

BEREA COLLEGE

THE MATILDA HAMILTON FEE HYDROELECTRIC STATION

FACT SHEET

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WHAT

Berea College is the first higher education institution in the United States to complete construction of a hydroelectric generating plant. This small-scale demonstration project, which will produce about half of the electricity the College uses on an annual basis, shows that small projects for renewable energy production can be feasible and economically viable.

WHO

Berea College has partnered with Appalachian Hydro Associates (AHA) to build the project at Lock and Dam 12 on the Kentucky River near Ravenna, Kentucky. Lock and Dam 12 opened to navigation in 1910 and remained open to commercial traffic into the 1990s, when the Lock ceased operations.

Appalachian Hydro Associates (AHA) created a new hydroelectric plant model that makes development financially viable by solving a number of problems presented with conventional hydroelectric dams.

A project 10 years in the making, **the Ravenna hydroelectric plant is the result of a robust collaboration** that includes Appalachian Hydro Associates, the Kentucky River Authority, Jackson Energy Cooperative, Wright Concrete & Construction of Pikeville, Kleinschmidt Group, Xylem and Berea College.

Additional financial support for the project has been provided by Hardscuffle, Inc., of Louisville in the way of investment tax credit capital, **New Markets Tax Credits** financing provided by Community Ventures Corporation (Lexington), Midwest Renewable Capital and Community Impact Fund (Iowa) and US Bank, NA and Chase, and capital from the Appalachian Regional Commission.

HOW IT WORKS

By “shoe-horning” a hydro powerhouse into an abandoned navigational lock, AHA significantly lowered the project’s construction budget.

Submersible turbine generators developed by Xylem, a leading water technology provider, are not affected by the frequent flooding of the Kentucky River and offer reliable, efficient means for generating power. The Lock 12 powerhouse contains five submersible turbine generators each producing 528 kilowatts, for a total plant size of 2.64 Megawatts. The generators have an efficiency of 96.8 percent, giving the units an overall efficiency of 81.1%. The Flygt turbine generators are **designed to last 50 years, twice as long as solar and wind plants.**

The project is the first new hydroelectric plant in the United States to use **Variable Speed Technology**. Borrowed from wind power, variable speed drives allow the turbines to operate at maximum efficiency as the river levels change, which increases net energy output by up to 15 percent over conventional fixed speed turbines. The variable speed drives also correct the low generator power factors, eliminating the need for power factor correction capacitors. In addition, **variable speed drives allow the power plant to easily sync to rural power grids** with existing distribution lines, a significant cost saving.

Conventional steel coatings last only 15 years before rusting. Polyset, the same zinc silicate coating used on U.S. Navy aircraft carriers, prevents rust on the plant's turbine generators as the coating forms a chemical bond with the steel and creates **an impermeable glass-like surface**.

*FINANCIAL
ASPECTS*

By using federal and Kentucky New Markets tax credits and other resources, the investment of approximately \$11 million in **this local, green initiative will generate an attractive and stable rate of return to Berea College in support of its educational mission.**

*COMMUNITY
IMPACT*

Through this hydroelectric project, Berea College is upholding two of its eight Great Commitments. The 7th Commitment, to sustainable living, inspires the College **to demonstrate sustainable systems to the community, students and other investors.** The 8th Commitment to Appalachian communities and families is demonstrated through **the local and regional labor force employed in constructing this project.** The power generated will be sold primarily to Jackson Energy Cooperative at a discounted rate and will power 1,200 homes in the West Irvine area. The Estill County public schools will benefit from property taxes generated by the project. The project demonstrates that important steps can be taken to address **climate change**, even in the heart of coal country.