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Department of Defense Selects 10 Winners from CTSI Defense Energy Challenge to Showcase at Honolulu Summit

(24 August, 2011—Honolulu)— Energy security and independence are two goals at the heart of the U.S. Military's investment in clean energy technologies. With over 220 submissions, the 2011 CTSI Defense Energy Challenge has selected the top 10 technologies for presentation at the Asia Pacific Clean Energy Summit on September 14th in Honolulu. These technologies reflect how critical clean energy is to America's national security.

Below are brief descriptions of the winning entries, including contact information:

1. **Thermal Conservation Technologies** is developing an ultra-thin and robust vacuum insulation panel (VIP). Current VIP technology has not been widely adopted for military and civilian applications due to three severe limitations: expense, a puncture prone aluminum skin, and large heat leaks at their edges. The VIP solves each problem by having inexpensive tensile supports, a stainless steel puncture-resistant exterior, and minimal heat loss at the edges. Due to the VIP being thin, puncture resistant, and inexpensive it is expected that the VIP technology can be used in refrigerated transportation, temporary housing for soldiers, and other cooling/heating applications where space is at a premium and energy costs are critical.

   For more information, please contact Dr. Alan Feinerman, Founder and Chief Technology Officer, or Dr. Prateek Gupta, President. Dr. Feinerman is a professor of mechanical, electrical, and bioengineering at the University of Illinois at Chicago (UIC). He may be reached at AFeinerman@tensileVIP.com or 312-498-7584. Dr. Gupta may be reached at PGupta@tensileVIP.com or 630-886-2325. For more company information visit

2. **LaserMotive** develops invisible extension cords; delivering kilowatts of power to locations kilometers away where wires are impractical or uneconomical. Its systems can keep electric UAVs aloft for days or weeks; power underwater sensors and drones, and unmanned ground vehicles; provide wireless power to forward operating bases; and secretly recharge unmanned sensors in denied territory. Multiple groups in every military branch can benefit from the technology.

   For more information, please contact Scott Milburn, COO. Mr. Milburn is an entrepreneurial senior executive with 30 years' experience in business, law, technology, and finance. He may be reached at scott.milburn@lasermotive.com or 206.890.0491. For more company information please visit http://lasermotive.com/.

3. **National University of Singapore** is developing thermal management technology which is highly effective and reliable and is well suited for various applications that dissipate high heat fluxes and/or require good temperature uniformity. In particular, thermal and power management are widely considered to be the crucial links in the ability to embrace high-performance computing technology in military systems designs. While particularly useful for High Energy Laser systems

and radar systems, other defense applications that could utilize the micro oblique fin liquid coolers include the next generation of high power Integrated Power Systems (IPSs), electromagnetic weapons (EWs) and aviation electronics.

For more information please contact Dr. PS Lee, an Assistant Professor with the Department of Mechanical Engineering at the National University of Singapore. He has over 10 years of experience working on high performance, energy efficient microchannel liquid cooling technology. He may be reached by contacting Ms. Karen LOH at karenloh@nus.edu.sg or +65-6601-1485.

4. **Nextek Power Systems** is a pioneer in direct current (DC) power networks. The Nextek Direct Coupling® Microgrid delivers superior efficiency, flexibility, and reliability to facilities and on-site renewable power sources. This unique system architecture lowers overall energy consumption, increases the efficiency of renewable energy and storage while reducing up front and long term costs. The DC Microgrid removes unnecessary power conversions (DC to AC and then AC back to DC) resulting in significant efficiency improvements. This approach enables the Military to meet the respective branches' energy mandates more efficiently and economically; drastically reducing dependency on fossil fuel.

   For more information please contact Jeff Daudert. Mr. Daudert is a retired Naval Officer with over 21 years of dedicated service. He brings to Nextek a wealth of government and military expertise, serving as the Key Accounts Manager with a primary focus on growing our government sector. After eight years of Enlisted experience, Jeff was honored to be selected as one of only 50 in the entire US Navy for a special commissioning program and upon successful completion of Officer Candidate School, was commissioned as a Surface Warfare Officer. He may be reached at 313-887-1321 x 125 or jeff.daudert@nextekpower.com. For more company information please www.nextekpower.com.

5. **LanzaTech** provides a strategically important route to drop-in hydrocarbon fuels through a process of alcohol production from CO-rich feedstocks, such as industrial gases or biomass syngas. It is the first company to utilize waste gases for the production of fuels and chemical intermediates. LanzaTech recently announced a contract with the Defense Advanced Research Projects Agency (DARPA) focused on reducing the cost of alcohol intermediates to produce jet fuel. LanzaTech is also partnering with the Department of Energy's Pacific Northwest National Laboratory on a project focused on the upgrading of LanzaTech's 2,3-butanediol to a synthetic paraffinic kerosene. In addition, LanzaTech and Swedish Biofuels have submitted a sample of its ATJ jet fuel to the Air Force Research Laboratory, where the sample was analyzed and shown to meet all key properties. LanzaTech's ability to utilize low cost, non-fossil resources for the reliable production of diesel and jet fuel supports the military's ability to execute mission critical operations.

   For more information please contact Carl Wolf, Business Development Manager, or Dr. Jennifer Holmgren, CEO. Dr. Holmgren has over 20 years of experience in the energy sector including a proven track record in the development and commercialization of fuels and chemicals

technologies. You may reach either party by contacting Carl.Wolf@lanzatech.com or 630-439-3056. For more company information please visit http://www.lanzatech.co.nz/.

