

**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

COMMITTEE ON ENERGY & ENVIRONMENTAL PROTECTION
and
COMMITTEE ON WATER, LAND, & OCEAN RESOURCES

Thursday, January 29, 2009

10:00 a.m.

State Capitol, Conference Room 325

in consideration of

HB1
RELATING TO NUCLEAR ENERGY

Chair Morita, Chair Ito, Vice Chair Coffman, Vice Chair Har, and members of the committees,

The Department of Business Economic Development and Tourism offers comments on HB1, which would direct DBEDT to develop the legislation and rules necessary to establish an appropriate permitting process to enable the construction and operation of nuclear energy generation facilities in Hawaii. The Department recognizes that nuclear energy is an option for the State and provides the following comments for consideration.

The primary responsibility for overseeing nuclear power plants in the U.S. rests with the federal Nuclear Regulatory Commission. State governments retain responsibility for regulating the non-radiological environmental impacts of the plants, such as impacts from plant cooling, and for assessing the role of nuclear power as part of the state's energy supply. The NRC regulates the design, siting, construction, and operation of new commercial nuclear power facilities in the United States.

Currently the NRC estimates that it needs a minimum of 42 months to issue the design, site, and construction/operation licenses required for reactor construction to begin. This 42 month timeline is based on the requirements of the Early Site Review permit and the Combined License application. An Early Site Review requires an applicant to conduct extensive research and analysis of the site, along with holding several public hearing throughout the assessment. The Combined License application looks at the construction and operation of the proposed nuclear power plant. This 42 month process is contingent on complete applications and minimal opposition from outside interest.

Should the State move forward into nuclear power, issues that need to be addressed include the transportation and storage of radioactive material, costs of design, and the amount of water required to operate a power plant. In addition, additional resources will be required in the Department of Health, the Department of Land and Natural Resources, and the State Energy Office, among others, to permit and monitor a nuclear energy facility.

The Hawaii Clean Energy Initiative (HCEI) is focused on using Hawaii's naturally occurring renewable resources – including wind, sun, ocean, geothermal, and bioenergy – to supply most of Hawaii's energy needs by 2030. The focus has been on reducing Hawaii's dependence on imported energy and bringing price stability to Hawai'i consumers. Nuclear energy may or may not meet these goals. As the demand for nuclear energy increases throughout the world, it is likely that the cost of uranium will also increase. For instance between 2004 and 2007, the spot price of uranium more than quadrupled, reaching more than \$140/lb before falling sharply in the past several months to less than \$80/lb. Switching from one commodity, petroleum, subject to speculative swings to another, uranium, would not appear to effectively address Hawaii's goal of energy independence. Should the Committee determine that an informed and productive discussion is desirable on the role of nuclear energy in a portfolio of energy sources for Hawaii, the Department would be willing to be involved in such a discussion. We respectfully suggest, however, that such a discussion not detract from the intense efforts underway to move Hawaii forward toward a clean energy future, as envisioned by HCEI.

Thank you for the opportunity to offer these comments.



COLLEGE OF SOCIAL SCIENCES
HAWAII ENERGY POLICY FORUM
UNIVERSITY OF HAWAII AT MĀNOA

Hawai'i Energy Policy Forum

Mr. Robbie Alm, HECO
Ms. Amy Asselbaye, Ofc. of US Rep.
Neil Abercrombie
Ms. Madeleine Austin, World Business
Academy
Ms. Catherine Awakuni, Div. of
Consumer Advocacy
Mr. Warren Bollmeier
Hi Renewable Energy Alliance
Mr. Carlito Caliboso, PUC (Observer)
Mr. Albert Chee, Chevron
Mr. Kyle Datta, New Energy Partners
Mr. Mark Duda, HSEA
Ms. Lynne Ebisui, The Gas Company
Sen. Kalani English, HI State Senate
Mr. Mitch Ewan, UH HNEI
Mr. Carl Freedman
Haiku Design and Analysis
Sen. Mike Gabbard, HI State Senate
Mr. Mark Glick, OHA
Dr. Michael Hamnett, RCUH
Ms. Paula Helfrich, EDAH
Mr. William Kaneko, HI Institute for
Public Affairs
Mr. Darren Kimura, Energy Industries
Holdings
Mr. Mike Kitamura, Ofc. of US Senator
Daniel K. Akaka
Mr. Kal Kobayashi, Maui County
Mr. Laurence Lau, DOH
Mr. Allyn Lee, C&C of HNL
Dr. Stephen Meder, AIA-Honolulu
Dr. Bruce Miller, UH Ofc of
Sustainability
Dr. Sharon Miyashiro, Social
Sciences Public Policy Ctr.
Rep. Hermina Morita, HI State
House of Representatives
Mr. Tim O'Connell, USDA/Rural
Development
Mr. Richard Paglinawan
Pa Ku'i A Lua
Ms. Melissa Pavlicek, Western States
Petroleum Assn
Mr. Ted Peck, DBEDT
Mr. Randy Perreira, HI State AFL-CIO
Mr. Rick Reed, Inter-Island
Solar Supply
Dr. Rick Rocheleau, UH HNEI
Mr. Peter Rosegg, HECO
Mr. Steven Rymsha, KIUC
Mr. Riley Saito, PowerLight Corp.
Mr. Glenn Sato, Kauai County OED
Mr. Bill Short, BIA of Hawaii
Ms. Joelle Simonpietri, Simonpietri
Enterprises LLC
Mr. H. Ray Starling, HI Energy Grp
Mr. Lance Tanaka, Tesoro HI Corp
Ms. Val Tavai, Hon Community
Action Program
Dr. Don Thomas, UH Center for the
Study of Active Volcanoes
Mr. Murray Towill, Hawaii
Hotel Assn
Mr. Joshua Wisch, Ofc. of US Rep.
Maize Hirono

Testimony of
Warren Bollmeier
Co-Chair – Renewable Energy Working Group
Hawai'i Energy Policy Forum

House Committees on Energy and Environmental Protection and
Water, Land and Ocean Resources
Thursday January 29, 2009
10:00 am
Conference Room 325

In Opposition to HB 1 – Relating to Nuclear Energy

I am Warren Bollmeier, Co-Chair of the Renewable Energy Working Group of the Hawaii Energy Policy Forum ("Forum"). The Forum is comprised of 46 representatives from the electric utilities, oil and natural gas suppliers, environmental and community groups, renewable energy industry, and federal, state and local government, including representatives from the neighbor islands. We have been meeting since 2002 and have adopted a common vision and mission, and a comprehensive "10 Point Action Plan," which serves as a framework and guide for meeting our preferred energy vision and goals.

HB 1 directs the department of business, economic, development, and tourism to develop a permitting process for nuclear energy generation facilities in Hawaii. The Forum takes no position at this time on the merits of nuclear energy generation facilities in Hawaii, but generally opposes the passage of HB 1 for the following reasons:

1. **Constitutional Exclusion.** Constitutional provision (Article XI, Section 8) requires a two thirds vote in both houses of the legislature to approve a nuclear power facility. Thus, it would appear premature to initiate a permitting process without resolving whether or not the people of Hawaii would allow an actual nuclear power facility;
2. **Hawaii Clean Energy Initiative.** The state has embarked on the Hawaii Clean Energy Initiative, which calls for 70% of our electricity by 2030 to be from clean energy sources, such as energy efficiency and renewables. Nuclear energy is neither; and
3. **State's Limited Resources.** Given the HCEI goals and its overall benefits to the people of Hawaii and the current limited resources available to the state for work needed to develop and produce renewable energy technologies and for energy efficiency programs, it appears premature to proceed with the proposed permitting process for nuclear energy generation facilities.

The Forum opposes passage of HB 1 for the above cited reasons and respectfully requests that it be held in the Committees.

Thank you for this opportunity to testify.

This testimony reflects the position of the Forum as a whole and not necessarily of the individual Forum members or their companies or organization

January 27, 2009

TESTIMONY IN SUPPORT OF H.B. 1

The scarcity and cost of fossil fuels makes the development of expensive nuclear energy a cost-effective if not essential proposition. France and Japan are leading examples of reliance on nuclear power with minimal ill effects. At the first oil crisis in 1973, only 1% of Japan's electricity was produced by nuclear energy. By the second oil crisis of 1979, 4% was from nuclear; in 2000 the ratio was up to 12% and the 2010 goal is 15%. As of 2005, Japan had 52 operating nuclear plants, 3 in construction and 8 in planning and design. France is even more ahead: Its 59 nuclear plants produce 88% of the country's electric power. There are about 440 nuclear power plants on the globe. France, Japan and the U.S. combined produce over 55% of the nuclear power energy on the globe.

The advantage of nuclear power is that it produces large amounts of dependable and easily controlled electric power like hydroelectric, coal-fired or oil-fired power plants. Solar, wind and wave energy have huge limitations in terms of capacity and reliability; practically all deployments are still experimental and heavily subsidized. No question that solar, wind and wave energy will be partners for the long-term energy sustainability in Hawaii, but they are unlikely to be the providers of the majority of the needed power.

They too have their environmental downsides such as requirements of very large areas for deployment, major susceptibility to hurricanes and/or tsunamis, large construction costs and all the noxious shortcomings of building, maintaining and disposing of expansive and expensive arrays of batteries which have a rather short life span.

One advantage of compact power plants is that since they are largely self sufficient (i.e., they do not need a tanker to anchor by regularly to refuel the plant) they can be placed off shore in what ocean engineers call "large floating structures." Thus, a nuclear power plant can be 20 miles away into the ocean (still easily accessible) and provide electricity to Oahu with a cable. There are undersea power plant transmission lines in excess of 40 miles.

However, this bill is not about building nuclear power plants. This bill simply provides a way for us to take the blindfolds off and begin to address the real issues of Hawaii sustainability, twenty or more years into the future. This bill will allow us to begin assessing the potential and work towards answers to questions, issues and challenges of nuclear energy in Hawaii.

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HB1, Relating to Nuclear Energy

HOUSE COMMITTEES ON ENERGY & ENVIRONMENTAL PROTECTION and
WATER, LAND, & OCEAN RESOURCES

Thursday, January 29, 2009

10:00 a.m.

Room: 325

The Office of Hawaiian Affairs (OHA) **OPPOSES** HB1, which would direct the Department of Business, Economic Development and Tourism (DBEDT) to develop a permitting process for nuclear energy generator facilities in Hawai'i.

