Hearing Summary and Legislative Recommendations from Joint Informational Hearing, September 27, 2012:

Energy Security

California, Business & Military Partnerships

Senate Committee on Veterans Affairs

Chair, Senator Lou Correa

Senate Select Committee on the Environment, the Economy & Climate Change

Chair, Senator Fran Pavley

November 3, 2012

This memorandum summarizes and analyzes the testimony delivered at a Joint Informational Hearing of the Senate Committee on Veterans Affairs and the Select Committee on the Environment, the Economy, and Climate Change that took place on September 27, 2012 at California State University, Channel Islands in Camarillo. The primary purpose of this hearing was to better understand how California can work to promote in-state clean energy business growth in partnership with the military to enhance energy security, grow the economy, and relieve energy cost burdens on the middle class.

Background

What is Energy Security? For purposes of this hearing, the term "energy security" was used to describe the correlation between "the stability and safety of our nation, at home and abroad, and the availability of energy resources that are abundant, clean and affordable enough to ensure that safety and stability."[1] Every day, the United States spends approximately $1 billion overseas for oil.[2] This daily expenditure is a major driver of our national trade deficit,[3] and it leaves our economy exposed to geopolitical pressures beyond our immediate control.[4] The Energy Information Administration estimates the United States consumes around 18.8 million barrels of oil a day, making it by far the largest consumer of oil in the world.[5]

The Department of Defense considers oil dependence a strategic threat to our national security and an operational risk to our men and women in uniform. According to the Secretary of Navy of the United States, for every 50 American fuel convoys, one marine is killed or

[1] Senator Fran Pavley, Opening Remarks, California State Senate Committee on Veterans Affairs and Select Committee on the Environment, the Economy & Climate Change Joint Informational Hearing on Energy Security (November 3, 2012).

[2] "Our Mission." *Operation Free | Secure America with Clean Energy.* Truman National Security Project, n.d. Web. 26 Oct. 2012. <http://www.operationfree.net/our-mission/>.

[3] Google: Foreign Oil import/National deficit.

[4] Zakaria, Fareed. "The New Oil and Gas Boom." *Time.* Time, 29 Oct. 2012. Web. 26 Oct. 2012. <http://www.time.com/time/magazine/article/0,9171,2127202,00.html>.

[5] "Total Petroleum Consumption (Thousand Barrels Per Day)." *International Energy Statistics.* U.S. Energy Information Administration, n.d. 2011.Web. 31 Oct. 2012. <http://www.eia.gov/cfapps/ipdbproject/iedindex3.cfm?tid=5>.

wounded.[6] Approximately 3,000 United States troops and civilian contractors have been killed or wounded protecting these convoys.[7]

The California Energy Security Nexus. Californians are uniquely exposed to the volatility of global oil markets. California is one of the largest consumers of oil in the country,[8] due in part to the fact that 10% of the nation's cars are in California,[9] and in part because of the long distances California drivers must travel on a daily basis due to our land use and transportation patterns. In his opening remarks to the Joint Informational Hearing, Senator Correa echoed the military's observation, describing our oil consumption pattern as a "strategic threat" to our military and to California, emphasizing that our addiction to oil compels us to unnecessary commitments of funds.

The increasing volatility of gas prices that is caused in part by our domestic market's exposure to a highly competitive, global market where demand is skyrocketing from industrializing nations like Brazil, China and India, and supply suffers disruptions from geopolitical conflict in the various oil producing regions like Iraq and Iran. These global factors are adversely affecting the daily lives of Californians, Senator Pavley explained: "Our addiction to oil also has very real impacts on families here in California. The burdens of these foreign subsidies are being born disproportionately by middle class families." The volatility of oil prices impairs families' abilities to financially plan, and many families are forced to choose between filing up the tank and buying food or paying bills.[10]

Clean energy can be a solution to this strategic threat at home and abroad. Convoys would not have to be diverted to protect fuel supply lines through treacherous mountain passes in Afghanistan if power and fuel could be generated on-site through alternative resources like solar power or waste biogas. Senator Pavley's opening remarks focused on the role that clean energy innovation could also provide economic security benefits at home. Pavley highlighted the new vehicle technologies that have been integrated into our nation's automotive fleet to meet new state and federal greenhouse gas emissions and fuel economy standards.

These clean cars are projected to dramatically reduce California and the country's oil consumption—led by California's efforts to implemented AB 1493 (Pavley, 2002), American

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[6] Wright, Austin. "Navy Powers up Campaign for Great Green Fleet." *POLITICO.* POLITICO, 7 Mar. 2012. Web. 26 Oct. 2012. <http://www.politico.com/news/stories/0312/73752_Page2.html>.

[7] *Energy for the Warfighter: Operational Energy Strategy*. Rep. Department of Defense (May 2011), Page 5. Web. 29 Oct. 2012. <http://energy.defense.gov/OES_report_to_congress.pdf>..

