WELCOME TO THE CHP SUMMIT:
WESTERN MISSOURI

Presented by the Missouri Division of Energy
and Spire Energy
Combined Heat & Power, A Natural Fit for Healthcare

CHP Summit, October 16, 2018
St. Vincent’s Chilton Hospital
St. Vincent’s Chilton Hospital

• Located on I-65 North halfway between Birmingham and the Montgomery
• 30 Bed Acute Care Facility
• Designed to be highly efficient for many years to come with advanced,
  – Building Automation Systems
  – Lighting
  – Exterior Insulation Finish Systems
  – Membrane roof
  – Low infiltration
  – Advanced Energy Systems
Missouri Connection

• Building owned by Chilton County and managed by the Chilton County Healthcare Authority.

• Hospital operated by St. Vincent’s Health Systems of Birmingham which is owned by Ascension.

  – **Ascension:**
    101 South Hanley Rd.
    St. Louis, MO 63105

• About Ascension,

  – 150,000 employees and 36,000 aligned providers
  – Operates 2,500 sites
  – 22 states
CHP Project Development

- **Identify need** - Reliability, resiliency, environment or economics.
- **Education, outreach and advocacy**
- **Qualification** - Determine technical potential and cost effectiveness.
  - Minimal site information and average utility costs.
- **Feasibility** - Level 1 and level 2 feasibility analysis with a qualified provider.
- **Procurement** – Procurement planning, contracting, financing, permitting and commissioning.
- **Operations and maintenance**

Resource: www.energy.gov, EPA CHP Project Development Handbook, CHP TAPs
Why CHP at St. Vincent’s Chilton?

• Efficiency
• Environmental benefits
• Economics
• Resiliency
Efficiency and Environmental Benefits

Conventional Generation

- Power Station Fuel (U.S. Fossil Mix)
  - 91 Units Fuel
  - Efficiency: 33%

- Boiler
  - 56 Units Fuel
  - Efficiency: 80%
  - Heat

Combined Heat and Power

- 5 MW Natural Gas Combustion Turbine and Heat Recovery Boiler
- Electricity
- Combined Heat & Power (CHP)
- 100 Units Fuel

51% ...overall efficiency... 75%

45 ktons/yr ...total emissions... 23 ktons/yr
Resiliency

Hospital is located near the Alabama Emergency Management Agency.

According to Kiplinger’s list of States Most at Risk of Disaster between 2006-2015, Missouri is 4th and Alabama is 5th.
Natural Gas Equipment

• Kitchen
• Water Heating
• Condensing Domestic Water Heaters
• Condensing Hot Water Boilers
• Steam Humidifiers
• Micro-Turbines
• Waste Heat Absorption Trigen Chiller
Domestic Hot Water Heater

- Kitchen Hot Water
- 2 at 150 MBH
- Up to 96% Thermal Efficiency
- 5:1 Modulation
- Vent up to 100 equivalent feet
- Smart Controls
Hot Water Boilers

- Heating and domestic hot water boilers
- 2 at 4,000 MBH
- Ultra low emissions
- Up to 98% efficient
- 5:1 turn down
- Metal fiber premix burner
Micro-turbines

- 2-Capstone Turbines
- 65 kw / Turbine
- Power Used Within Facility
- Turbine Exhaust Powers Absorption Chiller
Waste Heat Chiller

- Trane Thermax Chiller
- 1-150 Ton Chiller
- Turbine Waste Heat or Auxiliary burner
- Trigen Machine provides,
  - Cooling
  - Heating Hot Water
  - Domestic Hot Water
Chilled Beam System

• Saves
  – Space
  – Energy, Low Fan Energy
  – Maintenance
• Active Chilled Beams
• Passive Chilled Beams
• Hydronic Based 4-pipe Central System
Combustion Turbine with Heat Recovery Generator

- Fuel
- Turbine
- Generator
- Absorption Chiller
- Cooling
- Heating
- DHW
- Water
- Electricity
- Hot Exhaust Gases
- Hospital
Coming Soon!-Engine Driven Natural Gas Chiller

- Tecochill Natural Gas Chiller
- Supplies,
  - 150 tons of cooling
  - Waste heat for DHW and heating HW
- Resilient emergency cooling
- Reduces emergency electric generator load
- Variable speed and load following
MOB Expansion