

**SB 1303**



**DEPARTMENT OF BUSINESS,  
ECONOMIC DEVELOPMENT & TOURISM**

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Statement of  
**THEODORE E. LIU**  
**Director**

Department of Business, Economic Development, and Tourism  
before the

**SENATE COMMITTEE ON ENERGY AND ENVIRONMENT**

and the

**SENATE COMMITTEE ON ECONOMIC DEVELOPMENT AND TECHNOLOGY**

Tuesday, February 10, 2009  
3:00 P.M.

State Capitol, Conference Room 225

in consideration of

**SB 1303**

**RELATING TO ENERGY INDEPENDENCE**

Good afternoon, Chair Gabbard, Chair Fukunaga, Vice-Chair English, Vice-Chair Baker, and members of the Committees.

The Department of Business, Economic Development, and Tourism understands the concept of SB 1303; provided, however, we cannot support the bill to the extent its implementation will adversely impact or replace the priorities set forth in the Executive Biennium Budget for Fiscal Years 2009-2011. In light of current and projected State budget deficits, we are concerned that the amount of State funding proposed through this legislation.

We also wish to express a different point of view than that contained in the Preamble, page 1, lines 11 to 14. The Hawaii Clean Energy Initiative (HCEI) has conducted an analysis and concluded that, *based on existing renewable energy*

*technologies (that is, without factoring-in any expected breakthroughs in, for example, wave energy, OTEC or cellulosic ethanol)* , Hawaii can achieve the 70% clean energy goal by 2030. These studies, conducted by Booz Allen and supported by the National Renewable Energy Laboratory and other national labs, can be found on [www.hawaii.gov/dbedt/energy](http://www.hawaii.gov/dbedt/energy).

SB 1303 directs the Energy Resources Coordinator (ERC) to establish a government-industry consortium – the “Sustainable Energy Innovation LLC” – to support the funding, research, and development of new, innovative renewable energy technologies. This bill creates an impetus to make Hawaii a world-class leader in the incubation and commercialization of transformational renewable energy technologies including “space solar power prototypes, integrated solar energy systems, and green fuel generation.” If successful and proven to be cost effective and commercially viable, these technologies could provide sustainable and affordable energy alternatives that would support Hawaii’s transformation to a clean energy economy, with its attendant benefits to the environment and energy security.

The U.S. must establish new sustainable and affordable energy resource technologies, and nowhere is this need more pressing than in Hawai’i. Although green energy technologies such as conventional photovoltaic arrays and traditional biomass fuels are already commercially available, these alone are not adequate to meet our growing energy demands.

This bill would complement the Hawaii Clean Energy Initiative by establishing a government-industry consortium that would seek federal and private industry R&D funds

and other resources for renewable energy technology; develop and demonstrate advanced energy technology projects and testing in Hawaii; provide funding for qualified small business ventures to work on projects in partnership with the University of Hawaii and other universities, corporations and the international community; and assist the University of Hawaii in developing new curricula relating to advanced sustainable energy economics and systems.

This bill will encourage the inflow of new capital investments to Hawaii, help create a highly skilled technology-based future workforce, and provide more opportunities for energy and advanced technology companies that are already established in Hawaii to become more profitable. Creating a sustainable energy technology industry in our State presents an opportunity for Hawaii to become a world-class leader in a critical technology sector that will become increasingly important and ultimately essential to achieving Hawaii's energy independence and security.

To this end, DBEDT collaborated with the U.S. Department of Energy to convene a meeting on January 20, 2009 of local and Mainland investors in renewable energy projects to acquaint them with the potential developments that are being discussed for Hawaii. We will continue to pursue these and other partnerships to maximize investment in Hawaii.

Thank you for the opportunity to provide these comments.

George R. Ariyoshi  
999 Bishop Street, 23<sup>rd</sup> Floor  
Honolulu, HI 96813

**TESTIMONY**

February 9, 2009

Re: SB1303 relating to energy independence

Dear Members of the Twenty-Fifth Legislature:

I am writing this testimonial in strong support of SB 1303, which proposes the establishment of a government-industry consortium that will leverage Hawaii's natural resources and extramural expertise and funding to develop, demonstrate, commercialize and deploy advanced energy technologies and projects in Hawaii.

