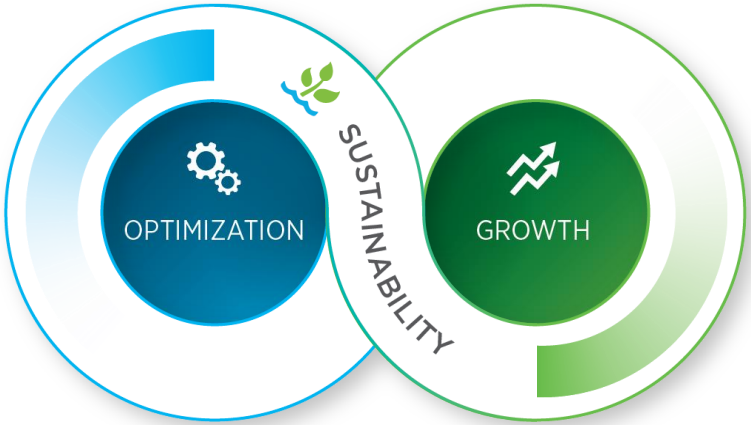
Hydropower Program Peer Review
Optimization Track

U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

Optimization Track Projects

- Improve Technology Costs and Performance (5 projects)
- Develop Environmentally Sustainable Hydropower (2 projects)
- Optimize Regulatory Processes (2 projects)
- Enhance Revenue and Market Structures (3 projects)

Hydropower Program Strategic Priorities



Optimization

- Optimize technical, environmental, and water-use efficiency of existing fleet
- Collect and disseminate data on new and existing assets
- Facilitate interagency collaboration to increase regulatory process efficiency
- Identify revenue streams for ancillary services

Growth

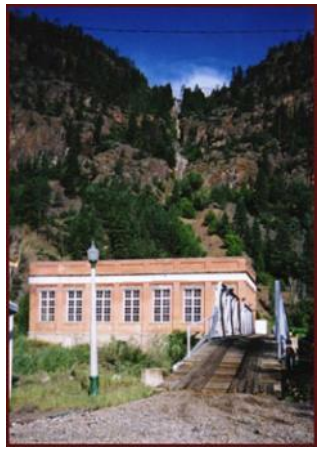
- Lower costs of hydropower components and civil works
- Increase power train efficiency for low-head, variable flow applications
- Facilitate mechanisms for testing and advancing new hydropower systems and components
- Reduce costs and deployment timelines of new PSH plants
- Prepare the incoming hydropower workforce

Sustainability

- Design new hydropower systems that minimize or avoid environmental impacts
- Support development of new fish passage technologies and approaches
- Develop technologies, tools, and strategies to evaluate and address environmental impacts
- Increase resilience to climate change

Recent Accomplishments:

- **March 2015:** Interagency **Hydropower MOU** with Dept. of Interior and Corps of Engineers was renewed for 5 years
- **April 2015:** DOE released the first-ever **Hydropower Market Report** to quantify the current size, scope, and variability of our nation's hydropower supplies
- **July 2016:** The Federal Energy Regulatory Commission and the Corps of Engineers, facilitated by DOE, sign **MOU to streamline hydropower project permitting**



Tacoma-Ames Project in Colorado, 2011 (upgraded from 8 to 12 MW)

Future Initiatives:

- Demonstrate use of **solid-state processes** to **enhance the performance and service life** of new and repaired hydropower components
- Publish and disseminate **Hydropower Asset Management State of the Art Report** to all U.S. hydropower asset owners
- Continuation of 3-year project to demonstrate the potential of **combining run-of-river hydropower plants with energy storage technologies** in order to participate in ancillary service markets
- Release two-year update of the **Hydropower Market Report**

Agenda - Wednesday, February 15

- Hydropower Manufacturing and Supply Chain Analysis - Jason Cotrell, NREL
- National Hydropower Asset Assessment Program (NHAAP) - Shih-Chieh Kao, ORNL

LUNCH

- U.S. Hydropower Market and Trends Report - Rocio Uria Martinez, ORNL
- Cost Data Collection and Modeling for Hydropower - Patrick O'Connor, ORNL
- Hydropower Asset Management Research - Brennan Smith, ORNL
- Low-Head, Short-Intake Flow Measurement Research - Marshall Richmond, PNNL
- Basin Scale Opportunity Assessment Initiative - Kyle Larson, PNNL

BREAK

- Hydropower Regulatory and Permitting Information Desktop (RAPID) Toolkit - Aaron Levine, NREL
- Facilitating Regulatory Process Improvements (Federal Interagency Collaborative) - Shelaine Curd, ORNL
- PSH Transient Simulation Modeling - Eduard Muljadi, NREL

Agenda - Thursday, February 16

- Iowa Hill Pumped-storage Project Investigations - David Hanson, Sacramento Municipal Utility District
- Integrated Hydropower and Storage Systems Operation for Enhanced Grid Services - Rob Hovsapian, INL