

Gulf Stream turbines might whirl out energy

The current that powers ships could slake our thirst for electricity.

By DAVID ADAMS, Times Latin America Correspondent

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DANIA BEACH - It's free, has zero emissions and sits off the Florida coast just waiting to be tapped.

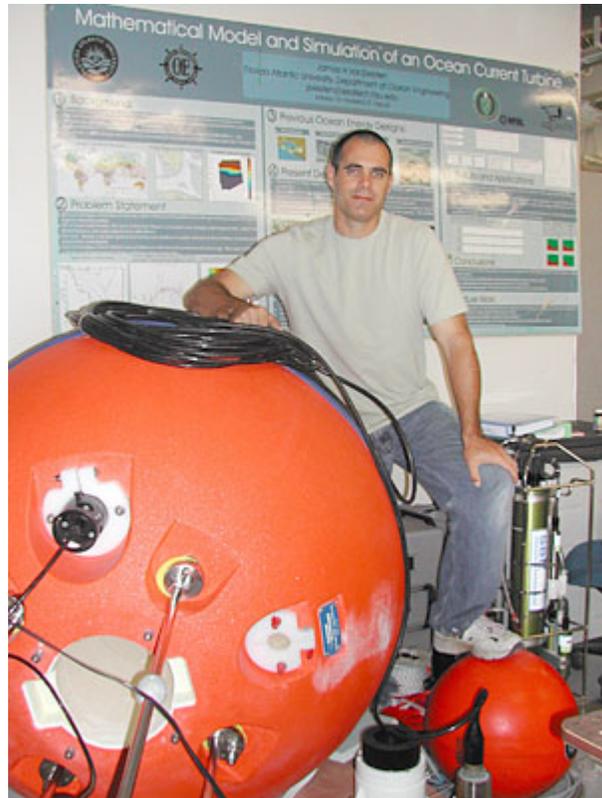
A boon to ship captains for centuries, could the Gulf Stream, which runs along Florida's east coast before curving out across the Atlantic, also be a major source of clean energy for the state?

"This is the closest location on the planet of a major ocean current to a significant urban center of electrical demand," said Rick Driscoll, director of Florida Atlantic University's Center of Excellence Ocean Energy Technology in Dania Beach, known as Sea Tech. "Its potential is immeasurable."

Driscoll envisages a vast field of thousands of underwater propeller turbines tethered to the ocean floor - imagine a wind farm hundreds of feet under the sea - slowly spinning in the current.

Some scientists say the Gulf Stream's vast energy content could provide up to one-third of the state's electricity needs, equivalent to six nuclear power stations. Realistically, that potential remains something of a dream right now. Of all the emerging alternative technologies, ocean energy is perhaps the least advanced. But it may be starting to catch on.

"Ocean energy is where wind was 20 years ago," Driscoll said. "There are a lot of concepts and designs."



Dr. Frederick Driscoll, is director of ocean energy research at Sea Tech at Florida Atlantic University. The orange buoy measures the ocean current using acoustic sonar. "Ocean energy is where wind was 20 years ago," he said.

Scientists have been studying the power of the Gulf Stream for centuries, but entrepreneurs have only recently begun to take an interest. Projects are just beginning to pop up around the country, in San Francisco Bay, New York's Hudson River and now Florida's east coast, though none are in commercial operation yet.

Sea Tech's ocean energy research is suddenly attracting intense interest. It got a major boost in 2006 with a \$5-million grant from the state. It has also formed an alliance with Florida Power & Light Co. Last week Gov. Charlie Crist proposed a \$10-million grant in his new budget, and he made his second visit to Sea Tech on Thursday to show his commitment.

"This is a resource that is boundless. I want to do everything I can to help," Crist said. "It's a national security issue. The more we can diversify our energy resources, the more independent it will make us."

Among those intrigued by the concept is influential Tampa Bay area developer and former Ambassador Mel Sembler. Sembler first heard about the potential of the Gulf Stream several years ago when he was approached by an ocean energy pioneer, Jim Dehlsen, who patented one of the earliest turbine designs in 2001.

"I think it's a fabulous idea," Sembler said. "It's so consistent and always in the same general area. To me it is Florida's answer for alternative energy. We desperately need it."

Sea Tech began work on ocean energy at its Dania Beach campus in 1999 under the leadership of Driscoll, 37, who holds a dual doctorate in mechanical engineering and oceanography.

Driscoll said the center's first prototype of an ocean current turbine, 10 feet in diameter, will be deployed later this year. Researchers want to see how the turbines behave in the current and what effect the massive blades might have on migratory fish species.

Early evidence suggests fish just swim around the blades, which rotate at speeds of up to 60 revolutions a minute.

"We see ourselves as the facilitator and a database to help provide the expertise that is needed," Driscoll said.

Driscoll's team is creating a profile of the Gulf Stream by placing acoustic Doppler equipment on the ocean bottom. It measures movement by firing sound pulses that reflect off particulate matter in the water.

At its closest, the Gulf Stream is 15 miles offshore and stretches 20 to 30 miles into the Atlantic. It varies from 320 to 650 feet deep, maintaining an average speed of about 5 mph. Crucial to any attempt to harness its energy, the current is confined to an identifiable area.

"It doesn't meander very much," Driscoll said.

While wind farms have attracted opposition from bird lovers, the notion of undersea turbines has so far not caused a stir. That may be because the Gulf Stream is not especially hospitable to marine life, Driscoll said. Its warmer temperature causes evaporation, making the water saltier.

"I have not heard any concerns," said Mark Ferrulo, director of Environment Florida, one of the state's leading nature protection advocacy groups. "If anything, there's a lot of excitement around this emerging technology."

Because 70 percent of Florida's population lives within 10 miles of the ocean, advocates say ocean energy is ideal. Its proximity offshore means reduced transmission costs.

Utilities like the concept as it offers the potential of a steady, reliable supply, unlike solar and wind energy, which are unpredictable due to variable weather conditions.

The potential energy "capture area" stretches about 100 to 200 miles from the lower Florida Keys to St. Lucie County, with the best potential around Miami-Dade, Broward and Palm Beach counties.

"This is the sweet spot down here," Driscoll said.

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A brief history

The power of the Gulf Stream was recognized by America's earliest explorers. Christopher Columbus took note of the heightened current as he approached the Caribbean. But Ponce de Leon is generally credited with discovering this warm "river in the ocean" in 1513 on his voyage to Florida in search of the Fountain of Youth.

Over the next two centuries, the Gulf Stream was used extensively by whalers, fishermen and sea captains seeking to speed their passage in the Atlantic north and east to Europe.

It may have been Benjamin Franklin who gave the current its name. As U.S. postmaster general, he pondered complaints that European mail traveling west to America took much longer to arrive than U.S. mail traveling east across the Atlantic. He printed what many believe to be the first map of the Gulf Stream in 1769.

Proposals to harness some of the energy of the powerful current have been around since Thomas Edison became interested in it in the late 19th century.

Source: Greg Allen, NPR