[8] Energy Consumption by Source and Total Consumption per Capita, Ranked by State, 2010, Table C11, *Independent Statistics and Analysis*. U.S. Energy Information Administration - EIA, 2010. Web. 01 Nov. 2012. <http://www.eia.gov/beta/state/seds/data.cfm?incfile=/state/seds/sep_sum/html/rank_use_per_cap.html>.

[9] *U.S. Census Bureau, Statistical Abstract of the United States: 2012: Transportation*. Rep. United States Census Bureau, 2012. Web. 30 Oct. 2012. <http://www.census.gov/compendia/statab/2012/tables/12s1098.pdf>.

[10] "Trapped in the Middle." *Studying the Energy Trap.* New America Foundation, n.d. Web. 26 Oct. 2012. <http://stories.energytrap.org/middleclass>.

automobiles are on track to double their fuel economy to 54.5 miles per gallon. By 2030, this will result in oil savings of more than 3 million barrels per day, which is roughly equal to the current imports from the Persian Gulf and Venezuela combined. These reduced imports will not only help strengthen our strategic geopolitical leverage, but also will save Americans $140 billion annually, and over $8,000 over the lifetime of a new 2025 vehicle.[11] The carbon pollution avoided annually from these clean transportation regulations is as equal to the emissions of 65 coal-fired power plants of typical size.

The state and the military have a wide variety of other tools, in addition to fuel economy, that can also enhance energy security, including alternative fuels, like advanced biofuels, electricity, hydrogen and natural gas, and related fueling infrastructure, energy efficiency, distributed generation of clean power, and smart and efficient water usage. Properly integrated distributed energy and water resources can provide lower costs and more control for end users.

Panel 1: Department of Defense's Clean Energy Progress in California

UNITED STATES MILITARY'S ENERGY OBJECTIVES

The Department of Defense (DOD) has set ambitious clean energy goals to drive the reduction of petroleum and grid-based energy consumption at all military installations. The first panel of the hearing explored the military's energy security objectives and Naval Base Ventura County's progress towards meeting those goals at the local level.

Efficiency. The DOD has determined that increasing vehicle efficiency across its large fleet of airplanes, ships and ground vehicles is the fastest and most cost effective way to reduce fuel consumption and address operational risks to soldiers in the field.

- By 2015, the Navy plans to reduce its energy consumption by 30%, water consumption by 16%, and petroleum use in the commercial fleet by 50%.[12] Evaluation of energy factors will now be mandatory when awarding Department of the Navy contracts for systems and buildings.[13]

[11] Union of Concerned Scientists, *Fact Sheet*, n.d. Web 31 Oct 2012 <http://www.ucsusa.org/assets/documents/clean_vehicles/Clean-Car-and-Truck-Standards-Model-Years-2017-2025.pdf>.

[12] "Energy." *U.S. Navy Energy, Environment and Climate Change.* United States Navy, n.d. Web. 25 Oct. 2012. <http://greenfleet.dodlive.mil/energy/>.

[13] "Navy Issues New Shore Energy Policy to Achieve Energy Security Goals." *Navy Issues New Shore Energy Policy to Achieve Energy Security Goals*. Chief of Naval Operations Shore Readiness Division, 10 July 2012. Web. 25 Oct. 2012. <http://www.navy.mil/submit/display.asp?story_id=68304>.

- The Air Force seeks to reduce consumption of aviation fuel by 10% by 2015.[14]

Alternative Fuels. The DOD is taking steps to harness advanced biofuels to displace its petroleum-based liquid fuel supply.

- The Navy will increase alternative fuel consumption by at least 10% annually, purchase clean vehicles when commercially available, and purchase 50% of power from renewable power plants. The Navy plans to demonstrate a Green Strike Group, part of the "Great Green Fleet", in local operations by 2012 and for a global tour in 2016.
- The Air Force is pursuing plans to use alternative fuels for 50% of its domestic aviation needs by 2016.
- The Army seeks to harness alternative fuels to power its vehicle fleet and increase non-petroleum fuel use by 10 percent annually in non-tactical vehicles to meet the requirements of Executive Order (EO) 13423, "Strengthening Federal Environmental, Energy, and Transportation Management," which was signed by President George W. Bush on January 24, 2007.
- The DOD is partnering with the Federal Aviation Administration, the United States Department of Agriculture and the Department of Energy, as well as domestic aviation, agriculture and transportation industries to further the advancement of biomass displacement of petroleum and other clean energy technologies.[15]

Renewable Energy. Currently the DOD is the world's largest institutional energy user but only 10% of the electricity consumed is renewable. In order to increase renewable energy production and procurement, the DOD has become an important player in the development of advanced renewable energy technologies.

