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Charlotte Business Journal - September 20, 2010
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CHARLOTTE BUSINESS JOURNAL

Friday, September 17, 2010 | Modified: Wednesday, September 22, 2010, 7 45am EDT

Duke Energy spending $15 million on its hydro plant upgrades

Charlotte Business Journal - by John Downey Senior Staff Writer

Duke Energy Carolinas has shut down two specialized hydro-power units to install new turbines that will increase their capacity to produce electricity.



photo JOHN DOWNEY

Reggie King, Duke's area supervisor for the region, descnbes how the turbines (the white discs on the plant below) will be replaced.

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The $15 million project at the Jocassee Pumped-Storage Station in the far northwest corner of South Carolina is the latest plant upgrade in a series that will see Duke increase capacity of its fleet by more than 300 megawatts by 2019 by improving efficiency.

The new Jocassee turbines will increase the capacity of each unit by 15% to 195 megawatts.

The pumped storage technology used at Jocassee is well-established, though used sparingly in the United States. There are only about three dozen plants in the country and Duke operates two of them — the 660-watt Jocassee plant and the nearby 1,065-megawatt Bad Creek Pumped Storage Station.

They use excess power produced by baseload plants when demand is relatively low — usually at night — to pump water through the turbines from one lake up to a higher one to store potential hydropower. During higher-demand times, the water is run back through the turbines to produce electricity.

For Jocassee, that involves pumping water from Lake Keowee, which is a regular hydropower station, up into the higher Lake Jocasseee.

Reggie King, Duke's area supervisor for the region, says the system helps balance electricity production without the expense of shutting down plants — and it provides electricity at peak times.

The new turbines, produced by the Voith division of Siemens Energy, are stainless steel rather than cast iron. And they have a fifth blade, which increases the efficiency both of pumping water into Lake Jocassee and of producing power when the water runs back to Keowee.

Each new turbine — 23 feet in diameter and weighing 150 tons each — costs about $6 million.

Jocassee generally produces power daily in the summer and winter, says Chad Luce, plant manager. It runs more occassionally in the spring and fall, when there is less peak-load demand.

Jocassee and Bad Creek were built to help Duke balance power production and load when Duke built its major nuclear plants. Those three plants are among Duke's biggest — each with a capacity exceeding 2,200 megawatts. And they essentially run all the time.

Jocassee was built in 1973, when the Oconee Nuclear Station started operating. Bad Creek started up in 1991, not long after the Catawba and McGuire nuclear stations started producing power.

King sees a good opportunity for more pump storage in Duke's future. Duke will add more than 2,050 megawatts worth of new plants in the next two years: the 825-megawatt expansion at Cliffside Steam Station in Rutherford County, the new combined-cycle gas plants at the Buck station in Rowan County and Dan River in Rockingham County.

But King says the real impetus could come with increased use of solar and wind power. Those sources run intermittently — when the sun shines and the wind blows — and not always when the power is needed. Pairing pump storage with those renewable resources — wind power, in particular — could help reduce the disadvantage of forms of energy in comparison to traditional power plants.

Starting in 2012, Duke has proposed a series of upgrades at its nuclear plants. Those proposals must be approved by federal regulators. But from 2012 until 2019, Duke could add as much as 205 megawatts of nuclear capacity at Oconee, McGuire and Catawba. The additional capacity from all the upgrades will total more than the three coal units Duke plans to retire in 2012 at its Dan River Steam Station.

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