# Chateau-Sur-Mer Goes Underground for Energy

*By Newport This Week Staff*

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Chateau-sur-Mer at the beginning of the geothermal construction. (Photos courtesy of The Preservation Society of Newport County)

In the latest component of an energy sustainability plan, The Preservation Society of Newport County dug down to subsurface water to install a geothermal energy system that will keep the Chateau-sur-Mer mansion warm in winter and cool in summer. In the process, they'll save big money, since the new system replaces an old oil heating infrastructure that used more than 300 gallons a week.

The vertical geothermal heating/cooling system took five months to install. According to the society's director of properties, Michael Taber, new systems at several society houses will help cut fossil fuel use throughout its properties by at least 80 percent.

"The system will pay for itself eventually," he said. "The direct benefits are lower energy costs and greater protection for the historic assets in the house. The side benefits are a much more comfortable environment and much cleaner air."

This is the fourth geothermal system the Preservation Society has installed in the past year or so. They previously put in similar renewable energy systems at The Breakers, Chepstow and a portion of The Elms.

So far this winter, the house's consumption of heating fuel has been reduced from more than 300 gallons a week to zero.

Taber and Trudy Coxe, the society's CEO, pointed out the benefits of climate control that reduces humidity, which can damage everything from wallpaper to furniture.

It sounds sensible enough, so why isn't it done more often? Initial expense is an issue, and it requires creative engineering approaches, especially at a large, historic, protected property like Chateau-sur-Mer, which is a National Historic Landmark. Built in 1852 for China trade merchant William Shepard Wetmore and later renovated and expanded by Richard Morris Hunt, it is considered the first of Newport's Gilded Age mansions. Descendants of Wetmore lived in the house until the mid-1960s.

Making the modern transition to a cleaner energy system required a great deal of planning and care to make sure none of the mansion's historic character would be disturbed. Looking at it from outside, you would never know that miles of plastic tubing reach down 45 feet to 21 wells underground on the south side of the house. In all, the plastic piping system travels four miles from the wells into the house and throughout its "innards."

The geothermal system draws underground water that holds a temperature of approximately 54 degrees year-round, which the U.S. Department of Energy says is the case throughout most of the country. The heat exchange happens through an elaborate system of pumps arrayed in the basement that serve the entire building. Heat pumps that are about six feet tall force the warming or cooling air directly into rooms.

The problem faced at a building like Chateau-sur-Mer involved locating the pumps and pipes in a way that did not detract from the beauty and historic character of the house. On a recent tour, Taber proudly revealed pumps hidden in closets and unused bathrooms.

“The trick we employed was to remove a panel or two from closet and bathroom doors and install a mesh screen that allows the hot and cool air to circulate in various rooms,” he said. “You can’t even really see the screens unless you are looking for them. One of the things we noticed first was how much cleaner everything seemed and how much better the air smelled throughout the house.”

Staff confirmed his assessment during the tour. “It is remarkable how much better the environment is now,” Coxe said. “There is so much less dirt and dust in the house, and the musty smell that used to be here is gone.”

When they first turned the system on last August, they gradually brought the temperature down. “It was a shock,” Taber said. “Staff and guides would sweat like crazy in here on hot days. It was difficult to breathe.”

Perhaps the hardest part of the work, which was directed by engineer William Wladyka, owner of WJ Wladyka, PE, Systems Consultants, in Middletown (Donovan & Sons of Middletown served as the general contractor for the project), was drilling through granite exterior walls to feed pipes into the building. Taber said walls were two feet thick and they had to drill two-and-a-half inch holes. “It took three weeks just for that,” he said.

Before they installed the system, they filled the house with air to find any leaks. Taber said that resulted in a window-tightening project that cost $350,000. “Overall, there is a slight increase in electricity costs, but the savings from not using oil more than make up for that,” he said.

The Department of Energy offers tax credits and other incentives to encourage homeowners to adopt a geothermal energy system. The goal clearly is to reduce fossil fuel use, but for a project such as the Preservation Society’s, the benefit extends to conservation and preservation. For instance, during the renovation that Hunt designed, the library and dining room took on an Italian Renaissance-style fashioned by Luigi Frullini, a famed Italian woodcarver who worked for clients throughout Europe and the U.S. The two rooms at Château sur-Mer are the most intact examples of his work that survive.

Furniture, paintings, tapestries, wall coverings and other furnishings require protection that a geothermal system can provide more efficiently and effectively than a fossil fuel system.

“Geothermal allows us to control the climate here much more effectively,” Coxe said. “It will make a big difference.”