

Combined Heat & Power/Integrated Energy Systems

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1. Introduction

The Center for Environmental Energy Engineering (CEEE) operates two combined heat and power (CHP) systems that supply electricity, heating and cooling to an occupied office building. The poster describes the systems, illustrates data that is being collected and summarizes lessons learned.

2. Key Features

The CHP systems consist of a reciprocating engine supplying heat to the building and to an innovative liquid desiccant system and a microturbine which also supplies heat to the building and to an absorption chiller. Both systems are highly instrumented for performance data and these data are used in simulations that help evaluate system performance.

Typical data shown in the poster are also presented below in Fig. 1.

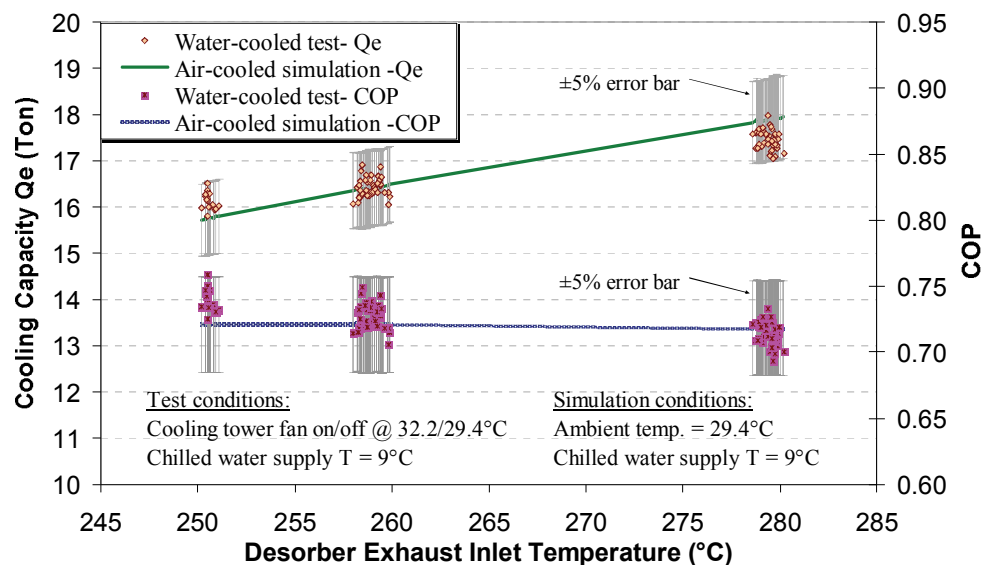


Fig. 1. Comparison of simulated versus measured absorber performance.

3. Conclusions

Key lessons learned from the operation of these test systems included the need to match component parameters to maximize system performance and to minimize parasitic loads, the need to standardize components and systems to better function in the international marketplace and to meet local requirements such as electrical system interconnection and the need for redundancy and ease of maintenance for high reliability and availability.

4. References and Bibliography

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Author Biographies

Dr. Reinhard Radermacher, *Director, CEEE, Professor of Mechanical Engineering*, is an internationally recognized expert in working fluids for energy conversion systems; in particular heat pumps, air-conditioners and refrigeration systems. His work has resulted in over 150 publications, including 3 books he co-authored, numerous invention records and 9 patents. He was a visiting scientist and NATO scholar at the National Institute of Standards and Technology before joining the University of Maryland. He currently serves as Editor for the ASHRAE HVAC&R Research Journal.

Dr. Orlando, Director of the Mid-Atlantic CHP Application Center, is responsible for promoting applications of Combined Heat and Power technologies in the multi-state region. Previously, as President of Platinum Energy over the past twenty five years, Dr. Orlando has been responsible for a variety of energy and central plant assignments both in the United States and abroad. He has a broad understanding of public and private energy issues having provided consulting services to industrial facilities, health care providers, utility companies, financial institutions, equipment manufacturers, independent power producers, and numerous energy end users. He was responsible for revising the ASHRAE Handbook chapters on Cogeneration and on Prime Movers and is the sole author of the ASHRAE Cogeneration Design Guide.