Case Studies: Mueller Energy Center at Dell Children's Medical Center, Austin, TX

Jim Collins, PE, PMP
Director
On-Site Energy Resources
Austin Energy

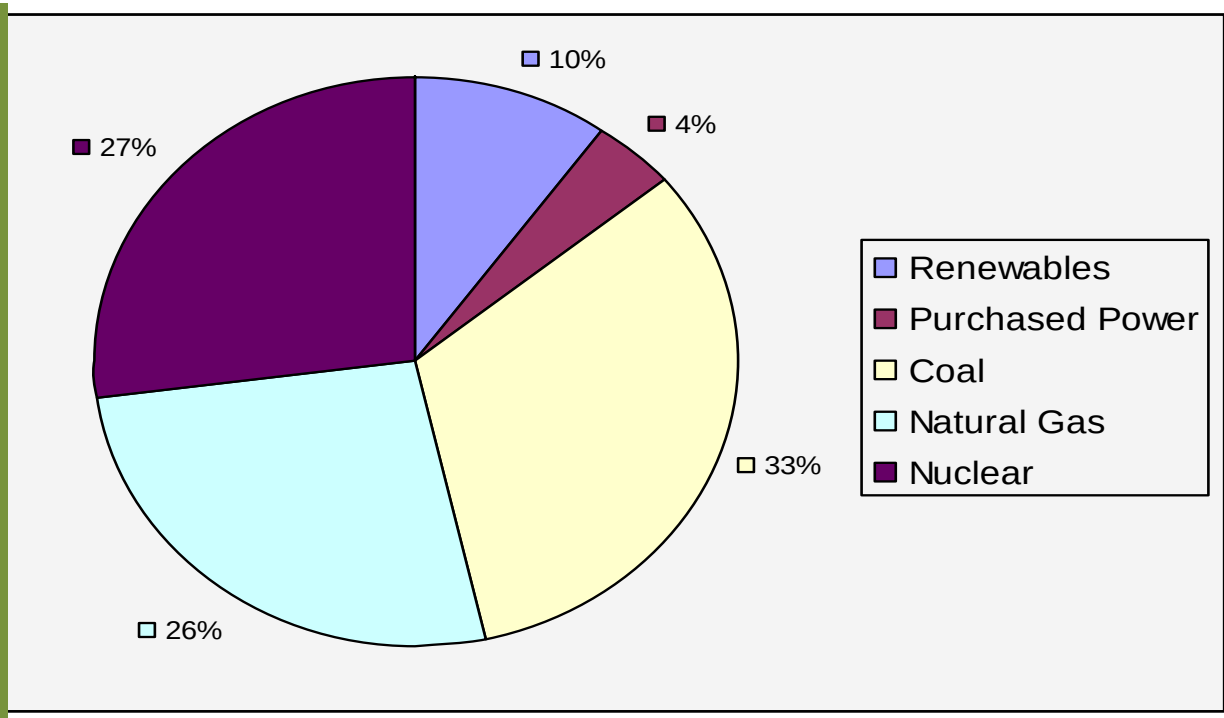
Ed Mardiat, DBIA
Principal
Burns & McDonnell

November 3, 2010

CHP Case Study: Mueller Energy Center

Austin Energy Overview

- Municipal utility of Austin, TX
- 9th largest municipal utility in U.S.
- Over 400,000 customers
- 437 square mile territory
- Own and operates district cooling systems downtown and Domain



Generation Assets = 2,760 MW

Fiscal Year 2008 Revenue = $1,059,822,331

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Drivers for CHP

- Cleaner normal power
- More back up power
- More reliable back up power
- Able to “island” from the grid
- Initial capital cost savings and operational savings to the Hospital

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Typical Power Delivery

At Austin Energy's Fayette Power Station, about 35% of the primary fuel is converted into electricity; the remainder is lost "up the stack". An additional 6% efficiency drop occurs in transmission to the site. Overall, at the Hospital's meter, the result is roughly a *29% efficient primary fuel conversion to useful energy*.