- As of 2010, the DOD was operating more than 450 projects involving wind, solar, geothermal and biomass energy.
- The DOD's renewable energy spending is projected to reach $3 billion by 2015 and $10 billion by 2030.[16]

LOCAL NAVY INSTALLATION'S CLEAN ENERGY PROGRESS IN VENTURA COUNTY

Representing Naval Base Ventura County (NBVC), Captain Lawrence R. Vasquez, Commanding Officer, and Tom Santoianni, NBVC Energy Manager, delivered the opening testimony at the hearing. NBVC is a major United States shoreside naval installation made up of three operating facilities: Point Mugu, Port Hueneme and San Nicolas Island. Strategically

[14] *Fiscal Year 2012 Operational Energy Budget Certification Report*. Rep. Assistant Secretary of Defense for Operational Energy Plans and Programs, Jan. 2011. Web. <http://energy.defense.gov/FY12_Operational_Energy_Budget_Certification_Report_FINAL%208%20JUN.pdf>.

[15] *From Barracks to the Battlefield: Clean Energy Innovation and America's Armed Forces*. Rep. Pew Environmental Group, 21 Sept. 2011. Web. 31 Oct. 2012. pp. 8-9

[16] *From Barracks to the Battlefield: Clean Energy Innovation and America's Armed Forces*, p. 11

located in a non-encroached coastal area of Southern California, NBVC is a key component of the DOD's infrastructure because of its superior geographical location. NBVC is a major aviation shore command and Naval construction force mobilization base. NBVC provides airfield, seaport and base support services to fleet operating forces and shore activities, including refueling infrastructure and shoreside power. [17]

The base is also a "showcase" clean energy base where new energy technology is monitored, tested and "lessons learned" are shared with other naval bases across the world. NBVC's Energy and Sustainable and Design Demonstration facility is the centerpiece of their clean energy efforts and was the first DOD facility to reach a gold level Leadership in Energy and Environmental Design (LEED) certification.

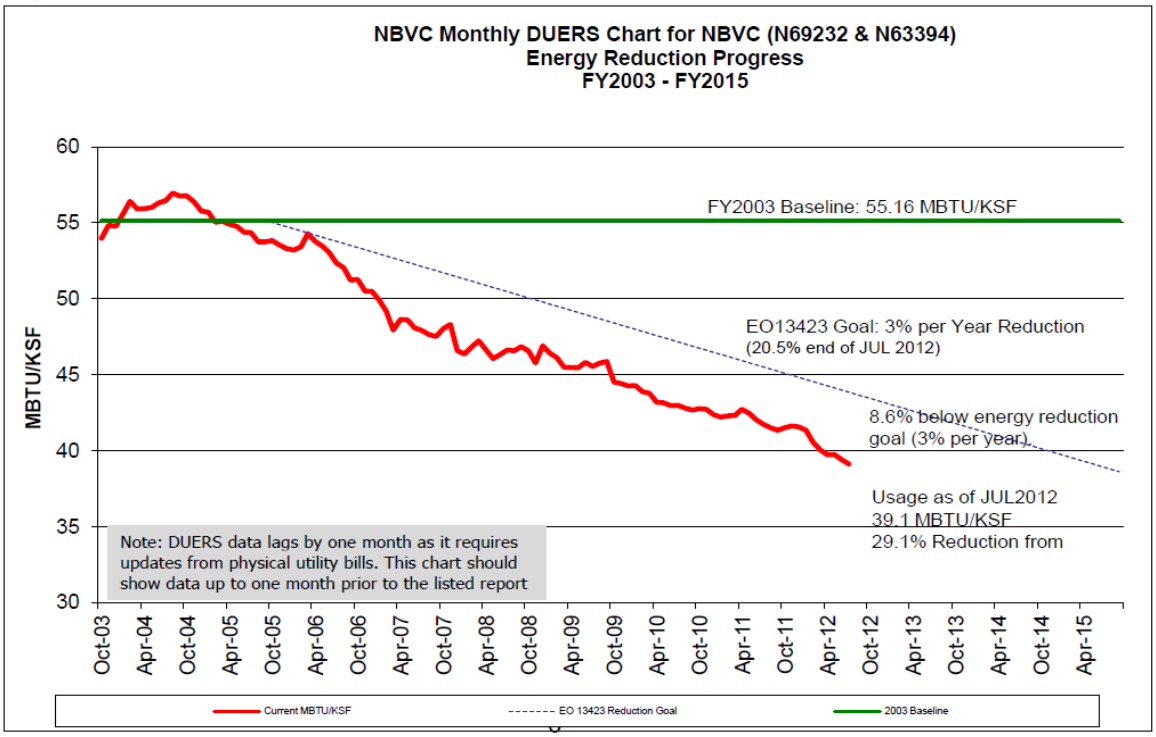
NBVC is the largest employer in Ventura County and is home to approximately 80 military commands representing all branches of the U.S. Military.[18] An economic impact study shows NBVC employs 19,000 military and civilian personnel, and contributes close to $1 billion to the local economy.[19] Vasquez explained a main driver of the base's local economic impact is the $99 million committed by the base to clean energy projects since 2005; 90% of these funds have stayed in state. NBVC is on track to meet or exceed several Navy clean energy goals. The base will reach the Navy's 30% reduction goal in energy consumption well before 2015 and has already reduced water consumption by 50%, well ahead of schedule.

