

## Water Infrastructure Rethink: Approaching “Dead Pool,” “Toilet to Tap” to the “Great Wet Hope”.



Lake Mead Reservoir. Photo by Bridget Bennett/Reuters

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The Colorado River is the main water source for agriculture and urban life for all Western States. It is at historically low levels. This water reduction includes the snowpack feeding the River and its tributaries, the Colorado River’s two major reservoirs (the largest reservoirs in the US), Lake Mead and Lake Powell. Lake Mead supplies water for about 25 million people and farmland in Arizona, California, Nevada, and Mexico. Lake Powell provides water storage and electricity for about 3 million households in Arizona, Colorado, New Mexico, Utah and Wyoming and water to about 1.5 million households in Arizona, Nevada, and California. Lake Mead and Lake Powell are 75% empty, and their water levels continue to fall. Since 2000 there has been a 20% decline in flow in the Colorado River, a major contributor to both reservoirs.<sup>1, 4, 3</sup>

Having ignored scientist’s warnings for years, water managers and politicians in the Western US are facing consistently depleted reservoirs due to overuse and climate change. Federal agencies continue to use a baseline of “climate normal” from the late 20<sup>th</sup> century when climate warming had not reached the critical stage we face now.<sup>1</sup>

The term “Dead Pool” is used to describe a situation when the water level sinks so low it cannot flow downstream from a dam. The hydroelectric turbines are at the bottom of dams. The lower water pressure generates less hydroelectric power. These almost “Dead Pools” are supposed to supply water and electricity to about 29 million people. There is just not enough water. The Bureau of Reclamation is estimating that Arizona and California will need to cut between 2-4

million acre-feet for 2023. Currently Arizona is allotted 2.8-million-acre feet and California 4.4-million-acre feet.<sup>5</sup>

An anecdote about “Dead Pool”. In 2014-15 a new \$522 million low level pumping plant and intake was commissioned at Lake Mead. It was considered a backup if the reservoir water levels ever diminished to “Dead Pool” and could no longer pass-through Hoover Dam. The pumping station was switched on earlier this year as Las Vegas is relying on the deeper intake.<sup>2</sup>

Now the question remains, who will have the political courage and capital to withstand typical human nature, climate risk deniers, and bureaucrats who prefer to ignore the bad news and doomsday predictions? “Dead Pool” has arrived in California and across the Southwest. If we are to save the largest sources of drinking water and electricity in the US, namely the Colorado River and our reservoirs from complete devastation, the warnings and advise of the scientific community must be heeded. Drastic steps need to be taken towards watershed sustainability. We have no choice if we want to continue to live in the Western States.<sup>1, 3, 4</sup>

What can we do? From “toilet to tap” to “great wet hope”: Spotlight Los Angeles and the South Coast Region.

**Now what, toilet water, again?** A cautionary tale from Los Angeles and elsewhere in California. Twenty plus years ago Los Angeles Department of Water and Power was preparing a huge water reclamation program in the City to use reclaimed wastewater to supply the City’s water needs. That was quashed during the 2001 City elections under the “toilet to tap” banner. Los Angeles had the technology to accomplish the goal of sustainable water management safely and viably then and now.

### **What’s changed in 2022?**

The main source of California water is the Sierra snowpack, the Colorado River, and the Lake Mead and Lake Powell reservoirs. They are all currently at historic low levels caused by climate change and mismanagement from the past century. The Cities interconnected to these water resources throughout CA and the Western US are already suffering due to insufficient supply.<sup>1,2</sup>

Without going into all the “solids and fluids” details, the State of California currently only recycles 23% of its wastewater. It’s slightly more in the Southern half of the state. Even still there are about **981million gallons/ per day** of wastewater that are not recycled, not being beneficially used in the South Coast region. (This is after considering replenishing river flows etc.)<sup>2</sup>

A proposed solution: two current examples of wastewater treatment plants include the Metropolitan Water District plant in Carson (Joint Water Control Plant). The estimated \$3.4 billion plant which is currently treating ½ million gallons/day, when fully scaled will process 150 million gallons/day. The full plant is to start construction in 2024 and be completed in 2031 and will cost about \$129 million/year to operate.<sup>2</sup>

The second plant is planned to process 100% of the wastewater at Hyperion Treatment Plant under the auspices of Los Angeles City, Department of Water and Power. It should be commissioned in 2035 and will process 230 million gallons/day. This will cost \$16 billion.<sup>2</sup>



Hyperion, Los Angeles, Photo: Doc Searls

Currently only 2% of Los Angeles' daily consumption of more than 400 million gallons, comes from recycled sources. This mainly irrigates golf courses and parks. Most of the water, about 60%, is derived from the Colorado River and Sacramento Delta sources. We have already noted the challenges from the Sierra snowpack and the Colorado River. The Colorado River is anticipated to provide 20% less water by 2050. Additionally, often not considered is the significant energy cost of the water import.<sup>6</sup>

