Combined Heat & Power (CHP)

Michael Ellis
Director
AGL Energy Services

Federal Energy Management Program

Virginia Natural Gas
An AGL Resources Company
What is Combined Heat & Power (CHP)?

“CHP is the most efficient way of generating power available today.”

-American Council for an Energy-Efficient Economy
Over Two-Thirds of the Fuel Used to Generate Power in the U.S. Is Lost as Heat

Bob Slattery   Oak Ridge National Laboratory

Federal Utility Partnership Working Group
May 7 - 8, 2014   Virginia Beach, VA
Big Picture: Direct Use is Most Efficient…
...so, Distributed Generation Makes Sense

Conventional Generation
- Power Station Fuel (U.S. Fossil Mix)
  - 91 Units Fuel
- 147 Units Fuel
- Boiler Fuel
  - 56 Units Fuel

EFFICIENCY: 33%

Combined Heat and Power
- 5 MW Natural Gas Combustion Turbine and Heat Recovery Boiler
- 30 Units Electricity
- 45 Units Steam
- 100 Units Fuel

EFFICIENCY: 80%

51% ...OVERALL EFFICIENCY... 75%

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Why CHP Now?

Federal Drivers & an Executive Order
Regulatory Drivers for CHP

Federal Drivers:

- EISA 2007
- EPAct 2005
- E.O. 13424 and 13514

Also:

Executive Order of August 2012
Accelerating Investment In Industrial Energy Efficiency

Recognizing the benefits of CHP and its current underutilization as an energy resource in the United States, the Obama Administration is supporting a new National goal to achieve 40 gigawatts (GW) of new, cost-effective CHP by 2020

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U.S. CHP Generation Capacity Vision

Source: Combined Heat and Power: Effective Energy Solutions for a Sustainable Future
Sponsored by the U.S. Department of Energy

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What are the benefits of CHP to the Federal facility?

- Power resilience
What are the benefits of CHP to the Federal facility?

“The necessary planning and capability to ensure we have available, reliable, and quality power to continuously accomplish DoD missions from our installations in the face of such disruptions can be described as power resilience.”

- John Conger, Acting Deputy Under Secretary of Defense  Dec 2013
What are the benefits of CHP to the Federal facility?

- **Power resilience**
- **Electric grid security**
What are the benefits of CHP to the Federal facility?

One month after The Wall Street Journal revealed that the United States “could suffer a coast-to-coast blackout” if just nine power substations were knocked out, the Senate Committee on Energy and Natural Resources is scheduled to hear testimony on the electric grid’s security and reliability.

-Alan Heuhauser (Senate Committee Takes Up Power Grid Security) April 10, 2014
What are the benefits of CHP to the Federal facility?

- Power resilience
- Electric grid security
- Reduced energy costs
- Stability of energy costs
- Energy efficiency and reduced greenhouse gases
Natural Gas is the Dominant Fuel for Existing CHP

Existing CHP Capacity by Fuel – 82 GW

- **Natural Gas**: 71%
- **Coal**: 15%
- **Biomass**: 1%
- **Other**: 1%
- **Wood**: 2%
- **Waste**: 9%
- **Oil**: 1%

Source: ICF/CHP Installation Database

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Changing Economics: Natural Gas Prices Exceptionally Low

Between June 2008 and August 2012, Henry Hub natural gas prices have decreased 78%.

Source: U.S. Department of Energy, Energy Information Administration
Natural Gas: American, Abundant, Affordable
Natural gas use for power generation has increased 87% in the past 25 years.
Power Generation Mix

Source: U.S. Department of Energy, Energy Information Administration
Financing of CHP at Federal Sites

Financing Vehicles utilized:
- Energy Savings Performance Contracts (ESPC)
- Utility Energy Savings Contracts (UESC)
- Enhanced Use Lease (EUL)

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Thank You