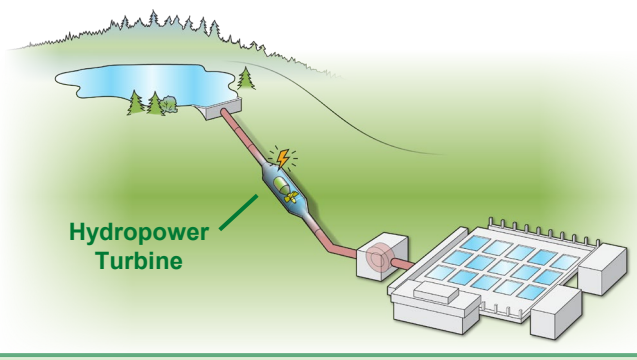


Broad, High-Impact Benefits

- Energy resilience from local generation
- Economic development from investment in infrastructure
- Decarbonization of the energy sector by increased hydropower generation

Specific, Additional Benefits

- Additional benefits can be enhanced specifically through the implementation of hydropower (**bolded**)

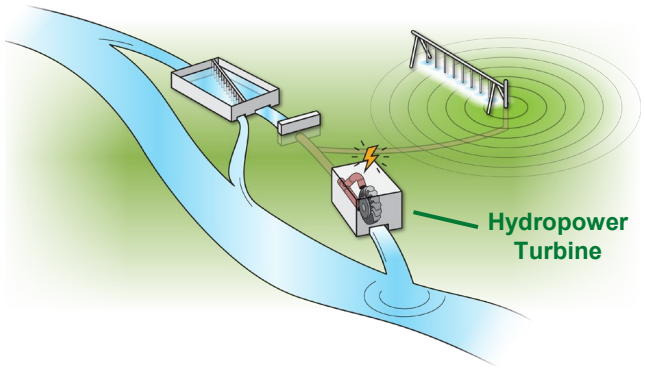
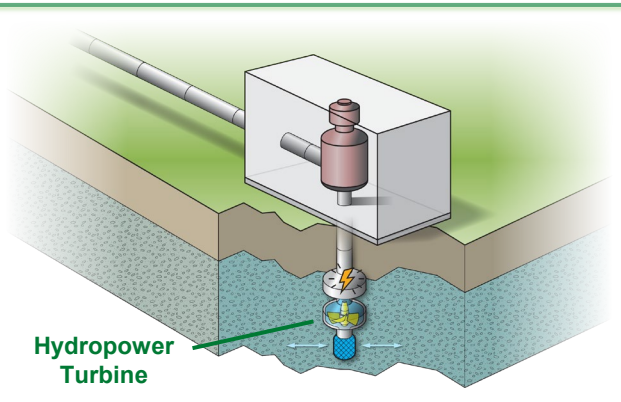


Water Supply and Treatment

- **Improved facility operation and maintenance through pressure optimization**
- Economic development from increased revenues

Source Water Recharge

- **Increased revenue from timing of pumping/generation**
- Protection of future water supplies
- Protection of groundwater-fed ecosystems
- Revitalization of rural communities
- Economic development by sustaining groundwater-dependent industries