OHA acknowledges that electricity can be safely produced from nuclear power generator facilities under a strict regulatory structure and oversight authority. HB1 calls for DBEDT to begin a permitting process, which we believe is premature prior to the formation of a permitting regulatory structure and oversight department familiar with the costs, benefits and risks of nuclear generator facilities vis-à-vis other electricity generating alternatives, including the State's commitment to renewable energy sources.

Furthermore, building the necessary regulatory, safety and storage/disposal system to accompany a nuclear energy generator facility in Hawai'i would require a significant investment of money & personnel, and such an investment may be shown to be much less cost-efficient and cost-effective than other energy options compared on a life-cycle basis. Directing DBEDT to embark on a permitting process that would presumably trigger such a capital intensive investment seems particularly ill-advised when state departments are being asked to reduce General Fund allocations by 20 to 30 percent. Consider these facts:

1. Nuclear waste remains an unresolved and costly component of nuclear power. There is no long-term solution to safely storing and reprocessing nuclear waste. Hawai'i would need to either bury its nuclear waste deep underground or ship it to the mainland US at considerable cost, and at the minimum OHA would be deeply concerned about the economic and cultural impacts of spent nuclear waste burial.
2. Based on recent PUC filings in other states, capital costs of nuclear energy generating facilities are among the most expensive options available, ranging from \$4,500 to \$6,500

per kW, for a total project cost of \$12.1 billion to \$17.5 billion. A clean coal electric power plant, by comparison, would cost about \$2.2 billion or \$3,593 per kW, and the natural gas and renewable energy options that OHA would prefer are equivalent or better to clean coal on a life cycle cost basis.

OHA urges the Committees to REJECT HB1. Thank you for the opportunity to submit testimony.



Testimony of
Madeleine Austin
Vice President, World Business Academy

House Committee on Energy and Environmental Protection
and Committee on Water, Land, & Ocean Resources

Thursday, January 29, 2009, 10:00 a.m.
Conference Room 325

In opposition to H.B. 1, RELATING TO NUCLEAR ENERGY

Chair Morita, Chair Ito, and Members of the Committees:

The World Business Academy strongly opposes H.B. 1, which directs the Department of Business, Economic Development and Tourism to develop a permitting process for nuclear energy generation facilities in Hawaii. We oppose H.B. 1 for the following reasons:

1. Investing in nuclear energy undercuts our ability to solve our intertwined energy and climate change crises and increases the risk of cancer, nuclear terrorism and proliferation, and contamination from nuclear waste;
2. Nuclear power will not further the State's Hawaii Clean Energy Initiative, which calls for 70% of our electricity to be generated from clean renewable sources such as renewables and energy efficiency by 2030; and
3. The bill's mandate would make poor use of the State's limited resources. It is conjectural at best whether a new nuclear facility could obtain the two-thirds majority of each house of the state legislature required under the Hawaii Constitution. The permitting process of the Nuclear Regulatory Commission (NRC) is itself in disarray and embroiled in litigation as it struggles to deal with its first permit applications in 30 years for new nuclear power plants. <http://www.nirs.org/reactorwatch/licensing/licensingprocess1208.pdf> The NRC has had enormous organizational difficulties in light of the nationwide and worldwide shortage of trained nuclear engineers.

I will elaborate only on selected points here. To provide more information, I attach two articles that Rinaldo Brutoco, President of the World Business Academy, and I co-authored last year: "The Nuclear Nemesis," which the American Bar Association published in *Trends*, May/June 2008; and "The Nuclear Nemesis *Redux*," which the new European magazine, *CSR Forum International*, published in December 2008. Both explain the problems with nuclear power and why it is particularly ill-suited to the climate change era.



- **Cancer risks from routine operations of nuclear plants**

Nuclear plants emit harmful radiation (strontium-90) during their routine operations. Many studies show higher rates of cancer, especially of childhood and breast cancer, in those who live near nuclear plants. Three recent studies confirm the older ones. For example, a German study reported in December 2007 found increased cancer in children living within 50 km of reactors. For more information, see http://findarticles.com/p/articles/mi_qn4156/is_/ai_n25391068 and <http://www.newscientist.com/article/mg19826570.700-no-to-nuclear-power.html>

- **Terrorism and proliferation**

Nuclear power increases the risk of nuclear terrorism. The 9/11 Commission reported that the lead pilot in the World Trade Center attack considered targeting the Indian Point nuclear plant near New York City. Nuclear plant manufacturer General Electric and a German government study both concluded that nuclear plants cannot withstand a direct hit by a 737 aircraft. Even a direct hit by a much smaller corporate jet could wreak widespread devastation. Litigation is pending, including by the state of New York, over the NRC's refusal to require U.S. nuclear plants to be built to withstand an airliner attack. A February 2008 GAO report concluded that U.S. nuclear research reactors are vulnerable to terrorist attacks.

The United States' nuclear power industry fans the interest of other countries in creating their own nuclear power industry. Mohamed ElBaradei, the head of the UN International Atomic Energy Agency and winner of the 2005 Nobel Peace Prize, has warned of the dangers of the spread of nuclear power technology and the diversion of nuclear materials to make weapons. He said, "countries that master uranium enrichment and plutonium separation become de facto nuclear weapons-capable states." In October 2008, ElBaradei reported that there had been 250 reports of theft of nuclear or radioactive material in the year ending in June. He has said that enrichment and reprocessing technologies "could be the Achilles' heel of the nuclear non-proliferation regime."

Advocates of nuclear power who point to the U.S. Navy's safety record with nuclear submarines ignore the difference between a highly disciplined military culture and the far different culture in many countries that have or plan to develop nuclear power technology. We recommend comparing the list of countries that have nuclear power plants or are planning to build them with those countries' rankings on Transparency International's Corruption Perception Index. (We also note that the Air Force's own well-publicized difficulties keeping track of U.S. nuclear materials has recently led to several high-level changes in command.)

- **Nuclear waste**

No country has found a way to permanently and safely store nuclear plants' high-level radioactive waste, including plutonium, the key ingredient in nuclear weapons. The waste is



piling up at nuclear plants and interim storage sites around the world, where it is vulnerable to diving airplanes, explosives, and theft.

In October 2007, Dennis Spurgeon, DOE's Assistant Secretary for Nuclear Energy, said that in order for nuclear to play "a substantial crucial role" in making a dent in carbon emissions, "the problem of waste must be solved quickly." (E&E News PM 10/29/07)

- **Yucca Mt. "on life-support"**

Last year, Rep. David Hobson, R-Ohio, said, "The nuclear waste repository at Yucca Mountain is still on life support, and the department is ignoring the political realities in the Senate and in the state of Nevada that can and will block any progress on the repository." Senator Pete Domenici, R-N. Mex., said, "Yucca Mt. looks less and less like a credible option."

Despite billions of dollars and 25 years of work on the science of the proposed Yucca Mt. waste storage site, the Department of Energy has not yet filed the site license application. New evidence shows that the Yucca Mt. site sits on or near an earthquake fault line, but DOE still insists that the site has the most favorable geology in the United States for storing waste. In February 2008, Nevada experienced an earthquake that measured 6.0 on the Richter scale.

Last year, DOE said that the scheduled 2017 opening of Yucca Mt. had been postponed at least 18 months, and that if it opens in 2020, taxpayers will owe about \$11 billion to utilities for the pile-up of nuclear waste on their premises. Utilities claimed that the real number is over \$35 billion and at that point, DOE had already paid \$342 million on the claim. The 2020 opening is almost inconceivable given the problems and the opposition in the U.S. Senate and by the state of Nevada. The State of Nevada and others have sued to block Yucca Mt., and it is unlikely to ever open. In February 2008, Exelon CEO John Rowe said, "Deep down, we all know Yucca Mt. isn't going to happen in any near-term time frame." (E&E News PM 2/12/08).

DOE has told Congress that unless it increases the Yucca Mt. waste limit from 77,000 to 135,000 metric tons, it will be full within two years of opening.

Civilian reprocessing of spent nuclear fuel is not the answer. Reprocessing eliminates some but not all of the waste, and converts the remainder into weapons-grade material.

- **The economics of nuclear power**

Because nuclear energy is far more expensive than its competitors considering lifetime costs (even without counting the unknowable costs of plant decommissioning and waste storage), investment in nuclear energy buys less energy and displaces less coal per dollar spent.



Between 1974 and 1982, nuclear power plants' history of cost overruns and construction delays caused utilities to cancel over 130 orders for plants as Wall St. turned off the money. This pattern of cost overruns and delays has continued, as with the Finnish plant now under construction.

In comparing cost estimates, it is important to distinguish between the cost of nuclear power produced by plants that are already built and paid-for, and the cost of nuclear power from new plants under consideration. In calculating the cost of power from new nuclear plants, we must distinguish between "overnight" cost estimates and those that include total capital costs. "Overnight" cost estimates are based on "today's prices" and assume no cost increases or cost of capital (as if the plant could be built "overnight.") Even apart from these distinctions, several well-regarded studies that include projected costs of nuclear power are based on significantly different assumptions, so comparisons among them are difficult.

Given the fact that costs for nuclear plants have been rising faster than costs for other coal and other power plants, estimates have gone steadily up since a 2003 MIT study, "The Future of Nuclear Power." According to the Union of Concerned Scientists, even the higher estimates in the well-known 2007 report by the Keystone Center were too low because they were based on flawed assumptions. The Keystone Center projected that the lifecycle costs of power from a nuclear plant would be 8 to 11 cents/kWh, although that number could go lower if taxpayers guaranteed 80% of the debt of new plants.

In October 2007, Moody's estimated that new plants would cost between \$5000 and \$6000/kWh and said, "Moody's believes that many of the current expectations regarding new nuclear generation are overly ambitious." Other estimates, including a 2009 study by Craig Severance, "Business Risks and Costs of New Nuclear Power," places the cost at over \$10,000/kwh (<http://www.nirs.org/neconomics/nuclearcosts2009.pdf>.) A recent article, "Nuclear illusions," by World Business Academy Fellow Amory Lovins, head of the Rocky Mt. Institute, contains a detailed analysis of the costs of nuclear power. Lovins said, "nuclear power costs far more than its distributed competitors, so it buys far less coal displacement per dollar than the competing investments it stymies."

- **Taxpayer subsidies, including publicly-funded compensation for nuclear accidents**

It is hard to understand why taxpayers are willing to subsidize and limit the liability of an industry that is afraid it may cause them so much damage that it cannot afford to pay for it.

