$30 million plant would use the sun to recycle tainted irrigation water

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WaterFX, a company using solar thermal energy to power a demonstration water-desalination plant in western Fresno County, hopes to build a $30 million commercial-scale version and have it producing water by next summer.

A WaterFX subsidiary, HydroRevolution, announced its plans Wednesday for the new facility to be built on about 35 acres of land owned by Panoche Water District, west of Firebaugh.

Aaron Mandell, the company's chairman, said the first stage will have a production capacity of about 2,200 acre-feet of water per year; a second phase would expand the capacity to 5,000 acre-feet per year. An acre-foot is about 326,000 gallons of water, enough to supply the needs of an average Valley family for about 18 months.

But rather than many other desalination proposals that would distill seawater, HydroRevolution's water source will be what Mandell estimates is about 1 million acre-feet of irrigation runoff, tainted by selenium and other minerals, that has been collected over the years by drains embedded under the surrounding 44,000 acres of farmland.

"We're not actually doing anything all that new," Mandell said. "The type of desalination we're doing has been around for decades. All we're demonstrating is that the energy source can come from solar and be done very efficiently."

In a nutshell, here's how it works:

A 377-foot-long parabolic mirror reflects and focuses the sun's rays on an oil-filled pipe that runs the length of the structure. WaterFX calls the assembly a SkyTrough. The focused solar energy super-heats the oil in the pipe, which runs to a treatment plant where it is used to boil water. The steam — pure, unadulterated water — is captured and condensed, while the minerals are left behind in a highly concentrated form to be disposed of.

The commercial-scale plant will include 35 SkyTroughs, Mandell said. The smaller demonstration plant will be used as a test bed for other technology, including looking for ways to increase efficiency and to process the leftover solids into products that can be marketed instead of disposed as hazardous waste.

The plant will have a life expectancy of at least 20 years, and perhaps 25 to 30, he added.

To get the plant off the ground, Mandell is looking for investors. The company is planning to issue a direct public offering — a state-registered and regulated offering of interest in the privately held firm — in hopes of raising $10 million in capital. For the remaining $20 million needed to build the plant, HydroRevolution expects to borrow and take on debt.

Income would be generated by the sale of water to Panoche Water District. The company reports it has a letter of intent with Panoche that will be converted to a final water contract over the next month.

"We are not yet disclosing the details of the contract publicly, but water pricing is competitively set based on the combined value of treating and eliminating the drainage water and the market value of a long-term supply of supplemental water," Mandell told The Bee.

There also is money to be made by processing and selling the processed solids left over after distillation, Mandell said: "There's gypsum for building materials. And even selenium, when it's separated and recovered, can be used as a health supplement."

Making the technology scalable will be a key to the success of the business model. “Unlike a seawater desalination plant, these are much smaller and more distributed plants,” Mandell said. “The value of what we’re doing is not just the water we produce, but eliminating the drainage water. … The Valley has upwards of 1 million acre-feet of drainage water that needs to be dealt with.”

The plant’s projected production capacity of 5,000 acre-feet of water annually is “only a drop in the bucket when it comes to Panoche’s water needs and the needs of the Valley,” Mandell acknowledged. “But it represents a truly new source of water. What’s important isn’t the overall volume, but where this approach can go from here. … Once we show that we can treat (contaminated) water sustainably and economically, these facilities can pop up all over the Valley and reclaim re-used water.”

Potential customers of solar desalination include water districts like Panoche or the neighboring Westlands Water District. Large farming operations could install their own plants to reclaim their used irrigation water. And, Mandell said, the technology also can be applied to produce distilled water anywhere there is tainted water to be treated, including municipal wastewater treatment plants.

“Our low-hanging fruit is dealing with water that already has a cost” to users, Mandell said.

HydroRevolution is starting its permitting process for the plant, including an environmental assessment required by the California Environmental Quality Act. “Our goal is to be under construction by the end of the year,” Mandell said, “with the plant operational by this time next year.”

Whatever the volume, the Panoche district is looking forward to the extra water.

“Given the trend of highly uncertain inputs from the Delta, we need to develop a reliable supply of water in the Central Valley,” Panoche district manager Dennis Falaschi said in a written statement. “After seeing the results from the demonstration plant … we’re eager to get the HydroRevolution plant online quickly and optimistic about seeing others replicate what we’re doing here. There is an enormous resource of subsurface water that can be utilized.”

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