

The Energy Tax Aspects of Geothermal Heat Pumps

By Charles Goulding, Joseph Most and Spencer Marr

Charles Goulding, Joseph Most and Spencer Marr explain the benefits of installing geothermal heat pumps, which are among the most energy-efficient, environmentally clean and cost-effective HVAC systems available.

Introduction

The U.S. Environmental Protection Agency (EPA) considers geothermal heat pumps the most energy-efficient, environmentally clean and cost-effective HVAC (heating, ventilation and air conditioning) systems available. Leading companies like Google, SAP and Halliburton use geothermal heat pumps, thus placing the United States among the top countries using this very desirable technology. When it comes to alternative energy, the big three are solar, wind and geothermal; however, geothermal has an advantage over solar and wind energy in that it provides consistent, uninterrupted energy savings, since it is not dependent on weather conditions, such as the sun shining or the wind blowing. Because of the rare combination of tax deductions, credits and rebates uniquely available to geothermal heat pump users through 2013, coupled with extraordinary energy cost savings, many companies are now implementing geothermal heat pump projects.

The EAct Tax Deduction

Under Code Sec. 179D, as enacted by the Energy Policy Act of 2005 (EAct),¹ building owners or tenants who make qualifying energy-reducing invest-

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ments can obtain immediate tax deductions of up to \$1.80 per square foot.

If the building project doesn't qualify for the maximum \$1.80-per-square-foot immediate tax deduction, there are tax deductions of up to \$0.60 per square foot for each of the three major building subsystems: lighting, HVAC and the building envelope. The building envelope comprises of every part of the building's exterior perimeter that "touches the outside world" including roof, walls, insulation, doors, windows and foundation.

The Geothermal Tax Credit

Pursuant to Internal Revenue Code Sec. 48, companies or individuals installing geothermal heat pumps can take a 10-percent tax credit for the total cost and installation. This credit is unique in that it can be used in combination with the Code Sec. 179D EAct tax deduction. In addition, Act Secs. 1104 and 1603 of the American Recovery and Reinvestment Act of 2009² allow for the taxpayer to take the 10-percent tax credit as a cash grant.

What is Geothermal?

Geothermal heat pumps are heating and cooling systems that pump heat to or from the ground. This design takes advantage of the moderate temperatures found just under the surface of the earth in order to boost efficiency and reduce the operational costs of heating and cooling systems. There are two basic

Table 1.

\$1 Million Geothermal Investment on 500,000 Square Foot Building Tax Savings Breakdown			
	\$0.60/sq ft EPAct Deduction	\$1.20/sq ft EPAct Deduction	\$1.80/sq ft EPAct Deduction
10% Federal Tax Credit	\$ 100,000	\$ 100,000	\$ 100,000
EPACT Tax Savings (Deduction x 40%) ¹	\$ 120,000	\$ 240,000	\$ 360,000
Present Value OF 5 Year MACRS ²	\$ 210,945	\$ 113,586	\$ 16,227
Total Savings:	\$ 430,945	\$ 453,586	\$ 476,227

Notes:

1. Tax savings based on a 40% income tax rate.
2. Standard tax depreciation schedule.

designs of geothermal heat pumps: closed-loop, which takes the form of horizontal, vertical or pond/lake design, and open-loop.

Closed-Loop Geothermal Heat Pumps

A closed-loop system connects a primary refrigerant loop with a secondary water loop buried underground within an appliance cabinet in order to exchange heat. As geothermal technology has improved over the last two decades, it has become increasingly easy to install a closed-loop system anywhere in the country, regardless of terrain or a building's proximity to water or a fault line.

Open-Loop Geothermal Heat Pumps

An open-loop system uses well or surface body water as the heat-exchange fluid that circulates directly through the system. However, by virtue of the need for an adequate supply of relatively clean water, open-loop systems become advantageous only in those areas with access to a sizable body of water.

The up-front installation costs of a geothermal heat pump vary widely depending upon the size of the property, use, geology of the surrounding land, hydrology

and land availability and can only be determined on a case-by-case basis. However, regardless of the expense involved in the initial installation, opportunities to save money on energy abound immediately after installation. Based on recent prices, ground-source heat pumps currently have lower operational costs than any other conventional heating source almost everywhere in the world. In general, a property owner may save anywhere from 30 percent to 60 percent annually on utilities by switching from an ordinary system to a ground-source system, depending on factors such as climate, soil conditions, the system features and prevailing energy rates.