Nuclear plants owners' and contractors' statutorily limited liability has been deemed necessary to maintain the nuclear industry. The Price-Anderson Act limits liability to the public for nuclear incidents. The Energy Policy Act of 2005 extended those liability caps through the end of 2025. A July 2007 Congressional Research Report, "Nuclear Energy Policy," states: "The Price-Anderson Act's limits on liability were crucial in establishing the commercial



nuclear power industry in the 1950s.... Extension of the act was widely considered a prerequisite for new nuclear reactor construction in the United States.” (at p. 17)

A 2007 report by the Union of Concerned Scientists documents 47 incidents in which U.S. reactors had to be shut down for at least a year for safety reasons over the last three decades. Even if new reactor designs are safer, this track record is cause for concern, especially because of the history of lax NRC regulatory oversight and the role of human error and malfeasance in many of the safety problems.

Investors in the U.S. and elsewhere remain unwilling to invest in plants without millions of dollars of various forms of taxpayer subsidies, including loan guarantees, and publicly-funded insurance against NRC licensing delays. Statements by executives of nuclear power companies are telling:

- Speaking of his company's plans to expand nuclear power, NRG Energy CEO David Crane said that the nuclear power provisions in the Energy Policy Act of 2005 (which include loan guarantees, insurance covering delays in NRC permit approvals, and limitations on liability for catastrophic accidents) were “the whole reason we started down this path. If it were not for the nuclear provisions in there, we would not have even started developing this plan two years ago.” (MSNBC 10/7/07)
- Unistar Nuclear Energy VP, speaking of the company's planned facility in Calvert Cliff, Maryland, said that continued investment depended on the federal loan guarantees. (Greenwire 2/6/08).
- Before the increase in federal loan guarantees for nuclear power, Constellation's CEO Wallace said, “Without this criterion, we're sort of looking at a yellow light.” (E&E Daily 12/4/07). A few months earlier, another Constellation company representative said that without federal loan guarantees, the whole project would be stymied. (Greenwire 9/5/07)

The nuclear industry and some advocates of nuclear power maintain that the so-called “4th generation of nuclear plants” will be safer. However, these unproven technologies would have the same barriers to rapid commercialization as older technologies, including the worldwide shortage of manufacturing capacity and trained personnel. They are not expected to be ready for commercialization before 2030 at the earliest.

- **The French nuclear industry**

Nuclear power provides 77% of France's electricity, but would be a mistake to use the French nuclear industry as proof of the proposition that the nuclear industry has outgrown the need for taxpayer subsidies or has overcome its challenges, including public opposition and the problem of long-term storage of nuclear waste. France, like the U.S., has no permanent storage site for nuclear waste, and there is strong public opposition to building one in Bure. A



2007 European Commission poll showed that 59% of the French were in favor of reducing the amount of the country's nuclear power, and 82% totally agreed or tended to agree that "there is no safe way of getting rid of high level radioactive waste."

For a thorough examination of the French nuclear industry, see the December 2008 report by Mycle Schneider (consulting for Greens/EFA in the European Parliament), "Nuclear Power in France: Beyond the Myth."

<http://www.nirs.org/international/westerne/258614beyondmythfr.pdf>

- **Additional resources**

For information about shortages of skilled nuclear workers and other key issues, see "The World Nuclear Industry Status Report 2007," by Mycle Schneider, Paris, with contributions from Antony Froggatt, London, (January 2008), commissioned by the Greens-EFA Group in the European Parliament, [http://www.greens-](http://www.greens-efa.org/cms/topics/dokbin/206/206749.the.world.nuclear.industry.status.report@en.pdf)

[efa.org/cms/topics/dokbin/206/206749.the.world.nuclear.industry.status.report@en.pdf](http://www.greens-efa.org/cms/topics/dokbin/206/206749.the.world.nuclear.industry.status.report@en.pdf)

For an assessment of nuclear power published by the conservative Council on Foreign Relations, see "Nuclear Energy: Balancing Benefits and Risks," Charles D. Ferguson, CSR No. 28, April 2007, Council on Foreign Relations, p. 15-16. "In the foreseeable future, nuclear energy is not a major part of the solution to further countering global warming or energy insecurity. Expanding nuclear energy use to make a relatively modest contribution to combating climate change would require constructing nuclear plants at a rate so rapid as to create shortages in building materials, training personnel, and safety controls."

Thank you for this opportunity to testify.

The nuclear nemesis

BY RINALDO S. BRUTOCO AND MADELEINE AUSTIN

Nuclear power is not the answer to our energy needs or the climate change crisis. Nuclear power plants produce more greenhouse gas emissions than wind, and certainly fewer than coal, but that is not the issue. Building new nuclear plants to try to reduce carbon emissions would irrevocably commit the world to a plutonium economy, increasing the risk of nuclear proliferation and terrorism, cancer, and contamination from nuclear waste.

New nuclear capacity cannot be added fast enough to significantly cut global carbon emissions. We need to take decisive action during the next decade to avoid the planetary tipping point described by NASA climate scientist James Hansen. Trying to build new nuclear plants fast enough to replace aging plants already past their design life while adding enough new plants to increase capacity and make even a modest contribution to combating climate change would compromise safety and create shortages in building materials and trained personnel.

Nuclear power's growth potential is inherently limited by the industry's need for vast amounts of cooling water for both normal operations and emergencies. As the planet warms, the population grows, and droughts spread, nuclear plants will not be able to obtain the water they need. Water levels in several lakes and rivers used for cooling nuclear plants have already dropped to minimum safety levels set by the Nuclear Regulatory Commission. Nuclear plants in the United States and Europe had to ramp down or shut down in recent summers after lakes and rivers became too shallow or too warm. Additionally, nuclear plants' right to use and discharge water will face increasing legal challenges based on impacts to species and ecosystems.

Nuclear plants will compete for increasingly scarce water needed for drinking and agriculture. The current drought in the southeastern United States, the site of many existing and proposed nuclear plants, has led to water competition among farmers, Atlanta households, Florida's fisheries, and Alabama's Farley nuclear plant. At least thirty-six states will face water shortages within five years.

Nuclear power raises serious security concerns in terms of safety and proliferation. The 9/11 Commission Report disclosed that Mohamed Atta, the lead pilot in the World Trade Center attack, considered targeting the Indian Point nuclear facility near New York City. Nuclear plant manufacturer General Electric and a recent German government study concluded that nuclear plants cannot withstand a direct hit by a 737 aircraft. A Consolidated Edison study of the Indian Point plant concluded that an aircraft

hit could cause a core meltdown. Nuclear plants' high-level nuclear waste is typically stored in fuel rod cooling pools in separate buildings adjacent to the reactor that are fifteen times more vulnerable to explosives or diving airplanes than the containment structure. Because of the lack of federal waste disposal facilities, large quantities of highly radioactive spent fuel are stored at sixty-five reactor sites in thirty-one states.

No country has found a millennia-long way to permanently and safely store plants' high-level radioactive waste, including plutonium, the key ingredient in nuclear weapons. Decades and billions of dollars later, the proposed Yucca Mountain waste storage site is no closer to opening and probably never will. New evidence shows that an earthquake fault line runs right under it. The Bush administration's proposed Global Nuclear Energy Partnership would end the thirty-year ban on civilian reprocessing of spent nuclear fuel, gravely increasing the risk of proliferation without solving the waste storage problem. Reprocessing eliminates some, but not all, of the waste and converts the remainder into weapons-grade material.

A growing body of published medical and scientific evidence links federally permitted radiation releases from the normal operation of nuclear power plants to increased cancer rates, especially of childhood cancer and breast cancer. During normal operation, *every* nuclear reactor in the world produces strontium-90 emissions at toxic levels.

From a business standpoint, nuclear power is a failure. Between 1974 and 1982, utilities cancelled orders for over 100 nuclear power plants, many well under construction. Wall Street rated nuclear power an unacceptably high risk and turned off the money. Nuclear power's life cycle production costs per kilowatt hour of electricity generated are several times that of coal, natural gas, and wind—*not including* the unknown ultimate waste disposal and decommissioning costs.

For now, despite safety and security lapses at nuclear plants, massive taxpayer subsidies keep the idea of a nuclear renaissance alive. In the long term, even a carbon price through a carbon tax or cap and trade system cannot help nuclear power compete with safer, cleaner, smaller, and more flexible distributed sources of power. Nuclear power is a trap for the unwary and unwise.

Rinaldo S. Brutoco is founder and president of the World Business Academy and co-author of *Freedom from Mid-East Oil* (2007). **Madeleine Austin** is vice president of the World Business Academy and a member of the Hawai'i Energy Policy Forum.

The nuclear nemesis

BY RINALDO S. BRUTOCO AND MADELEINE AUSTIN

Nuclear power is not the answer to our energy needs or the climate change crisis. Nuclear power plants produce more greenhouse gas emissions than wind, and certainly fewer than coal, but that is not the issue. Building new nuclear plants to try to reduce carbon emissions would irrevocably commit the world to a plutonium economy, increasing the risk of nuclear proliferation and terrorism, cancer, and contamination from nuclear waste.

New nuclear capacity cannot be added fast enough to significantly cut global carbon emissions. We need to take decisive action during the next decade to avoid the planetary tipping point described by NASA climate scientist James Hansen. Trying to build new nuclear plants fast enough to replace aging plants already past their design life while adding enough new plants to increase capacity and make even a modest contribution to combating climate change would compromise safety and create shortages in building materials and trained personnel.

Nuclear power's growth potential is inherently limited by the industry's need for vast amounts of cooling water for both normal operations and emergencies. As the planet warms, the population grows, and droughts spread, nuclear plants will not be able to obtain the water they need. Water levels in several lakes and rivers used for cooling nuclear plants have already dropped to minimum safety levels set by the Nuclear Regulatory Commission. Nuclear plants in the United States and Europe had to ramp down or shut down in recent summers after lakes and rivers became too shallow or too warm. Additionally, nuclear plants' right to use and discharge water will face increasing legal challenges based on impacts to species and ecosystems.

Nuclear plants will compete for increasingly scarce water needed for drinking and agriculture. The current drought in the southeastern United States, the site of many existing and proposed nuclear plants, has led to water competition among farmers, Atlanta households, Florida's fisheries, and Alabama's Farley nuclear plant. At least thirty-six states will face water shortages within five years.

Nuclear power raises serious security concerns in terms of safety and proliferation. The 9/11 Commission Report disclosed that Mohamed Atta, the lead pilot in the World Trade Center attack, considered targeting the Indian Point nuclear facility near New York City. Nuclear plant manufacturer General Electric and a recent German government study concluded that nuclear plants cannot withstand a direct hit by a 737 aircraft. A Consolidated Edison study of the Indian Point plant concluded that an aircraft

hit could cause a core meltdown. Nuclear plants' high-level nuclear waste is typically stored in fuel rod cooling pools in separate buildings adjacent to the reactor that are fifteen times more vulnerable to explosives or diving airplanes than the containment structure. Because of the lack of federal waste disposal facilities, large quantities of highly radioactive spent fuel are stored at sixty-five reactor sites in thirty-one states.

