

# Geothermal Energy: Energy Savings, Storm Protection and EPAct Tax Savings

*By Charles R. Goulding, Charles G. Goulding and Andressa Bonafe*

Charles R. Goulding, Charles G. Goulding and Andressa Bonafe discuss the different benefits of geothermal heat pumps. Not only do such systems entail considerable energy cost reductions, tax credits and utility rebates, but they also constitute a “stormproof” energy source.

Recent destructive natural phenomena, such as Hurricane Sandy, have emphasized the necessity of resilient and reliable energy sources. Geothermal energy systems emerge as a promising alternative as their functioning does not rely on fossil fuels or mechanical systems that are exposed to high winds and flooding.<sup>1</sup> Considered by the U.S. Environmental Protection Agency (EPA) as one of the most energy-efficient, environmentally clean and cost-effective heating, ventilation and air conditioning (HVAC) systems available,<sup>2</sup> geothermal heat pumps are also a good investment. In addition to their ability to endure adverse weather conditions, such systems entail a combination of benefits: tax deductions and credits, utility rebates and, more importantly, significant cuts on energy costs. Nationwide, important companies, such as Google, SAP and Halliburton, have adopted this source. In New York, an increasing number of prominent organizations and sites are currently implementing heat

pump projects, amongst which are the American Institute of Architects, the Brooklyn Children’s Museum and the Queens Botanical Garden.<sup>3</sup>

## Incentives for Geothermal Energy

### The EPAct Tax Deduction

Under Code Sec. 179D, as enacted by the Energy Policy Act of 2005 (EPAct),<sup>4</sup> building owners or tenants who make qualifying energy-reducing investments can obtain immediate tax deductions of up to \$1.80 per square foot. If the building project doesn’t qualify for the maximum 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 is every item on the building’s exterior perimeter that “touches the outside world” including roof, walls, insulation, doors, windows and foundation. Residential buildings four stories and above are eligible for Code Sec. 179D tax incentives.

An HVAC retrofit that reduces total building energy use by 15 percent allows the building to qualify for the \$0.60-per-square-foot EPAct HVAC deduction.<sup>5</sup> Given the extraordinary efficiency of geothermal heat

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**Table 1.**

<b>\$1 Million Geothermal Investment on 500,000 Square Foot Building Tax Savings Breakdown</b>			
	<b>\$0.60/sq. ft. EPAcT Deduction</b>	<b>\$1.20/sq. ft. EPAcT Deduction</b>	<b>\$1.80/sq. ft. EPAcT Deduction</b>
10-Percent Federal Tax Credit	\$ 100,000	\$ 100,000	\$ 100,000
EPAcT Tax Savings (Deduction x 40%) <sup>1</sup>	\$ 120,000	\$ 240,000	\$ 360,000
Present Value of Five-Year MACRS <sup>2</sup>	\$ 221,682	\$ 119,367	\$ 17,052

Notes:

<sup>1</sup> Tax savings based on a 40-percent income tax rate.

<sup>2</sup> Standard tax depreciation schedule.

pumps, a retrofit by means of geothermal will most likely qualify for the immediate \$0.60-per-square-foot HVAC deduction and can potentially reduce energy use enough to trigger \$1.20- to \$1.80-per-square-foot EPAcT tax deductions on its own. Achieving maximum EPAcT tax savings is even more likely when heat pump installation is combined with upgrades in other building subsystems, such as lighting. Table 1 illustrates the potential tax savings, including EPAcT, the geothermal tax credit and MACRS building depreciation, for installation of a geothermal heat pump HVAC system.

### Code Sec. 48 Tax Credit

Pursuant to 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 as it can be used in combination with the Code Sec. 179D EPAcT tax deduction.

### Utility Rebates

Throughout the nation, several utility companies 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.<sup>6</sup> 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 of 20-percent local utility rebate.

These pumps represent both heating and cooling solutions—they are equipped to pull heat from the earth and distribute it throughout the building and to extract heat from the building and direct it to the earth (or to a hot water tank). The Geothermal Energy Association<sup>7</sup> highlights the reduced electricity consumption of geothermal heat pumps. Unlike conventional systems, electricity is not necessary to produce heat, only to collect, concentrate and deliver it.

There are two basic designs of geothermal heat pumps. Closed-loop systems connect a primary refrigerant loop with a secondary water loop buried underground within an appliance cabinet in order to exchange heat; in other words, liquids are reused within the system. Open-loop systems use well or surface body water as the heat-exchange fluid that circulates directly through the system.