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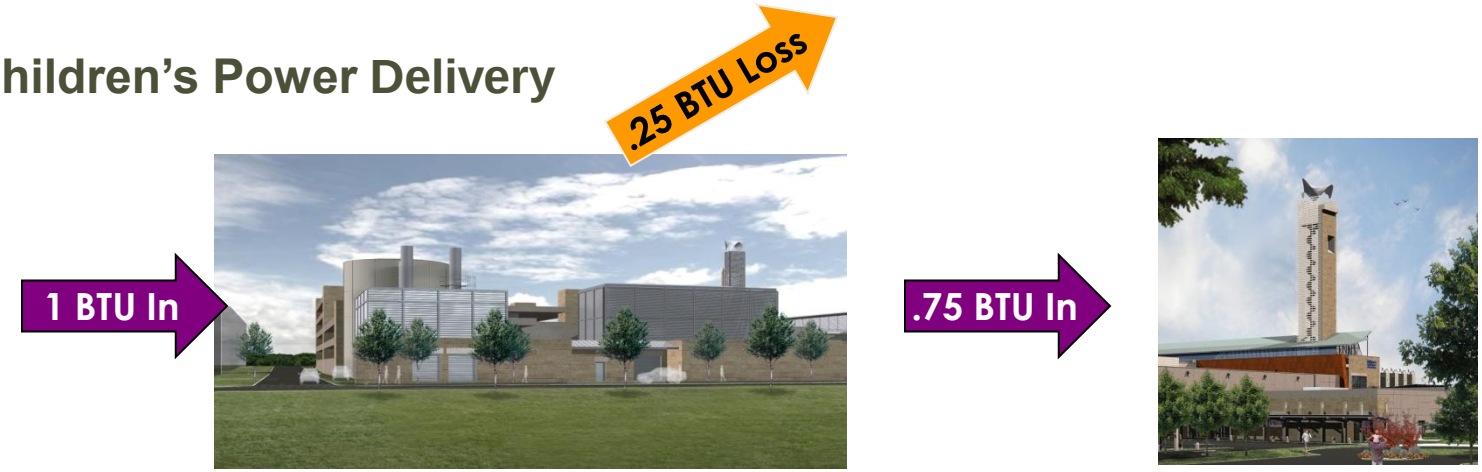
Dell Children's Power Delivery



Austin Energy's Building Combined Cooling, Heating and Power Plant at the Dell CMCCT will be *75% efficient at primary fuel conversion to useful energy*.

This is a *46% savings in primary energy utilization* compared to the Typical Power Service Model.

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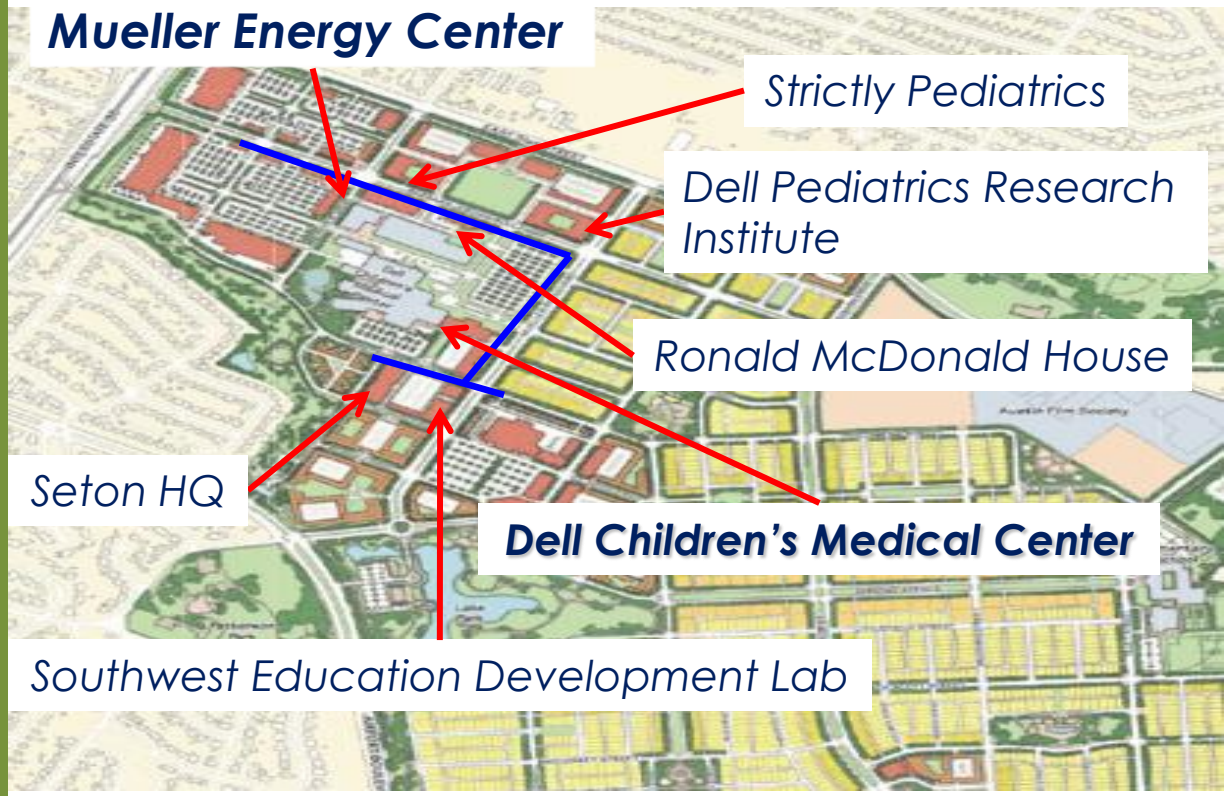
Project Overview

