Combined Heat and Power Program

Massachusetts Program Administrators

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CHP as an Electric Energy Efficiency Measure

Green Communities Act of 2008 now recognizes CHP projects as an Energy Efficiency Measure eligible for Incentive Funding by Program Administrators ("Utilities plus Cape Light Compact").

CHP Program Incentives

- Systems smaller than 150 kW: $750 per kW
- Over 150 kW: No more than $750 per kW
  - Incentive offered will consider the overall added value of the CHP project to the PA's EE portfolio considering factors such as the overall building energy efficiency, BCR ratio and project risk.
- Up to 50% of Installed Cost
- May be subject to Program Administrator Budget Limitations

Requirements

- Passes Massachusetts' Benefit/Cost Test Requirements
- 60% Combined Electric and Thermal Efficiency (HHV basis)
  - A project which barely exceeds the minimum efficiency requirement is unlikely to have a BCR > 1.0
- Overall building energy efficiency measures are also implemented
  - Discuss specific requirements with applicable Program Administrator.

Benefit/Cost Ratio Test

- BCR Test considers societal value of CHP Project
  - Quantity: kW, kWh, Fuel Fired to CHP system and Boiler Fuel Savings
  - Timing: Winter/Summer – Peak versus Off-peak
  - Pricing:
    - Wholesale values for electricity and fuel costs
    - Installed Cost of System
    - Federal Tax Credits and Grants
    - Maintenance Costs
- BCR Analysis is ≠ Customer Economics

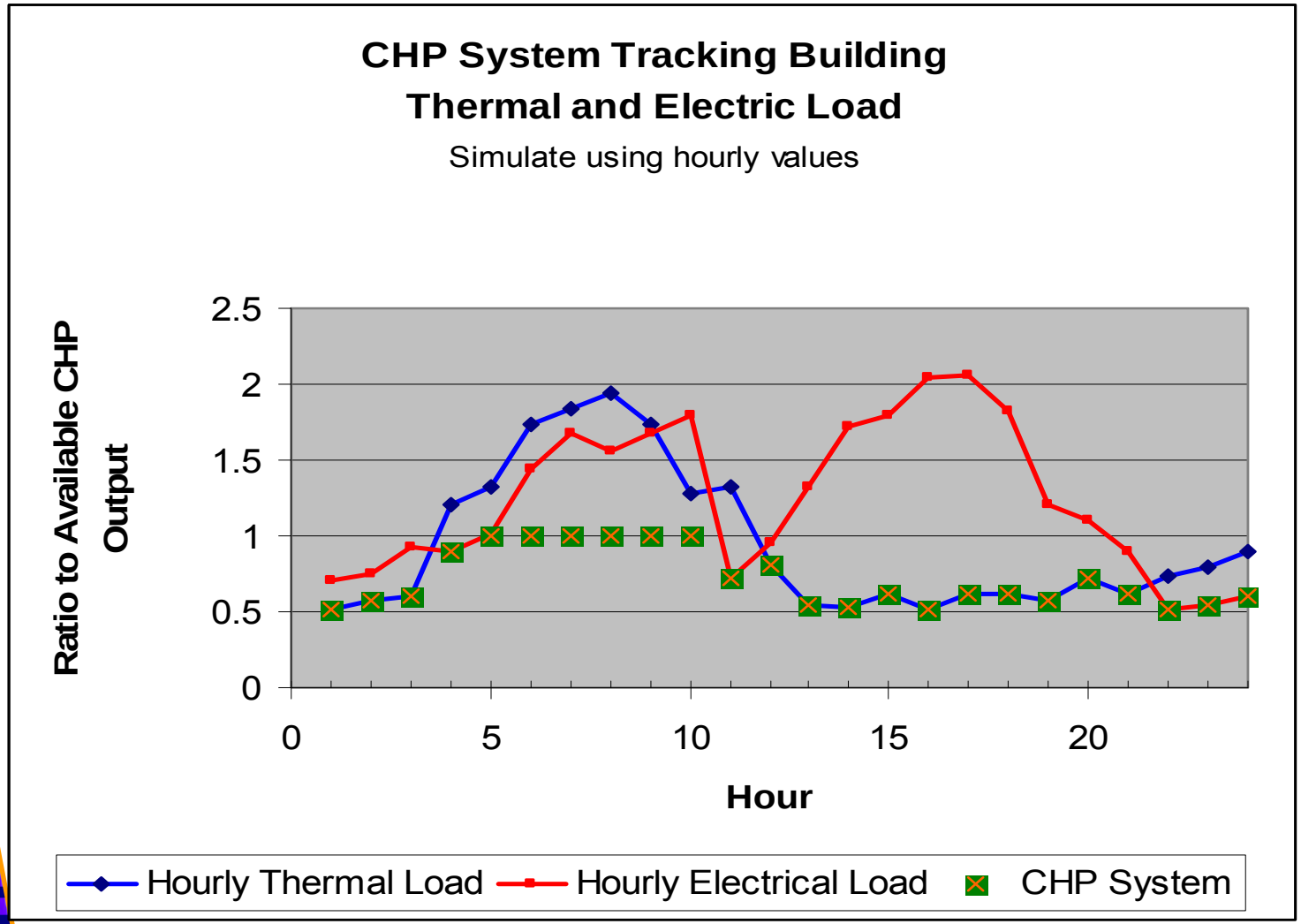
Primary BCR Drivers

- CHP System Electrical and Thermal Efficiencies
- Utilization of CHP Thermal Output
- Run Hours (while utilizing thermal output)
- Installed Costs
- Maintenance Costs