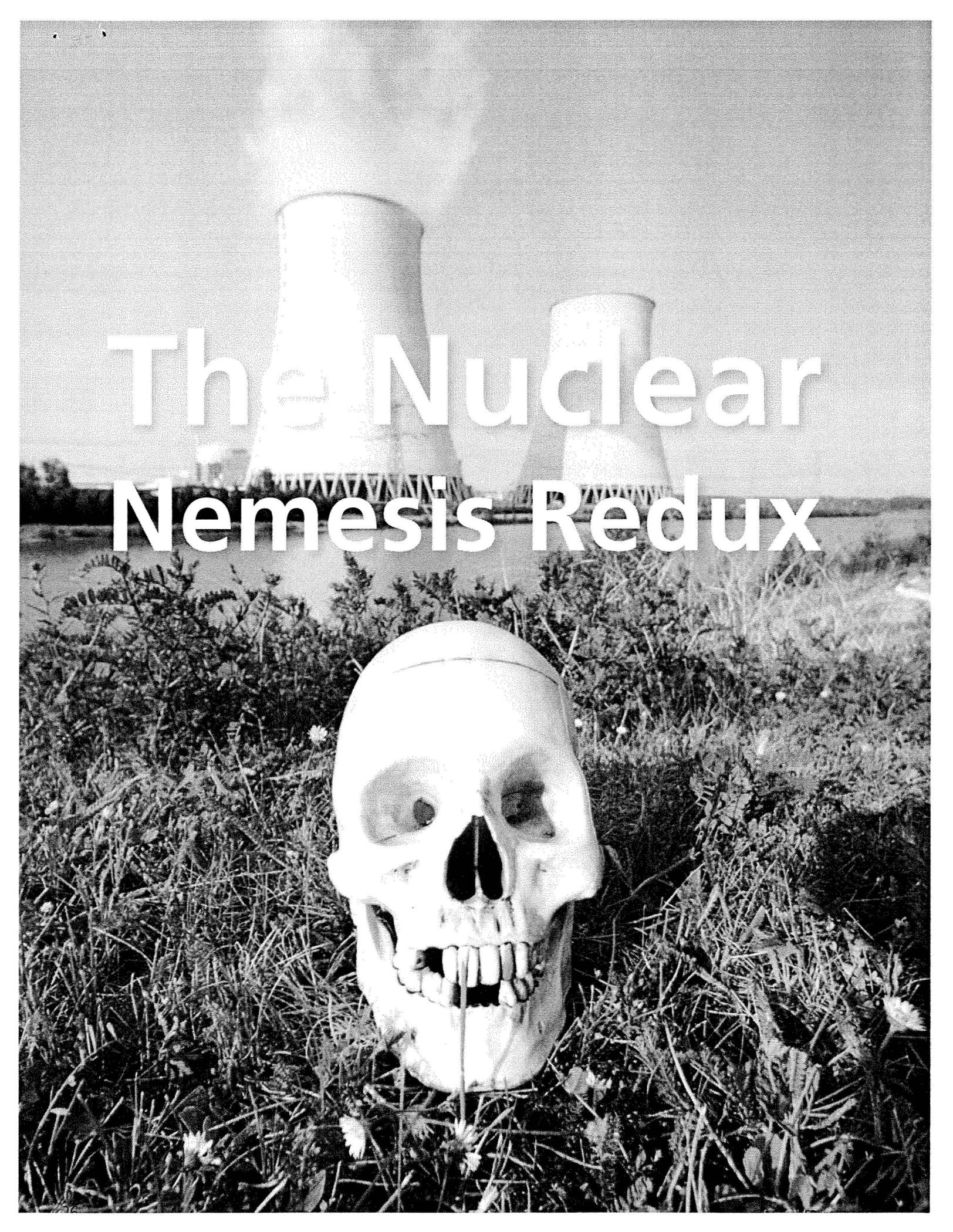
No country has found a millennia-long way to permanently and safely store plants' high-level radioactive waste, including plutonium, the key ingredient in nuclear weapons. Decades and billions of dollars later, the proposed Yucca Mountain waste storage site is no closer to opening and probably never will. New evidence shows that an earthquake fault line runs right under it. The Bush administration's proposed Global Nuclear Energy Partnership would end the thirty-year ban on civilian reprocessing of spent nuclear fuel, gravely increasing the risk of proliferation without solving the waste storage problem. Reprocessing eliminates some, but not all, of the waste and converts the remainder into weapons-grade material.

A growing body of published medical and scientific evidence links federally permitted radiation releases from the normal operation of nuclear power plants to increased cancer rates, especially of childhood cancer and breast cancer. During normal operation, every nuclear reactor in the world produces strontium-90 emissions at toxic levels.

From a business standpoint, nuclear power is a failure. Between 1974 and 1982, utilities cancelled orders for over 100 nuclear power plants, many well under construction. Wall Street rated nuclear power an unacceptably high risk and turned off the money. Nuclear power's life cycle production costs per kilowatt hour of electricity generated are several times that of coal, natural gas, and wind—not including the unknown ultimate waste disposal and decommissioning costs.

For now, despite safety and security lapses at nuclear plants, massive taxpayer subsidies keep the idea of a nuclear renaissance alive. In the long term, even a carbon price through a carbon tax or cap and trade system cannot help nuclear power compete with safer, cleaner, smaller, and more flexible distributed sources of power. Nuclear power is a trap for the unwary and unwise.

Rinaldo S. Brutoco is founder and president of the World Business Academy and co-author of *Freedom from Mid-East Oil* (2007). **Madeleine Austin** is vice president of the World Business Academy and a member of the Hawai'i Energy Policy Forum.



The Nuclear Nemesis Redux

Nuclear power creates unacceptable risks to our planet. Investing in nuclear energy undercuts our ability to solve our intertwined energy and climate change crises and increases the risk of cancer, nuclear terrorism and proliferation, and contamination from nuclear waste.

Greenwashing at its worst

The growing interest in nuclear energy has been bolstered by the industry's slick and well-financed public relations campaigns that cast nuclear power as a green technology. Often the industry's media campaigns feature statements by one of its paid lobbyists, Patrick Moore, wrongfully described as a Greenpeace founder, and the mainstream media buys the greenwashing. A March 2007 piece, "Moore Spin", reports that a Nexis news database search "identified 302 news items about nuclear power that cite Moore since April 2006" but only 12% of them mentioned that he was now on the payroll of the nuclear industry's trade group, the Nuclear Energy Institute.

The nuclear industry's touting of nuclear plants as "emissions-free" is particularly disingenuous given their routine emissions of harmful radiation. A recent German study caps the growing list of published medical and scientific studies that link radiation releases from the normal operation of nuclear power plants to increased cancer rates, especially of childhood and breast cancer. During normal operation, every nuclear reactor in the world produces strontium-90 emissions at toxic levels. The danger of nuclear plants' low-level radiation is explained in the college textbook, *Profiles In Power* (1997), by Rinaldo Brutoco and Professor Jerry B. Brown, and the Academy's newest book, *Freedom From Mid-East Oil* (2007).

The myth of cheap nuclear energy

According to climate scientist James Hansen, we need to take decisive action during the next decade to avoid a tipping point in climate change. This

can't be done with nuclear energy partly because it is an abject economic failure. As Academy Fellow Amory Lovins explains in "The Nuclear Illusion", "new nuclear power costs far more than its distributed competitors, so it buys far less coal displacement per dollar than the competing investments its stymies." As a result, "every dollar invested in nuclear expansion will worsen climate change by buying less solution per dollar."

Nuclear power's life cycle production costs per kilowatt hour of electricity generated are several times that of coal, natural gas, and wind - not including the unknown ultimate waste disposal and decommissioning costs. The nuclear industry creates the misleading impression that electricity from nuclear power is cheap by quoting only the costs to operate plants that are already built and comparing such costs with the cost to operate and construct power plants that use other energy sources.

As Lovins points out, cost comparisons of various technologies should be based on the "real leveled cost (over a lifetime appropriate for each technology) per kilowatt-hour delivered to the retail meter." On this basis, new delivered nuclear power costs about 2 to 10 times more than equivalent firm delivered power from "negawatts" (electricity saved through efficiency or better end-use) and micropower (which includes both on-site generation of electricity at the customer's site, and all renewable power sources other than big hydro plants). This cost gap will continue to widen with or without carbon taxes or emissions trading schemes, and it would be even wider today if all nuclear waste and plant decommissioning costs could be adequately factored in.

Nuclear power is particularly ill-suited to the climate change era because of nuclear power plants' need for vast amounts of cooling water for both normal operations and emergencies. As the planet warms and droughts spread, nuclear plants located anywhere but on the ocean will compete for increasingly scarce water needed for drinking and agriculture and will

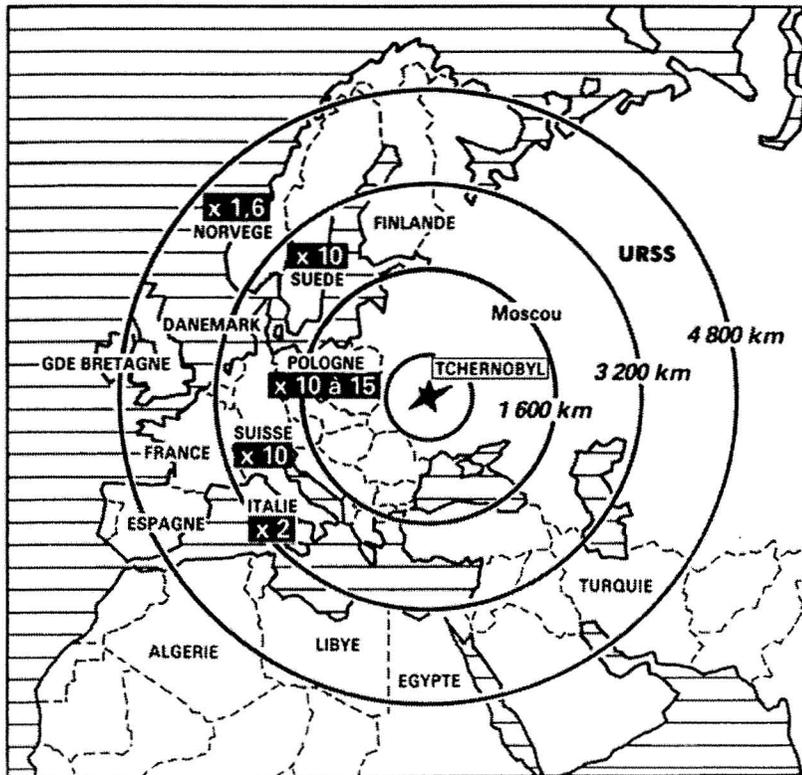
not be able to obtain the cooling water they need. Nuclear plants in the United States and Europe had to ramp down or shut down in recent summers after lakes and rivers became too shallow or too warm. Many existing ocean coastal plants will be threatened by rising sea levels.