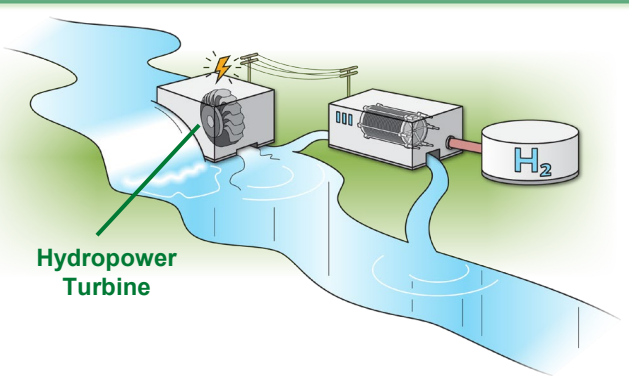
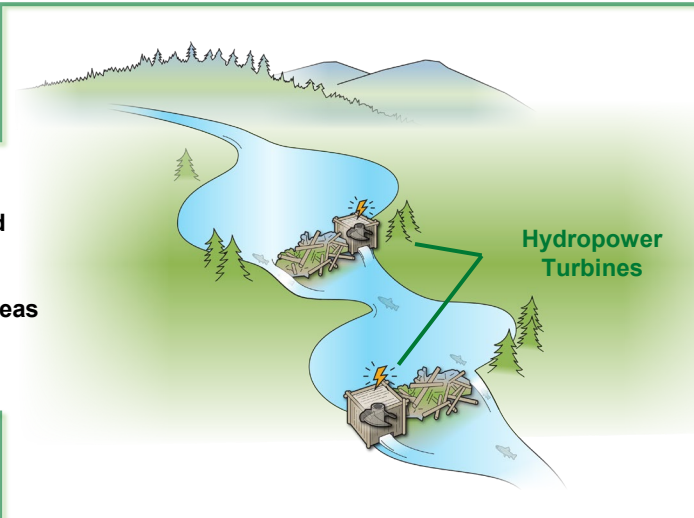


Irrigation Modernization

- **Electrification of farming equipment**
- Erosion control from water speed reduction
- Environmental protection via leaving more water in-stream
- **Economic development in remote and underserved areas**
- Improved sensing and control of system
- Increased agricultural productivity

Environmental Restoration and Cleanup

- **Environmental restoration from hydropower's effects of reduced flow velocity, increased wetlands, and reconnected floodplains**
- Improved river water quality management
- **Increased economic development in remote and underserved areas**
- Invasive species removal
- Contaminant or mineral extraction



Deferrable Loads

- **Energy decarbonization and resilience through grid balancing (e.g., hydrogen production)**
- Improved water quality and availability
- Contaminant or mineral extraction
- Economic development from increased revenues



Alternative Opportunities for Hydropower

Beyond bulk electricity sales, non-energy drivers create alternative opportunities for hydropower to enable a wide range of environmental, societal, and energy benefits. Through stakeholder outreach and research over the course of Alternative Opportunities for Hydropower project, five core/primary alternative opportunities were identified—(1) water supply and treatment, (2) source water recharge, (3) irrigation modernization, (4) environmental restoration and cleanup, and (5) deferrable loads. Within these alternative opportunities, hydropower can take advantage of its intrinsic connection to water, groundwater, water infrastructure, and aquatic habitat to enable a unique value proposition, often increasing revenues to the owner, increasing the resiliency of the opportunity, reducing operation and maintenance costs, and improving ecosystem outcomes.

Unlocking Benefits by Novel Implementations

In an evolving electricity grid, hydropower can be a key source to provide clean, affordable, firm, flexible, and renewable, in situ power. Within the engineered water infrastructure, depending on topographic and hydrogeologic conditions, harvestable hydrokinetic energy may be readily available. Within the natural riverine system, hydropower devices also have the potential to modulate water flow rates by extracting hydrokinetic energy to provide ecological benefits.

In the first four opportunities, implementing hydroelectric power generation is relatively straightforward because each depends on moving water. Deferrable loads can be served by excess hydropower to provide services that are not time critical. Hydropower implementation in each of these settings can provide benefits in addition to the primary objective of a project. With these novel implementations, hydropower can contribute to decarbonization of energy production. Some of these implementations can be in remote, rural, or underserved areas where access to the electricity grid may be difficult.

For More Information, Contact:

Rajiv Prasad

Project Lead
Pacific Northwest National Laboratory
509-375-2096 | Rajiv.Prasad@pnnl.gov

Thomas Mosier

INL Lead
Idaho National Laboratory
971-219-4534 | Thomas.Mosier@inl.gov

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