The total output capacity of geothermal heat pumps in the United States is expected to grow almost exponentially over the next 40 years. According to the National Renewable Energy Laboratory, 7,385 MWt of geothermal capacity was available in the U.S. in 2006. They expect that number to grow to 18,400 MWt in 2015, 66,400 MWt in 2025 and over 1,000,000 MWt by 2050.³ With the technology available and geothermal capacity expected to more than double by 2015, property owners should take advantage of this technology before the current EPAct tax incentives expire in 2013.

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Table 2.

\$1 Million Geothermal Investment on 500,000 Square Foot Building Tax Savings Breakdown With Rebate			
	\$0.60/sq ft EPAct Deduction	\$1.20/sq ft EPAct Deduction	\$1.80/sq ft EPAct Deduction
Local Utility Rebate	\$ 200,000	\$ 200,000	\$ 200,000
10% Federal Tax Credit (\$800,000 net investment)	\$ 80,000	\$ 80,000	\$ 80,000
EPACT Tax Savings (Deduction x 40%) ¹	\$ 120,000	\$ 240,000	\$ 304,000
Present Value OF 5 Year MACRS ²	\$ 149,284	\$ 51,925	\$ -
Total Savings:	\$ 549,284	\$ 571,925	\$ 584,000

Notes:

1. Tax savings based on a 40% income tax rate.
2. Standard tax depreciation schedule.

also a more affordable method of storage, which has enabled many companies, particularly start-ups, to avoid the purchase and maintenance of expensive servers. Leading tech companies provide cloud computing services to businesses. Among these are Amazon's EC2 (Elastic Cloud Compute), Google's App Engine, and HP's Cloud Assure. Amazon uses an Amazon Machine Image (AMI) which is the Web service interface that contains the applications, libraries, data and settings custom to the company. Benefits to these services include lower operating costs, increased scalability, accessibility and reliability.

Conclusion

Developing a central data center is a highly beneficial decision for many companies operating in the fast-paced technological business environment of today. It ensures a reduction of costs and allows for greater focus on energy efficiency. This can lead to even more savings by qualifying for the wide range of tax incentives available for environmentally friendly data centers.⁸

ENDNOTES

- ¹ NICHOLAS CARR, *THE BIG SWITCH: REWIRING THE WORLD, FROM EDISON TO GOOGLE* (2008). Carr was formerly the executive editor of the *HARVARD BUSINESS REVIEW*.
- ² Energy Policy Act of 2005 (P.L. 109-58).
- ³ Charles Goulding, Taylor Goulding and Raymond Kumar, *LED Parking Garage Lighting Installations Accelerate With EAct Tax Savings*, *CORP. BUS. TAX'N MONTHLY*, Sept. 2009, at 15-16, 46
- ⁴ Available at www.liebert.com/common/ViewDocument.aspx?id=13.
- ⁵ Code Sec. 48.
- ⁶ The Bloom Box. Retrieved from www.cb-news.com/video/watch?id=6228828n&tag=mncol;lst;1.
- ⁷ *Id.*
- ⁸ Additional information on cloud computing is available at www.informationweek.com and www.datacenterknowledge.com

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Geothermal Heat Pumps & HVAC EAct

An HVAC retrofit that reduces total building energy use by 16.67 percent allows the building to qualify for the 60-cent-per-square-foot EAct HVAC deduction.⁴ Given the extraordinary efficiency of geothermal heat pumps, a retrofit by means of geothermal will most likely qualify for the immediate 60-cent-per-square-foot HVAC deduction and can potentially reduce energy use enough to trigger \$1.20- to \$1.80-per-square-foot EAct tax deductions on its own. Table 1 illustrates the potential tax savings, including EAct, the geothermal tax credit and MACRS building depreciation, for installation of a geothermal heat pump HVAC system.

To obtain the \$0.60- to \$1.80-per-square-foot EAct deduction, the required energy-cost reduction must be documented by an IRS-approved energy simulation model. The popular U.S. Green Building Council (USGBC) Leadership in Energy and Environmental Design (LEED) certification program also requires building energy modeling. Moreover, recognizing the increasing importance of building energy-efficiency measures, recent changes to the factors considered for LEED certification place much more emphasis on granting LEED-qualifying points for energy-efficiency measures. The only way to accurately right-size HVAC to the building envelope and other building systems is to model the building. As a result of improvements in CAD systems

and modeling interfaces, along with the huge increase in professionally trained energy modelers, soon every new building will be modeled as matter of course.⁵

Free-Riding Existing Geothermal HVAC System EAct Tax Deductions

If a building has already achieved the required energy-cost reduction from installation of an HVAC system, such as a geothermal heat pump, but has not yet taken its EAct tax deduction, any further energy-reducing HVAC equipment installation will bolster EAct HVAC tax deductions. Accordingly, any building that already has very efficient HVAC, such as a geothermal heat pump, and has not already taken the EAct tax deduction, should give strong consideration to further HVAC upgrades on or before December 31, 2013. One common EAct tax deduction free-riding project is to upgrade building controls. For instance, if the owner of a 500,000-square-foot building installed a geothermal heat pump prior to 2006 that resulted in a large energy-cost reduction, but could not take an EAct deduction because the law had not yet been signed into effect, they could then realize up to the full \$900,000 EAct tax deduction upon upgrading HVAC building controls before December 31, 2013.

