Put energy efficiency and renewable energy tax credits to work for you

By John Bruce

The residential energy efficient property (REEP) tax credit slashes 30 percent of the cost of alternative energy-producing systems, including geothermal heating-and-cooling systems, solar energy systems and small wind turbines.

There is no lifetime cap for this home energy efficiency tax credit, and it expires in 2016. The tax credit covers equipment and professional installation.

Consumers who purchase a geothermal system for a home will get a 30 percent credit with no cap as long as the system qualifies for the high-efficiency Energy Star designation.

Energy-efficient equipment always gets the most bang for the buck when old furnaces, air conditioners or heat pumps need replacement. The tax credit makes geothermal an option worth serious consideration.

Without the tax credit or other incentive, a geothermal system for a 2,000-square-foot home typically starts around $15,000 — well above a conventional high-efficiency heating-and-cooling system usually costing roughly $8,000.

Geothermal savings and payback

A geothermal system can save hundreds of dollars a year in electricity. Without the tax credit, it could take 10 to 14 years to recover up-front costs — longer than homeowners usually stay in a house.

But consumers can cut the payback time in half thanks to the 30 percent tax credit. If other incentives are available, the payback time is even less.

Heating and cooling are the largest household energy expenses, typically accounting for more than half of energy used. Geothermal systems quietly provide reduced-cost space conditioning and can be equipped to supply nearly free hot water.

As the most energy-efficient heating and cooling systems available, geothermal systems harness the renewable energy of the sun by using the earth as a heat exchanger. A geothermal system is the most efficient way to heat and cool.

Geothermal systems go by several names, including "GeoExchange," geothermal heat pumps and ground-source heat pumps.

For geothermal information, visit geoexchange.org, write Geothermal Heat Pump Consortium, 701 Pennsylvania Avenue NW, Washington, DC 20004-2696 or call 888-255-4436.

Solar water heaters and panels

Solar water heaters, solar panels or photovoltaic systems (solar cells that capture sunshine and convert it directly into electricity) also qualify for the 30 percent tax credit.

The solar device must provide hot water or energy for a dwelling. Solar water heaters used to heat pools or hot tubs cannot qualify.

Solar water heaters are one of the most popular renewable energy technologies because of bang for the buck

and relatively simple setup. The heaters can save anywhere from $400 to $1,000 per year in water heating costs, which usually account for roughly 15 percent of a household's total annual energy needs.

A solar water heater supplying half or more of domestic hot water starts at roughly $1,500 without the tax credit. Payback can be as short as five or six years. The reduction in energy bills realized over the 15-year to 20-year life of the unit means solar water heaters equal or better the long-term cost of conventional water heaters.

What's more, solar power produces no emissions. Eight tons of carbon dioxide — almost double that of a gasoline fueled car — are produced in generating enough coal-fired electricity to power the water heater for a four-person household.

Solar panels are devices that convert sunlight into electricity. The electricity is direct current (DC), not household alternating current (AC), and needs to be converted. The panels are made in various sizes and are rated by the amount of electricity they produce per hour, measured in watts.

Solar panels are usually mounted on the roof of a home and need to face the sun (south) with at least six hours of sunlight (even under fog or cloud cover) daily. Panels are wired together to increase the amount of power produced. For example, five 200-watt panels generate 1,000 watts, or one kilowatt of maximum power.

Most systems feed into the electric grid. Grid-tie systems require an interconnection agreement with the local electric cooperative.

Solar panels supply free power, and the initial installation costs are gradually dropping. The federal tax credit, plus other incentives, helps make the solar option more appealing to consumers. On average, solar panels return two to four times their cost in saved electricity bills.

The Cooperative Research Network (CRN) says the payback period for a solar panel system can range from fewer than 10 years to more than 20 years, depending on the cost of the system, available rebates and incentives, the amount of electricity produced, and the retail price of electricity in your community. In addition, an online calculator you can use to figure the payback time can be found at www.solar-estimate.org.

Wind power for the home

Wind power may be feasible in some areas. Professionally installed home grid-tied systems typically cost up to roughly $20,000 without the tax credit. As with solar panels, the payback period for wind power can vary widely according to installation costs and incentives. According to CRN, the payback period for a small wind system can range from several years to several decades, depending on the cost of the system and the average annual wind speed at the hub height — the distance from the ground to the center of the turbine rotor. The average speed is often more critical to the payback period than the initial installed costs, according to some experts.

Wind turbines require an average of at least 6.5-mph wind speed to generate electricity. In North Carolina, only the coastal and some mountain areas see that much wind typically. For a wind speed map to help determine if your area might be suitable for harvesting wind power, visit www.windpoweringamerica.gov.

Also, wind turbines usually must meet local government requirements before they are sited.

For federal tax credit application and eligibility information, visit www.energystar.gov and click on "tax credits for energy efficiency."

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North Carolina tax credits

North Carolina offers a tax credit equal to 35 percent of the cost of eligible renewable energy property constructed, purchased or leased by a taxpayer. The credit has been extended through 2015.

The credit is subject to various ceilings depending on sector and the type of renewable energy system. The Department of Commerce lists the following credit limits for various technologies:

- A maximum of $3,500 for non-business solar energy equipment for active space heating, combined active space and domestic water-heating systems and passive space heating.
- A maximum of $1,400 for non-business solar water-heating systems, including solar pool-heating systems.
- A maximum of $10,500 for renewable energy systems for non-business use.
- A maximum of $8,400 for geothermal equipment installation.
- A maximum of $2,500,000 for solar, wind, hydro, geothermal and biomass applications on commercial and industrial facilities, including photovoltaic, daylighting, solar water-heating and space-heating technologies.

For more information, visit the North Carolina Incentives section of the website www.dsireusa.org.