Behind the scenes



FILE PHOTOS

The Bad Creek Hydro Station pumps water from Lake Jocassee to Bad Creek reservoir (below) when energy demand is low and releases it back down through tunnels during peak demand.

Bad Creek technical boss talks storing energy



BY STEPHANIE JADRNICEK
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SENECA — In a modern, industrialized country, electricity is often taken for granted. But there's a lot of behind-the-scenes work to make those lights turn on when the switch is flipped.

Duke Energy Bad Creek technical supervisor Eddie Duncan explained that process to a room full of curious minds at the Oconee Economic Alliance Business Forum at Thrift Development on Thursday morning. He specifically spoke about pump storage and how Duke Energy uses pump storage.

The powerhouse of Bad Creek Hydro Station sits about 600 feet under the ground, carved like a cave into the mountainside.

During the night, while most people are sleeping and energy demand is low, the hydro station pumps water from Lake Jocassee up to Bad Creek reservoir — approximately 1,200 feet uphill.

Then, when energy usage increases the next day, the water that's been stored in the upper reservoir is released into power tunnels, driving turbines in the powerhouse to produce electrici-

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ty. And the cycle repeats itself.

Duncan said in terms of power output, a new Chevrolet Super Sport Camaro has about 500 horsepower.

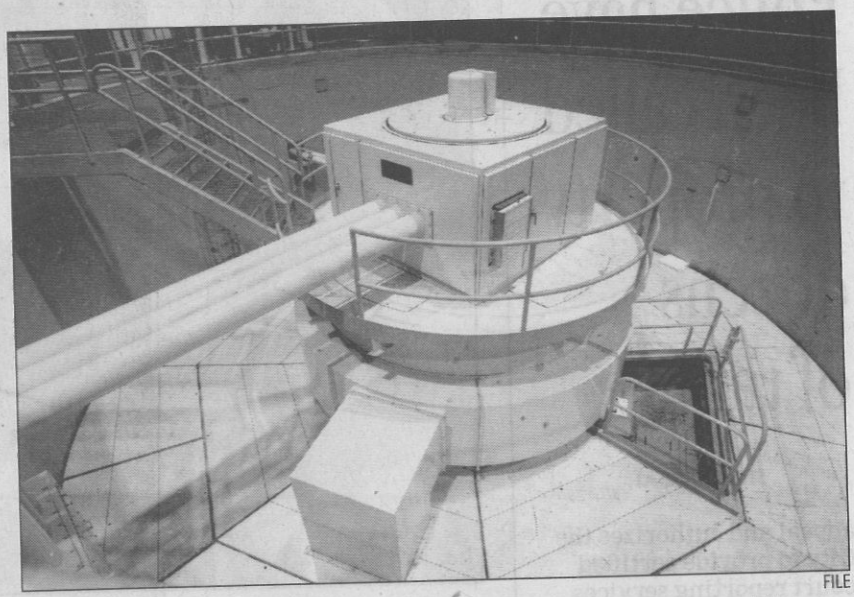
"A pump that's considered to be large is probably 800-1,000 horsepower," he said. "When we reverse our turbines at Bad Creek, the pumping power of our pumps is rated at 345,000 horsepower — which is equivalent to about 345 megawatts in generation."

Hydropower is electricity generated using the energy of moving water. One of the oldest, cleanest and most affordable forms of energy production, it provides about 10 percent of Duke Energy's power capacity in the Carolinas.

A pumped-storage hydroelectric plant works much like a conventional hydro station, except the water can be used again. The two-reservoir system at Bad Creek forces four turbines to spin at 300 revolutions per minute to create electricity. This storage-and-release design also helps Duke Energy add other renewables such as solar to the grid.

Duncan said there's been a lot of legislation passed, including tax credits for renewable energy sources such as solar and wind, which are necessary parts of a total generation mix. But the real challenge is how to store that power.

"When we look at solar and wind, the basic concept is that when renewable resource is available you have to use it or store it," he said. "So if the sun's shining brightly on your solar panel, either you have to use it or store it — otherwise, it's lost."



FILE

The unit at Bad Creek Pumped-Storage Hydroelectric Station contains a turbine that spins at 300 revolutions per minute to create electricity.

Bad Creek Hydro Station alone contains about 31,000 megawatt hours of storage. Duncan's last slide in his presentation showed a grid of boxes that represented lithium batteries, stretching 1.7 miles in one direction and 1.2 miles in the other.

"You'd have to have a thousand football fields, in terms of the footprint of the land, to place the batteries to get the same amount of storage that we have in Bad Creek," Duncan said.

He said pump storage is a truly renewable energy resource, even though Duke Energy uses more power to pump than it generates, because the water runs back and forth.

"If you don't get any rainfall at a regular hydro station, you run it through and it's gone," he said. "But in pump storage, we can keep running it back and forth, uphill and downhill, and we can do that indefinitely as long as we have that water available."

stephanie@upstatetoday.com | (864) 973-6686