

Liberty Coca Cola Beverages First Quadgeneration Project in US: Delivering Cooling, Heat, Power, and Beverage Grade CO₂

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Liberty Coca Cola Beverages (LCCB) has initiated a first-in-nation sustainable energy project at its Elmsford, NY Coca-Cola bottling plant. This investment will enable the facility to generate its own electrical power, along with thermal and cooling energy, through utilization of quad generation technology. The project involves the construction of an onsite energy system, a carbon recovery system, and related equipment. The power, heat and cooling will be utilized on site in the production, and warehousing processes along with capturing carbon to be purified to beverage grade and processed to create the carbonation within the beverages manufactured at the location.

The plant will be the first of its kind in the country to generate its own electricity, heat, cooling and recover carbon dioxide (CO₂) for beverage use. Generating energy using combined heat and power technology will deliver significant carbon savings versus grid sourced electricity. Additionally, recovering CO₂ further improves the environmental performance of the system by reducing the need to source it from the market. Once cleaned, the beverage-grade CO₂ will be used to carbonate beverages, eliminating hundreds of trucks annually that currently deliver it to the facility.



This Quad generation system is the first of its kind using reciprocating engines in North America. Once constructed and operating, this system will reduce greenhouse gas emissions by 3,936 metric tons annually when compared against Con Ed's published CO₂ grid emissions. When Liberty looks at the innovative benefit the scrubbed CO₂ that adds an additional 8,800 tons per year of reduced emissions. This figure represents only a fraction of the total carbon dioxide reduced, as the system's carbon capture works to reduce such a number even further. With this investment, we mark another major milestone for Liberty's efforts to create a more sustainable future," said Paul Mulligan, co-owner of Liberty Coca-Cola Beverages.



This is an extraordinarily efficient system, capturing otherwise wasted heat and utilizing it for several productive purposes. Of the recovered thermal energy Liberty will be utilizing 90% in the manufacturing process (conservative figure) the heat will be used to chill the product during its manufacturing process and then heat the product during its manufacturing process. i.e., offset boiler heat (existing) and electric chiller cooling (existing). They fill the product chilled to avoid foaming and any quality concerns associated with high speed manufacturing, then re heat the sealed container

beyond daily dew point to avoid condensation build up in the packaging. The CO2 scrubbing that will also utilize system heat to vaporize the liquified beverage grade CO2 for carbonation. Liberty will operate an onsite energy system, comprised of two Jenbacher gas-powered reciprocating engines, delivering almost 1,700kW of electrical power to the facility. At the same time, in a highly efficient and environmentally superior system design, the engines will also provide thermal energy and cooling for internal processes. Finally, Liberty will recover CO2 directly from the engine exhaust systems. They utilize a CO2 recovery process that involves exhaust gas upgrading systems to bring the final product to International Society of Beverage Technologists (ISBT) and Coca-Cola internal CO2 standards.

This investment represents a best-in-class example of energy efficiency, delivering a total system efficiency of the 88.3%. Putting that figure into perspective, this system is nearly 65% more efficient than the typical user of energy in the region.

Liberty's emission reduction strategy was a key driver in the company's decision to develop a project that incorporates a highly efficient quadgeneration plant. This complex technology can substantially reduce manufacturer's carbon emissions through high efficiency local energy production. With the benefits of the recent Inflation Reduction Act and increased price of CO2 globally, this provides many opportunities for carbon capture technologies in the United States.

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Thank you to Dylan T. Penn
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