- Owned and operated by Austin Energy
- 36,000 sq/ft
- Provides electricity, chilled water, steam to the hospital
- Life safety emergency power
- Provides chilled water to Mueller Campus



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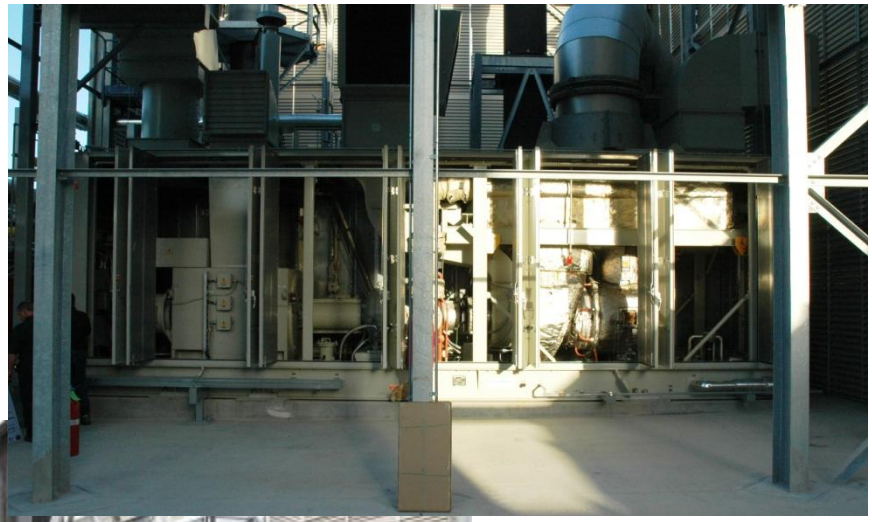
CHP Modules

- 4.3 MW Combustion turbine
- Natural gas compressor package
- 13,500 lb/hr Heat Recovery Steam Generator
- 24,500 lb/hr with duct firing



