

Combined Heat and Power (CHP) Systems Add Food Resiliency to the Menu

By Tom Bourgeois Director U.S. Department of Energy's New York New Jersey Combined Heat and Power Technical Assistance Partnership (NY/NJ CHP TAP) June 16, 2022

In this article, we turn our attention to CHP systems role in adding "Food Resiliency" to the menu of CHP benefits. Recent events including the disruptions caused by the COVID pandemic, and now supply chain issues, have highlighted the tenuous nature of the world's food supply. These occurrences, whether man-made or natural, can disrupt world food supplies and inventories.

In the same way that decentralized energy systems can decouple from the risks that threaten centralized energy generation and transmission approaches, localization of food production enhances the resiliency of a region's food supplies. CHP is a critical enabling technology to support high efficiency, low emission and economically viable, local food production while also providing support to the electric grid.

The Dutch, who are recognized world leaders in Controlled Environment Agriculture (CEA) have nearly 4,000 MWs of CHP systems operating at greenhouses across the country. In 2020, production of electricity using natural gas fired CHP in greenhouse horticulture in the Netherlands was 1.8 billion kWh.² By deploying CHP in greenhouse horticulture, the Dutch have reduced total CO₂ emissions by approximately 1.76 million tons³

The U.S. Department of Energy's CHP Technical Assistance Partnership (CHP TAP) Program has been investigating CEA as an important and impactful market sector that can significantly benefit by the inclusion of CHP. Greenhouses and vertical farms are an ideal application for CHP as they demand year round substantial heat and power. CHP systems generate on-site electricity, heat, cooling, dehumidification, and CO₂ are well suited to match CEA load profile. In addition, CHP at CEA can also be used to support the local power grid. CHP connected sites are used widely in Europe and Canada to

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² Energiemonitor van de Nederlandse glastuinbouw 2020, Wageningen Economic Research Rapport 2021-1, Projectcode 2282200621. October 2021. Page 10.

³ Ibid., page 10

At a recent NY/NJ CHP TAP sponsored event Mike Swider, Senior Market Design Specialist at NYISO provided an illuminating presentation describing several NYISO Market Initiatives with potential implications for CHP

more details as we investigate the validity and the robustness of our hypothesis local food