years and bring a deep understanding of all aspects of pumped storage plants.

## Small Hydropower Plant Engineering



Our team is focused on technology of hydroelectric turbines installed in parallel to pressure-reducing stations and microturbines installed at plant discharge points. We have also implemented small hydro projects on existing dams to qualify projects as renewable energy sources.

## SCADA and Controls Upgrade Engineering



With many existing plant systems decades old, resulting in inefficient plant operation, our core group of electrical and control engineers provide value-added solutions for clients in support of the continuing trend to upgrade electrical, control and SCADA systems.



*Operating in concert with existing Lower Baker facilities, the 30 MW Lower Baker Unit 4 Powerhouse allows Puget Sound Energy to closely regulate and maintain river flows.*

# Hydropower Capabilities (cont.)

## Fisheries Engineering



With clients facing requirements to improve anadromous fish passage, Black & Veatch has provided a variety of solutions including screening, fish ladders and floating surface collectors. We team with firms specializing in biologic and hydraulic issues related fish passage.

## Large Valves



We provide technical design support, manufacturer interface and industry knowledge to our clients with regard to large valves used in the hydropower industry.

## Licensing & Permitting



Black & Veatch helps clients navigate through the daunting FERC relicensing process which can include state environmental and regulatory agencies with impositions of new obligations on projects to meet current standards.

## Hydrology and Hydraulics



Centralizing our knowledge and resources available throughout our business, we perform hydrology studies and develop and study the hydraulics for hydropower and hydraulic structures facilities.

## Gates and Penstocks



Through this community of practice, our team brings focused expertise on these critical project components. In addition to aging, gates and penstocks also often experience corrosion and other mechanical stresses that can impact operations under challenging conditions.

## Hydro Generators



Our staff brings decades of expertise in the fundamental design and care of hydroelectric generators. We execute sound assessments and analyses to deliver clear, focused and actionable results to restore reliable, efficient operation for generation equipment.

## Startup and Commissioning



This group is focused on managing the critical startup and commissioning of hydropower facilities and large pumping plants.

# Hydropower Experience Highlights

Client	Project	Size MW	Type	State	Year Complete	Role
HYDROPOWER EXPERIENCE						
Rancho California Water District	WR-34 Hydroelectric Project	0.3	Conduit	CA	Ongoing	
Absaroka Energy LLC	Gordon Butte	400	Pumped Storage	MT	2018	
WE Energies	Twin Falls	9	Run of River	WI	2017	
Tarrant Regional Water District	Arlington Outlet Hydroelectric Project	1.3	Conduit	TX	2015	
HYDROPOWER REHABILITATION EXPERIENCE						
Wisconsin Public Service	Grandfather Falls	17.2	Elec. Rehab	WI	2020	
Wisconsin Public Service	High Falls	7	Elec. Rehab	WI	2020	
WE Energies	Michigamme Falls	9.6	Elec. Rehab	MI	2020	
Pacific Gas & Electric	Oil Spill Prevention Program	n/a	Elec./Mech. Rehab	CA	DS 2018 DD & CPS Ongoing	
Tennessee Valley Authority	Cherokee Hydro Plant	122	Elec./Mech. Rehab	TN	DS 2018 DD & CPS Ongoing	
Tennessee Valley Authority	Watauga Hydro Plant	63	Rehab	TN	Design 2018 CPS Ongoing	
Tennessee Valley Authority	Pickwick Hydro Plant	40	Elec./Mech. Rehab	TN	DS 2018 DD & CPS Ongoing	
PUMPED STORAGE AND LARGE PUMPING PLANTS EXPERIENCE						
Absaroka Energy	Gordon Butte Pumped Storage Project	400	Engineering and Design	MT	2018 - Ongoing	
San Diego County Water Authority	San Vicente Energy Storage	500	Owner's Rep	CA	Ongoing	
AES Corporation	Review of Pu'u Opae Pumped Storage	25	Due Diligence	HI	2020	
Pacific Gas & Electric	Helms PS Powerhouse Outage Scheduler Support	1200	System Support	CA	2020	
Pacific Gas & Electric	Helms PS Powerhouse Sump Controls Upgrades	1200	System Support	CA	2020	
Pacific Gas & Electric	Helms PS Powerhouse AC and DC Protection Upgrades	1200	System Support	CA	2020	
Pacific Gas & Electric	Helms Pumped Storage Powerhouse TSV Seals Modification	1200	System Support	CA	2018	
Los Angeles Department of Water and Power	Boulder Canyon Pumped Storage Concept	400-2000	Study/Due Diligence	CA	2017	
SMALL HYDROPOWER EXPERIENCE						
WE Energies	Kingsford Falls Electrical Rehabilitation	7.2	Electrical Upgrades	MI	Ongoing	
WE Energies	Brule Electrical Rehabilitation	3	Electrical Upgrades	WI	2019	

ROLE LEGEND			
Conceptual Design	Construction Support	Due Diligence	Project Mgmt
Construction Management	Design Support	Feasibility Study	
Construction Phase Support	Detailed Design	Preliminary Design	





**Stanislaus Power Tunnel Fish Screen**  
*Tuolumne County, CA*



**Cowlitz Falls North Shore Collector**  
*Morton, WA*



**PG&E Pit 6 Stilling Basin Repair**  
*Shasta County, CA*

# Black & Veatch Overview

Black & Veatch is an employee-owned engineering, procurement, consulting and construction company with a more than 100-year legacy of innovation in sustainable infrastructure. Our 10,000-plus global professionals are committed to solving humanity's critical infrastructure challenges, while also considering the impact on the people, places and resources where we live and work.

Our more than 100 global offices are strategically located to provide clients with localized solutions.

We have completed projects in more than 100 countries on six continents.

Our portfolio spans power, water and telecommunications – all necessary to support commercial and industrial operations, data centers, mining, government and utilities.

Our Core Value of Safety ensures clients, their employees and Black & Veatch professionals return home safely from work each day; they are unharmed and ready for tomorrow. Planning for safety early in the process heightens hazard awareness and gives us the opportunity to develop mitigation strategies.



# Hydropower

For more information,  
visit [bv.com/hydro](https://bv.com/hydro)