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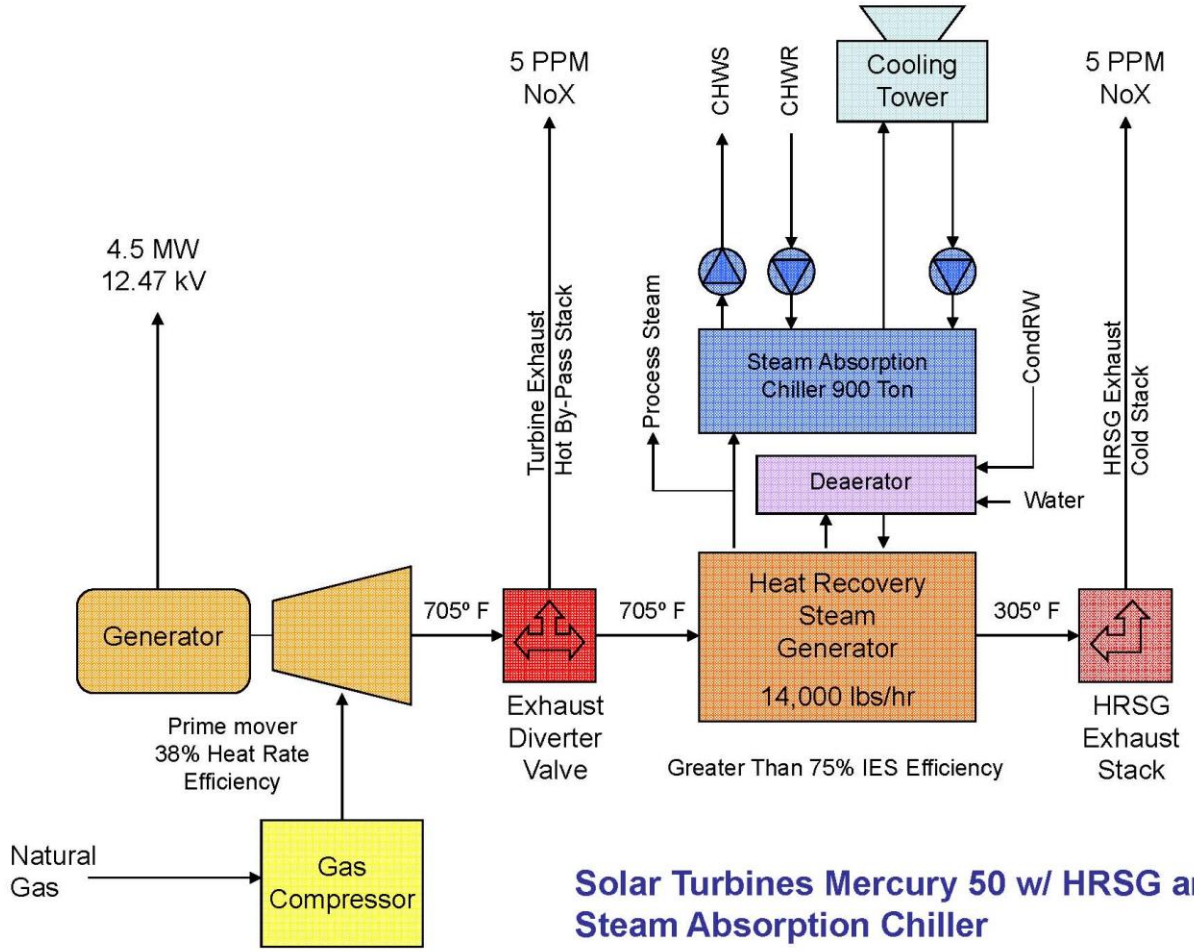

Solar Turbines Mercury 50 w/ HRSG and Steam Absorption Chiller

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Chillers and Boiler Packages

- 20,000 lb/hr and 27,000 packaged boilers
- Deareator
- 1,500 ton and 2-2,500 ton packaged chiller plants
- 900 ton two stage absorption chiller
- 8,000 ton/hr TES Tank

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Electrical System Reliability

- Dual 12.47kV feeds from two independent substations
- 4.3 MW on-site natural gas fired generation
- 1,500 kW emergency generator (black start)

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Dedication Ceremony October 17, 2006

- DOE funding $995,000
- Output based emissions
- LEED NC 2.2 CHP Calculation Methodology
- First LEED Certified Platinum hospital in the world

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Project Awards and Recognition

- *"Little Big Man of the State's Generation Sector"*
- *"For looking good and being clean" - kab*
- *2007 award winner industrial category - CCJ*

HEATING/PIPING/AIR CONDITIONING HPAC ENGINEERING

Meeting Today's Energy Challenges with On-Site Energy Systems

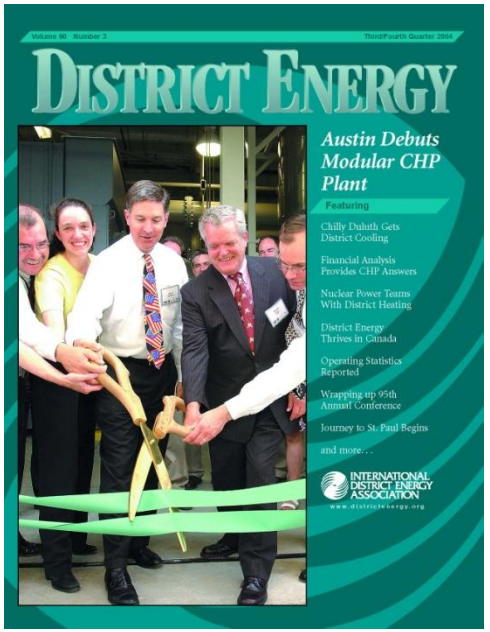
ES Engineered Systems

kab KEEP AUSTIN BEAUTIFUL

2007 Pacesetter Plant Award

COMBINED CYCLE Journal

Steel Tank of the Year - Special Storage
Dell Children's Medical Center in Austin, TX
Built by CB&I Constructors Inc.,
The Woodlands, TX



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