The Water Replenishment District, which is an agency treating water south of Los Angeles County at its plant in Pico Rivera, treats 14.8 million gallons/day of wastewater from the Cities of Whittier and Pomona. The WRD uses 100% recycled water to replenish regional groundwater supplies. This locally based strategy needs to be replicated across the Southwest.<sup>2</sup>

“Operation Next Initiative”, is a regional water infrastructure rethink. To replenish depreciating local aquifer resources and supply the population with “clean and safe” treated water, new wastewater treatment plants must be enlarged and built. Alongside this stormwater and rainwater reclamation is critical. The attendant infrastructure piping, pumps and more will need to be developed and built out to both capture and store in local aquifers and pipe back out so local water districts can reuse these renewed water resources. It will save Los Angeles and the Western region money by not relying on freshwater during the current megadrought (an anthropogenic megadrought not seen since the 1500's). With current technology, either ultrafiltration or membrane bioreactor systems, between 80-90% of the wastewater can be recycled. This will first be stored in local aquifers and then pumped to local water districts for “normal” water use. Based on today's estimates the “great wet hope” will provide the region

with 70% of its drinking water. It's estimated that recycled water usage will increase between 78-88%.<sup>2</sup>

As noted above, solving "Dead Pool" is not going to be easy or inexpensive. But what choice do we have if we want to continue to live in the Western United States? Local, State and Federal leaders, politicians, and business leaders need to prepare themselves and the public for difficult and costly decisions.

### **Business opportunities abound!**

The infrastructure improvements needed to solve the water problems referenced above, provide ample opportunities for public private partnerships. These will include financing, huge human resource investment, great "white collar" and "green collar" jobs, and Real Estate development. There will be significant engineering projects, technological advances to the current filtration and membrane systems, utilizing and managing wastewater to energy for direct parasitic loads and to sell back to the grid, community and governmental relations work, public education, just to mention some of the "low hanging" fruit.

An example: BlackRock, the world's largest asset manager is spending \$700 million for Vanguard Renewables. They use anaerobic digestion to produce renewable natural gas (RNG) direct from dairy farm waste and supply it to utilities and energy firms partnering with Dominion Energy. Right now, there are six farms with digestors. At 100 digestors, the RNG would provide enough power for several hundred thousand homes. Well-known brands, such as Unilever, Chobani and Ben & Jerry's are also using Vanguard Renewables' services to combine their organic waste with cow manure to produce RNG. The residuals (digestate) become a well-received low carbon fertilizer.<sup>7</sup>

**CAN INNOVATIVE Business solutions save our planet?** If we do not act now, and embrace the "great wet hope", we can anticipate the economic devastation, aridization, and desertification closely connected to land degradation, water source mismanagement, climate change, and drought as evidenced in the Western USA and globally. Well-known examples include sub-Saharan Africa, parts of India, regions of China, and the Tibetan Plateau. Time is up. Human survival is on the line. Solutions are viable but costly. The potential business leadership opportunities are compelling as are the potential for global and local public-private partnerships.<sup>8</sup>

Share your story with us at LINKCO! How is your business helping to solve the challenges associated with climate change? We constantly note and summarize lessons learned as well as best practices to help business leaders gain perspective and insights.

1. "River Warnings were ignored" Ian James LA Times, B1,4.

<https://www.latimes.com/california/story/2022-07-15/scientists-have-long-warned-of-a-colorado-river-crisis>

2. "Recurring drought prompts cities to study recycled water", Jamie Ding B1, 2.

<https://www.latimes.com/environment/story/2022-07-17/wastewater-recycling-provides-hedge-against-drought>

3. <https://westernresourceadvocates.org/healthy-rivers-lakes/protecting-the-colorado-river/lake-powell-2/>

4. "What is Dead Pool? A Water Expert Explains", Prof. Robert Glennon, The Conversation, May 13, 2022. <https://theconversation.com/what-is-dead-pool-a-water-expert-explains-182495#:~:text=Dead%20pool%20occurs%20when%20water,on%20the%20Nevada%2DArizona%20border.>

5. Major water cutbacks loom as shrinking Colorado River nears ‘moment of reckoning’, Ian James, LA Times (updated 6/14/2022). <https://www.latimes.com/environment/story/2022-06-14/big-water-cutbacks-ordered-amid-colorado-river-shortage>
  6. Op-Ed: “Wastewater recycling got derailed in Los Angeles. Now it’s back on track”, Marc Hafele LA Times, May 17, 2021. <https://www.latimes.com/opinion/story/2021-05-17/op-ed-wastewater-recycling-got-derailed-in-los-angeles-now-its-back-on-track>
  7. BlackRock Is Buying Renewable Natural Gas Producer for \$700 Million, Amrith Ramkumar, WSJ, 7/20/2022. [https://www.wsj.com/articles/blackrock-is-buying-renewable-natural-gas-producer-for-700-million-11658311201?mod=Searchresults\\_pos1&page=1](https://www.wsj.com/articles/blackrock-is-buying-renewable-natural-gas-producer-for-700-million-11658311201?mod=Searchresults_pos1&page=1)
  8. <https://reliefweb.int/report/world/world-atlas-desertification-rethinking-land-degradation-and-sustainable-management>
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