

ASSESSMENT OF COMBINED HEAT AND POWER SYSTEM “PREMIUM POWER” APPLICATIONS IN CALIFORNIA

*Zack Norwood, Timothy Lipman, Michael Stadler, Chris Marnay
Pacific Region Combined Heat and Power Application Center
University of California, Berkeley
2614 Dwight Way, 2nd Floor, MC 1782, Berkeley, CA, 94720-1782
Phone (510) 642-4501, Fax (510) 642-5483
E-mail: znorwood@umich.edu*

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ABSTRACT

The effectiveness of combined heat and power (CHP) systems for power interruption intolerant, “premium power”, facilities is the focus of this study. Through three real-world case studies and economic cost minimization modeling, the economic and environmental performance of “premium power” CHP is analyzed. The results of the analysis for a brewery, data center, and hospital lead to some interesting conclusions about CHP limited to the specific CHP technologies installed at those sites. Firstly, facilities with high heating loads prove to be the most appropriate for CHP installations from a purely economic standpoint. Secondly, waste heat driven thermal cooling systems are only economically attractive if the technology for these chillers can increase above the current best system efficiency. Thirdly, if the reliability of CHP systems proves to be as high as diesel generators they could replace these generators at little or no additional cost if the thermal to electric (relative) load of those facilities was already high enough to economically justify a CHP system. Lastly, in terms of greenhouse gas emissions, the modeled CHP systems provide some degree of decreased emissions, estimated at approximately 10% for the hospital, the application with the highest relative thermal load in this case.