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ENERGY: Hoover Dam could stop generating electricity as soon as 2013, officials fear

Dropping water levels imperil power flowing to Southern California

By ERIC WOLFF - ewolff@nctimes.com | Posted: Saturday, September 11, 2010 8:18 pm

After 75 years of steadily cranking out electricity for California, Arizona and Nevada, the mighty turbines of the Hoover Dam could cease turning as soon as 2013, if water levels in the lake that feeds the dam don't start to recover, say water and dam experts.

Under pressure from the region's growing population and years of drought, Lake Mead was down to 1,087 feet, a 54-year low, as of Wednesday.

If the lake loses 10 feet a year, as it has recently, it will soon reach 1,050 feet, the level below which the turbines can no longer run.

Those hydroelectric generators produce cheap electricity for the Metropolitan Water District of Southern California, which is responsible for pumping water across the Colorado River Aqueduct to hydrate much of Southern California.

Without that power, Metropolitan's costs to transport water will double or even triple, a district executive said.

That could result in a \$10 to \$20 a month increase in annual costs for residential customers, but could have greater impacts on business customers who use more water.

Federal and state water managers have been working to stave off that day, and two scientists from the Scripps Institution of Oceanography in La Jolla who study Lake Mead believe that managers will never allow levels to get below 1,050 feet.

But Pat Mulroy, who runs the Las Vegas Valley Water District and the Southern Nevada Water Authority, said she has to worry about the worst-case scenario.

One of two intake pipes that pump water to Las Vegas is at that same 1,050-foot level.

"We're teetering on the first shortage right now," Mulroy said. "How quickly Mead goes down depends on which hydrology you look at; the Bureau (of Reclamation, which runs the dam) bases it on probability. But the whole probability analysis, because of climate change, has been thrown out the window. We're experiencing anomaly after anomaly."

The decrease in water already experienced at Lake Mead has reduced output from the turbines from 130 megawatts of peak capacity to 100, according to Peter DiDonato, who runs the Hoover Dam's hydroelectric generators.

Each megawatt could power 650 homes.

Megawatts per foot

For every foot of elevation lost in Lake Mead ---- about 100,000 acre feet of water, or enough for 200,000 households ---- the dam produces 5.7 megawatts less power.

That's because at lower water pressure, air bubbles flow through with the water, causing the turbines to lose efficiency.

"It was designed as a high-elevation dam," DiDonato said.

The bureau is preparing for reduced elevations by testing a different type of turbine starting in 2012, one that can handle levels down to 1,000 feet, he said.

DiDonato is concerned about falling levels, but not too concerned. The government's 24-month forecast shows lake levels returning to 1,100 feet next year.

"The drought can't last forever," DiDonato said. "Eventually, the lake is going to fill up again. You have to hope it does."

Actually, the drought may not be a short-term emergency so much as a feature of a new, drier American West.

"To blame this on a drought that's going to be over next year or something, that's not correct," said Tim Barnett, a marine physicist at the Scripps Institution of Oceanography in La Jolla. "This looks like the first harbingers of man's impact on the climate."

Barnett and his Scripps colleague, climate researcher David Pierce, wrote several papers on the hydrology of Lake Mead.

In a 2009 paper in the Proceedings of the National Academy of Sciences, the pair calculated a 50 percent chance that by 2025, users would not receive their full request of water from the Colorado River.

That would create water problems for Arizona, Nevada, California and Mexico (which is at the end of the river), in addition to the lost megawatts from lower efficiency in the hydroelectric turbines.

Pierce recalculated their figures to determine the effects of increased demand from development and of climate change.

He determined that with no change in water management policy, there was a 20 percent chance that the turbines would have to shut off in 2025.

Wet century past

Also, natural cycles exacerbate the problem, Pierce and Barnett wrote.

The 20th century was the wettest in a millennium for the American West, based on research using tree rings.

If a reversion to historical water levels combines with climate change and continued increases in demand, there's a 20 percent chance that Lake Mead will fall below 1,050 feet next year, Pierce said in an interview.

But Pierce and Barnett don't think the government will allow that to happen.

Federal water managers can release more water from upriver Lake Powell, although no water was released this year.

And they can refuse to grant water requests in full, something that's never happened before, Pierce said.

Losing power from the Hoover Dam would raise expenses for Metropolitan and for Southern California Edison, both of which buy power for the dam at low rates. Edison has already begun preparations for lower power generation from the dam, which represents 0.3 percent of its portfolio, said Gil Alexander, a spokesman for the utility.

The dam supplies 60 percent of Metropolitan's power needs, said Brian Thomas, chief financial officer and assistant general manager of the agency.

Without power from the dam, Metropolitan would turn to the spot electricity market and pay double or triple the cost, depending on how much less power the dam is producing.

Government agencies aren't sitting around doing nothing.

When Lake Mead falls to 1,075 feet, an austerity plan kicks in that reduces water deliveries by 10 percent.

Metropolitan and the Southern Nevada Water Authority are storing excess water from other sources in Lake Mead, and the Mexican government is in negotiations to do the same thing.

Metropolitan initiated a new energy policy last month that includes more efficiency and construction of 10 megawatts of solar panels, to offset loss of power from the dam.

Still, Barnett and Pierce are worried.

"It would be very foolish to think this is a short-term aberration due to a drought of three, four, five or even 10 years," Barnett said. "It's a resource that's fully utilized. You can't get any more out of it. And nobody's talking about curtailing development."

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