

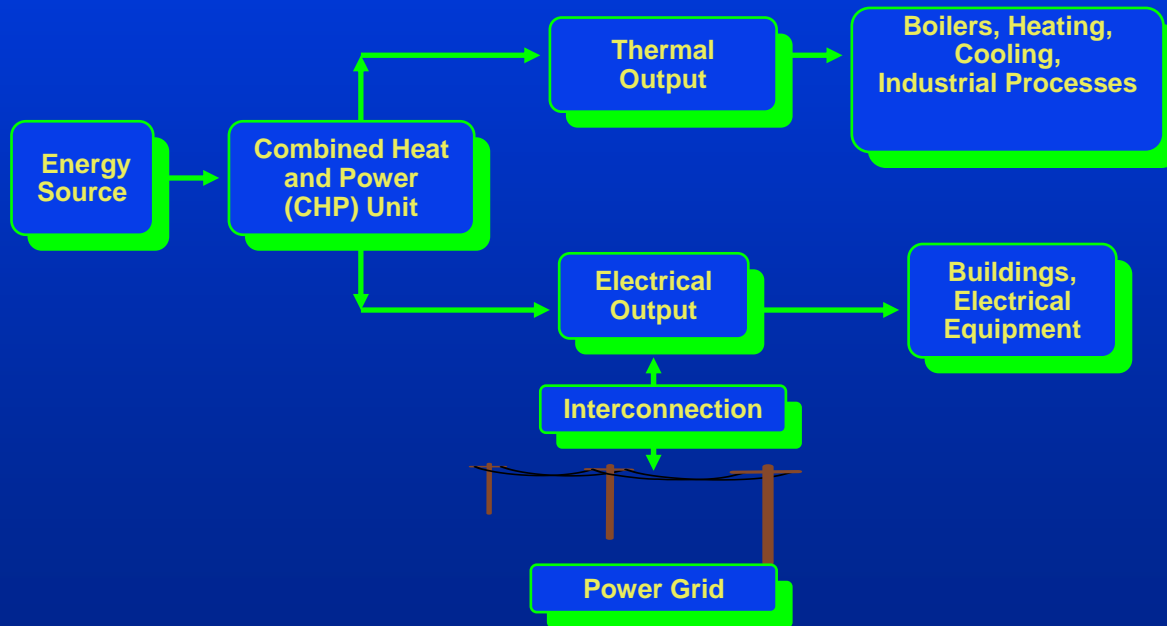
Combined Heat and Power Southwest Gas Incentive Program

November 20, 2008

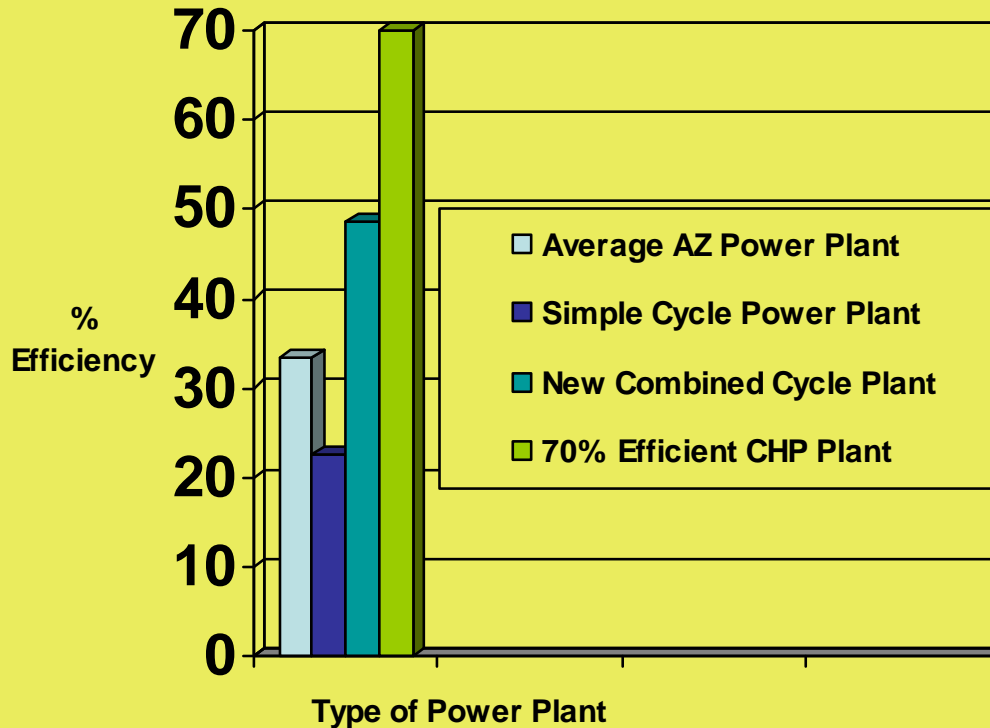


Brian O'Donnell, PE

Combined Heat and Power (CHP) Schematic



ENERGY EFFICIENCY of POWER PLANTS



CHP ECONOMIC DECISION USE SPARK SPREAD METHOD



Price for Electricity: X

Equivalent Price for Electricity with CHP: Z

Cost of Fuel to Make Electricity: Y

$$Z = \frac{Y}{\text{CHP Efficiency}} \text{ (Fuel Conversion Factor)}$$

$$\text{Spark Spread} = X - Z$$

Example

Electricity Price = \$0.092/kWh

Fuel Price = \$8.70/MMBtu (million Btu)

