

[Back](#)

---

Published August 28, 2006

**TIDAL POWER »**

## Ocean energy gets a deeper look

*New projects look for ways to harness oceans' thermal, tidal power.*

**Dennis Camire**

Gannett News Service

Washington — With oil topping \$70 a barrel and fuel costs soaring, engineers and scientists are again focusing on how to wring power from one of the world's largest reservoir of renewable energy — the oceans.

New projects seeking ways to use the oceans' thermal energy, tidal power and wave action are under way from Maine to Oregon to Hawaii in the United States and are widespread in Europe.

The emphasis on ocean power is growing as fossil fuel becomes harder to find, its price climbs and environmental concern mounts over global warming, said Hans Krock, an engineer and president of OCEES International Inc. in Honolulu.

Ocean thermal power plants, which generate electricity from the temperature difference between the tropics' warm surface water and deep cold water, could be built on land in several hundred areas around the globe's equatorial zones and also could be constructed as floating plants.

Krock said the plants' electricity also could provide enough hydrogen from the ocean water to power cars and provide energy needed to replace fossil fuels in the future. The technologies already exist to move and store hydrogen, he said.

"The ocean thermal energy resource is the only one big enough to supply the world's energy in place of fossil fuel," said Krock, whose company is working on contracts for plants at the Natural Energy Laboratory of Hawaii Authority and on Diego Garcia in the Indian Ocean for the Navy.

Ron Baird, chief executive officer of the state laboratory, said he hopes the 1-megawatt plant to be built on the island of Hawaii will interest hesitant investors in building commercial size plants.

"While the front-end cost of ocean thermal energy conversion is high, just like a hydroelectric dam or nuclear power plants ... the fuel cost to run this kind of power generating station is either free or very low," he said. "We need to get it going so we can free ourselves from the grip of fossil fuel."

Although ocean power is still in its infancy, wave and tidal energy technology are at the point where some U.S. commercial projects of limited size are under way.

A tidal plant, for example, is planned for New York's East River and will use underwater turbines — like wind turbines but much smaller with slower turning blades — to generate up to 10 megawatts of electricity, enough to power about 12,000 households.

A recent Electric Power Research Institute study found sites in Maine, Alaska, California and Washington that had good potential for tidal power generation with production costs ranging from 4.2 cents per kilowatt hour to 10.8 cents. By comparison, the average retail cost of electricity to U.S. consumers in May was 8.64 cents per kilowatt hour.

Roger Bedard, ocean power leader of the institute sponsored by the electric utility industry, said ocean power has an advantage over other renewable energy forms, such as wind and solar, because water is denser. That means ocean power systems cost less to build than the others to capture the same amount of energy, although operations and maintenance probably will cost more, he said.

"But there is no silver bullet with energy," he said. "We need to utilize all the different sources we can find."

Wave energy also is drawing attention with Ocean Power Technologies planning to build a 50-megawatt wave park off the southern Oregon coast. The system uses buoys that drive a piston with the rise and fall of the waves to turn an electrical generator.

But development of ocean thermal energy technology has lagged since the Energy Department pulled the plug in the 1990s on an experimental 217-kilowatt demonstration plant at the Natural Energy Laboratory in Hawaii.

Andy Trenka, an ocean power expert at the National Renewable Energy Laboratory in Golden, Colo., said the Energy Department stopped the research after a study showed it could get more impact for its limited money from developing other renewable energy forms such as solar and wind.

But private companies surged ahead and now Krock's company, OCEES, expects the Diego Garcia ocean thermal plant to generate up to 13 megawatts and produce 1.25 million gallons of fresh water a day, a byproduct of the process.

The plant will pipe in warm surface water to vaporize a working fluid, such as ammonia and water, which turns a turbine to drive an electrical generator. A second pipe, reaching 3,000 feet or more deep, draws in cold seawater to condense the steam to a liquid to repeat the cycle.

The Natural Energy Laboratory's plant will use a slightly different system that boils warm seawater in a low-pressure container to produce steam to drive a generator.

The ocean thermal process has no emissions and generates much more electricity than is needed to operate the plant. Environmental problems center on where the used seawater is discharged to avoid algae blooms.

---