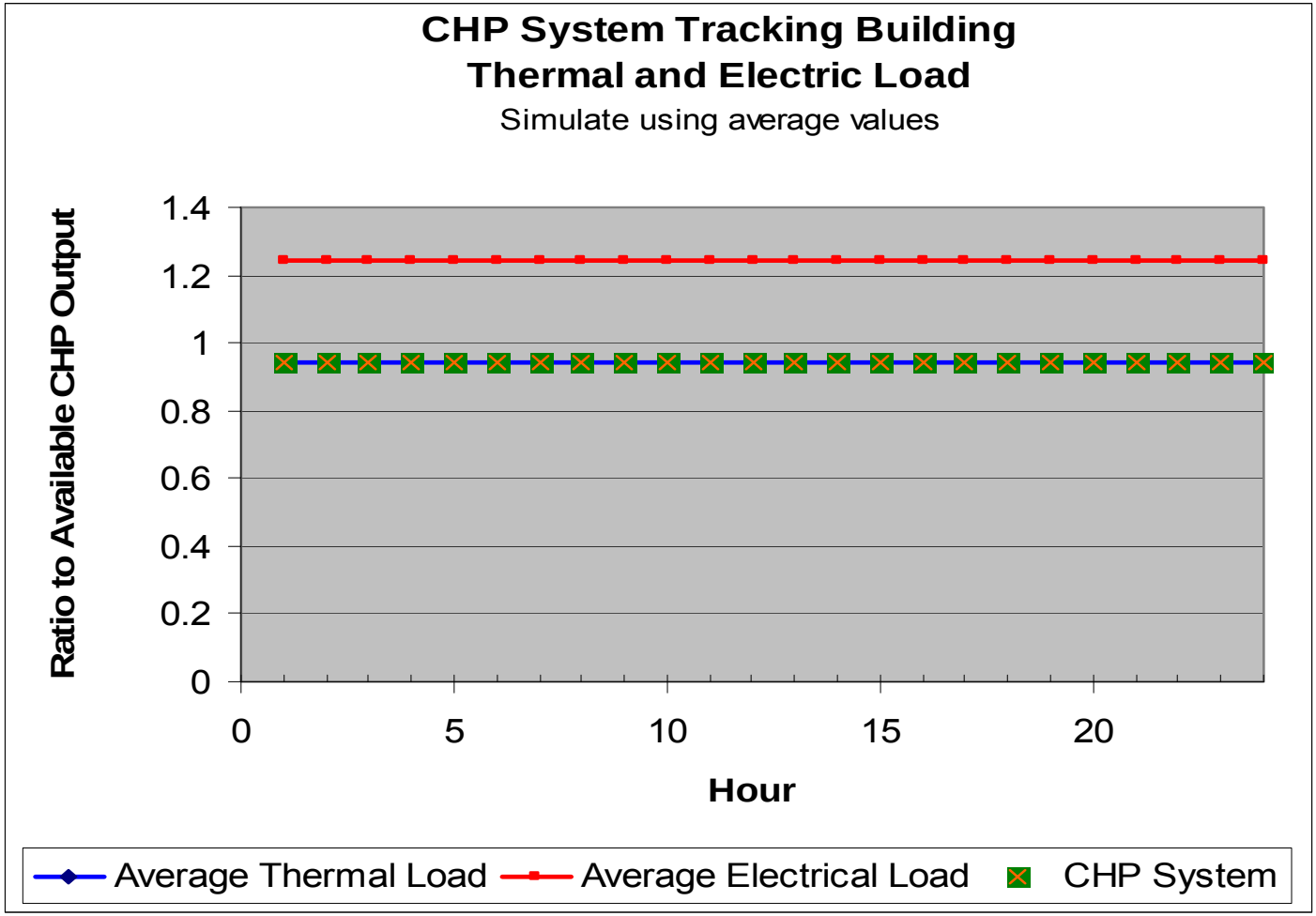
Analysis Detail

- Detailed hourly analysis is essential to determine the financial benefit to the customer and the Utility Model Benefit/Cost Ratio.
- Can be provided by the proposing contractor or through a separate engineering study.
- PA will pay the customer 50% of the reasonable costs for performing an approved Engineering Technical Assessment.

Required Hourly Analysis



Monthly Averages for Analysis



Analysis Comparison Hourly Granularity vs. Monthly Averages

	Equivalent Full Load Hours during Month
Simulate using Hourly Electrical & Thermal Load	530
Simulate using Average Electrical & Thermal Load	701

Overstatement from using Average Values 32%

Analyzing Proposals

- **Comparing technology and manufacturers:**
  - Cost, performance and electric/thermal efficiency may vary widely
  - If gas supply pressure is insufficient, a booster compressor may be needed - reduces net electric output
  - Fuel Input to Engine presented on an HHV basis
- **Proposal detail and supporting calculations:**
  - Supporting detail for claimed benefits (from proposing contractor or third party engineer)
  - Consider planned changes to building electric and thermal consumption
- **Proposals should consider variations in equipment size:**
  - Smaller sizes will typically have more run hours – may be more cost-effective
  - Larger sizes will usually run fewer hours – may have unused electric and thermal output adversely affecting economics

Analyzing Proposals (cont'd)

- Understand basis of energy benefits/costs:
  - Marginal Value:
    - Electric energy produced, boiler fuel savings, and fuel costs to operate.
    - Electric demand savings and required operation to achieve.
    - Value of exported electric power (usually minimal - best to avoid export)
  - Maintenance costs (Routine and overhauls)
- Standby power charge (if applicable)
- APS credit value (if applicable)
- Potential tax incentives
- Financial analysis and sensitivities:
  - Consider historical and future projections

Summary

- Many facilities may benefit from CHP
- Niche market applying to a subset of all facilities
- Best applications fully utilize electric and thermal energy outputs with sufficient run hours to meet required financial criteria