It is well known that Hawaii is the most energy-challenged state in the nation. We import over 90% of the energy we require to operate in the form of fossil fuels, yet also hold stewardship over tremendous natural energy resources that stem from our volcanic origins, mid-oceanic location, prevailing trade winds, and abundant sunshine.

The United States, and indeed the world, must establish sustainable and affordable new energy sources. Nowhere is this need more pressing than in Hawaii and throughout the Pacific Basin. Indeed, the future health of our State economy depends upon finding sustainable and affordable alternatives to our current dependence on fossil fuels.

Currently existing "green energy" technologies, such as conventional photovoltaic arrays and traditional biomass fuels, can contribute toward establishing a renewable energy economy in Hawaii, but the current technological state-of-the-art is incapable of meeting the broader challenge of energy independence in a timely and sustainable manner.

This legislation would establish a government-industry consortium that would seek federal, private industry and other funding resources for the research and development of renewable energy technologies; develop and demonstrate advanced energy technology projects in Hawaii; provide funding for qualified small business ventures to work on projects in partnership with the University of Hawaii as well as other universities and institutions throughout the Asia-Pacific community; and assist the University of Hawaii in developing new curricula in advanced sustainable energy economics and systems.

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By creating the proposed government-industry consortium, we also will help lead the development and demonstration of "transformational" energy technologies, including both space and terrestrial-based solar energy solutions; implement a diverse portfolio of visionary short- and long-term energy solutions; create profitable, high-quality new business opportunities for innovative start-up firms statewide; establish Hawaii as a world-class leader in sustainable energy education, research and development, manufacturing, operations, and field demonstrations; and help move Hawaii toward energy self-sufficiency within a generation – establishing a global standard for renewable energy development.

Finally, by accomplishing these objectives, we will be encouraging new investment in Hawaii, creating more jobs with better pay for our residents, and providing expanded opportunities for energy-related and other advanced technology companies already established in Hawaii to help train a highly-skilled workforce of local residents that can lead us to the future.

The time has come to make this bold move toward energy independence, and I therefore urge you to pass this legislation.

Thank you for the opportunity to provide these comments.

Sincerely,



George R. Ariyoshi

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## COMMITTEE ON ENERGY AND ENVIRONMENT

Senator Mike Gabbard, Chair

Senator J. Kalani English, Vice Chair

## COMMITTEE ON ECONOMIC DEVELOPMENT AND TECHNOLOGY

Senator Carol Fukunaga, Chair

Senator Rosalyn H. Baker, Vice Chair

Tuesday, February 10, 2009

3:00 p.m.

Conference Room 225

SB 1303 Energy Independence.

**OPPOSE**

Aloha Chairs Gabbard, Fukunaga, Vice Chairs English, Baker and Members of the Committees

My name is Henry Curtis and I am the Executive Director of Life of the Land, Hawai'i's own energy, environmental and community action group advocating for the people and `aina for almost four decades. Our mission is to preserve and protect the life of the land through sound energy and land use policies and to promote open government through research, education, advocacy and, when necessary, litigation.

SB 1303 directs DBEDT Director to establish a govt-industry consortium consisting of : DBEDT, UH, Managed Energy Techn, LLC; U.S. DOE, Natl Science Foundation, NASA, Off. of Naval Research, and Defense Advanced Research Projects Agency; Boeing, Lockheed Martin, ENTECH, Battelle Memorial Inst, Kobe Univ, Mitsubishi, Auburn Univ, and Texas A&M Univ.

The DBEDT Director, who has been charged with energy policy since 1974, will lead us towards independence by bringing in outsiders.

Membership is open to everyone except local businesses; local renewable energy companies; local environmental, community, and cultural groups; counties; etc.

In addition, the military-industrial-governmental consortium can avoid sunshine and open government regulations through establishing "working groups".

This is not the way to go.