The plethora of risks

Nuclear power increases the risk of nuclear terrorism. The 9/11 Commission reported that the lead pilot in the World Trade Center attack considered targeting the Indian Point nuclear plant near New York City. A German government study and nuclear plant manufacturer General Electric both concluded that nuclear plants cannot withstand a direct hit by a 737 aircraft. Even a direct hit by a much smaller, rented private jet could cause devastation. Litigation is pending to decide whether U.S. nuclear plants must be designed to withstand terrorist attacks. The pools of spent nuclear fuel often stored on site for lack of permanent waste storage facilities are even more vulnerable to terrorists than the plants themselves.

No country has found a millennia-long way to permanently and safely store nuclear plants' high-level radioactive waste, including plutonium, the key ingredient in nuclear weapons. The waste is piling up at nuclear plants and interim storage sites around the world, where it is vulnerable to diving airplanes, explosives, and theft. The nuclear waste traffic between Western Europe and Russia over the last three decades has left Russia with many thousands of tons of waste stored in unsecure and unsafe conditions. Civilian reprocessing of spent nuclear fuel is not the answer. Reprocessing eliminates some but not all of the waste, and converts the remainder into weapons-grade material.

As Mohamed ElBaradei, the head of the UN International Atomic Energy Agency (IAEA) and winner of the 2005 Nobel Peace Prize, warned in October 2008, the more nuclear material there is worldwide, the greater the risk some of it will be diverted to make nuclear



General overview of areas most affected by the radioactive contamination caused by the Chernobyl nuclear plant No. 4 reactor's blast, 26 April 1986, the world's worst nuclear accident of the 20th century (N.B. actual radiation patterns are affected by wind flow).

weapons. "Countries that master uranium enrichment and plutonium separation become de facto nuclear weapons-capable states," he said. He has previously predicted that enrichment and reprocessing technologies "could be the Achilles' heel of the nuclear non-proliferation regime."

In October 2008, ElBaradei announced that there were 250 reports of stolen nuclear and radioactive material in the year ending in June. Much of the concern is with the countries in the former Soviet Union. China, hardly an expert in quality control management, has agreed to help build a nuclear power plant in Pakistan, a country notorious for illicit sales of nuclear material. Even Japan and Great Britain have been unable to keep track of their nuclear material and have lost enough to make several bombs.

Nuclear power has not been viable in any country in the world without some form of taxpayer subsidy. Despite the subsidies and legal caps on nuclear plants' liability for catastrophic accidents, private capital has

shunned it and flocked to cleaner and less risky sources of energy such as wind, solar, and geothermal. It is hard to understand why taxpayers are willing to subsidize and limit the liability of an industry that is afraid it may cause them so much damage that it cannot afford to pay for it. The Chernobyl disaster and the near disaster at Three-Mile Island in the U.S. show the real risk of such damage. Despite technological improvements in newer reactors, the list of safety violations in every country's nuclear plants continues to grow due to the intractable problem of human error. As Edward Teller, father of the H-bomb, said, "Sooner or later the fool will prove greater than the proof even in a foolproof system."

Nuclear power won't stop climate change

In reality, nuclear energy's role in the world is likely to shrink, not expand. Nuclear power is not the ticket to energy independence. Even if countries want nuclear power, over the next ten years the world cannot build new

nuclear plants fast enough to replace the many aging plants already past their design life while adding enough new plants to increase capacity.

As shown in "The World Nuclear Industry Status Report 2007," commissioned by the Greens in the European Parliament, the nuclear industry's ability to ramp up over the next few years is seriously constrained by a lack of manufacturing capacity and trained personnel. An April 2007 report, "Nuclear Energy," published by the conservative U.S. Council on Foreign Relations, concurred and added that for nuclear power to ramp up fast enough "to make a relatively modest contribution to combating climate change" would compromise safety controls. The report concluded that "in the foreseeable future, nuclear energy is not a major part of the solution to...global warming or energy insecurity."

Peter Bradford, a former member of the U.S. Nuclear Regulatory Commission who participated in the licensing of about 25 nuclear plants, has described the limited future of nuclear power even more bluntly. Bradford said that those who say things like nuclear energy can stop global warming "are inviting you into a dangerous lala land in which nuclear power will be oversubsidized and underscrutinized while other more promising and more rapid responses to climate change are neglected and the greenhouse gases that they could have averted continue to pollute the skies at dangerous rates." He should know. We should listen.

Contact

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Madeleine Austin,
 Vice President of the World Business Academy, member of the Hawaii Energy Policy Forum.
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VIA FACSIMILE CARE OF HOUSE SGT-AT-ARMS 586-6401

**HOUSE COMMITTEES ON ENERGY AND ENVIRONMENTAL PROTECTION
AND WATER, LAND AND OCEAN RESOURCES:**

**Representative Hermina M. Morita, Chair; Denny Coffman, Vice Chair of the
Committee on Energy and Environmental Protection; and
Representative Ken Ito, Chair; Sharon E. Har, Vice Chair of the Committee on
Water, Land and Ocean Resources.**

TESTIMONY IN SUPPORT OF HB 1; RELATING TO NUCLEAR ENERGY

Hearing Date: Thursday, January 29, 2009
Time: 10:00 AM
Place: Conference Room 325
State Capitol
415 South Beretania Street
Copies: 30

Chair Morita and Vice Chair Coffman, Chair Ito and Vice Chair Har, and members of the House Committee on Energy and Environmental Protection and the House Committee on Water, Land and Ocean Resources.

I am James Kuroiwa, Hawaii Director for the Alliance of Worker Freedom at P.O. Box 30783 Honolulu, HI 96820, and we work in close association with the Grassroot Institute of Hawaii and the Alliance for Worker Freedom in Washington, DC.

We are testifying in strong support of House Bill 1 and its basic intent to move Hawaii into a sustainable and environmentally pristine 21st century with the support of developing nuclear energy facilities.

Hawaii's sustainability plan for 2050, of which I participated, must include the establishment of nuclear energy for the generation of clean, low cost, and a reliable source of electricity. At the same time, Hawaii must continue the development of other alternative energy sources that are competitive towards the benefit all its citizens.

France, Japan, China, Saudi Arabia, Germany, Russia, United Kingdom, and some thirty-two other countries are years ahead of the United States in the development and construction of nuclear energy facilities. Michael R. Fox, Ph.D. a nuclear scientist has provided information that, "The Nuclear Energy Institute and the United Nations International Atomic Energy Agency (IAEA) as of September 2008 tracks 439 nuclear energy facilities in 31 countries."

France, Japan, Russia, and the United Kingdom have developed reprocessing facilities for spent nuclear rods for their reuse. An example is that the eventual waste from a 1,000 MW plant is some 4 cubic meters of glass per year (the equivalent size of two picnic tables).

The United States continues to face the unjustified fear factor that is disabling America's research and development of nuclear energy for our sustainability. The U.S. Navy has overcome that resistance at a great cost and continues to do research and development in the nuclear energy arena. The Navy now installs nuclear energy units that perform safely for the life of the ship and has eliminated the need for refueling.

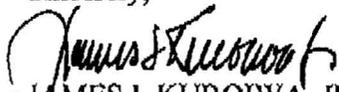
Today, there are international company's that has developed "mini" units. The State of Alaska has agreed to install a mini-unit, upon approval by the U.S. Nuclear Regulatory Commission, in the town of Galena manufactured by the Toshiba Corporation that would produce clean, inexpensive electricity for 800 residents. The average family of four will be saving some \$250.00 to \$300.00 of their present electric costs of \$400.00 a month.

Hawaii has the opportunity to become a leader in standardizing nuclear energy facilities for Island states and smaller population areas in generating safe, low cost, reliable, and non polluting electrical energy.

The potential for economic expansion for Hawaii will become a reality through reducing our dependence on fossil fuel to generate electric energy and lowering its cost. The availability of electric power that is reliable and low cost could lead towards an affordable electric automobile that further reduces Hawaii's dependence on fossil fuels.

We would recommend that the Committees amend the section limiting the nuclear energy plant of 200 MW by inserting the words "to one thousand". The new sentence would read, "Nuclear energy generation facility" or "facility" means a new nuclear fission power plant or facility located in the State with the capacity to produce from nuclear fissile material at least two hundred to one thousand megawatts of electricity.

Sincerely,



JAMES I. KUROIWA, JR.

Hawaii Director

The Alliance for Worker Freedom

TESTIMONY IN VIGOROUS SUPPORT OF HB1

The House Committee on Energy and Environmental Protection
and
The House Committee on Water, Land and Ocean Resources

In Conference room 325 at 1000 on Thursday, 29 January 2009
EEPtestimony@Capitol.hawaii.gov.

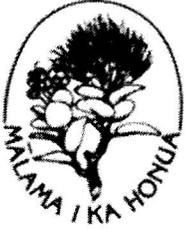
Chairs and Respected Members of the Committees;

Hawaii is the most oil and coal dependant state in the union. We must, both for economic reasons and also for our own security, diversify the generation of our electrical needs away from imported sources of power. A tsunami, a shipping disaster or world political conditions , any of these three, can on no notice at all cut off our ability to provide our state with the electricity that we need to conduct the basic functions of our lives and our economy. Please support this bill, HB1, that will begin the long planning process towards making ourselves energy self-sufficient.

For those of you on the Environmental Protection Committee, the reduction of greenhouse gasses alone is reason enough to support this bill. We also can rest assured that nuclear generation technology has made much progress in the past forty years and is now one of the world's most dependable and safe systems. We have approximately 6 to 8 nuclear generators in Pearl Harbor at any given time. Each a bit larger than the latest bio-diesel powered plant recently built by HECO. The emissions are zero and the refueling interval is more than twenty years. Should you be worried about site security, I suggest we begin now the long process to lease space inside the military reservation for the location of our plant. This will provide, at very low cost to the taxpayers, the finest security available anywhere in the world.

