



Lock No. 14 – Heidelberg Hydroelectric Project

Harnessing the Kentucky River: Turning Historic Infrastructure into Renewable Power

Project Overview

Client
Appalachian Hydro

For Appalachian Hydro Associates, the Kentucky River represents more than a historic waterway—it’s an opportunity to expand reliable, renewable energy generation using existing infrastructure.

Project Location
Heidelberg, KY

At Lock No. 14 near Heidelberg, Kentucky, that opportunity came with significant challenges. The abandoned lock chamber offered a promising location for hydropower development, but the site also had to withstand extreme river conditions, including flood events capable of overtopping the lock walls by more than 23 feet.

Timeframe
2018-Present

Appalachian Hydro partnered with Kleinschmidt to transform the century-old structure into a modern hydroelectric facility—one designed to maximize power production while minimizing construction impacts within the existing lock footprint.

Key Outcomes

- ✓ Approximately 30% greater projected power generation than the previous installation
- ✓ Minimal in-river construction impacts
- ✓ Reduced mechanical complexity and lower long-term maintenance requirements
- ✓ Lower capital costs through efficient use of existing infrastructure

Flood-Resilient Design

Designing for the Kentucky River’s extreme flood conditions was essential to protecting the facility and ensuring long-term operational reliability.

The powerhouse was engineered to withstand overtopping flood events exceeding 23 feet above the lock wall without adding structures that could raise upstream flood levels. By housing the entire facility within the existing lock chamber, Appalachian Hydro was able to maintain river hydraulics while minimizing environmental and construction impacts.

Simplified Operations & Maintenance

To improve long-term reliability, the project team prioritized a design that reduced mechanical complexity.

The final design incorporates a horizontal trashrack system that eliminates the need for mechanical raking equipment. A rubber dam maintains headpond elevation while also allowing debris to be flushed efficiently from the system.

By removing traditional headgates and trashraking systems, the design reduces maintenance requirements and operational risks while improving overall system reliability.

Reduced Construction Costs

Maximizing the use of the existing lock chamber allowed Appalachian Hydro to significantly reduce construction complexity.

By eliminating heavy mechanical systems, minimizing concrete quantities, and simplifying structural components, the streamlined design lowered overall construction costs while maintaining durability and long-term performance.

Value Provided

The Heidelberg Hydroelectric Project demonstrates how innovative engineering can unlock new value from existing infrastructure.

By repurposing the abandoned lock chamber, Appalachian Hydro was able to create a modern hydropower facility that delivers reliable renewable generation with significantly lower construction and operational complexity.

This project reflects Appalachian Hydro’s long-term vision for expanding sustainable energy along the Kentucky River while demonstrating how historic waterways can play a critical role in the transition to renewable power.

Bridging History and Innovation

Integrating a modern hydroelectric facility within a century-old lock structure required careful balance between innovation and preservation.

Working together, Appalachian Hydro and Kleinschmidt developed engineering solutions that respected the historic structure while enabling modern energy generation. The project demonstrates how aging river infrastructure can be repurposed to support today’s growing demand for renewable power.

By transforming an abandoned lock into a productive energy asset, the Heidelberg Hydroelectric Project sets an example for sustainable hydropower development along the Kentucky River and beyond.