[17] "CNIC//Naval Base Ventura County." *Naval Base Ventura County.* United States Navy, n.d. Web. 25 Oct. 2012. <http://www.cnic.navy.mil/ventura/index.htm>.

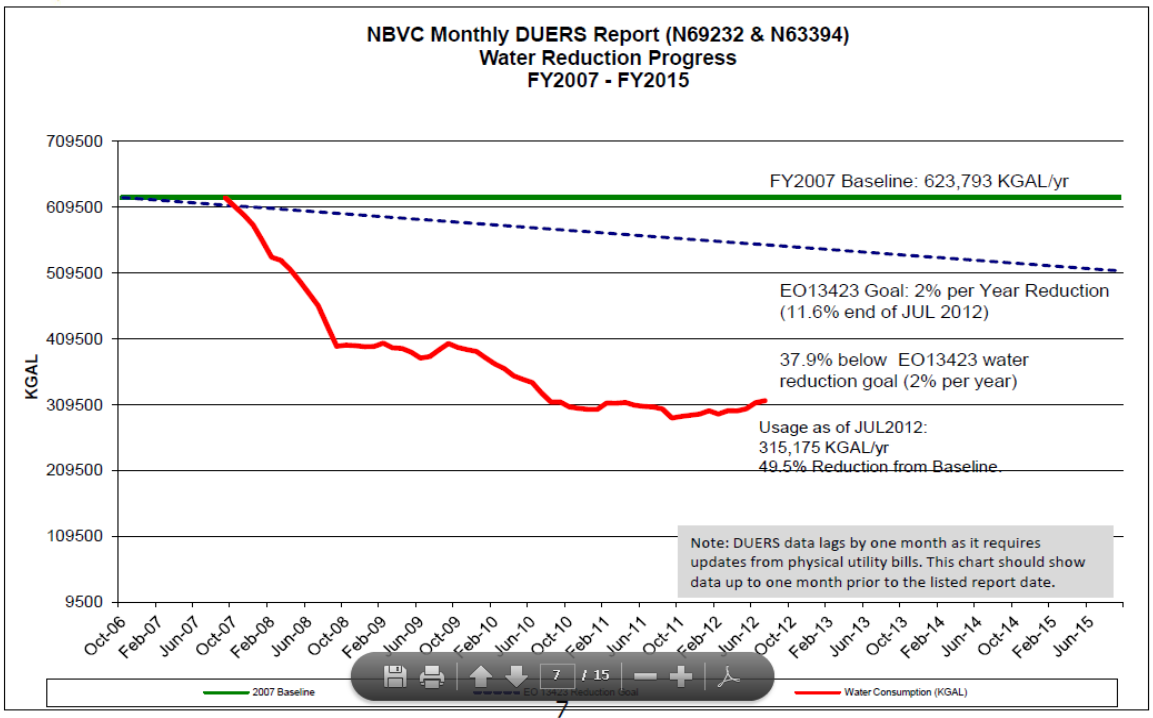
[18] *Id.*

[19] *Naval Base Ventura County 2006 Economic Impact Report*. Rep. Workforce Investment Board of Ventura County, n.d. Web. 29 Oct. 2012. <http://www.cnic.navy.mil/navycni/groups/public/@cnrsw/@vc/@about/documents/document/cnicd_a077788.pdf>.

By The Numbers—Naval Base Ventura County Energy And Water Usage



Energy Usage of Naval Base Ventura County *(Source: Defense Utility Energy Reporting System)*



Water Usage of Naval Base Ventura County *(Source: Defense Utility Energy Reporting System)*

NBVC's Funding and Financing Strategies. The base obtains funding for clean energy projects from a variety of sources:

- The Energy Conservation Investment Program (ECIP) is a prestigious, congressionally funded program for projects over $750,000. ECIP projects must show economic sense, energy savings and meet return-on-investment requirements.
- Projects on base can also receive funding from local sources such as Utility Energy Service Contracts and Energy Savings Performance Contracts which are financed by local utility companies. These funding sources are used only if full funding is not available.
- Restoration and Modernization-Energy (RMe) funds are used for traditional energy retrofit projects. RMe projects are fully funded and must meet stringent return-on-investment requirements.
- Funding for clean energy projects is also available through the American Recovery and Investment Act and the Environmental Security Technology Certification Program.

