

Opportunities and Resources for Biomass Combined Heat and Power

Benefits

Using biomass instead of fossil fuels to meet energy needs with CHP provides many potential environmental and economic benefits, which can include:

- Reduced greenhouse gas and other emissions
- Reduced energy costs
- Improved local economic development
- Reduced waste
- Expanded domestic fuel supply
- Reduced transmission and distribution losses

Market and policy forces are increasingly driving strong interest in biomass as a fuel source to reduce the environmental impact of energy production and expand the development of domestic and renewable energy sources. Biomass is used most efficiently for power and heat production in combined heat and power (CHP) projects. The U.S. Environmental Protection Agency (EPA) CHP Partnership offers a wide variety of tools and resources for energy users and other parties interested in biomass CHP.

Biomass CHP. In almost all cases, the production of electricity from biomass resources is most economical when the resulting waste heat is also captured and used as valuable thermal energy—known as CHP or cogeneration.

CHP is the simultaneous production of electricity and heat from a single fuel source that can include fossil fuels, biomass, or biogas.

- Biomass fuels (e.g., wood waste, agricultural residues) can be combusted in a boiler or gasified to fuel a CHP system.
- Biogases (e.g., landfill gas, digester gas) can be captured and combusted in a CHP system much like natural gas.

CHP offers distributed generation of electrical and/or mechanical power; waste-heat recovery for heating, cooling, or process applications; and seamless system integration for a variety of technologies, thermal applications, and fuel types into existing building infrastructure. CHP systems typically achieve total system efficiencies of 60 to 80 percent for producing electricity and thermal energy.

Key considerations for a successful biomass CHP project include:

Proximity to fuel source. Biomass is most economical as a fuel source when the CHP system is located at or close to the biomass fuel stock.

Renewable portfolio standards (RPS). As of March 2009, 33 states and the District of Columbia have an RPS, each of which includes biomass CHP as a permissible renewable energy resource.

Grants, loans, or tax credits. Biomass CHP projects often qualify for additional state incentives that traditional CHP systems are ineligible to receive.

EPA CHP Partnership Biomass Tools and Resources

The EPA CHP Partnership offers a variety of tools and services designed to facilitate and promote the development of biomass CHP projects. In addition to the offerings listed, check out the complete list of tools, services, and benefits on the Partnership's Web site: www.epa.gov/chp.

Biomass CHP Catalog of Technologies. This report includes information on cost and performance parameters of biomass-fueled CHP systems, the commercial readiness of a range of biomass fuel preparation techniques and heat and power production methods, and characteristics of various advanced technologies (e.g., status of research and development, projected performance). It is available at: www.epa.gov/chp/basic/catalog.html.

Funding Opportunities. Many financial incentives, such as grants, tax incentives, and low-interest loans, are available for using biomass feedstocks in power generation applications. These incentives can substantially help the economics of using biomass as a fuel source. In addition, state and federal policies—such as simplified interconnection, fair rate design, and output-based emissions permitting—benefit projects by reducing barriers and can save time and money in the development process. Find regularly updated information about these policies and incentives along with information on how to qualify and apply: www.epa.gov/chp/funding/bio.html.

The CHP Emissions Calculator compares the anticipated carbon dioxide (CO₂), sulfur dioxide (SO₂), and nitrogen oxide (NO_x) emissions from a CHP system to the emissions from a comparable system that uses separate heat and power. Users select from default or user-specified system profiles (including renewably fueled systems) to describe the CHP and separate heat and power systems for comparison: www.epa.gov/chp/basic/calculator.html.

CHP Project Development Process. The *Streamlining Project Development* pages of the Partnership Web site provide resources for companies considering or implementing CHP projects. These include information, tools, and hints on project development, CHP technologies, and how to access EPA assistance during each stage of

the CHP development process: www.epa.gov/chp/project-development/index.html.

Wastewater Facilities Strategic Market. Wastewater treatment facilities (WWTFs) that use anaerobic digesters to treat their waste are an excellent technical fit for CHP. The report, *Opportunities and Benefits of Combined Heat and Power at Wastewater Treatment Facilities*, provides engineering rules-of-thumb for estimating the generation potential at a WWTF, and links to case studies demonstrating the benefits of CHP at WWTFs: www.epa.gov/chp/markets/wastewater.html.

Dry Mill Ethanol Strategic Market. The CHP Partnership offers a wide range of analysis and outreach documents related to the dry mill ethanol production industry. The fact sheet, *Combined Heat and Power: An Energy-Efficient Choice for the Ethanol Industry*, explains the efficiency gains of CHP over separate heat and power, discusses the excellent technical fit for CHP at ethanol production facilities, and provides information on some ethanol facilities currently employing CHP. The report, *Assessment of the Potential for Energy Savings in Dry Mill Ethanol Plants From the Use of Combined Heat and Power*, details the energy savings from using CHP to generate electricity and steam for ethanol production compared to using natural gas-, coal-, and biomass-fired boilers to generate steam and purchase grid electricity. These reports and more can be found at: www.epa.gov/chp/markets/ethanol.html.

Technical Assistance for Candidate Sites. In addition to Web-based resources, the Partnership provides information, tools, and technical assistance to energy users who are considering implementing CHP projects. With a short phone call, the Partnership can help:

- Identify opportunities for cost-effective CHP (including biomass or biogas CHP).
- Assess goals, drivers, and potential barriers for a project.
- Direct energy users to existing tools and resources.
- Determine next steps for project-specific technical assistance.

See: www.epa.gov/chp/partnership/tech_assistance.html.

For more information about opportunities for biomass CHP or how the EPA CHP Partnership can help with your project, contact:



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