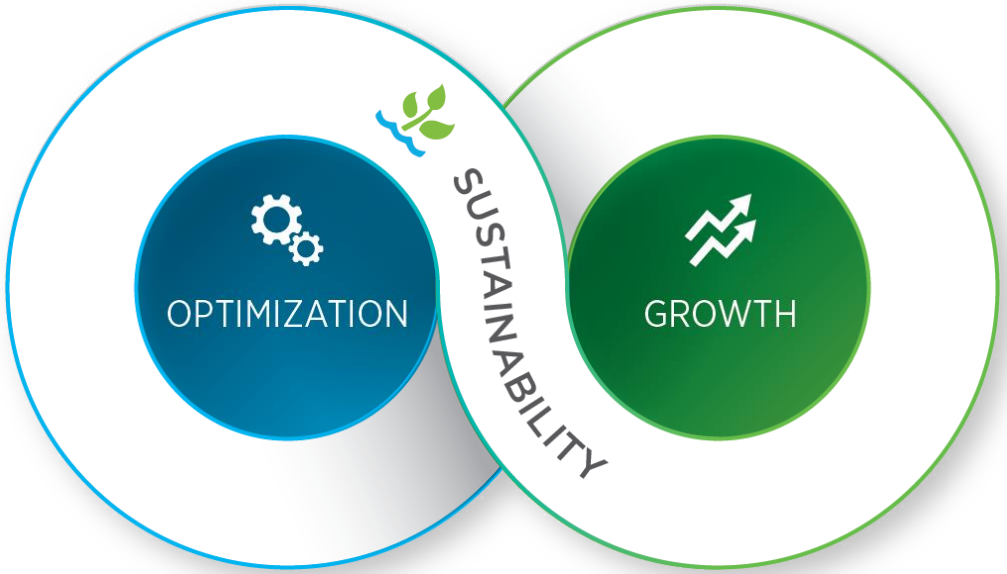
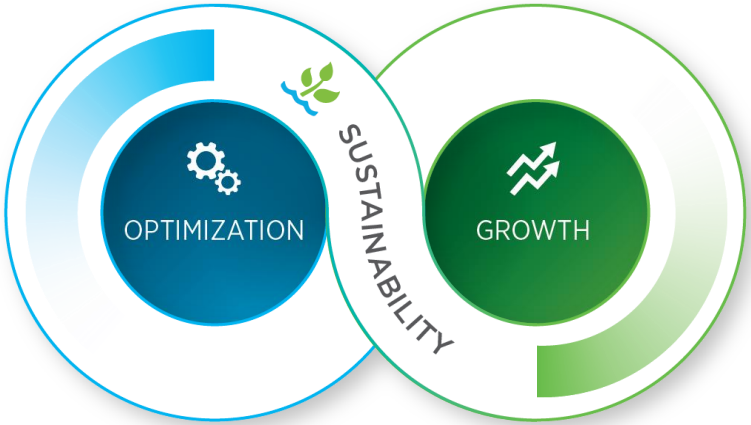
Hydropower Program Peer Review
Sustainability Track



Sustainability Track Projects

- Develop Environmentally Sustainable Hydropower (8 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

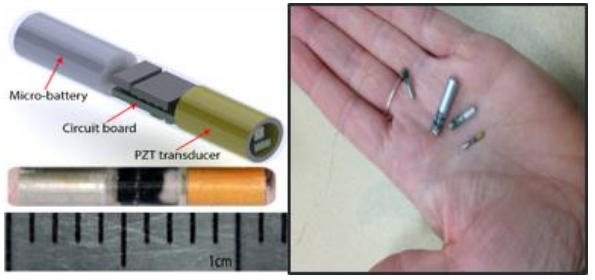
- Design new hydropower systems that minimize or avoid environmental impacts
- Support development of new fish passage technologies and approaches
- Develop technologies, tools, and strategies to evaluate and address environmental impacts
- Increase resilience to climate change

Recent Accomplishments:

- **January 2017:** Released the second SECURE Water Act **9505 Report to Congress** and Technical Assessment on the potential **effects of climate change on federal hydropower**
- **July 2016:** Publication on the usage and evaluation of the **Whooshh Fish Transport System** to transport adult fall Chinook salmon
- **September 2016:** Completed improvements to **multi-reservoir water quality models** for the **Columbia and Cumberland River Basins** to improve **dissolved oxygen**, **total dissolved gas**, and **temperature** while balancing energy constraints
- **October 2016:** Developed and patented a **miniaturized fish-tracking tag** for **sensitive species**

Future Initiatives:

- Continuation of a review and cataloguing of existing **scientific metrics** used for evaluating **ecological impacts of hydropower projects**
- Continuation of work with industry and fish biologists on new **Biological Design and Evaluation Tools** to improve **fish passage** for new and retrofitted **hydropower turbines**
- Design and patent a new **self-powered fish-tracking tag**



Monitoring Technology Development for Sensitive Species (Eel/Lamprey Tag Development)

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

Agenda:

- Monitoring Technology Development for Sensitive Species (Juvenile Eel / Lamprey Tag Development) - Daniel Deng, PNNL
- Environmental Performance Analysis and Testing Campaign for New Technologies - Alison Colotelo, PNNL
- Environmental Metrics for Hydropower - Shelaine Curd, ORNL
- Water Quality Modeling Improvements in the Columbia and Cumberland River Basins - Boualem Hadjerioua, ORNL

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- Biologically-Based Design and Evaluation of Hydro-Turbines (BioDE) - Gary Johnson, PNNL
- Report to Congress-Potential Climate Change Impacts on Federal Hydropower - Shih-Chieh Kao, ORNL
- CERC-WET Topic 3: Improving Sustainable Hydropower Design and Operations - Soroosh Sorooshian, University of California, Irvine
- Informing Hydropower Investment and Operational Decisions Under Changing Hydrologic Conditions - Mark Wigmosta, PNNL

Hydropower Program Peer Review
Sustainability Track - Timeline

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