



208 – Hydropower Generation

2023 Product List and Program Information

INTRODUCTION

The Hydropower Generation program focuses on research for conventional and pumped storage hydropower assets, through performance optimization and technology development. The program performs research on the impacts of operational flexibility in hydropower assets and the hidden economic value that hydropower may provide to markets. The program also provides tools to assist asset owners with their current maintenance and modernization plans.

The Hydropower program conducts research activities in four areas: operational flexibility, condition-based maintenance, hydropower operations valuation, and environmental analysis.

The Hydropower Generation program supports methods and technologies for the economic, reliable operation of hydro assets in an environmentally sustainable manner, while advancing innovative renewable energy technologies. The results of this program are intended to prepare owners and operators to identify possible new failure modes and equip them with useful tools to optimize day-to-day operations.

PUBLISHED PRODUCTS

Economics and Valuing Hydropower

PRODUCT NUMBER	TITLE
3002006369	Engineering and Economic Evaluation of Conduit Hydropower Technologies
3002006158	Evaluating the Effects of Uncertainty in Unit Characteristics on the Operation and Optimization of Hydro Plants with Francis, Diagonal Flow, Fixed Propeller, and Kaplan Units
3002003700	Evaluating the Effects of Uncertainty in Unit Characteristics on the Operation and Optimization of Multiunit Hydro Plants
1004429	Flow Measurement at Hydro Facilities: Achieving Efficiency, Compliance, and Optimal Operation
TR-111707	Mechanisms for Evaluating the Role of Hydroelectric Generation in Ancillary Service Markets

Environmental Aspects of Hydropower

PRODUCT NUMBER	TITLE
3002003911	Evaluation of Survival and Behavior of Fish Exposed to an Axial-Flow Hydrokinetic Turbine
3002003711	Industry Experience with Power Generation Options for Environmental Flows
3002003709	Federal Energy Regulatory Commission Record Research Tool: Version 1.0 - Effects of Flow and Water Level Fluctuations on Environmental Resources

Environmental Aspects of Hydropower *(continued)*

PRODUCT NUMBER	TITLE
3002001583	Hydroacoustic Technologies for Environmental Assessment at Hydro Projects
3002001564	Assessment of Aerating Hydroelectric Turbine Developments and Related Research Needs
3002001515	Fish Protection at Pumped Storage Facilities
1024684	2010 Tests Examining Survival of Fish Struck By Turbine Blades
1014937	Turbine Blade Shape Favorable for Fish Survival
1005392	Upstream and Downstream Fish Passage and Protection Technologies for Hydroelectric Application: A Fish Passage and Protection Manual

Impact of Flexible Operation in Hydropower Assets

PRODUCT NUMBER	TITLE
3002020101	Flexible Operation of Hydropower Assets: An Analytical Look into the Runner
3002015938	The Impacts of Flexible Operation on Hydropower Assets: Generator: An Analytical Look into the Pole to Rim Anchoring & Pole to Pole Connector Assembly
3002015423	Guideline for Preparing Flexible Turbine Procurement Specifications
3002015422	Implications of Flexible Operations on Runner Procurement: Case Study
1006277	Implications of Energy and Ancillary Service Market Structure for Hydroelectric Generation: A Survey of U.S. International Organization for Standardizations

Managing Aging Infrastructure and Equipment

PRODUCT NUMBER	TITLE
3002021540	Best Practices for Hydro Generator Rewinds
3002023041	Dam and Spillway Monitoring Technologies
3002014447	Continuous Online Monitoring (COLM): Generator
3002015305	Data-Based Hydro Asset Management
3002014639	Hydro Generator Field Pole Attachment Cracking: In-Situ Nondestructive Examination
3002011682	Autonomous Underwater Vehicles for Tunnel and Penstock Inspection: Applications from Other Industries
3002010393	Advanced Inspection Technology for Penstocks
3002007908	Conduct of Operations and Maintenance for Hydroelectric Facilities
3002006160	EPRI Preventive Maintenance Basis Database (PMBD) Application in Hydro Generation
1016148	Instrument Development for Continuous Flux Monitoring in Hydrogenerators
1011282	Field Testing of Continuous Flux Monitoring for Hydrogenerators: Feasibility Study
1009015	Hydrogenerator Stator Winding Evaluation
1008019	HydroTrac: Continuous Partial Discharge Monitor for Hydrogenerators
TR-114245	Advanced Condition Monitoring of Hydrogenerators Knowledge Base

New Development/Technologies and Pumped Storage Hydro

PRODUCT NUMBER	TITLE
3002024788	Additive Manufacturing in Hydropower: A Technological Overview and Opportunity Identification
3002023316	Hydropower Digital Twin Roadmap Development
3002017987	Program on Technology Innovation: Closed-Loop Pumped Storage Hydropower Motivations and Considerations
3002015428	Pumped Storage Hydro Operations and Benefits in the United States: Review and Case-Studies
3002015414	Pumped Storage Hydro in Resource Planning in the United States: A Survey of Recent Results and Methods
3002012935	Powering Non-Powered Dams: Hydropower Scouting
3002003689	Water Power Technology Guide
1015600	Advanced Hydropower Turbine System Design for Field Testing

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