

NEWS RELEASE

For Immediate Release

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Makai's OTEC Turbine and Two New Heat Exchangers Arrive at the Ocean Energy Research Center in Hawaii



Makai has installed two new heat exchangers and a turbine-generator, which will complete the OTEC power cycle.

Makai's Ocean Energy Research Center (OERC) in Kona, Hawaii has received several major pieces of equipment for its Ocean Thermal Energy Conversion (OTEC) demonstration plant. Two new heat exchangers (2-megawatt thermal duty each), and a 100 kilowatt ammonia turbine-generator have arrived and are in various stages of installation and testing. To date, Makai has tested four condensers and three evaporators at the OERC, each made of either aluminum or titanium. The facility has been designed to easily swap out OTEC heat exchangers, and test as many as six simultaneously.

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The Ocean Energy Research Center is an essential tool for the development and testing of candidate OTEC heat exchangers. Heat Exchangers will be the single most expensive component in a commercial offshore OTEC plant and thus optimizing their lifetime, performance, and cost are critical for OTEC's economic success. The OERC enables engineers to rapidly design, build, and test candidate OTEC heat exchangers using a sophisticated control and instrumentation system that includes thousands of calibrated, high precision sensors. These tests yield data that are fed into Makai's OTEC plant design software to evaluate heat exchangers for lifetime (corrosion resistance), performance (heat transfer and hydraulic efficiencies), and cost (fabrication and size/weight effects on OTEC platform), as well as to optimize the next generation of heat exchangers. Makai is in the process of scaling up a design for a novel low-cost, compact, corrosion-resistant design that may significantly reduce the capital cost of OTEC heat exchangers.

Beyond its own research efforts, Makai provides objective engineering services to domestic and international third-party OTEC developers, such as testing OTEC heat exchangers, corrosion samples, and providing OTEC plant and marine pipeline design and analysis support. The OERC is primarily dedicated to OTEC research, but includes research programs in other ocean-related areas, such as corrosion prevention and heat exchangers for other marine applications. With its continuous access to large flows of both shallow and deep seawater up to 3,000 feet deep, the OERC serves as a valuable platform for international collaboration on OTEC research and development.

Finally, Makai's 100-kilowatt OTEC turbine has been placed on the OTEC tower while heat exchanger testing is being performed. Makai plans to connect the turbine to the OTEC system, and connect power to the local electrical grid in early-2015, followed by a dedication ceremony in mid-2015. This will mark the first time in history that closed-cycle OTEC power has been connected to a U.S. grid, and represents an important step toward commercializing this clean, constant (24/7) source of renewable energy.

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ABOUT OTEC: Ocean Thermal Energy Conversion (OTEC) produces electricity from the ocean by using the temperature difference between deep cold and warm surface seawater. OTEC plants pump large quantities of deep cold seawater and surface seawater to run a power cycle and produce electricity. OTEC is a constant power source 24 hours per day and 365 days per year, clean, environmentally sustainable, and can provide huge quantities of energy.

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ABOUT MAKAI: Makai Ocean Engineering, Inc. is an innovative ocean technology firm based in Hawaii, USA since 1973. Makai's expertise includes submarine cable software and services, marine pipelines, Seawater Air Conditioning (SWAC), Ocean Thermal Energy Conversion (OTEC), underwater vehicles, and general marine engineering and R&D. Makai owns and operates the world's largest OTEC demonstration plant at the Ocean Energy Research Center, the world's premier location for OTEC research and development. Visit www.makai.com for more.

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