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ALTERNATIVE ENERGY IN CONSTRUCTION PROJECTS

Construction choices are expanding with new cost- and energy-saving systems.

M. Tracy Hammer

The nuts and bolts of a construction project will always remain basically the same, but today owners have several different choices when considering energy systems for their facilities. Geothermal, solar, wind, hydropower and biomass all represent exciting new systems for maximizing energy savings to support the heating, cooling and electricity for most types of new or existing facilities. Although only 8 percent of the nation's total energy comes from renewable sources, that number is increasing according to the U.S. Energy Information Administration (EIA).

CURRENT CONSIDERATIONS

The recent rise in crude oil prices has brought the energy crisis back to the forefront. Crude oil was trading at around \$100 a barrel in March — up nearly \$20 from a year ago — and Americans are feeling the pinch at the pump. The average price of gasoline in mid-March was \$3.56, a \$0.77 increase from last year, according to the EIA.

The use of alternative energy is growing as the population becomes more environmentally conscious, contemplates the political implications of dependence on foreign oil and under-

stands the long-term cost savings of these natural energy sources.

Additionally, the installation of an alternative energy system within a facility can also be applied toward LEED certification. LEED points are calculated in terms of the alternative system's efficiency over a traditional system. The more efficiencies and energy savings that the heating/cooling system provides, the more LEED points can be earned.

The technology of such systems is rapidly advancing, making them more accessible, less bulky and more productive. Additionally, there are numerous government programs in place that promote the use of geothermal systems, solar panels and wind energy, among others.

GOVERNMENT SUPPORT

The Energy Policy Act of 2005 supports the greening of commercial buildings through the act's Energy Efficient Commercial Buildings Tax Deduction (CBTD). This provision allows building owners or tenants to upgrade HVAC/hot water, indoor lighting and the building envelope with the help of a tax credit of up

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RECENT EARTHQUAKES REINFORCE NEED TO RETROFIT AGING HOSPITALS

Building Information Modeling is an important cost-savings tool in relocating essential services.

Brad Hardin

This year's earthquakes in Japan and New Zealand have focused the public's attention on safety issues and the vulnerability of hospitals that have not been built or retrofitted to current safety standards. The deadline for most California in-patient facilities to be able to withstand an 8.3 quake has been extended from 2008 to 2013. Unfortunately, efforts to retrofit the hospital system have been going slower than anticipated because of the high cost and disruption to services.

As demonstrated in a recently completed \$8 million seismic upgrade project at the University of California, San Diego (UCSD) Hillcrest Medical Center, Building Information Modeling (BIM) can dramatically reduce the risks involved in such a project by "virtually" coordinating the construc-



In late March, the old 722d military hospital at the former March AFB was torn down as McCarthy Building Cos. and U.S. Demolition cleared the way for March LifeCare, the planned 200-acre medical campus in Riverside, Calif. BIM is an advanced way to complete hospital retrofit projects so that Mother Nature doesn't do the same to our mission-critical medical facilities.

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ALTERNATIVE ENERGY IN CONSTRUCTION

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to \$1.80 per square foot. The CBTD can be claimed for qualifying projects completed before January 1, 2014.

Additionally, the American Reinvestment and Recovery Act (ARRA) earmarked \$467 million for geothermal and solar energy projects of all types to accelerate the development and use of these renewable energy sources.

Several types of federal grants for energy savings and sustainability are also available if geothermal systems are installed. The U.S. Department of Energy (DOE) offers a Loan Guarantee Program that funds up to 80 percent of the total cost of projects that reduce greenhouse gas emission by employing "new or significantly improved technologies" as compared to current systems.

Government programs, such as the Emergency Economic Stabilization Act of 2008, allow for a tax credit of 10 percent of the cost of geothermal

equipment placed in service by the end of 2016.

UNDERGROUND ENERGY SOURCE

More clients are taking advantage of the benefits of geothermal systems. In general, geothermal systems work by utilizing underground wells followed by the installation of pipes that carry water throughout a series of geothermal heat pumps located within the building. The pumps capture the underground energy generated from the Earth, and an exchange system then facilitates the use of this natural energy to heat and cool the building.

The monetary advantages of geothermal systems can be substantial so proper budgeting is essential. The owner should plan to absorb the full cost of the system up front, which is higher than typical HVAC systems. However, the DOE has cited that upfront costs are typically recovered within 5 to 10 years of use.

RAY OF LIGHT

Solar energy is extremely valuable due to its abundance and relative ease to harness. A solar conduit essentially captures free electricity from the sun's rays that is then used to provide heat, light, hot water, electricity and even cooling for a facility. Different types of collectors are used for these different energy purposes, and the cost varies depending on the type of equipment and location.

Government subsidies are helping to generate use of solar power. To be completed in December, Sarah's Place, a 24-unit, 15,000-square-foot senior-living residential complex in Glendale, Arizona, will utilize solar technology funded by a grant from Salt River Project, one of Arizona's largest utilities. The grant will pay for the purchase and installation of 60 solar panels. Additionally, the 820,000-square-foot build-to-suit project for W.W. Grainger underway in Patterson, California, has been designed and constructed to facilitate the addition of solar panels in the future.

BLOWIN' IN THE WIND

Another renewable energy source that is rapidly growing is wind power. Wind-generated electricity increased by 61 percent between 2007 and 2008 and by 28 percent between 2008 and 2009, more than any other renewable energy source in both years. Newly constructed wind power plants were primarily responsible for these large increases.

Wind power currently supplies about 1 percent of United States electricity needs, but capacity is expanding rapidly. For example, the State of Texas energy grid obtained 7.8 percent of its electricity from wind energy in 2010, according to the American Wind Energy Association. Wind energy is one of the most cost-effective ways to harness natural energy since the technology has remained virtually unchanged for 1,000 years. As demand for this product increases, so will the need for additional manufacturing and industrial facilities to produce the wind turbines to support the growing use of this clean energy source throughout a multitude of geographical locations.

HYDROPOWER

A hydroelectric power plant uses a dam to store water. Once the water is released, it flows through a turbine that turns a generator to produce electricity. This process accounts for 7 percent of the nation's electricity, according to the U.S. government. The construction of a hydroelectric plant is a highly

specialized and expensive undertaking. A \$500 million hydroelectric dam is currently under construction in Bracken County, Kentucky. There are hundreds of smaller hydroelectric plants scattered across the country. Major sites for these facilities include the Northwest, the Tennessee Valley and along the Colorado River.

BIOMASS

Wood, crops, organic compounds and industrial waste are all important sources of biomass power. The energy from these organic materials is transferred into power by utilizing high-efficiency conversion technologies. Biomass can be used for direct heating, such as burning wood for warmth, for generating electricity or it can be converted directly into liquid fuels, such as ethanol, to meet transportation energy needs.

LOOKING AHEAD

The benefits of utilizing renewable energy sources are abundant. This market is continuing to grow, despite a slow moving economy. Many of these alternative energy systems are available for contemplation or incorporation into an upcoming project undertaking. Additionally, more development and construction opportunities that support the manufacture, distribution and office functions for these growing industries will become available as the alternate energy market continues to gain popularity.

Based in Phoenix,

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Horizon at Playa Vista Owner: Lincoln Property Company
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