

# Oceans may provide future energy source

*Solar energy available 24 hours a day from ocean water, regardless of weather*

By TOM ARMBRUSTER and MIKE SILLUP  
Daily Collegian Staff Writers

The Department of Energy is taking a hard look at the oceans as a potential source of energy.

Four energy sources from the ocean currently being researched as energy alternatives are waves, currents, salinity (the ocean's salt) and ocean thermal energy.

The DOE is looking particularly hard at Ocean Thermal Energy Conversion. Instead of using steam to turn the turbines, as a coal power plant does, OTEC uses sun-warmed water from the ocean's surface to boil ammonia and turn the turbines. Cold water from the ocean's depths is pumped to change the vapors back to a liquid state and the ammonia is recirculated.

The project is of more than just passing interest to the Department of Energy. Between 1972 and 1978, Federal support for OTEC increased from \$100,000 to \$36 million.

A pilot plant with a 25-megawatt output is being planned for the mid-1980s. If it is successful, DOE will build a 100-megawatt demonstration plant in the early 1890s. A large land power plant generates about 800 megawatts.

The major reasons for interest in OTEC is that the ocean is the world's largest solar collector, about 70 percent of solar energy reaching the earth lands on water, and because the ocean's temperature is relatively constant, this form of solar energy is available 24 hours a day, regardless of the weather.

The DOE says it is looking at the possibility of locating the plants in the southeastern part of the country where the temperature difference would be greatest because of the Gulf Stream.

The ocean itself presents problems.

Ralph Webb, associate professor of mechanical engineering, said heavy seas could require the plant be built of expensive long-lasting materials, such as Titanium, possibly reducing the cost-effectiveness.

He also said the challenge of the project is finding the optimum design and construction of the plant.

"Before they put all their eggs in one basket ask, 'Hey, is this the best basket?'" he said.

One of the major concerns at present is the problem of organisms attaching themselves to the OTEC hardware and presumably fouling the system. The DOE has funded research to find cleaning methods to overcome "biofouling," as the DOE terms it.

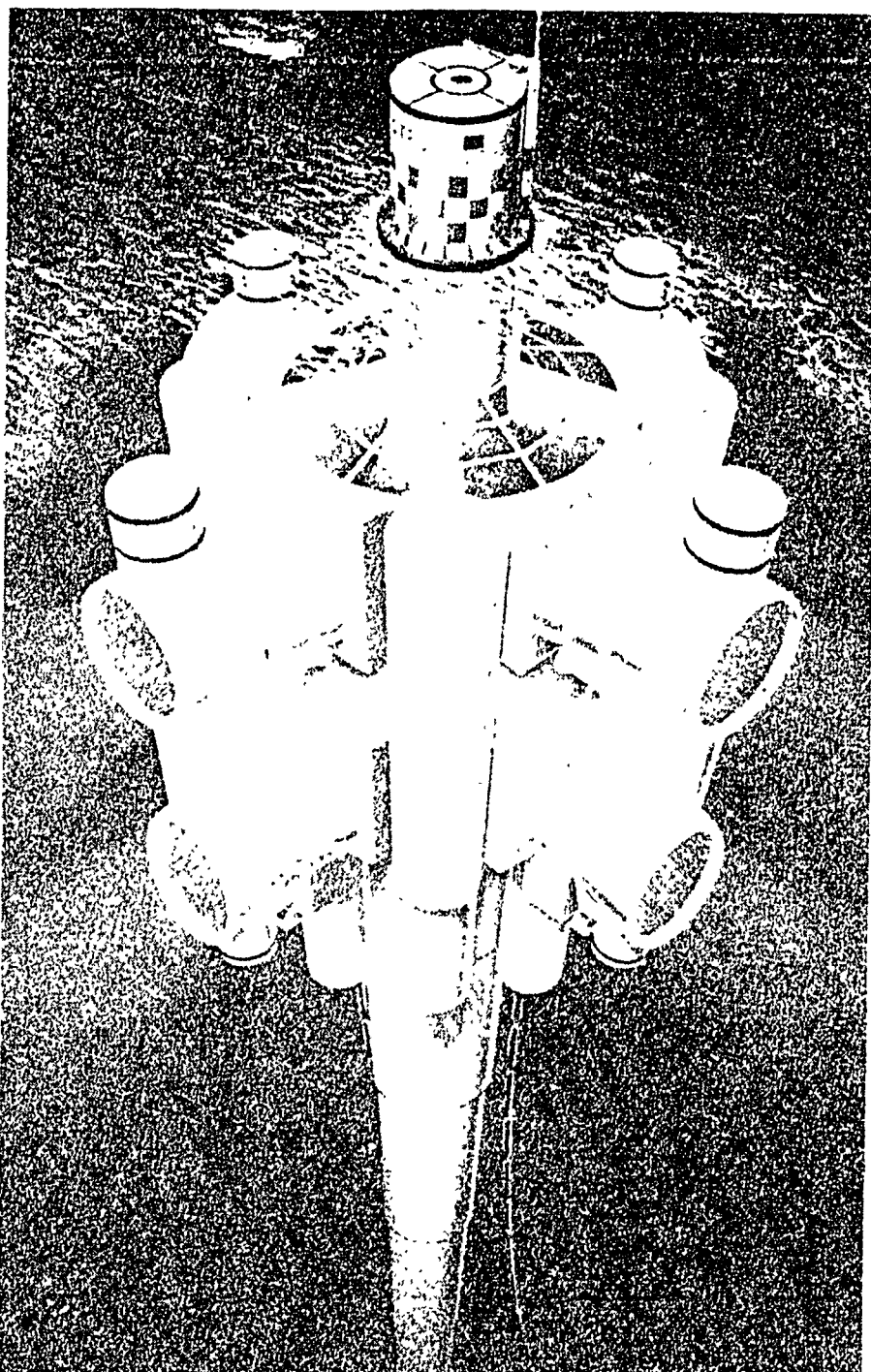
The DOE also cites some possible beneficial side-effects. An OTEC plant pumping cold water from the ocean's depths bring up nutrients attracting fish to the area. A plant could also produce millions of gallons of fresh water daily by desalting the water used in the plant's boilers.

