Industrial Application of CHP

Examples of CHP at Industrial Sites

Mike Kemp – HCS GROUP, INC.

Industrial Application of CHP

Examples of Cases at Industrial Sites

Presentation Focus

- What Drives Combine-Heat-Power (CHP) Projects
- Identify Applicable Project Characteristics
- Current Trends Being Observed in Market
- Information on Successful Projects
- Types of Facilities Which Are Positive Candidates

Industrial Application of CHP

Examples of Cases at Industrial Sites

Why Should CHP Be Considered

- Increase Energy Efficiency
- Reduces Overall Operating Expenses
- Increase Reliability
- Potential Safety Enhancement
- Emission Reductions
- Mitigation of Future Carbon Cost Impacts
- Potential for Renewable Energy Credits
- Proposed Increase in Tax Credits

Industrial Application of CHP

Examples of Cases at Industrial Sites

Current Trends Driving CHP

- Energy Savings
  - Opportunities Exist Even in Down Economy
  - Funding is Critical Point
  - New Technologies Providing Opportunities
    - Mechanical Equipment
    - Thermal Fluids
    - Organic Rankine Cycle (ORC) Cross Integration

Industrial Application of CHP

Examples of Cases at Industrial Sites

Current Trends Driving CHP (Continued)

- Regulatory Compliance
  - More CHP Friendly Permitting Requirements
    - Added Enhancement on Smaller Facilities (<10Mw)
    - New Turbine Combustion Emission Systems
  - Foreign Companies Needing International Credits for Kyoto Protocol (1st Stage is end of 2012, Extension Being Considered)

Industrial Application of CHP

Examples of Cases at Industrial Sites

Current Trends Driving CHP (Continued)

- Operational Impacts
  - Better Understanding on Thermal De-coupling
  - Utility Transmission Limits on Future Projects
  - Redundancy on Critical Applications (Power or Thermal)
  - New/Enhanced Combustion Systems for Non-Standard Fuels Allows for Opportunities
  - Flexibility in Systems Types

Industrial Application of CHP

Examples of Cases at Industrial Sites

Current Trends Driving CHP (Continued)

- Replacement of Aging Equipment
  - Direct Fired to Excess Heat Usage
  - Upgrade/Replacement of Existing Excess Heat Recovery Units Allowing for Thermal Enhancement
- Financial Opportunity Window
  - Added Tax credits Proposed by Federal Govt.
  - Depending of Fuel Classification up to 30% Credit
  - Specific Thermal and Electrical Efficiency Requirements

Industrial Application of CHP

Examples of Cases at Industrial Sites

Economic Drivers

- Internal Consumption (Wholesale Vs Retail) Affecting Utility Costs
- Projections of Lower Natural Gas Prices
- Potential of Carbon Regulations to Increase Utility Power Prices
- Tax Implications on Reducing Capital Investments

Industrial Application of CHP

Examples of Cases at Industrial Sites

Polymer Facility

Provides 22 MW of 80 MW Need

Multiple Units Reduced Power Standby Charge

Capacity of 500 kpph of Steam

Total Cycle Efficiency of 89%

IRR ~ 40%

Industrial Application of CHP

Examples of Cases at Industrial Sites

Refining Facility

Provides 8 MW of 20 MW Need

Provides All Steam 80 kpph

Avoided New Utility Charges

Replaced Aging System

Doubled Total Cycle Efficiency

IRR ~ 35%

Industrial Application of CHP

Examples of Cases at Industrial Sites

Site Challenges for Existing Locations

Used Abandoned Building to Meet Spacing Requirements

Area 200’ x 70’

Industrial Application of CHP

Examples of Cases at Industrial Sites

Building Services

Provides 2 MW of 3 MW Need

Capacity of 650 Ton Chilled or Hot Water

Engine Exhaust and Cooling Water Recovery

Total Cycle Efficiency of > 60%

IRR ~ 40%

Industrial Application of CHP

Examples of Cases at Industrial Sites

Paper Recycle

Provides 4 MW of 7 MW Need

Capacity of 80 kpph of Steam

Driven by Change in Utility Contract

Total Cycle Efficiency of > 90%

IRR ~ 50%

Industrial Application of CHP

Examples of Cases at Industrial Sites

Water Treatment

Provides 3 MW of 4 MW Need

Capacity of 300 gpm Hot Water

Engine Driven Generators on Waste Fuel

Total Cycle Efficiency of > 60%

IRR ~ 35%

Industrial Application of CHP

Examples of Cases at Industrial Sites

Other Facilities Candidates for CHP

- Direct Drying Applications (Catalyst Manufacturer)
- Natural Gas Processing/Treating
- Mining/Minerals
- Sub-system Within Merchant Utility Plant
- Specialty Plastics (Cooling and Heating)
- Petrochemical/Refining
- Other Facilities With Large Thermal to Electrical Loads