6. **California Energy & Power Company** has developed a powerful, affordable and durable wind energy solution, the Cal-ePower 10 kW vertical-axis wind turbine and distributed wind system. This system can provide green energy for customers requiring 10 kW to 10 MW of distributed wind power, without spoiling the view, creating noise or disrupting radar—at a reduced cost. It is of great interest to the military because it will not interfere with RADAR systems, will not harm wildlife and has a much smaller footprint/MW than large wind turbines. The turbines can be quickly assembled on site, are inexpensive to maintain, and can be closely regulated within a smart-grid; seamlessly meshing their power output with other renewable energy systems on base. These turbines can be deployed in harsh environments without shut-down or excessive maintenance due to their tough composite construction and corrosion-resistant steel, coated with an environmentally-safe sealant developed by the US Navy.

   For more information please contact Michael Allawos, President and COO. An experienced Senior Executive, Michael has founded and grown companies from start-up to acquisition. Previously (1985 to 2006), Mr. Allawos was the President of Mikana Manufacturing Company Inc., an aerospace, health care, semi-conductor, and terrestrial build-to-print products manufacturing company based in southern California with a high emphasis on DOD specifications and platforms. He may be reached at 626-824-4546/626-914-2463 or mallawos@cal-epower.com. For more product information please visit http://cal-epower.com/img/CE_PBrochure2-25-11.pdf.

7. **Ener-G-Rotors, Inc** is commercializing devices that represent a breakthrough in the economic generation of electricity from low temperature heat. This can take heat from 190F to 240F and make electricity ranging from 1kW to 60kW for less than 1.5¢/kWh. The flexibility and incredible efficiencies of the technology also allow it to extract value from heat streams that no other technology can. This technology solution will help the Department of Defense meet requirements by reducing electrical needs and GHG emissions, while making better use the energy already consumed on site. An immediate application consistent with the Army Net Zero installation initiative of "repurposing" waste energy is to convert waste heat from a boiler stacks and combined heat and power installations into electricity. A system-wide effort at all 388 major DoD installations worldwide, assuming one GEN4 per site, would generate 170 gigawatt hours of electricity per year and reduce carbon emissions by 103,000 metric tons.

   For more information please contact Michael Newell, CEO. Mr. Newell has been in three start-ups previous to EGRI that introduced a new product to a new market. He has years of experience in sales, marketing, and general management for technology based industrial products in new businesses and markets. He may be reached at 518 372 2608 or mnewell@energrotors.com. For more company information please visit http://www.ener-g-rotors.com/.

8. **Sempra Energy** built, owns, and operates the largest solar photovoltaic project in the US, the 50 MW Copper Mountain Solar Project in Nevada, which was awarded Renewable Energy World

Project of the Year in 2010. Sempra is currently building the largest solar PV project in the world, the 150 MW Mesquite Solar Project in Arizona. Sempra is proposing to develop, build, own, and operate the Navy Hawaii Solar Project, a solar photovoltaic project of up to 300 MW on underutilized Navy land surrounding Pearl Harbor Navy Base. The Navy Hawaii Solar Project would supply power to both the Navy and Hawaiian Electric. The Navy would receive power for zero cost in exchange for a land lease for the Hawaiian Electric project. The project would save the Navy tens of millions of dollars in energy costs over its 25-year life. The project would also provide solar electric power to Hawaiian Electric and Hawaiian consumers at costs at or below current electric prices and make a major contribution the State of Hawaii's, the Navy's, Hawaiian Electric's, and President Obama's renewable energy goals. Based on Sempra's solar development experience, Navy Hawaii Solar could be fully developed and permitted by 2013 and fully operational by 2014.

For more information please contact Mitch Dmohowski, Director of Commercial Development. Mr. Dmohowski manages the acquisition and greenfield development of wind and solar projects and has over 15 years experience in project management, construction, and finance in the energy industry. He has played key roles in the successful development of over $5 billion in energy projects including combined cycle power plants, petrochemical refineries, pipelines, wind farms, and solar photovoltaic projects. He may be reached at 619-818-3981 or mdmohowski@semprageneration. For more company information please visit http://www.sempra.com/.

9. **ZeaChem's** 250,000 gallon per year demonstration integrated biorefinery in Boardman, Oregon will begin operations by the end of 2011. The facility will utilize hybrid poplar trees from its feedstock partner GreenWood Resources as the primary feedstock. The facility will also process agricultural residuals, including wheat straw from the local area. The production of renewable and economical bio-based jet and diesel using ZeaChem's highly efficient process will expand the partners and product consumers the company will work with going forward, including the US military. ZeaChem is leveraging its feedstock-flexible, low-cost conversion process for advanced biofuels and bio-based chemicals into the production of drop-in biofuels, including jet and diesel, for use in military applications.

   For more information please contact Carrie Atiyeh, Director of Public Affairs at 303-248-7778 or catiyeh@zeachem.com. For more company information please visit http://www.zeachem.com/.

In addition to winners, top scoring defense technology solutions will be on display at the Defense Energy Showcase during the summit. Join us in Hawaii on September 13-15 for a full three day program on the Department of Defense clean energy needs.

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