"Research and development work looks very attractive for it to become a viable system," Sigmund Gronich, a DOE spokesman, said.

OTEC will not solve our immediate energy problems. The DOE estimates that by the year 2000 it will generate only 1.6 percent of the United States' energy demands.

The United States is not the only nation looking to the ocean for energy. France and Japan are also researching OTEC. Japan and Great Britain are studying the possibility of using waves for electricity. Israel hopes to use salinity as a viable energy source.

OTEC and the other ocean systems are being studied by the DOE and are listed as solar energy programs.



A model of the Ocean Thermal Energy Conversion plant proposed by scientists to solve future energy needs. The plant would use sun-warmed water from the ocean's surface to turn turbines and produce power. The ocean is the world's largest solar energy collector, holding energy 24 hours a day, regardless of the weather.

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The course format requires enrollment by May 18th to permit students to complete the independent reading which is required as the first phase of the program. The second phase is a seven day — six night field expedition, June 10-16th, into the Allegheny National Forest, under the direction of a faculty team (Literature and Biological Science). During this portion of the course, backpacking, canoeing, orienteering, and nature study skills are developed. At this time the readings are discussed and applied to field conditions. Each student is instructed to keep a daily journal or reactions and perceptions in relationship to the reading material. The third phase consists of a written examination by which each student demonstrates his assimilation of the entire program.

Participants should be in good health because of the ruggedness of the wilderness area and the physical demands of the field experience. Participants will not be in contact with civilization during this time.

A basic list of necessary equipment is provided to each participant at registration. Major items of equipment which the student does not have will be furnished.

Registration must be completed the week of May 14-18. Enrollment is limited to 14 students.

Fee: The total fee of \$345 for Pennsylvania undergraduate residents includes the three undergraduate credits, transportation to and from the Allegheny National Forest, all food, required textbooks, camp sites, and camping equipment if needed. A \$100 deposit must be made at initial registration. The total \$345 fee must be paid by June 1, 1979. Students selected for the field trip who withdraw after May 22nd will receive a refund only for that portion of monies not committed.

FOR ADDITIONAL INFORMATION AND REGISTRATION, CONTACT:

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