Dr. Neville Marzwell  
Manager of Advanced Concepts- Technology Innovations  
NASA-Jet Propulsion Laboratory  
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**PERSONAL TESTIMONY**

Re: SB 1303 relating to energy independence

It is hard to imagine a subject more critical to the question of economic stability and growth than how to transform the energy landscape of the State of Hawaii. I am pleased to join this important conversation. If I had been addressing this same group a year ago, I would have argued that we should aggressively pursue innovative energy answers for two central reasons: First, to respond to looming energy demand, which is expected to double, at least, by 2050, as hundreds of millions of people emerge from poverty and naturally seek the energy-intensive advantages of modern life; and, second, to battle global climate change. This audience will have acute awareness that the concentration of atmospheric CO<sub>2</sub> of 200 parts per million that prevailed for 1,000 years has, in the last century, soared to a level approaching 400 parts per million. Those data alone tell us that our current high-carbon lifestyle is clearly untenable.

These two reasons still provide compelling impetus for us to act, and to act quickly. Given the current global economic downturn, however, today I must add a third reason: We need to focus on alternative energy because reviving the economies of the world requires a return to fundamental economic growth, which also applies to Hawai'i. I am convinced that the next wave of economic growth will rise from the same source that powered the information and biotechnology revolutions: from innovation. Today, by far the most powerful potential for immediate, catalytic innovation is alternative energy.

As in previous technology revolutions, much of that innovation will spring from some of the world's leading research universities, including the one that I am privileged to lead, the Advanced Concepts- Technology Innovations of the NASA-JPL/ California Institute of Technology involvement in energy innovation systems from a particular approach to combining our dual mission of education and research: We have always been intensely concerned with solving real world problems; it is part of our founding mission. We have a long track record of developing breakthroughs that catalyze revolutionary change. We have a powerful pipeline for moving ideas from the mind to the marketplace, and we have a system of education that produces a remarkable number of innovators and entrepreneurs.

I will talk briefly today about the key role of basic research in sparking an energy technology revolution at JPL and the various NASA Centers. Years ago, NASA launched many technologies focusing on power generation, management and storage, including but not limited to Space Solar Power. JPL unites the best talent from across our campus to tackle energy issues -- from basic science, to new technologies, to new designs for buildings and cityscapes, to public policy and economics. Importantly, JPL has links to industry around the world, through sponsors and partners ranging from established energy suppliers to alternative energy firms.

Our guiding premise is that no one yet knows the equation for a future of clean and sustainable energy. We do not know which technologies will prove successful and which will fail. That is especially true given the vexing challenge of scale: how to make new technologies work at, for example, the scale of a billion households. Yet given the combined pressures of energy demand, climate change and economic drought, we obviously cannot wait until we know the perfect answer. We cannot let the perfect be the enemy of the good. We must pursue a portfolio of options: transitional strategies in the near-term to improve current technologies and buy time, and transformational technologies that will alter the landscape in the decades ahead.

Let me give you a sense of what I mean, starting with a transitional issue. Suppose we want to make electric cars viable on a grand scale. Such an advance would help reduce dependence on oil; however, electric cars will help stabilize the climate only if we can produce the electricity for those cars without increasing the production of CO<sub>2</sub>. What are the transitional options, in that case? We can pursue nuclear power, and I believe we must. JPL/Caltech gave birth to the field of nuclear engineering, and we continue to be nuclear pioneers. Yet the challenges in terms of safety, cost, waste disposal and public resistance, especially in the United

States, remain daunting. Another option is coal. In the United States, half of our electricity comes from burning coal; we consume more than one billion tons a year. China already burns twice that amount. Given its sheer abundance, coal will be used, so it is imperative that we find ways to mitigate its release of CO<sub>2</sub>; the atmosphere has a limited capacity to absorb CO<sub>2</sub>, and we are exhausting this finite resource. Unfortunately, we do not have a workable solution at present.

While carbon capture and sequestration are fine ideas, the technology is simply not yet ready for broad-based implementation. CO<sub>2</sub> capture today is neither efficient nor economic. Sequestration is being done on a small scale in a few places, but nowhere at a scale that approaches what is necessary. The possibility of converting captured CO<sub>2</sub> into useful materials excites the imagination, but the technology is in its infancy. Given the scope of the energy challenge, then, we need to work toward all of our transitional options, including safer nuclear power and cleaner coal. We also have to get serious about designing higher efficiency into our cars, buildings, and transportation. Improving all of these technologies will require research development and deployment, to help move us part way to the goal.

