Tax Incentives for Combined Heat and Power (CHP)

By Charles Goulding, Spencer Marr and Taylor Goulding

Charles Goulding, Spencer Marr and Taylor Goulding discuss the potential energy efficiency and greenhouse gas reductions afforded by the use of Combined Heat and Power, along with the total economic benefits related to the technology, including the tax incentives that are available to facilities that install CHP systems.

Introduction

Combined Heat and Power (CHP), or "cogeneration," as it is more commonly referred to, is the simultaneous generation of usable heat and electric power in a single process. In other words, it uses the heat produced in electricity generation rather than releasing it wastefully into the atmosphere. These systems, which currently account for approximately seven percent of U.S. electrical generation, produce a fraction of the nitrogen oxides as conventional systems do. As a result of the potential energy efficiency and the greenhouse gas reductions, both the U.S. Department of Energy and the Environmental Protection Agency have the achievable goal of doubling the number of these CHP systems in the United States.1

Because CHP is a very energy efficient technology, many building owners and facilities managers would purchase CHP systems if they were fully aware of the total economic benefits related to the technology, including the tax incentives available to them. Their time has come. As a result of recent federal tax law changes, CHP now has its most favorable tax treatment ever provided for in the U.S. tax system, making 2011 the ideal time to install CHP.2

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Expanded Tax Incentives for CHP

Pursuant to the American Recovery and Reinvestment Act of 2009, there are 10-percent tax credits available to buildings owners who install CHP systems through January 1, 2017. These systems are normally depreciated on a five-year MACRS basis, but recent changes to the U.S. tax laws allow this depreciation down to one year, meaning that building owners who install CHP systems after September 8, 2010, and before December 31, 2011, can take 100-percent tax bonus depreciation. Even if building owners miss this 2011 window, they can enjoy a 50-percent tax bonus depreciation on equipment placed in service from January 1, 2011 through December 31, 2012.3

Further, CHP installations that are eligible for the 10-percent tax credit from January 1, 2009, can also elect to receive an equivalent cash grant. See Exhibit 1 below for an illustration of the potential tax savings available through December 31, 2011.

Combined Heat and Power Defined

Combined heat and power refers to the simultaneous production of electricity and heat from a single fuel source, such as natural gas, biomass, biogas, coal, waste heat or oil. It is not a single technology, but

<table>
<thead>
<tr>
<th>Tax Benefit Description</th>
<th>Tax Benefit Calculation</th>
<th>Tax Benefit</th>
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<tbody>
<tr>
<td>10% Tax Credit or Grant</td>
<td>10% x $1,000,000</td>
<td>$100,000</td>
</tr>
<tr>
<td>Added Depreciation</td>
<td>50% x $100,000</td>
<td>$50,000</td>
</tr>
<tr>
<td>Remaining Bonus Depreciation</td>
<td>$1,000,000 less $100,000 credit</td>
<td>$900,000</td>
</tr>
<tr>
<td>Total Depreciation</td>
<td></td>
<td>$950,000</td>
</tr>
<tr>
<td>Tax Benefit of Depreciation at 40%</td>
<td>40% x $950,000</td>
<td>$380,000</td>
</tr>
<tr>
<td>Value of First Year Tax Benefits</td>
<td></td>
<td>$480,000</td>
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an integrated energy system that can be modified depending upon the needs of the energy end user. However, common throughout all types of CHP systems is on-site generation of electrical power, waste-heat recovery for heating, cooling, dehumidification or process applications, and the integration of a variety of technologies, thermal applications and fuel types into existing building infrastructure.

The two most common CHP system configurations use a gas turbine or engine with heat recovery unit or a steam boiler with steam turbine, both of which realize substantial energy savings relative to conventional fossil-fueled power plants. The average efficiency of fossil-fueled power plants in the United States is 33 percent. By using waste heat recovery technology to capture a significant proportion of this wasted heat, CHP systems typically achieve a system efficiency of 50 to 80 percent for producing electricity and thermal energy. Because CHP is more efficient, less fuel is required to produce a given energy output than with separate heat and power. When the current historically low cost of natural gas is factored into this equation, energy costs are driven down further.

The Advantages of Combined Heat and Power

The energy lost in the United States from wasted heat in the utility sector is greater than the total energy use of Japan. The major advantage of CHP is that it reduces on-site energy, so there is no energy lost in the distribution process. In the typical building situation electricity is distributed from a generation location, which means that a substantial portion of the energy generated at a remote location is wasted while end users are exposed to price and supply volatility.

CHP system is an independent system that remains operational during power outages. This is helped in part by the fact that CHP offers flexibility in fuel selection and can take advantage of both fossil fuels and locally sourced and renewable fuels like biomass or ethanol. This means that when traditional fuel sources like coal and oil spike in cost, CHP systems offer certainty and insulation from volatility.

Because CHP’s greatest advantage is its maximization of energy efficiency, the best candidates for CHP are high-energy-use buildings, large buildings and building complexes/campuses. Ideal users are often universities and colleges, airports, hospitals, data centers, sports stadiums, pharmaceutical complexes, hotels and casinos.

CHP Project Management

In order to immediately spur the development of large-scale CHP projects, the U.S. Environmental Protection Agency has assembled a comprehensive 85-page guide to assist building developers through the installation process from start to finish. This guide is intended to help building owners take advantage of the unique opportunity that CHP presents by walking them through whether they would make a good CHP candidate, procuring financing for the project, selecting a design team/contractor, getting the necessary building permits and operating and maintaining a CHP system.

After calculating the energy savings using the guide’s cost and emissions calculator, it is possible to see the total savings between tax and energy so that.

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ENDNOTES

Massachusetts
Among the nation's leaders in incentivizing energy-efficient investments, Massachusetts' National Grid utility offers energy strategies, technical assistance and financial incentives to customers who are building new facilities, adding capacity for manufacturing, replacing leaded equipment or undergoing major renovations. In particular, the state sees the value in encouraging CHP systems installation, as they can currently offer payback benefits for over 70 percent of the increased costs for the high efficiency CHP systems and systems or buy down the incremental investment to a 1.5-year simple payback. Some debate varies by capacity, building size or efficiency.

Conclusion
Our federal government hopes that CHP installations will soon double in order to support 14 percent of U.S. electrical generation needs. Understanding the tax opportunities in 2011, along with utility incentives should help our country achieve this goal.

ENDNOTES
2. Corporate Taxation Strategies, 2008 Tax Insights, and Analysis by G. Sack