Forum Barcelona 2004 Waste Energy Recycling Plant

District Energy System

by

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CO-GEN CONCEPT



Offset building thermal loads by Recycling the waste heat energy available at site Reduces Costs and increases Reliability Increases Efficiency and Reduces Fossil Fuel Combustion





CCHP Exhaust Reference Design



Two Stage Hi-Temp Exhaust Fired



CCHP Traditional Reference Design



FT BRAGG – N. Carolina

Natural Gas/Exhaust Co-Fired w/HEX



1.high stage generator 2.low stage generator 3.condenser 4.evaporator 5.absorber 6.high temperature heat exchanger 7.low temperature heat exchanger 8.water heater 9. solution pump 10.refrigerant pump 11.chilled water valve(open) 12.heating water valve(closed) 13.cooling water valve(open) 14.cooling/heating switch valve(open) 15.burner 16.blower 17.automatic damper 18.heat-recovery generator 19.three way automatic damper 20.compressor 22.combustor 22.turbine 23.generator Chilled water cooling water refrigerant water \bigcirc refrigerant vapor \bigcirc diluted solution concentrated solution

Reciprocating Engine with Jacket Water and Exhaust Recovery and Single-Effect Absorption Chiller





Broad Two Stage Steam Absorption Chiller



CHP Test Case Profiles

University of Maryland & Pico Rivera, CA

DOE/ORNL

Microturbine/Absorber/Desiccant



UMD BCHP System 2 Single Stage Lo-Temp Exhaust Fired



Turbine efficiency 25.6 %, with chiller 63.5 %, and with desiccant 79.2%
Single effect absorption chiller with COP of 0.7

CHP Choices & Issues

Generator	Range	Cooling TAT	Av. Ton/kW
Gas Turbine	> 1 MW	Absorber Steam Turbine	.3 to .8
Microturbine	< .4 MW	Absorber Desiccant	.4
IC Engine	.1 to 3 MW	Absorber Desiccant	.3
Fuel Cell	> .25 MW	Absorber	.15

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Q & A

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