At JPL/Caltech, among a range of new technologies, many of our faculty members are focusing on the transformational power of solar. In the end, that is where the energy is: the amount of sunlight that reaches the Earth's surface in an hour contains enough energy to meet the world's current energy needs for a year. Today, the cutting-edge tools of nanotechnology, materials modeling and biotechnology are being deployed to make solar a realistic, economically competitive choice. One promising recent development is a breakthrough solar concentrator that increases the power obtained from solar cells by several factors without needing to track the sun. However, even as we work on better ways to collect solar energy, if we want to make electric cars practical and competitive – or to make any form of alternative energy truly viable -- we have to improve energy storage, which means new kinds of batteries.

For a century, the core weakness of electric cars has been their batteries: they are too big, too heavy, too expensive, too dangerous, and they only carry you 40 to 50 miles. But thanks to groundbreaking research into the nature of materials, we already can see a new generation of safe, high-power, quick-charging lithium ion batteries. Before too long, their automotive counterparts could transform the electric car from a quaint, pricey, boutique option to an affordable, mainstream solution. At the same time, with all of us tethered to the world by our cell phones and PDAs, the challenge of storing electricity is clearly not just about cars. What's more, energy storage is also the rate-limiting technology for virtually all alternative

energy sources. At JPL/Caltech we are developing a number of transformational energy storage technologies, from carbon nanotube-based ultracapacitors, to benign viruses that self-assemble into extremely light, flexible, battery components, with no toxic by-products. We're working on new catalysts that economically cleave water into hydrogen and oxygen for use in fuel cells. With a bevy of intriguing new technologies on the horizon, no one can yet know which of them will contribute most to the transformational change we envision.

At a time when the world hungers for energy answers, it is easy to get excited about new technologies like these, the transitional and the transformational. It is easy to feel hopeful about the new companies and new industries that will arise from them. As I said before, I believe that new energy technologies can be a path back to innovation-based economic growth. However, if we want to turn any of these laboratory possibilities into practical marketplace answers, in time to make a difference for the economy or the climate, we must do everything we can to increase public and private investment in fundamental energy research, on a scale the world has never seen before. Speaking for JPL/Caltech, we look forward to the challenge, and we welcome the opportunity to work with and learn from bold, imaginative leaders in industry and government.



**SENATE COMMITTEE ON ENERGY AND ENVIRONMENT  
SENATE COMMITTEE ON ECONOMIC DEVELOPMENT AND TECHNOLOGY**

February 10, 2008, 3:00 P.M.

Room 225

**(Testimony is 1 page long)**

**TESTIMONY SUPPORTING INTENT OF SB 1303**

Chairs Gabbard and Fukunaga and members of the committees:

The Blue Planet Foundation supports the intent of SB 1303, directing and funding the state energy resources coordinator to establish a government-industry consortium to increase the level of clean energy research and development occurring in Hawai'i. This idea has merit and it would be worthwhile to give the energy resources coordinator specific policy direction that these activities are important to further the goal of Hawaii's energy independence.

Blue Planet also believes that it may be time to consider elevating the level of energy planning, research, and implementation in Hawai'i. If we are serious about ending our addiction to fossil fuel and seek to be powered by 100% clean, renewable, and indigenous sources, the government office charged with guiding the transition deserves greater standing and funding within state government. We would support the creation of a state Hawai'i Energy Security Authority (HESA), something akin to the existing Hawai'i Tourism Authority (HTA). HESA would be a stand-alone entity, tasked with all aspects of planning, research, permitting, and implementation of Hawaii's clean energy future. The Authority would be funded solely from a fee on each barrel of oil imported into the state; as dependency on oil decreases, so does the work of the Authority, and the budget decreases accordingly. Given Hawaii's energy independence the status, funding, and prioritization it deserves would help ensure that we achieve our clean energy goals.

Thank you for the opportunity to testify.