

Combined Heat and Power (Cogeneration)

ENERGY STAR[®] Award and CHP Certificate of Recognition

The United States Environmental Protection Agency (EPA) and the United States Department of Energy (DOE) are proud to announce this year's activities recognizing cost-effective, high-efficiency combined heat and power (CHP) projects. Both EPA and DOE want to promote environmentally beneficial CHP projects that reflect leadership in helping achieve the national goal of doubling CHP capacity by 2010.

The **ENERGY STAR[®] CHP Award** highlights projects using at least 10% less fuel than separate heat-and-power generation. Projects must have a minimum of 12 months and 5,000 hours of operating data, and thermal energy must comprise between 10% to 90% of total net system output. Finally, all facilities must be operating within existing emission permit levels to apply.

A **CHP Certificate of Recognition** recognizes efficient energy conversion projects that demonstrate leadership in environmental performance without achieving the strict award criteria. Projects that demonstrate emerging technologies, fuel diversity, or otherwise advance new markets for environmentally beneficial CHP are candidates for the certificate. New projects with less than one year of operation are eligible for a certificate based on design efficiency and operating data.

Basic Application Information

1. Facility name and address
2. Contact name and information
3. Total net project efficiency
4. Other environmentally beneficial characteristics
5. Signature of responsible official

Process

An EPA/DOE committee will review all applications. The application deadline for the 2001 ENERGY STAR Award and Certificate of Recognition is February 1, 2001. Multiple awards and certificates may be presented to one organization based on the number and type of applications.

Recognition

An award or certificate will be presented to select CHP project participants recognizing their contribution to expanding the development of efficient energy conversion processes. Award winners will be recognized at the ENERGY STAR Awards Program in Washington, DC on March 20, 2001. Additional recognition may include highlighting winners on EPA and DOE web sites, in press releases, and in case study materials. Awards may also be presented at industry and/or association proceedings.

Example Award Efficiency Criteria Assessment

For purposes of the ENERGY STAR CHP Award evaluation process, CHP project efficiency will be compared to highly efficient separate heat-and-power generation (e.g. an onsite boiler and grid electricity). Comparisons will be performed assuming a natural gas combined cycle electric-only plant operating at a heat rate of 6,800 Btu/kWh (50% efficient) and an 80% efficient boiler. To be eligible for consideration, the CHP project must use at least 10% less fuel at the same power-to-heat (P/H) ratio.

Assume, for example, a 10 MW and 100,000 lb. steam/h (29.3 MW_{thermal}) CHP system (P/H ratio = 0.34).

Separate heat-and-power fuel calculation:

Fuel to generate electricity

$$(10,000 \text{ kW}) * (6,800 \text{ Btu/kWh}) = 68 \text{ mmBtu/h}$$

Fuel to generate steam:

$$(100,000 \text{ lb. steam/h}) * (1 \text{ mmBtu}/1,000 \text{ lb. steam}) / 80\% = 125 \text{ mmBtu/h}$$

Total fuel used = 193 mmBtu/h

CHP minimum efficiency award calculation: (less 10% fuel)

$$\text{Fuel input} = 90\% * (193 \text{ mmBtu/h}) = 174 \text{ mmBtu/h} = 50.9 \text{ MW}$$

$$\text{Power output} = 10 \text{ MW}_{\text{electric}} + 29.3 \text{ MW}_{\text{thermal}} = 39.3 \text{ MW}$$

$$\text{Award-eligible efficiency} = (39.3 \text{ MW}) / (50.9 \text{ MW}) = 77\% \text{ or higher}$$

The above calculation demonstrates that the award eligibility efficiency varies with power-to-heat ratio. The following table shows the minimum award eligibility efficiency (HHV) at different power-to-heat ratios.

P/H Ratio	Award Eligibility efficiency
0.11	84%
0.25	79%
0.50	74%
1.00	68%
2.00	63%
4.00	60%
9.00	58%

Additional Information/Application Materials

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 www.eren.doe.gov/der/chp

If the installation startup date is after December 1, 1998, you are eligible to sign up for the Department of Energy CHP Registry. Contact Merrill Smith for more information.

ENERGY STAR® CHP Award and Certificate of Recognition Application



All applicants must fill out the information in the space provided. Supporting documentation with operating data is required.

General Information

Company/Organization: _____

Facility name: _____

Facility address: _____

Project startup date: _____

Contact name: _____

Contact title: _____

Contact address: _____

Contact phone: (____) _____

Contact fax: (____) _____

Contact E-mail: _____

Technology Information

	Design Capacity	Single Year Operating Data ¹
Net power capacity	kW	kWh
Net thermal capacity	mmBtu/h	mmBtu
Heat input (HHV)	mmBtu/h	mmBtu
Total net efficiency (%)		

Annual operating hours: _____

% electricity sold to grid: _____

¹ Systems operating for less than one year are eligible for a certificate based on their design efficiency and available operating data. Supporting documentation of operating efficiency is required. This includes a monthly summary of total fuel input, gross energy output, and parasitic losses. Any twelve months of consecutive operating data is acceptable (must include all data not just best 5000 hours) beginning October 1999 to January 2000.