Respectfully,

Reg White
Vp, project development
Star of Honolulu Tours and Events



Sierra Club Hawai'i Chapter

PO Box 2577, Honolulu, HI 96803
808.537.9019 hawaii.chapter@sierraclub.org

**HOUSE COMMITTEE ON ENERGY & ENVIRONMENTAL PROTECTION
HOUSE COMMITTEE ON WATER, LAND, & OCEAN RESOURCES**
January 29, 2009, 10:00 A.M.

(Testimony is 1 page long)

TESTIMONY IN OPPOSITION TO HB 1

Chair Morita, Chair Ito, and members of the Committees:

The Sierra Club, Hawai'i Chapter, with 5500 dues paying members statewide, firmly opposes HB 1, which directs the Department of Business, Economic, Development, and Tourism to develop a permitting process for nuclear energy generation facilities in Hawai'i.

HB 1 puts the cart before the horse. It moves directly to permitting, construction, and operation of nuclear reactors without first ensuring:

- (1) Development of adequate policies to curb energy over-use;
- (2) Resolution of the significant safety problems inherent in reactor operation, disposal of spent fuels, and possible diversion of nuclear materials capable of use in weapons manufacture; and
- (3) Establishment of adequate regulatory machinery to guarantee adherence to the foregoing conditions.

Moreover, requiring DBEDT to pursue permitting of nuclear reactors also takes attention and valuable resources away from other efforts to develop renewable energy resources. Considering the large community support -- from both the public and private sector -- for renewable energy development, it is an unnecessary distraction to allow any further consideration of this bill.

Thank you for the opportunity to testify.



**HOUSE COMMITTEE ON ENERGY & ENVIRONMENTAL PROTECTION
HOUSE COMMITTEE ON WATER, LAND, & OCEAN RESOURCES**
January 29th, 2008, 10:00 A.M.
Room 325

(Testimony is 2 pages long)

TESTIMONY IN OPPOSITION TO HB 1

Chairs Morita and Ito and members of the committees:

The Blue Planet Foundation is opposed to House Bill 1, allowing nuclear fission power generating plants to operate in Hawai'i.

Given our small islands and diverse indigenous resources, nuclear power just doesn't make sense for Hawai'i. Even in a perfect world free of accidents, nuclear's environmental, financial, logistical, and opportunity costs are simply too high.

Today, splitting atoms for energy is by no means clean. The mining, production, and disposal of nuclear fuel is messy and energy intensive. The dual threats of accidents and persistent radioactive waste make it difficult for nuclear power to pencil out economically. That's one reason the nuclear industry enjoys a vast subsidy through a taxpayer-backed liability cap. No one wants to own that risk, so the public gets to hold the bag.

Logistically, nuclear is the wrong technology for Hawai'i. Siting such a facility would be nearly impossible, and the required emergency zone surrounding the plant would occupy a significant portion of any island. For example, a nuclear power plant at Kahe along the Waianae coast (an area explored earlier for a nuclear facility) would require a safety zone that covers not only the Waianae coast but also the Ewa plain and a portion of Pearl City (see image on page 2 of this testimony). In 2002, Congress expanded the radius of the emergency zone to up to 20 miles (Section 127 of the Public Health Security and Bioterrorism Preparedness and Response Act of 2002). According to the law, the state would be required to provide potassium iodide tablets to individuals living within this area.

Further what the island rely on for power when the nuclear facility has to go offline for maintenance and refueling? The backup capacity necessary would obviate the need for the nuclear facility.

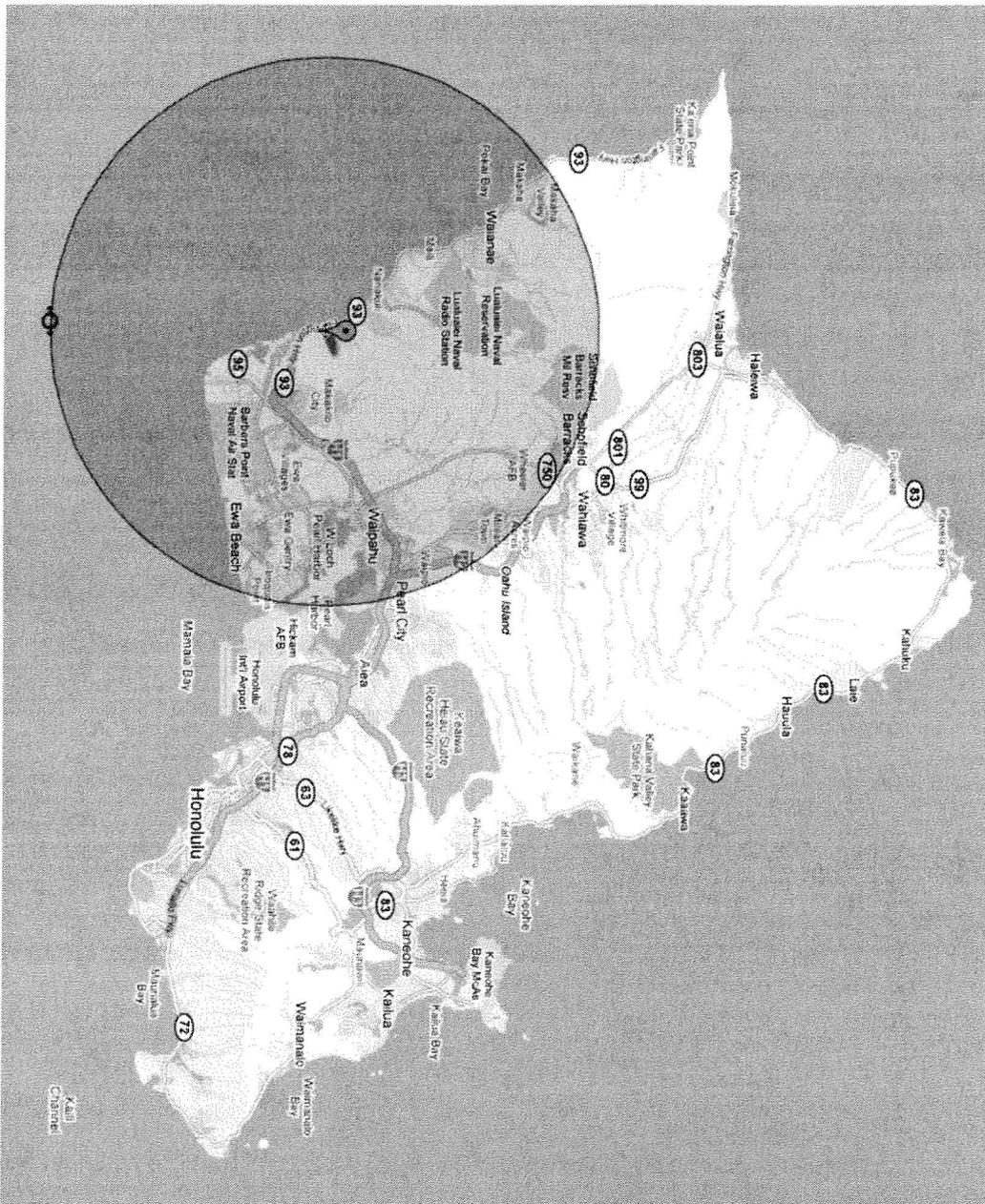
Recent blackouts are demonstrating that big power plants and big transmission lines are vulnerable; whereas distributed and diverse energy sources make our power grid more robust against Mother Nature's whims. Hawai'i's constitution wisely requires that any proposed fission power plant first receive approval by at least two-thirds of both houses of the state legislature.

The bottom line is we don't need nuclear. We can do much better for Hawai'i.

We are blessed with a host of clean energy resources, from wind to solar to ocean energy. So ample, in fact, is solar power that each rooftop statewide receives an average of about 15 gallons of gasoline equivalent in the form of sunlight daily. We are the Saudi Arabia of sun—and of wind and ocean energy, for that matter. Let's choose to tap these safe, sensible, clean, decentralized, and indigenous sources of energy to power our economy.

Hawaii's only safe nuclear option is located 93 million miles away—the sun. Let's keep it there.

Thank you for the opportunity to testify.





LIFE OF THE LAND

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Honolulu, Hawai'i 96817

Phone: 533-3454; E: kat.lifeoftheland@gmail.com

Committee on Energy & Environmental Protection

Rep. Hermina Morita, Chair

Rep. Denny Coffman, Vice Chair

Committee on Water, Land and Ocean Resources

Rep. Ken Ito, Chair

Rep. Sharon Har, Vice Chair

Thursday, January 29, 2008

10:00 A.M.

Room 325

STRONG OPPOSITION TO HB 1 - NUCLEAR POWER

Aloha Chairs Morita and Ito and Members of the Committees:

My name is Kat Brady and I am the Assistant 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.

HB 1 directs the department of business, economic, development, and tourism to develop a permitting process for nuclear energy generation facilities in Hawai'i.

Life of the Land is in strong opposition to this measure. We are stunned that Hawai'i, with an abundance of indigenous resources on every island for energy self-reliance, would even consider such an idea. That we would even entertain such an idea is mind-boggling.

Life of the Land was the only group in Hawai'i to support the people of Nevada in opposing the Yucca Mountain disposal site. Sen. Harry Reid wrote us a letter thanking us for taking a stand against the site.

In 2003, an interdisciplinary MIT faculty group decided to study the future of nuclear power because of a belief that this technology is an important option for the United States and the world to meet future energy needs without emitting carbon dioxide and other atmospheric pollutants. Other options include increased efficiency, renewables, and carbon sequestration, and all may be needed for a successful greenhouse gas management strategy. This study, addressed to government, industry, and academic leaders, discusses the interrelated technical, economic, environmental, and political challenges facing a significant increase in global nuclear power utilization over the next half century and what might be done to overcome those challenges.

The study is called The Future of Nuclear Power and can be accessed at: <http://web.mit.edu/nuclearpower/pdf/nuclearpower-summary.pdf>

The study found that for an expansion of nuclear power to succeed, four critical problems must be overcome:

1. **Cost.** In deregulated markets, nuclear power is not now cost competitive with coal and natural gas. However, plausible reductions by industry in capital cost, operation and maintenance costs, and construction time could reduce the gap. Carbon emission credits, if enacted by government, can give nuclear power a cost advantage.
2. **Safety.** Modern reactor designs can achieve a very low risk of serious accidents, but “best practices” in construction and operation are essential. We know little about the safety of the overall fuel cycle, beyond reactor operation.
3. **Waste.** Geological disposal is technically feasible but execution is yet to be demonstrated or certain. A convincing case has not been made that the long-term waste management benefits of advanced, closed fuel cycles involving reprocessing of spent fuel are outweighed by the short-term risks and costs. Improvement in the open, once through fuel cycle may offer waste management benefits as large as those claimed for the more expensive closed fuel cycles.
4. **Proliferation.** The current international safeguards regime is inadequate to meet the security challenges of the expanded nuclear deployment contemplated in the global growth scenario. The reprocessing system now used in Europe, Japan, and Russia that involves separation and recycling of plutonium presents unwarranted proliferation risks.