As much as possible, NBVC tries to combine project funding sources, saving time, money and reducing the payback period. NBVC has completed over $82 million in energy projects, saving nearly $9 million a year in energy and water costs. If it should continue to work at its current pace, the base estimates that, by 2015, it will complete $100 million in energy projects with annual savings over $11 million.

PERSISTENT SECURITY RISKS AND RISK MITIGATION THROUGH CLEAN ENERGY

Representing the Truman National Security Project's Operation Free at the hearing, Executive Director and former Army Captain Michael Breen spoke on behalf of a coalition of veterans and national security organizations that recognize that climate change and energy dependency on foreign sources pose serious threats to the United States national security. The Operation Free campaign advocates for clean, domestic energy production to help protect America from oil sources in destabilizing, weak and failed states – the breeding grounds and safe havens for terrorist organizations like al Qaeda and the Taliban.[20]

Breen emphasized consensus: five former Secretaries of Defense, two Chairmen of the Joint Chiefs of Staff, a Secretary of the Army, and three Secretaries of the Navy, jointly stated that oil's status as a strategic commodity weakens our economy and jeopardizes national security. The DOD, the world's single largest consumer of oil, is especially vulnerable to the unstable oil market. According to the Congressional Research service, a 10% increase from the FY2011 price of fuel would cost DOD as a whole an additional $1.7 billion per year—the price of about 14 F-35s.[21] Oil demand is largely inelastic, so shortfalls in fuel budgets must be met elsewhere in the military operational budget.

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[20] "Our Mission." *Operation Free: Secure America with Clean Energy*. Operation Free, n.d. Web. 25 Oct. 2012. <http://www.operationfree.net/our-mission/>.

[21] Congressional Research Service, *Department of Defense Energy Initiatives: Background and Issues for Congress*, Page 9 (August 10, 2012). Web. 31 Oct. 2012. <http://www.fas.org/sgp/crs/natsec/R42558.pdf>.

The U.S. accounts for 22% of the world's oil demand and oil powers more than 95% of U.S. transportation infrastructure. Breen explained that one in twenty-six fuel convoys in Afghanistan end with an American casualty because our adversaries abroad recognize and exploit our dependence on oil. To combat this threat to national security, the United States Armed Forces are taking aggressive steps to integrate clean energy technology to lessen the military's dependence on oil.

Breen also emphasized California's role as an essential partner in the military's initiative to mitigate these risks with clean energy innovation. The Navy recently signed an offtake agreement for 450,000 gallons of drop-in renewable jet fuel, the largest purchase in history, from Solazyme, a northern California company, in a joint venture with Tyson Foods and Syntroleum. Many other new, clean energy projects that will play an important part in our nation's energy security are being developed in California with the assistance of the Armed Forces. For example, most crude oil refineries operating in California do not operate at full capacity, and have spare refining infrastructure that could be used for the production of drop-in diesel and jet fuels through a relatively low cost conversion of that portion of the refining facility. This could provide additional revenue to oil refineries in need of cash flow, and help improve air quality at the facility. In-state production of drop-in sustainable jet and diesel fuels could help provide more stable sources of fuel off-take contracts for military end users as well as commercial, state and local buyers.

STATE EFFORTS TO ASSIST MILITARY AND VETERAN OPERATIONS IN CALIFORNIA

The lives of California veterans and active duty members of the military, as well as the military's overall ability to meet key strategic objectives, like energy security, are influenced by California state policy. In the 2011-12 legislative session, a number of measures affected bases throughout California, and veterans' employment opportunities:

- ***SB 1409 (Pavley)***, the Energy Security Coordination Act of 2012, directs the Governor's Director of Planning and Research to direct state agencies like the Public Utilities Commission and the Energy Commission to consider the military's energy security objectives that directly impact the implementation of certain California energy and environmental policies, like AB 32, the Global Warming Solutions Act, the Renewables Portfolio Standard, or the Low Carbon Fuel Standard.
- ***SB 813 (Committee on Veterans Affairs)*** extends the period of time, from two years to five years, that a former member of the Armed Forces of the United States can receive priority registration enrollment at the California State University and California Community College systems.
- ***SB 1563 (Cannella)*** specifies that veterans who have completed acceptable training in the United States Armed Forces as peace officers shall be allowed 15 additional points for any entrance examination for a peace officer position.

- ***AB 2659 (Blumenfield)*** allows licensed drivers of military commercial vehicles to qualify for a California commercial driver's license without additional California driving tests.

CONSIDERATIONS FOR LEGISLATORS AND STAFF

- ***What regulatory barriers exist that inhibit stronger partnership between the military, clean energy companies and California?*** For example, should the state consider streamlined environmental and land use permitting for projects with energy security benefits like the interconnection of distributed solar power generation, or the conversion of existing oil refineries to a drop-in renewable jet/diesel refineries?

