CHP Working Session

Developing successful CHP projects

Reliable power when and where you need it.
Clean and simple.

Elements of a successful CHP project

1. Compelling project economics
   - Meets savings target
   - Stable commodities environment
2. Motivated customer
   - Interested in benefits, environmental or monetary
   - Willing to invest (time and money) for project development
3. Regulatory permission
   - Air permitting
   - Interconnection
   - Building Permits

Developers can identify a good project, but must also have a motivated customer

Motivated Customer

1. Reasonable savings expectations
2. Multi-level support
   - Facilities
   - Operations
   - Management
3. Resource Commitment
   - Process/usage data
   - Supports engineering activities
   - Prioritizes project
4. Believes in technology / Product

CHP Project roadblocks

1. Air permitting / Interconnection
   - Real or perceived?
   - Should not be a concern until after an initial applicable
2. Engineering reviews / studies
   - Third party reviews and studies can waste project money
   - Use a qualified and familiar partner if 3rd party review is required

CHP Project roadblocks

3. Project Financing
   - Will reduce savings, increase timeline
   - Use qualified with experience funding CHP (or customer's bank)
4. Shifting Priorities
5. Mistrust in technology
   - Not a new technology, case studies are abundant
   - Focus on application, not the end-user

CHP policy and utility barriers

1. Incentives – can motivate customers and help projects
    1. Monitoring requirements – need to be minimal
    2. Availability of funds – will the customer be funded
    3. Project requirements – do they damage project ROI?
2. Investment Tax Credits
    1. Can customer monetize?
    2. Is it worth monetizing?

CHP policy and utility barriers

3. Interconnection
    1. Reasonable cost and time
    2. CHP tariff preserves ROI (demand ratchet, tariffs)
    3. Departing load or non-bypassable charges
4. Fuel Supply
    1. Availability, infrastructure costs
    2. Rates reflecting increased usage
5. Air Permitting
    1. Increased fuel use changes air permit
    2. Considered insignificant source

FDS Plastic Case Study

- Great Project and Customer
  - Understand the system technically and economically
  - Provide resources for design and optimization
  - Motivated by $ savings and environmental benefits
  - Actively promotes project success

    "Business should be required to do CHP"

- FDS total electric load is 1.5MW
  - 6 Capstone C65 units provide 300kW (1/5) of total load
  - Without Capstone CHP total load would be ~1.6MW

- The CHP system runs in Parallel with SCE
  - waste heat offsets natural gas fired plastic dryers
  - waste heat offsets electric powered cooling for sheet forming

Economics Without CHP

- Value of self-generated electricity
  - 300kw(30day)(24hr/day)($.165/kwhr)
  - $35,640/month
- Electric cost to run traditional chillers
  - 120kw(24hr/day)(30days)($.165/hr)
  - $14,256/month
- Fuel cost to run traditional dryer
  - (895,000btu/hr(2 units)(30days)(24 hr/day))/100,000 btu/therm= 12,888 therms/month
  - Nat. Gas Cost=$.68/therm
  - 12,888therms/month($.68/therm)= $8763/month.

Economics with CHP

- Capstone CHP partially offsets electric purchase and provides drying and cooling
- CHP System gas cost
  - 34,435 therms/month gas used @ $.41/therm plus transmission cost
  - $16,422/month
- Total Value of CHP system outputs
  - $35,640 (electric value)+$8763(burner savings)+$14,256(chiller savings)
  - $58,659/month
- Total cost to operate CHP system
  - $16,422/month (gas) + $3,083/month (O&M)
  - $19,505/month
- Total Savings $39,153/month (or $469,848/year)
- 39 month ROI, with a $1.5 million dollar install cost. (without any state or federal incentives)

www.capstoneturbine.com