

Cleaning up

Chart Industries is seeing a growing demand for its liquid oxygen systems

By Nick Parkinson

Treatment for clean water is one of the macro trends driving business for equipment manufacturing giant Chart Industries in 2020.

Other business segments such as LNG may have a bigger potential market size for Chart, but the US company still estimated water treatment to have a potential market size of \$400m in its 2019 Investor Presentation in November.

Chart CEO Jill Evanko said on a recent financial call, “In recent months we’ve seen municipalities across the United States exploring oxygen ozone systems for these applications.”

In 2019 alone, Chart has been awarded equipment contracts for municipalities in various states such as California, Texas, Florida, New Jersey, Maine, Colorado and Washington.

Water treatment – improving water quality and wastewater reuse by utilizing liquid oxygen and carbon dioxide (CO₂)

“Bulk liquid oxygen systems are practically a set-it-and-forget-it type of system”

in the purification process – is being driven by regulation on water treatment, and population growth.

Water scarcity impacts 40% of the world’s population, and there are 34 billion gallons of wastewater daily in the US. Chart engineers and manufactures turnkey cryogenic liquid oxygen storage systems; systems to store and re-gasify liquid CO₂; full system engineering for cryogenic treatment solutions, and bulk storage tanks and vaporizers.

Demand is increasing for Chart’s equipment with more stringent regulatory issues on water treatment,

and increasing environmental concerns. Liquid oxygen systems can be vertical or horizontal and pictured are what Chart has provided as pre-fabricated manifolds or major equipment. Chart worked closely with the awarded general contractor to install Chart’s equipment in each case.

Liquid oxygen is used to generate oxygen/ozone for disinfection via a system like the one Chart installed in Duchesne, Utah, in 2011. Duchesne County wanted to build a new water treatment plant, designed to double the area’s water output to 8 million gallons per day, and wanted to pre-treat the water with ozone instead of chlorine.

To supply the ozone generator, the \$39.4m Duchesne plant had to maintain a steady supply of cryogenic liquid oxygen, storing it in bulk and then converting it to gas on demand. Chart supplied a 6,000 gallon vacuum-insulated tank and vaporizer system to hold the liquid oxygen at -297 F (-182 C) for this project with maximum oxygen gas flow rate of 1,117 standard cubic feet/hour.

The plant required specialized electric-actuated valves (instead of the typical air-actuated valve) and Chart’s engineers worked with the client to help implement custom piping, specialized valves, and an unusual type of steel that the requirements specified.

Chart also delivered an engineered system equipped with liquid oxygen storage tanks and vaporizers for



© Chart | Pictured left is a water treatment ozone plant in Massachusetts; right, is a liquid oxygen aeration system for a hydroelectric plant in Alabama

regasification to deliver the oxygen supply for Clark County, Nevada, which needed a liquid oxygen storage and regasification solution for oxygen supply used in ozone generation for water treatment (disinfection).

Richard Rosik, Business Development Manager at Chart, told *gasworld*, “Chart is seeing a substantial growth in the use of ozone disinfection as an efficient way to eliminate odor, improve taste, and kill certain bacteria. The municipalities are the main adopters of the use of ozone. However, numerous industrial end-users in the private sector are also seeing the benefits of ozone as their disinfection process, for example, meat processors, breweries, etc.”

Chart, which is a member of AWWA (American Water Works Association) and IOA (International Ozone Association), has been providing liquid oxygen storage and vaporization equipment for ozone systems for over a decade, and has the ability to provide a fully integrated liquid oxygen system per required customer and engineering firm’s specifications.

“We have done numerous systems

over the years and Chart assists on the design of many of them so many of the challenges have been solved with experience,” Rosik added.

“However, some challenges would be to find the best solution for the application. For example, if a client has any height restrictions, the need to hide the equipment, location and distance from an ASU. Chart works closely with various engineering firms to assist in developing industry accepted liquid oxygen and CO₂ solutions appropriate for the municipalities needs, location, and most importantly the safety of their operators and personnel.

“Bulk liquid oxygen systems are practically a set-it-and-forget-it type of system. Many times (think of hospitals) the personnel don’t even realize it’s in the back of their building. There are no moving parts or noise it generates, it typically doesn’t take up a lot of space, and is easily maintained.”

The Middle East accounts for just over a half of where desalination technology (taking away mineral components from salt water) is deployed, with North America making

up 17%. It is used on seawater and salty underground water with two major municipal seawater desalination plants in the US (one under construction in Tampa, and another inactive plant in Santa Barbara, California).

Chart manufactures its bulk storage tanks at its New Prague facility in Minnesota, and has manufactured 20,000 gallon and 30,000 gallon tanks specifically for the water treatment industry. However, New Prague has the ability to make 263,000 gallon tanks if need be.

Are there any recent modifications/advancements in Chart’s oxygen system package?

“A recent push and becoming more and more included in systems is utilizing vacuum jacketed piping in lieu of conventional foam insulation,” Rosik added.

“With clean drinkable water becoming increasingly scarce each year, it is Chart’s intent to be on the forefront of water reuse and cleaning technologies. Chart will continue to support our customers that are working to create a better, cleaner tomorrow.” **gw**

© Chart | This larger system was started up in 2019 and is for oxygenation for a hydroelectric power plant in Alabama



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