

Should combined heat and power systems be part of energy-efficiency recommendations in a constrained airshed?

Authors: Elaheh Safaei Kouchaksaraei, Ali Khosravani Semnani, Kody Merlin Powell and Kerry Elizabeth Kelly

Abstract

Energy-efficiency programs can lead to emissions reduction and corresponding health benefits. Some of the strategies employed by these programs, such as combined heat and power systems (CHP), reduce overall emissions but increase local emissions. Few studies consider adverse health outcomes of CHP in constrained airsheds. This study explores the emission changes and associated health impacts of implementing CHP with and without emission control systems. It focuses on the Wasatch Front area of Utah, an airshed that struggles to meet air quality standards, and a Utah-specific energy-saving program, the Intermountain Industrial Assessment Center (IIAC), as a case study. After calculating electricity and natural gas changes associated with IIAC recommendations in 2019 and corresponding emission changes, we estimated the health and economic effects using Co-Benefit Risk Assessment (COBRA). This study considers direct combustion and electricity-related impacts. The value of the US health benefits from the IIAC recommendations were \$ 2.4 million (US), while recommending control systems on CHP increased this value to \$3 million (US). In contrast, CHP implementation has local adverse health effects due to increased natural gas usage, although emission-control technologies can mitigate this. These results help quantify energy-saving programs' health impact, including cases in which CHP may be recommended.