FOUNTAIN VALLEY, Calif. — Water spilled out of a spigot, sparkingly clear, into a plastic cup. Just 45 minutes earlier, it was effluent, piped over from Orange County’s wastewater treatment plant next door. At a specialized plant, it then went through several stages of purification that left it cleaner than anything that flows out of a home faucet or comes in a brand-name bottle.

“It’s stripped down to the H, 2 and O,” said Mike Markus, the general manager of the county water district. He was not exaggerating. Without the minerals that give most cities’ supply a distinctive flavor, this water tastes of nothing.
As California scrambles for ways to cope with its crippling drought and the mandatory water restrictions imposed last month by Gov. Jerry Brown, an array of ideas that were long dismissed as too controversial, expensive or unpleasant are getting a second look. One is to conserve more water; another is to turn nearby and abundant sources of water, like the Pacific Ocean, into drinking water through desalination.

Yet another is to recycle the water Californians have already used. And therein lies a marketing challenge that can be even greater than the technological one.

Water recycling is common for uses like irrigation; purple pipes in many California towns deliver water to golf courses, zoos and farms. The West Basin Municipal Water District, which serves 17 cities in southwestern Los Angeles County, produces five types of “designer” water for such uses as irrigation and in cooling towers and boilers. At a more grass-roots level, activists encourage Californians to save “gray water” from bathroom sinks, showers, tubs and washing machines to water their plants and gardens.

Enticing people to drink recycled water, however, requires getting past what
experts call the “yuck” factor. Efforts in the 1990s to develop water reuse in San Diego and Los Angeles were beaten back by activists who denounced what they called, devastatingly, “toilet to tap.” Los Angeles built a $55 million purification plant in the 1990s, but never used it to produce drinking water; the water goes to irrigation instead.

But with the special purification plant, which has been operating since 2008, Orange County swung people to the idea of drinking recycled water. The county does not run its purified water directly into drinking water treatment plants; instead, it sends the water underground to replenish the area’s aquifers and to be diluted by the natural water supply. This environmental buffer seems to provide an emotional buffer for consumers as well.

The $481 million plant opened during a previous drought. “It made us look like geniuses,” Mr. Markus said. The timing is right again. In the midst of the current drought, the county has completed a $142 million expansion that will increase capacity by more than 40 percent, to 100 million gallons a day, and at a fraction of the cost of importing water or desalinating seawater. (A further expansion to 130 million gallons a day is planned.)

Now water reuse is being tried elsewhere around the country, including parched cities in Texas that do pipe treated water directly to their water supplies. Here in California, “there are agencies considering this all over the state,” said Jennifer West, the general manager for WateReuse California, a trade association.
In November, the San Diego City Council voted for a $2.9 billion Pure Water program to provide a third of the city’s daily needs by 2035. The Santa Clara Valley Water District hopes to meet up to at least 10 percent of its water demands by 2022 with its project.

And Los Angeles is ready to try again, with plans to provide a quarter of the city’s needs by 2024 with recycled water and captured storm water routed through aquifers. “The difference between this and 2000 is everyone wants this to happen,” said Marty Adams, who heads the water system for the Los Angeles Department of Water and Power.

The inevitable squeamishness over drinking water that was once waste ignores a fundamental fact, said George Tchobanoglous, an expert in water reuse and a professor emeritus at the University of California, Davis: “When it comes down to it, water is water,” he said. “Everyone who lives downstream on a river is drinking recycled water.”

**The Parched West: Exploring the Impact of Drought**

The processes at Orange County and most other plants that clean the water...
include microfiltration that strains out anything larger than 0.2 microns, removing almost all suspended solids, bacteria and protozoa.

After that comes reverse osmosis, which involves forcing the water across a membrane, which removes other impurities, including viruses, pharmaceuticals and dissolved minerals. A zap with powerful ultraviolet light and a bit of hydrogen peroxide disinfects further and neutralize other small chemical compounds.

But after all that, 13 percent of adult Americans say they would absolutely refuse to even try recycled water, according to a recent study in the journal Judgment and Decision Making. "A small minority of people are very offended by this, and can slow it down or stop it because of legal and political forces," said Paul Rozin, a psychology professor at the University of Pennsylvania who studies revulsion and a co-author of the study.

Opponents of reusing water have long had the upper hand, said Paul Slovic, a professor of psychology at the University of Oregon, because of the "branding problem."

People tend to judge risk emotionally, he said, and a phrase like “toilet to tap” can undercut earnest explanations. “The water industry has not been good at marketing reuse,” he added. But research has shown that highlighting the benefits of recycled water — and the need — can shift emotions to a more positive reaction and help diminish the sense of risk.

"Under crisis, people accept things that they wouldn’t accept otherwise," Dr. Rozin noted.

The cities now considering using recycled water for drinking have watched Orange County’s success carefully. San Diego and the Santa Clara Valley Water District have opened demonstration plants, and conducted tours and talks.
When the San Diego City Council voted in November to move forward with purification plans, it had the support of businesses and several environmental groups. “We are not so naïve to believe that there aren’t customers who have concerns,” said Brent Eidson, a spokesman for San Diego’s Department of Public Utilities. “But at this point we have not seen any organized opposition.”

Wichita Falls and Big Spring, Tex., have put purified water directly into the drinking supply without incident. Wichita Falls has been using its system since July 2014.

Russell Schreiber, the city’s director of public works, said that some people have told him, “I’m not going to drink it.” His response? “That’s great. Saves water!” The city produces nine million gallons a day, and he said people now stop him to say, “The water tastes better.”

For the ultimate in recycled water, there is one place to go: the International Space Station. Aboard the space station, equipment captures liquid from the onboard toilets and even the moisture from breath and sweat.

Col. Douglas H. Wheelock, who served as commander of the station in 2010, said, “I drank it for six months, and it was actually quite tasty.” That did not keep his colleagues from making light of the situation, however.

“We had a running joke on the station,” he said. “Yesterday’s coffee is tomorrow’s coffee.”