ISSUE BRIEF

Micro Combined Heat and Power (CHP) and CHP Microgrids

The Issue: As a clean, abundant, domestic fuel, propane can be utilized in micro-CHP and CHP microgrid systems to meet the energy needs of U.S. homes, commercial buildings, and communities while significantly reducing emissions and increasing the resilience of the nation's energy infrastructure.

Background: Improved building technologies and energy infrastructure will play a critical role as local, state, and federal governments seek to reduce emissions across the United States. While many recent efforts have taken a misguided approach with a single-source solution, government agencies must deploy various technologies and fuels to ensure long-term, meaningful progress. CHP systems generate electricity and utilize heat from the process to provide thermal energy for additional heating and cooling applications.

Micro-CHP units provide highly efficient and green power generation. According to a Gas Technology Institute Study, using a 10kW propane engine-based CHP unit compared to an equivalent all-electric system can reduce GHGs by 52%, NOx by 53%, and SOx by 89%.[1] Propane CHP systems reduce emissions further when paired with renewable energy sources, like solar, and have resulted in zero-net-energy capabilities. Additional development of these micro-CHP units can increase resilience and efficiency while taking pressure off the nation's electrical grid.

Propane fueled CHP microgrids provide reliable power generation in remote locations and other areas where existing grid infrastructure cannot supply energy. These systems can power large homes, strip malls, and even small communities. Unlike the sprawling national grid, microgrid systems generate power near the consumers, eliminating energy loss during transmission and improving reliability. Additionally, propane microgrids can offer significant emissions reductions and cost savings. By transitioning from two-20 year old heat pumps and two diesel-fired steam boilers to a propane CHP microgrid, one resort reduced its annual emissions foot print by 22 tons of NOx, 9824 tons of CO2, and 45 tons of SO2. This upgrade paid for itself after just 6.3 years.[2]

Both of these technologies are resilient energy solutions during emergencies such as natural disasters and prolonged supply disruptions. By eliminating inefficient centralized electricity generation and complex transmission networks, CHP units and microgrids are less exposed to potential damage and can be brought back online more efficiently. Propane is a highly efficient and portable fuel that can perform under the most extreme conditions. The fuel is also readily available and able to accommodate increased demand. More than 99% of the propane consumed in the United States is produced in North America, with 93% coming from domestic facilities. Additionally, in 2019, the U.S. exported more than 16 billion gallons of propane, enough to fuel more than 15 million homes.[3]

The Ask: Support federal funding for and adoption of propane micro-CHP and CHP microgrid technologies.

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[1] Gas Technology Institute. (17-01). GHG and Criteria Pollutant Emissions Analysis (GTI PROJECT NUMBER 22061). Propane Education & Research Council.
[2] CHP GENERATION CAPTURES HEAT — AND IMAGINATION. (n.d.). Retrieved February 11, 2021, from https://bpnews.com/index.php/publications/magazine/current-issue/1365-chp-generation-captures-heat-and-imagination-butane-propane-news
[3] Movements of Crude Oil and Selected Products by Rail. (n.d.). Retrieved February 12, 2021, from https://www.eia.gov/dnav/pet/pet_move_railNA_a_EPC0_RAIL_mbbl_m.htm

Last Updated 2/2021