- ***Are additional state incentives necessary to attract potential military clean energy suppliers to California and prepare veterans for jobs in these fields?***

- ***Where should the Governor's Office of Planning and Research initially focus in implementing SB 1409*****?** Options include electric transmission grid planning, bulk procurement of drop-in low carbon fuels, permitting microgrid development including distributed generation and energy storage. Moreover, Department of General Services' recent Request for Information on the bulk procurement of low carbon alternative fuels could benefit from coordination with the Department of Navy's outstanding request for $510 million in alternative fuel supply and related infrastructure in a manner that stimulates millions of dollars of new federal biorefinery and alternative fuel feedstock investment in California. Department of General Services, *Request for Information for Advanced Renewable Fuel Market Research*, RFI DGS 1207-013 (Aug. 2012)

Panel 2: Energy Solutions to a Strong Economy and a Safe Country

The second panel of the hearing, featuring California clean energy business leaders, focused on how the deployment and scaling of clean energy technologies into our transportation and energy infrastructure will not only strengthen our energy security but also stimulate the California economy and create jobs. With over 318,000 jobs and counting, California has the largest clean energy economy in the country.[22]

DISTRIBUTED POWER

[22] "Sizing the Clean Economy: A National and Regional Green Jobs Assessment." *Series: Sizing the Clean Economy.* The Brookings Institution, 13 July 2011. Web. 01 Nov. 2012. <http://www.brookings.edu/research/reports/2011/07/13-clean-economy>.

Darren Jamison, CEO of Capstone Turbine, testified at the hearing about the sustainable technology his company is creating and manufacturing. Capstone Turbine Corporation is headquartered in Chatsworth, California; is the world's leading producer of low-emission microturbine systems, and was first to market with commercially viable air-bearing turbine technology. Originally founded on an automotive platform, Capstone currently has approximately 215 employees, but could increase hiring significantly if the company had more demand to fully utilize its manufacturing capacity, which is currently only operating at about one-third of total capacity.[23]

Microturbines can be deployed in a number of applications that have potential energy security benefits—most notably, as a highly efficient distributed power source for military bases that can replace more emissions intensive sources of backup power, like diesel generators. Two of the three major manufacturers of microturbines are located in California—Flex Energy and Capstone. Despite the strong in-state jobs link, California generates less than 5% of Capstone's sales—demand in the state's combined heat and power market, a primary industrial application for these products, has been historically weak. A recent ICF report to the California Energy Commission notes that the state has about 16 gigawatts of technical capacity, with significant room for growth in industrial processes, oil and gas refining and other emissions intensive businesses.[24] Fostering in-state demand for the continued manufacturing of microturbines and other sources of distributed power could provide significant benefits to the economy and help larger California businesses cost-effectively attain the greenhouse gas emission reduction goals required under AB 32.

A number of state policies support the growth of this market, including tariff rules and regulations governing combined heat and power, the Self Generation Incentive Program, and the AB 1613 feed-in tariff for CHP, all of which are administered by the Public Utilities Commission. Despite these policy drivers, the California marketplace for clean distributed generation remains underutilized. As grid power gets greener under the 33% Renewables Portfolio Standard, there will be a limit to how cost-effective CHP systems will be for pollution reduction efforts, but that limit is not yet in sight, and regardless, the fuel efficiency and resource diversity provided by CHP provides significant economic and energy security benefits to large end users of heat and power, such as military bases, manufacturers, and universities.

CLEAN TRANSPORTATION

Transportation is the single largest end use for foreign oil and because more than ten percent of the nation's cars are in California, our state is responsible for a considerable amount

[23] In its 2012 Fiscal Report, Capstone reported revenue growth of 34 percent year-over-year to $109.4 million and a gross margin of 5 percent. Accelerating order momentum drove record backlog of $139 million at March 31, 2012, reflecting a compounded annual growth rate of approximately 48 percent since fiscal 2009.

2012 Annual Report. Rep. Capstone Turbine Corporation, n.d. Web. 26 Oct. 2012. <http://phx.corporate-ir.net/External.File?item=UGFyZW50SUQ9MTQ1ODg0fENoaWxkSUQ9LTF8VHlwZT0z&t=1>.