In summary, the prospects for nuclear energy as an option are limited, the report finds, by four unresolved problems: high relative costs; perceived adverse safety, environmental, and health effects; potential security risks stemming from proliferation; and unresolved challenges in long-term management of nuclear wastes.

Another reason why nuclear power will not work in Hawai'i is the 'economies of scale' argument. Our island environment is not suited for electricity generated from nuclear power.

In 1978 a provision was added to the Hawai'i State Constitution banning nuclear power. We thank the insightful people who recommended this amendment and thank the people of Hawai'i for supporting this common-sense clause. We are aware that there is a bill to remove this clause from our Constitution, and we strongly oppose that bill as well.

Just for a minute, think about tourist brochures promoting a nuclear Hawai'i. Wouldn't that just make folks want to visit!

Let's use the abundant resources we have to produce all the electricity we need and stop fooling around with ideas that threaten public safety, promote centralized power, and get us stuck in the status quo.

Mahalo for this opportunity to testify.

ALAN S. LLOYD, P.E.
383 B Kaelepulu Drive
Kailua, HI 96734

Hawaii State Legislature
25th Session
Committee on Energy and Environmental Protection
Committee on Water, Land and Ocean Resources

TESTIMONY

January 29, 2009

H. B. # 1 - Relative to Nuclear Energy
Testimony of Alan S. Lloyd, P.E.

My name is Alan S. Lloyd. I am testifying as a private citizen. I am a Licensed Professional Engineer. For 13 years I sold Westinghouse Power Equipment, including steam turbine generators, to our sugar plantations and to the electric utilities in Hawaii. For 30 years I worked for the Maui Electric company and the Hawaiian Electric Company. I retired in 1996.

I would like to commend Representatives Mark Takai and Scott Nishimoto for introducing this Bill, as well as the Committee on Energy and Environmental Protection and the Committee on Water, Land and Ocean Resources for holding this hearing.

I am very much in favor of the widest possible use of nuclear energy for our nation because the cost of nuclear fuel is only about one cent per kwh compared to coal at three to six cents per kwh and oil at sixteen cents per kwh at about \$100 per barrel of oil or about eight cents per kwh with residual fuel oil at \$50 per barrel.

Secondly, a nuclear power plant emits no carbon dioxide to the atmosphere and its radioactive emissions are similar to those from many coal fired power plants.

Everybody on earth is exposed to radiation from the sun, space and minerals in the soil. For example, a resident of Hawaii could double his natural background radioactive dose by simply moving to Denver or increase this natural radiation dose by about 50 times by moving to certain river deltas in Brazil or India. In this context, it is interesting to note that the very healthy crews of jet airliners receive an annual radioactive occupational dose that is 3 to 5 times higher than Hawaii's natural background radiation. (There is no such thing as a radiation free environment.) In addition, our nation's 104 nuclear power plant reactors have never killed anybody and nobody was injured at Three Mile Island.

There are three kinds of power plants:

Dispatchable Base Load [including steam turbine generators, slow speed diesel engines, combined cycle gas turbines (all burning fossil fuels), geothermal and municipal waste power plants, ocean thermal energy conversion (OTEC) and nuclear power plants]

Alan S. Lloyd Testimony
Relative to Nuclear Energy

Dispatchable Peaking or Intermediate Load [including gas turbines, high speed diesel engines and hydroelectric power plants with reservoirs.]

Non-Dispatchable [including run-of-the-river hydroelectric power plants, wind turbines, solar-photovoltaic systems and ocean wave power systems]

Dispatchable means the power plants can be started up at any time and can be set to run at the power level required to meet the utility customers' load. The only renewable-energy electric generators that meet that requirement in Hawaii are Puna Geothermal Ventures on the Big Island and some small hydro electric plants on Kauai and the Big Island.

The annual electric system peaks in Hawaii occur right after sunset and often on light wind days. While wind turbines and solar photovoltaic systems can produce useful amounts of electric energy, they cannot be depended upon to keep the lights on and maintain a steady system frequency during the utility system's evening peak load period.

The non-fossil fuel generators capable of reliably meeting the evening peak megawatt demand in Hawaii include combustion turbines, steam turbines or diesel engines consuming a non-fossil fuel, a geothermal power plant, an OTEC plant, a pump-storage hydro-electric plant and a nuclear power plant.

Hopefully, our utilities will be able to find an economical site for a pumped-storage hydro-electric power plant and obtain the necessary State and County approvals to build it.

With 400 MW of wind power on Lanai, a large amount of electric energy could be stored in the pump storage plants' upper reservoir during early morning hours from wind farms, from H-Power or from a nuclear or OTEC power plant. With all that stored electric energy available for use during the day and the evening peak, the use of imported fossil fuels and carbon emissions will be minimized.

At the present time, the smallest nuclear power plant licensed for use in the U.S. is far too large to be integrated into an interconnected Oahu-Maui County transmission system. The largest generator that the Oahu system can handle is the existing 200 MW coal fired steam turbine. The smallest nuclear unit presently available for a U.S. installation is about 1000 MW.

There are several manufacturers that are developing designs for much smaller nuclear generating units. (See attached data on the proposed Hyperion 25 MW design) Accordingly, your committee should keep abreast of these developments.

Frankly, nuclear powers' main competitors for a future base load generator in Hawaii will probably be Ocean Thermal Energy Conversion (OTEC) Power Plants or possibly large conventional generators burning non-fossil fuels. Both OTEC and nuclear have relatively high capital costs and very low operating costs. If OTEC works out to be a dependable and steady

Alan S. Lloyd Testimony
Relative to Nuclear Energy

source of reasonably priced base load electric energy, nuclear may not be needed in Hawaii. However, it is very important that the State keep its options open in this regard.

It is also very important that the legislature remember that it takes about one fifth of a kilowatt hour of electric energy to produce one dollar of Hawaii Gross State Produce (GSP). Adjusted for inflation, that ratio has remained at that general level since the 1970's. Thus, the electric utilities must be given the opportunity to install the most economical base load generators that will pay their own way.

Thank you very much for introducing H. B. No. 1 and for requesting testimony on nuclear power's role in our economy. There are about 440 nuclear plants operating throughout the world including 104 in the U.S., 58 in France (generating 80% of that nation's electric energy), and 53 plants in Japan. The world's largest nuclear generating unit is currently under construction in Finland.

The U.S. currently gets about 49% of its kilowatt hours of electric energy from coal, 22% from natural gas, 20% from uranium 6% from hydro-electric and 3% from everything else including oil.

The January 12th edition of Barron's includes an article (attached) that notes that 17 applicants have begun the approval process to build 26 new nuclear power plants in the U.S., even though the federal government has not yet decided how it is going to store or re-process the spent fuel. Because of the relatively small volumes involved, the industry does have a very good alternative by storing the spent fuel rods in concrete dry casks at or near the power plant sites.

In conclusion, I have also included an article from the April 21, 2008 edition of Newsweek covering an interview with Patrick Moore, a co-founder of Greenpeace. In response to the reporter's question Mr. Moore stated, "Other than hydro-electric which I also favor, nuclear is the only technology besides fossil fuels that is available as a large scale continuous power source."

With respect to the proposed revisions to Chapter 196 of Hawaii Revised Statutes, I would suggest that the last underlined paragraph on Page 3 be amended to clearly state that where the facility located in the State will be capable of producing at least 200 megawatts, individual generating units rated less than 200 megawatts could be installed as needed.

In addition, I would suggest that Sub-paragraph (c) on Page 3 also call for the Department to seek input from the Hawaiian Electric Co. and appropriate consulting engineering firms.

Again, thank you for the opportunity to testify on this important matter.

Once the object of widespread fear, new nuclear-power plants look like the future of clean energy. How to profit from the trend—right now.

The Blossoming of Nuclear Power

by Robin Goldwyn Blumenthal



THE U.S. STANDS AT A PIVOTAL MOMENT for the advancement of nuclear energy.

President-elect Barack Obama has put forth a goal to reduce carbon emissions in the U.S. by 80% by 2050, using \$150 billion over 10 years to create a "clean-energy" future. Nuclear plants are the biggest producers of energy that doesn't emit any greenhouse gases.

"Nuclear power is in a renaissance," says Tom Neff, a physicist and research affiliate at MIT's Center for International Studies. In fact, 17 applicants are seeking government approval to build 26 nuclear plants, meeting a Dec. 31 deadline for federal tax credits and potentially ending a 30-year hiatus in the construction of new U.S. nuke facilities.

That adds up to a big investment opportunity. Even if it takes 10 years for the first of the new crop to be built—a distinct possibility—some of the power companies operating the 104 existing nuclear plants look tempting right now. Their stocks are cheap and their competitive advantages are many.

They have lower costs than rivals such as coal-fired facilities, putting them in a better position to ride out the recession. They'll come out much better than the competition if a carbon tax is imposed. And they're better-prepared for the long haul in the new era of nuclear power.

"Owning companies that already own nuclear is the sweet spot for investing in utilities," says Mark Finn, utilities analyst at T. Rowe Price.

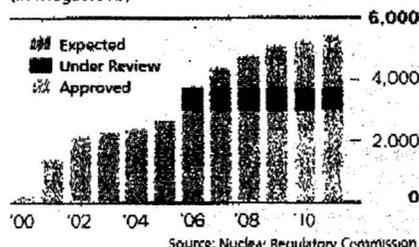
Judith Saryan, portfolio manager of Eaton Vance Dividend Builder Fund (EVTMX), which has 30% of the portfolio in high-yielding electric utilities and telecommunications stocks, says integrated utilities like Exelon (ticker: EXC), the biggest nuclear-power generator in the U.S., and Entergy (ETR), No. 2 in nukes, operate with great efficiency. The fund owns both.

New Orleans-based Entergy, with a market capitalization of \$15.7 billion, trades for a modest 11 times 2009 earnings estimates of \$7.50 a share. Hilliard Lyons has a 12-month price target of \$100, or 25% above the recent stock price of \$80. The stock is down 34% in the past 12 months.