### The Installation of Geothermal Systems

While open-loop systems become advantageous only in those areas with access to a sizable body of water, it has become increasingly easy to install closed-loop systems anywhere in the country, regardless of terrain or a building's

**Table 2.**

<b>\$1 Million Geothermal Investment on 500,000 Square Foot Building Tax Savings Breakdown with Rebate</b>			
	<b>\$0.60/sq. ft. EPAcT Deduction</b>	<b>\$1.20/sq. ft. EPAcT Deduction</b>	<b>\$1.80/sq. ft. EPAcT Deduction</b>
Local Utility Rebate	\$ 200,000	\$ 200,000	\$ 200,000
10-Percent Federal Tax Credit (\$800,000 net investment)	\$ 80,000	\$ 80,000	\$ 80,000
EPAcT Tax Savings (Deduction x 40%) <sup>1</sup>	\$ 120,000	\$ 240,000	\$ 360,000
Present Value of Five-Year MACRS <sup>2</sup>	\$ 156,883	\$ 54,568	\$ -

Notes:

<sup>1</sup> Tax savings based on a 40-percent income tax rate.

<sup>2</sup> Standard tax depreciation schedule.

proximity to water or a fault line. Nowadays, New York, New Jersey and Pennsylvania concentrate more operating geothermal systems than anywhere else in the United States. Almost all of the projects are closed-loop systems.<sup>8</sup>

## **Benefits from Geothermal Energy**

### **Returns to Investment**

High initial costs are often pointed out as an obstacle to the spread of geothermal energy use. However, geothermal heat pumps can constitute a highly profitable investment, with a payback time ranging from two to eight years.<sup>9</sup> An abbreviated payback time is favored by a careful choice of system according to the geological features of the location and, most certainly, by the use of tax incentives and utility rebates available. Financial advantages are not restricted to cutting annual energy bills by 30 to 60 percent but also encompass reduced maintenance costs. Based on recent prices, ground-source heat pumps currently have lower operational costs than any other conventional heating source almost everywhere in the world.<sup>10</sup> Not only are geothermal systems easy to maintain, due to the absence of combustion, but their equipment has approximately double the lifespan of conventional ones, such as furnaces.

### **Environmentally Clean**

When considering the move towards green buildings, geothermal systems stand out as an energy-efficient alternative for reducing constructions' carbon footprint. Jack DiEnna, Executive Director of the Geothermal Heat Pump National and International Initiative, highlights that "buildings consume approximately 40 percent of the world's primary energy and are responsible for 40 percent of global carbon emissions."<sup>11</sup> In addition, geothermal energy is also renewable and sustainable, allowing for a continued consumption rate. 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.

## **Storm Protection**

Adverse weather conditions can threaten HVAC equipment and menace cooling and heating services. Hurricane Sandy (October 2012), for instance, destroyed cooling towers, ravaged air-conditioners and unearthed fuel tanks. Millions of people had to go through several days without heat. This tragic scenario highlights the importance of a more resilient and stable energy source. Geothermal heat pumps, which work through a system of pipes drilled into the earth, stand out as a promising alternative. Their unique mechanical design, sheltered from flooding and high winds, guarantees a "stormproof" energy source.

## **Conclusion**

Geothermal heat pumps represent a unique combination of environmentally clean, financially advantageous and "stormproof" energy source. In the aftermath of Hurricane Sandy, demand for geothermal HVAC is expected to increase. In this scenario, 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 EPAct.

### **ENDNOTES**

- <sup>1</sup> See *Stormproof' Geothermal Systems Get a Post-Hurricane Boost*, available online at [www.energymanagertoday.com/stormproof-geothermal-systems-get-a-post-hurricane-boost-086915/](http://www.energymanagertoday.com/stormproof-geothermal-systems-get-a-post-hurricane-boost-086915/).
- <sup>2</sup> See *Geothermal Energy Association*, online at [http://geo-energy.org/geo\\_heat\\_pumps.aspx](http://geo-energy.org/geo_heat_pumps.aspx).
- <sup>3</sup> See *Geothermal Designs Arise as a Stormproof Resource*, available online at [www.nytimes.com/2012/11/07/business/geothermal-energy-advocates-hope-systems-get-a-second-look.html?pagewanted=all](http://www.nytimes.com/2012/11/07/business/geothermal-energy-advocates-hope-systems-get-a-second-look.html?pagewanted=all).
- <sup>4</sup> Energy Policy Act of 2005 (P.L. 109-58) ("EPAct").
- <sup>5</sup> 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.
- <sup>6</sup> See Charles Goulding, Joseph Most and Spencer Marr, *The Energy Tax Aspects of Geothermal Heat Pumps*, CORP. BUS. TAX'N MONTHLY, Dec. 2010, at 13.
- <sup>7</sup> *Supra* note 2.
- <sup>8</sup> *Supra* note 3.
- <sup>9</sup> *Id.*
- <sup>10</sup> *Supra* note 6.
- <sup>11</sup> *Supra* note 3.

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