[24] *ICF, Consultant Report, Combined Heat and Power Policy Analysis and Market Assessment, 2011-2030,* prepared for California Energy Commission (February 2012), Page 2. <http://www.energy.ca.gov/2012publications/CEC-200-2012-002/CEC-200-2012-002.pdf>.

of the demand driving the market for imported oil. Clean energy innovations in transportation will be critical if the country is to meet its energy security goals. For this reason, the second panel featured representatives from various companies working to deploy alternative fuels and alternatively fueled vehicles at commercial scale—Tesla, General Motors and Biodico. As Senator Pavley stated during her opening remarks, "California is ready for this next generation of cars. They get it, not only is [this industry] creating jobs here, but will save Californians thousands of dollars that are needlessly wasted at the pump every day."[25]

Consumer Choice and Incentives for Affordable Clean Cars. As gas prices continue to increase erratically, consumers are looking at alternative modes of transportation, noted panel speaker Diarmuid O'Connell, Vice President of Business Development at Tesla Motors. A historic lack of choice for drivers has perpetuated a "dependency in [the] economy, constraint on foreign policy, and leads to perversion of investment and waste in lives." O'Connell noted that the electric car is better viewed in the context of providing automotive variety.

The success of electric cars will depend on consistent, meaningful economic signals that give companies certainty and provide a natural trigger for consumers to explore alternatives to traditional gasoline powered vehicles. Examples of consistent signals include long term emissions standards (e.g. AB 1493 Advanced Clean Car Standards), downstream incentives for clean car purchases (e.g. AB 118 Clean Vehicle Rebate Project), or the pricing of pollution externalities in fuels (e.g. the AB 32 Low Carbon Fuel Standard). Dave Bartmuss, an Executive from General Motors, explored some of the company's experience selling the Chevrolet Volt into markets with and without downstream incentives. According to Barthmuss, without state policy driven incentives such as HOV access and the $1,500 Clean Vehicle Rebate, Volt sales were about one-third less than with the sales average with such incentives in place.

Micro-refineries—Modular Alternative Fuel Production. While many businesses in the alternative fuel industry are aiming to achieve cost reductions by refining at hundred of millions of barrels of oil, a scale that oil companies operate at, some companies are taking a slightly different approach, finding cost savings in going small and siting near steady feedstock supplies. Russell Teall, president and founder of the Oxnard-based[26] company, Biodico, testified to the Committees that his company is developing "energy islands"—modular, truck-transportable, remotely-operable, 10 million gallon per year, self-powered, fuel production units, called Automated Remote Integrated Energy Systems, or ARIES.

Cool Planet Biofuels, another Ventura County alternative fuel company is also adopting the "distributed scale" micro-refinery model. Like Biodico, their units are designed to produce

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[25] "Consumer Savings." *Advanced Clean Cars: New Standards for Tomorrow's Cars.* California Air Resource Board, n.d. Web. 01 Nov. 2012. <http://www.arb.ca.gov/msprog/consumer_info/advanced_clean_cars/consumer_acc_cost_savings.htm>.

[26] Biodico's primary facilities are located at the National Environmental Technology Test Site (NETTS) at NBVC in Port Hueneme, California and a parallel pilot facility for processing of ultra-low carbon intensity aquatic (e.g. algae produced from brine shrimp) and terrestrial feedstocks (e.g. agricultural waste) at the Biodico Agricultural Research Station at Red Rock Ranch, California.

over 10 million gallons of advanced biofuels annually. Cool Planet's cellulosic (e.g. wood chips, corn stover, or *Miscanthus*) renewable gasoline is the first such technology to be granted CARB approval for fleet testing. Cool Planet's test blend is designed to address California's 2020 Low Carbon Fuel Standard, which mandates a 10% reduction in carbon intensity versus today's gasoline. Investors include BP Ventures, Google Ventures and Energy Technology Ventures, a joint venture involving GE, NRG Energy and ConocoPhillips. It aims to produce high octane gasoline from sustainable feedstocks at $1.50 per gallon without subsidy at one billion gallons per year by 2015.

Like Cool Planet, Biodico's ARIES is also designed to adapt to a variety of feedstocks, and unlike the Cool Planet systems, can also produce a variety of fuels, including diesel fuel replacements for generators or heavy duty vehicles and equipment in agricultural operations (with built in waste-based feedstock streams) or marine diesel fuel for military bases like NBVC.[27] ARIES is designed to serve as a model for "energy islands" for the DOD and civilian applications, and is slated to be constructed at 20 additional DOD locations.

Biodico has formed strategic partnerships with the military and California, as envisioned under SB 1409, where the military and California work together to support clean energy businesses of mutual interest:

- ***Military Research and Fuels Offtake Agreements.*** Biodico has both research and technology development agreements with the Department of Defense. The company operates under a Cooperative Research and Development Agreement (CRADA) with the Naval Facilities Engineering Service Center that began in May 2002. The purpose of the CRADA is to to design, develop, and deploy modular biofuel and bioenergy systems capable of processing the widest possible array of feedstocks and producing renewable on-demand primary heat and power. On October 19, 2012, Biodico also signed a new agreement with the Navy for joint development and evaluation of renewable energy, fuels, and products for use on DOD facilities. The intent is to optimize production at the lowest cost; work under the new contract will include a range of technologies including but not limited to transesterification, gasification, gas to liquids, hydrogenation, anaerobic digestion, catalysis, and the production and processing of feedstocks and co-products.
- ***California Energy Commission Grants.*** In concert with this CRADA, the California Energy Commission funds various aspects of the Biodico operation through two separate multi-year grants funded by the Public Interest Energy Research Program(PIER). The first PIER grant funded fuel production in laboratory setting. The CEC reassessed the Biodico operation and on April 24, 2012, awarded a new $1.8 million, three-year grant to scale up and test the ARIES system, a self-powered biorefinery that uses solar cogeneration and anaerobic digestion to provide its own heat and power. The grants also fund the cultivation of advanced aquatic and terrestrial feedstocks, and the automation of ARIES process controls

[27] Biodico Homepage. Biodico, n.d. Web. 29 Oct. 2012. <http://www.biodico.com/>. Biodico has developed full-scale commercial facilities in Australia, California, Colorado, Nevada and Texas. It has also conducted feedstock and production feasibility studies for clients in over 20 countries. Biodico has been the recipient of numerous grants to conduct fundamental research and in 2005, it was selected to receive the US EPA Project of the Year award for developing the first biogas operated, renewable biofuels production facility.

for simultaneous centralized command of multiple systems.[28] By design, these ARIES units are intended to be deployable in the battlefield and at home.

Other Clean Transportation Considerations. While these smaller, modular applications may provide tailored solutions suitable to certain types of fuel offtakers, there are many other fuel sources and suppliers that will be critical to the success of the burgeoning alternative vehicles, fuels and related infrastructure industries. Both natural gas and electric power utilities have an important role to play considering the existing fueling infrastructure these utilities fund and maintain for two primary alternative fuels, natural gas and electricity. Hydrogen fueling infrastructure, to accommodate projected growth in fuel cell vehicle ownership, is also necessary.

CONSIDERATIONS FOR LEGISLATORS AND STAFF

- ***How can the availability of affordable zero emissions vehicles, low carbon fuels, and related fueling infrastructure be accelerated to meet state climate and energy goals?***
  - The 2025 Advanced Clean Car Standards.
  - The 2020 Low Carbon Fuel Standard.
  - The statewide cap and trade program—transportation fuels come under the cap starting in 2015; refineries are already under the cap.
  - The Governor's Zero Emissions Vehicle Action Plan.
- ***Are current sources of public funding sufficient to transition to an entirely private funded market?*** While the market may eventually embrace the shift to clean transportation, many major sources of private capital remain on the sidelines. Banks, pension funds, oil companies, agricultural concerns, utilities and other energy market investors are likely to take significant stakes in the alternative vehicle, fuel and infrastructure economy, but what can be done to speed up the transition in California?
- ***How effective are existing policy tools and public funding structures working to transition to clean transportation in California?*** For example, are they sufficiently consistent, uniform and long-term enough to promote certainty for industry and consumers? Are they the most cost-effective use of public funds? Are there cheaper ways to drive ZEV adoption like HOV lane access?
- ***What new policy tools may be necessary?*** For example, should proceeds from the AB 32 auction for transportation related fuels be apportioned to transportation related emissions reducing projects? Or should consumers interested in purchasing a ZEV not only be eligible for a rebate at the point of purchase and a tax credit but also lower interest financing?

[28] California Energy Commission, *Grants/Contingent Award Request* (April 24, 2012), n.d. Web. 31 Oct. 2012. <http://www.energy.ca.gov/business_meetings/2012_packets/2012-06-13/2012-06-13_Item_22_Biodiesel_Industries_of_Ventura_LLC.pdf>.

CONCLUSION: LOOKING AHEAD TO THE 2013-14 LEGISLATIVE SESSION

The testimony jointly received by the Senate Committee on Veterans Affairs and the Senate Select on the Environment, the Economy, and Climate Change, reflected a consensus, business executives, veterans, and military leadership all agreed that increasing energy efficiency and clean energy is good for California business and families' pocketbooks, and the nation's security. Likewise, the distributed generation of clean power provides unique operational benefits to the military, and economic benefits to self-generating businesses and residents.

But oil will remain our dominant transportation fuel source if we do not uphold state and federal laws driving demand for more fuel efficient and alternatively fueled cars, alternative fuel supply and infrastructure and more sustainable land use and transportation patterns. In an oil dependent future, the middle class and local businesses will remain in the "energy trap,"[29] where gas prices go up without an alternative to long-distance daily commutes with gasoline-powered, inefficient vehicles.

As the Senate commences the 2013-14 session, members may wish to consider the findings and questions discussed herein in determining the efficacy of various legislative proposals that impact energy security.

[29] The Energy Trap, *Interactive Report* (New America Foundation, 2011), n.d. Web. 31 Oct 2012. <http://stories.energytrap.org>.