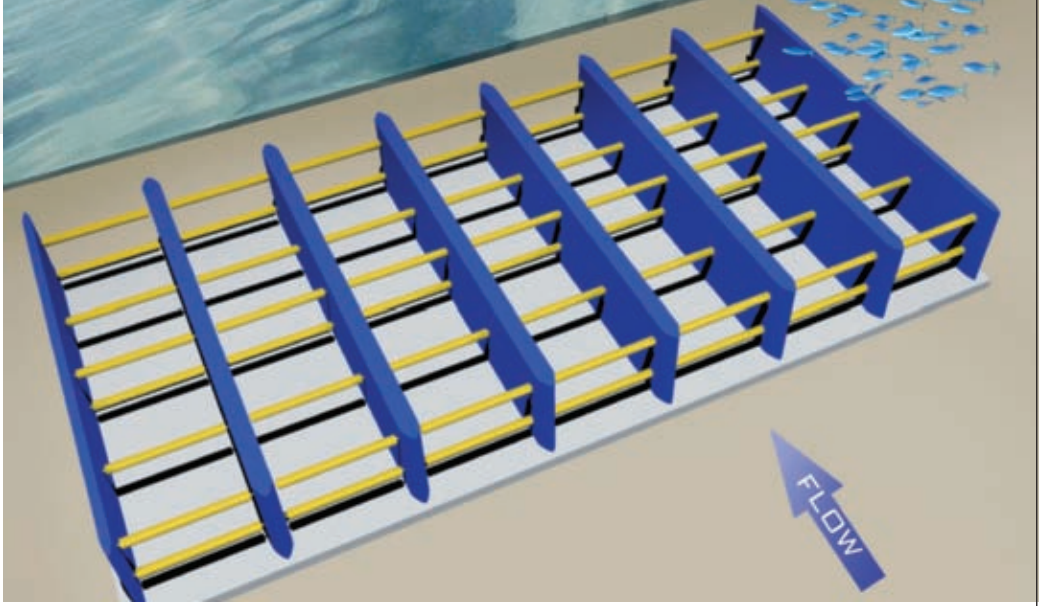

Vortex Hydro Energy's VIVACE energy converter is designed to generate electricity from low-speed water currents.
ILLUSTRATION COURTESY OF VORTEX HYDRO ENERGY

Going With the Flow

BY SALVATORE SALAMONE

THERE IS GREAT INTEREST IN DERIVING ENERGY FROM tides and water currents using submerged devices such as turbines. However, according to the Electric Power Research Institute, for such efforts to be financially viable requires fairly strong currents in the 5- to 7-knot range.

This limits the use of underwater turbines to areas of the country such as the Pacific Northwest, San Francisco Bay, New York Harbor, and rivers with strong currents.

With such shortcomings in mind, the University of Michigan Marine Renewable Energy Lab has developed a technology that has the potential to greatly expand the number of locations where hydrokinetic energy can be harnessed.

The technology is based on a phenomenon called vortex induced vibration, which was first observed by Leonardo da Vinci over 500 years ago. Essentially, any blunt object, but particularly a cylindrical object, placed in a stream of water creates vortices on the downstream side of the object.

The vortices form and shed on the downstream side in a manner where the shedding alternates from one side to another, thus creating vibrations. In most structures, such as bridge pylons, engineers seek to reduce the vibration. The lab, however, has developed a way to convert the vibrations to energy.

Specifically, Michael Bernitsas and his students have built six working models of their vortex induced vibration for aquatic clean energy converter to prove the concept works. To commercialize this technology, Bernitsas formed a company called Vortex Hydro Energy.

James MacBain, formerly director of government relations at the University of Michigan, is the company president. "We've done the work in the lab and we're going after funding to develop a prototype to put in a river," said MacBain.

The VIVACE converter can generate energy with currents as low as 2 knots, which means devices based on this technology could be deployed in most rivers and streams. The technology is modular, reconfigurable, and scalable from 1 kilowatt to 1 gigawatt.

This technology has similar benefits as the water turbine technologies being piloted today. Namely, unlike wind- and solar-based systems, hydrokinetic technologies are predictable, meaning a utility company could reliably estimate how much energy a farm of devices based on this technology would generate each month.

The technology, once matured, is expected to be cost-competitive with other technologies, generating electricity at 5.5 cents per kilowatt-hour for units on the order of 10 megawatts.