Combining Geothermal with Lighting Retrofits

Since geothermal heat pump installation can generate large

energy savings on its own, combining the upgrade with a lighting retrofit can easily achieve the maximum \$1.80-per-square-foot deduction. Installing highly efficient lighting, such as LEDs or T-5 and T-8 fluorescents, will not only help to increase the total EAct deduction, but also comply with the recent manufacturing bans on T-12 fluorescents and probe state metal halide lighting.

Rebates

Across the nation, there are many utilities that offer rebates for the installation of geothermal heat pumps. Currently, utilities in over 20 states are offering rebates for geothermal heat pump installation, ranging from a few hundred to a few hundred thousand dollars. When deciding whether or not to install a geothermal heat pump, a smart tax planning decision should always factor in utility rebates. Table 2 illustrates the tax incentives for geothermal installation including a sample 20-percent local utility rebate.

The Geothermal/ Ground Source Heat Pump Associations

One way to follow geothermal developments is becoming part of the Geothermal Energy Association (GEA) or the International Ground Source Heat Pump Association (IGSHPA). According to its Web site, the GEA is a trade association composed of companies that support the expanded use of geothermal energy and the development of geothermal resources worldwide for electrical power generation and direct-heat uses.⁶ A member of the GEA re-

ceives weekly updates and news about geothermal energy and the geothermal community and receives discounted marketing prices on a leading renewable energy Web site. The IGSHPA is a similar organization, whose stated goal is to promote and advance the use of ground source heat pump technology.⁷

Conclusion

Geothermal heat pumps present the opportunity to realize the rare nexus between tax deductions, tax credits, tax rebates and a significant reduction in energy costs. Although the investment costs for these systems are high, the combination of energy savings and tax savings can produce a very favorable economic payback. As the geothermal heat pump market expands, more property owners and HVAC systems designers are getting very comfortable with this technology. When considering a geothermal heat pump investment, the project team should focus on maximizing the savings that are available through utility and state rebates, the federal tax credit and EAct.

ENDNOTES

- ¹ Energy Policy Act of 2005 (P.L. 109-58).
- ² American Recovery and Reinvestment Act of 2009 (P.L. 111-5).
- ³ See *Geothermal-The Energy Under Our Feet*, www1.eere.energy.gov/geothermal/pdfs/40665.pdf.
- ⁴ See Charles Goulding, Raymond Kumar and Kenneth Wood, *New Efficient HVAC Drives Large Tax Deductions for Buildings*, CORP. BUS. TAX'N MONTHLY, May 2009, at 11.
- ⁵ See Charles Goulding, Jacob Goldman and Kenneth Wood, *Tax Deductions for HVAC Efficiency*, BUILDING OPERATING MGMT., Apr. 2010, at 58.
- ⁶ See *Geothermal Energy Association At-a-Glance*, www.geo-energy.org/pdf/GEAAta-Glance.pdf.
- ⁷ See *About International Ground Source Heat Pump Association*, www.igshpa.okstate.edu/about/about_us.htm.

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Secretary of State Madeleine Albright prepared a Letter of Submittal pertaining to the submission of the Treaty between the U.S. government and the Honduran government concerning the encouragement and reciprocal protection of investment. This Letter of Submittal provides, as to the definition of the term "investment agreement," that this definition thus excludes agreements with subnational authorities (including U.S. states) as well as agreements arising from various types of regulatory activities of the national government. In the tax area, such agreements include rulings, closing agreements and advance pricing agreements.

Preservation of Rights

Article XI clarifies that the U.S.—Honduras BIT does not derogate from any obligation of a party that has to provide better treatment to the covered investment than is specified in the treaty. Such a covered investment may be entitled to more favorable treatment through domestic legislation, other international legal obligations or a specific obligation (e.g., to provide a tax holiday) assumed by a party with respect to that covered investment.

Treaty Shopping within the BIT Context

The U.S.—Honduras BIT does not directly address treaty shopping concerns. Nevertheless, Article