CHP Efficiency = 85%

$$\text{Equivalent Cost} = (\$8.70 \div 0.85) \times \frac{3412 \text{ Btu/kWh}}{1,000,000 \text{ Btu}} = \$0.035/\text{kWh}$$

$$\text{Spark Spread} = \$0.092 - \$0.035 = \$0.057/\text{kWh}$$

CHP or Buy From the Grid

- **Operate CHP**
 - Turbine or Engine Cost
 - Maintenance
 - Operations
 - Standby Charges
 - Finance Costs
 - Auxiliary Power Consumption
- **Buy From the Grid**
 - Electricity
 - Boiler Fuel
 - Boiler Maintenance
 - Operations



Program Description

- CHP systems can Help Arizona commercial and industrial businesses increase energy efficiency and save on energy costs
- Customers may qualify for financial support **up to 50%** of the installed costs for CHP systems that meet requirements and energy-efficiency standards
- Projects will be selected by Southwest Gas

Program Limitations

This program will be limited to Southwest Gas Arizona customers who qualify under the program requirements.

Feasibility

Southwest Gas Key Account Management engineers or its contractors may work with the customer or customer's consultants to prepare preliminary economic studies and environmental assessments to determine the feasibility of CHP projects.

Eligibility for Incentives

To be eligible for funding, CHP technologies will be required to achieve a total fuel efficiency of **60 to 70% or higher**.

This efficiency must be shown during standard operations as defined by the customer. Standard operations will vary depending upon the type of facility where CHP is being utilized.

Amount of Incentives

- \$500/kW for CHP systems with minimum fuel efficiency of 70%, up to a maximum of **50%** of the installed cost of any project.
- \$450/kW for CHP systems with minimum fuel efficiency of 65%, up to a maximum of **50%** of the installed cost of any project.
- \$400/kW for CHP systems with minimum fuel efficiency of 60%, up to a maximum of **50%** of the installed cost of any project.

Savings

CHP proposals must show savings in one or more of the following areas:

- Energy usage**
- Energy demand**
- Emissions**
- Water use**

These savings will be estimated by comparison to a baseline both with and without the measures.

Total Annual Program Funding

- **Incentives: \$350,000**
- **Energy/design studies: \$22,000**

Application Dates for 2009

Opening Date for Applications

- Cycle 1 TBD
- Cycle 2 TBD

Deadline for Applications

TBD
TBD

Application Requirements

- **Complete the program application form and supply additional documents as shown in the application**
- **Include 12 months of gas and electric utility bills**
- **Include a copy of a CHP preliminary project economic feasibility study.**
- **A final study stamped by an Arizona registered professional engineer (PE) will be required prior to award.**
- **Applicants may request partial funding for either the preliminary or final study depending upon the project circumstances.**

Project Evaluation and Selection

- Southwest Gas will review applications on a first-come, first-served basis and select qualified projects, until all funding is used.
- Any project submitted will have a three year application life and will be considered prior to other projects submitted in later application cycles.
- The incentive program will continue until all funds are depleted. Any funding not used in one year cannot be carried over to the next.

Owner Agreement with Southwest Gas

- Southwest Gas may award only a portion of project funding or no project funding at all.
- All projects awarded will require that the facility owner sign an agreement with Southwest Gas. The agreement will specify verification of project costs, project fuel efficiency and ensuring that the **project will remain in operation a minimum of three (3) years.**
- The agreement will also specify when funding will be provided to the project as well as other pertinent information.
- After the CHP project is operational, Southwest Key Accounts Management will verify energy savings and demand reductions during normal operations.

COMBINED HEAT and POWER

Southwest Gas Incentive Program Application

For questions regarding this application, please contact Key Accounts at (602) 395-4058

• Project Name: _____ Date: _____

• Project Address: _____

• Project Contact Name: _____ Title : _____

• Phone: _____ Cell: _____ E-Mail: _____

• Section I. Proposed Project

• A. Size of Project in kW (or Hp if not producing electricity): _____

• B. Project Description (e.g. 100 kW generator with waste heat to displace boiler load):

C. Size and Description of Proposed Equipment (e.g: 100 kW Caterpillar model XXX natural gas generator, 600,000 Btu/hour heat exchanger, electric switchgear, concrete supporting structure, process piping, etc).

Obstacles in Implementing CHP Program in Arizona

- **Arizona Corporation Commission supportive of concept (but fuel cells, microturbines and natural gas blending projects deleted)**
- **Renewable Energy Advocates and Electric Utilities somewhat wary of CHP except with use of hydrogen**
- **Utility rules and tariffs for interconnection, net metering and standby charges currently being developed**
- **Natural gas price spikes and economy add uncertainty for potential CHP users**

History/ Status of CHP in Arizona

- About 15 CHP systems installed through the 1970's, 80's and 90's.
- Electric deregulation killed the CHP market
- SW Gas CHP program was introduced in April 2008
- A fuel cell project and a blended gas project have shown the most interest (not qualified under the guidelines)
- Adjustments in program guidelines might be considered in 2009
- CHP is capital intensive and takes time to develop

Contact Information

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