

### **Required Information in a Detailed CHP Feasibility Study (Total study cost greater than \$20,000 total cost)**

The following information must be included in detailed CHP feasibility studies, in addition to general final report requirements in Appendix B-2.

#### **System Information**

- Energy use profiles must be reviewed in detail to accurately determine the level of temporal coincidence between thermal and electrical loads to be satisfied by the CHP system. An electronic copy of a spreadsheet-based model that describes system operation, including electricity produced and heat recovered on an hourly basis must be provided with the DEA. Assumptions used in the model should be clearly indicated in the DEA.
- Thermal usage and electricity profiles must be illustrated in a figure for variance by month for one year and by hour on a summer, winter and shoulder day.
- The type and rating of the prime mover and an energy balance around the prime mover must be shown. The energy balance must be applied to a schematic of the system showing all major components, including the uses for the recovered heat. Annual totals for each energy input/output must be shown along with maximum, minimum, and average instantaneous values. Temperatures for each waste heat transfer fluid and sink must also be indicated.
- CHP system efficiency and emissions must be described.
  - Annual thermal utilization percentage must be given (i.e., the annual amount of heat that is recovered for space and/or process heating and/or cooling divided by the annual recoverable thermal output from the prime movers).
  - Fuel conversion efficiency (FCE) for the prime movers must be provided. FCE is defined as the ratio expressed as a percentage of the total usable energy produced by a technology to the sum of all fuel or other energy inputs to the technology measured at each fuel's lower heating value.
  - The annual emissions of the proposed system must be provided.
  - Any additional emission control technology must be provided if necessary to meet emission regulations.
- The description of the proposed system must include a preliminary floor plan indicating equipment location. Construction cost estimates should include estimates for rigging, building construction (if necessary) and any anticipated structural modifications.
- The pressure and availability of natural gas must be described in the study.
- An operational sequence must be included that specifies the control system to be used along with a discussion of its integration with other on-site control systems and who will have responsibility for system operation.
- A project schedule that includes durations for design (engineering & architectural), utility coordination and review, permitting (environmental and construction), construction, start-up, and commissioning must be provided.

#### **Economic Evaluation**

- Electricity, fuel, operation, and maintenance costs before and after the proposed installation along with a summary of project economics must be included.
- Economics must be presented in a simple payback format. Additionally, a cash flow analysis or life cycle cost analysis must be presented.
- Operational costs must include any impact to the customer's energy tariffs.
- Maintenance costs can be listed in \$/kWh, but must also be annualized. This should include M&V costs.
- Capital costs must include:
  - Equipment purchase and system installation
  - Structural (new building, existing building modifications, etc)
  - Interconnection and Utility Connection (construction & utility fees)

- Electrical distribution system changes
- Rigging
- Permitting
- Design fees
- Commissioning

### **Maintenance**

- In addition to inclusion in the economic analysis described above, maintenance items must be described in detail. The source of the maintenance costs must be included along with a list of what would be covered (i.e. annual major overhaul of prime mover, oil changes, etc.).
- An estimate of downtime that would occur due to routine maintenance must also be included.

### **Tariff Impacts and Interconnections**

- In addition to inclusion in the economic analysis described above, a detailed description of the relationship between the proposed CHP facility and the Customer's existing energy tariffs must be included. Contract dates and dates of potential tariff rule must be included. In the case where such future changes would significantly impact the economics of the Project, sensitivity analysis must be presented assuming the potential tariff or contract changes occurred.
- Site-specific grid interconnection issues and costs must be discussed. A brief, clear plan for if and how the system will be properly interconnected to the grid, natural gas pipelines and/or the Con Edison steam system must be presented.

### **Permitting**

- A brief description of the necessary environmental and building permits that the customer needs to obtain must be provided. The permit determination should be based on the annual emissions potential for the size of the unit and the emissions of any existing equipment at the facility. Anticipated time frames and durations for environmental, utility and construction permitting should be incorporated in the Project schedule.

### **System Reliability and Availability**

- The reliability and availability of the CHP System must be quantified (e.g. number of hours the system would be available at less than full capacity). This must be compared to service and discussed in the context of the Customer's core business and tolerance for risk.