J. Wayne Leonard, Entergy's CEO, who brought the company back from the brink when he joined 10 years ago, says Entergy delivered the highest total shareholder return—414.3%—of any company in its

Plans are afoot to build 26 nuclear plants. No new plants have been built in the U.S. for 30 years.

U.S. Nuclear Capacity Additions At Existing Facilities (2000-2011)
(in Megawatts)



The Bottom Line



January 17, 2009

industry for the nine years ended Dec. 31, 2007.

Moreover, Entergy has articulated a goal of reducing its carbon emission to 20% below its 2000 level by the end of this decade. The company, whose operating earnings rose 22% in 2007 to \$5.76 a share, is expected to earn \$6.60 a share for 2008, 15% above the current price.

Chicago-based Exelon, down 36% in the past 12 months, is rated Outperform by Macquarie, which has a price target of \$82 on the shares, some 47% above their current price of 54. The company sees earnings of \$4 to \$4.30 a share in 2009, about flat with 2008. That means the stock trades for about 13 times next year's earnings and yields a hefty 3.8%.

Exelon, with 17 plants, is "cheap relative to future cash flows," says Grant Taber, a vice president and analyst at Westwood Holdings Group in Dallas. He also likes Southern Co. (SO), an integrated utility with nuclear power and a stock that has fallen just 12% in the past 12 months. Southern has "very low relative economic sensitivity," Taber says. With a yield of nearly 5%, Taber calls it a "bond proxy" that has a relatively high return on equity and good relationships with regulators.

Nuclear energy has been gaining ground as safety fears have eased. Exelon and other operators have addressed the problem of nuclear-waste disposal with "dry-cask storage"—high-tech sealed containers that they keep on their sites. Due to innovations like that, many of the safety concerns that arose after accidents at Three Mile Island in Pennsylvania in 1979 and Chernobyl in Ukraine (then part of the Soviet Union) in 1986 have eased.

"It's safer to work in a nuclear plant than it is in real estate," says Patrick Moore, a scientist and founding member of Greenpeace who began supporting

Low-Cost Energy

Stocks of leading nuclear-energy players got their lights punched out in the past year, but could start climbing even as the recession lingers.

Company/Ticker	Market Value (bil)	P/E '09E	12-Mo Change	Dividend Yield
Entergy/ETR	\$15.7	11.1	-34%	3.6%
Exelon/EXC	36.4	13.1	-36	3.8
Southern/SO	27.6	14.5	-12	4.7
Duke Energy/DUK	19.5	12.2	-25	0.0
Constellation/CEG	5.3	6.9	-75	7.2
FPL Group/FPL	20.9	12.5	-29	3.5

E=Estimate.

Source: Thomson Reuters

nuclear energy several years ago. He cites data from the U.S. Bureau of Labor Statistics, and notes that a Columbia University study published in 2004, which followed 54,000 nuclear-plant workers for 15 years, found that they had fewer cancers, less disease and lived longer than the average person.

Notwithstanding the increased difficulty of obtaining financing since the credit crisis erupted, Cambridge Energy Research Associates has estimated that the potential for world-wide investment in clean energy, of which nuclear generation is the focal point, will reach \$7 trillion in real 2007 dollars by 2030.

"If you honestly believe that greenhouse gas is the seminal issue of the day, as world population and economic growth continue to expand, so will the need for electric capacity," says Sheila Slocum Hollis, a partner at the Washington law firm of Duane Morris who specializes in energy law. "Whether to power electric vehicles or for general manufacturing needs, ultimately people are looking toward nuclear as the big power source."

Yes, concerns have cropped up about the costs of building new plants, with some estimates putting them at five times the cost of building natural-gas plants. Yet the Nuclear Energy Institute, the industry trade group, maintains that the capital costs become competitive due to nuclear plants' lower operating costs versus gas producers' costs. What's more, cost comparisons with other types of energy producers don't reflect any benefit that nuclear operators might see from carbon credits.

Even Warren Buffett got into the act last fall, with Berkshire Hathaway's Mid-American Energy Holdings investing \$1 billion in Constellation Energy Group (CEG), which has extensive nuclear operations, and proposing to pay \$26.50 a share in cash for the Baltimore company before losing out to France's *Électricité de France* (EDF France). It is paying \$4.5 billion to buy half of Constellation's nuclear-generation assets.

Exelon, meanwhile, has made an all-stock offer totaling about \$6 billion, for NRG Energy (NRG), which last September became the first company to file for a permit in the new round of construction proposals.

"I have seen a sea change in public acceptance of nuclear power," says Slocum Hollis. "People have seen it for 35 years now, and it's working," she says. And perhaps most important, "it has a lot of jobs associated with it in many communities." ■

Scott Pollack for Barron's

From:

01/19/2009 14:06

#358 P.001/001

Alan S Lloyd
383 Kaelepulu Dr Apt B
Kailua HI 96734-3356



REGULATORY DIVISION

Docketed (A-Actual, T-Target)

To: Alan Lloyd
From: Mitch Singer

New Nuclear Plant Status

Company	Site, (Plant Site)	Design # of Units	Early Site Permit (ESP)	Construction / Operating License Submittal	Docketed (A-Actual, T-Target)
Altamare Energy Holdings / Unistar	Emerse County, ID	EPR 1		FY 2009	
Amarillo Power / Unistar	Vicinity of Amarillo, TX	EPR 1		FY 2009	
AmerenJE / Unistar	Callaway County, MO (Callaway)	EPR 1		7/24/08	10/3/08 - T
Consolidation / Unistar	Calvert County, MD (Calvert Cliffs)	EPR 1		7/13/07 & 3/14/08	3/25/08 & 6/3/08 - A
Constellation / Unistar	Orange County, NY (Nine Mile Point)	EPR 1		9/30/08	12/10/08 - T
Defeat Edison	Fernald, MI (Fernald)	ESBWR 1	Not yet determined	9/18/08	11/25/08 - A
Dominion	Louis County, VA (North Anna)	ESBWR 1	Approved November 2007	11/27/07	01/28/08 - A
Duke	Charleston County, SC (William States Lee)	AP1000 2		12/13/07	02/25/08 - A
Duke	Darke County, MO	NTD*	Under consideration	Not yet determined	
Duke	Oconee County, SC (Oconee)	NTD*	Under consideration	Not yet determined	
Energy	West Feliciana Parish, LA (River Bend)	ESBWR 1		9/28/08	12/3/08 - T
Energy (NuStart)	Calhoun County, MS (Grand Gulf)	ESBWR 1	Approved April 2007	2/21/08	04/17/08 - A
Exelon	Clinton, IL (Clinton)	NTD*	Approved March 2007	Not yet determined	
Exelon	Victoria County, TX	ESBWR 2		9/3/08	10/30/08 - A
Florida Power & Light	Miami-Dade County, FL (Turkey Point)	AP1000 2	Not yet determined	FY 2009	
Luminant	Glen Rose, TX (Comanche Peak)	APWR 2		9/19/08	12/3/08 - T
NRG Energy / STPNOC	McGregor County, TX (South Texas Project)	ABWR 2		9/20/07	11/29/07 - A
PPL Corp. / Unistar	Luzerne County, PA (Ball Blaine)	EPR 1		10/10/08	12/15/08 - T
Progress Energy	Wake County, NC (Nantux)	AP1000 2		2/19/08	04/17/08 - A
Progress Energy	Levy County, FL	AP1000 2		7/30/08	10/6/08 - A
South Carolina Electric & Gas	Fairfield County, SC (W.C. Coker)	AP1000 2		3/27/08	7/31/08 - A
Southern Company	Burke County, GA (Vogtle)	AP1000 2	Under review, Approval expected early 2008	3/31/08	5/30/08 - A
TVA (NuStart)	Jackson County, AL (Bellefonte)	AP1000 2		10/30/07	1/18/08 - A

* Not Yet Determined
FY - Federal Fiscal Year
Updated: 12/08

NEI New Nuclear Plant Review Schedule
<http://www.nei.gov/pressroom/pressroom.cfm?newsitem=2008121801>

FROM: NUCLEAR ENERGY INSTITUTE
MITCH SINGER
MEDIA RELATIONS
202-739-8000



Latest News

Hyperion's CEO Grizz Deal to speak at Project Green America's "United We Stand" conference in Washington, D.C.

News Archive

Technology Development Award presented to Hyperion Power Generation ... [Details here.](#)

John Grizz Deal to present [Hyperion at Dow Jones — VentureWire AEC Alternative Energy Innovations Conference](#) October 21-22, 2008 in Redwood City, CA ... and at the National Renewable Energy Laboratory's (NREL) 21st Industry Growth Conference, October 28-30 in Denver, CO.

[Hyperion at International Atomic Energy Agency conference in Vienna](#) Sept. 29 – Oct. 3, 2008

Inventor Dr. Otis (Pete) Peterson presenting Hyperion's Compact, Self-Regulating Nuclear Reactor at [Pacific Basin Nuclear Conference](#) in Aomori Japan

[NEI International Uranium Fuel Seminar](#) to hear Hyperion CEO John Grizz Deal speak October 19-22, 2008 in Denver, CO.

Hyperion presented at [Venture Capital in the Rockies Conference](#) Sept. 9-11, at Sun Valley Resort, ID.

Hyperion's Deborah Blackwell speaking at [the U.S. Women in Nuclear 2008 conference](#) in Charlotte, NC July 21, 2008.

Hyperion CEO John Grizz Deal presenting Hyperion's clean and safe power alternative at PennWell's [Oil Sands & Heavy Oil Technologies Conference](#) in Calgary, Alberta, Canada July 15, 2008.

Hyperion on CNN and BBC TV

[Did you catch Hyperion on the BBC Nov. 9, or CNN on Nov. 10?](#)

Clean, Safe, Affordable Power

Where you need it, When you need it.

Who would have thought that the benefits of generating electricity from huge nuclear power plants...



...could ever be provided in a small compact, energy module that can be transported by truck, rail or ship to remote locations wherever reliable electricity and heat for communities and industry is needed?

Now it is! Introducing the Hyperion Power Module (HPG)

Think About It:

Global warming. Dependence on foreign oil. Infrastructure vulnerable to natural and manmade catastrophes. Undrinkable water, poverty, disease, social unrest.

These increasingly serious problems can only be solved by finding solutions to the ever-expanding energy crisis.



For many good reasons an integral part of the new mix of energy technologies that will be needed to solve these problems is Nuclear. Wind, solar, geothermal — all available technologies are important and will have their place in the ultimate solution to our global energy problem. But the workhorse is going to be nuclear. (see [why nuclear](#))

However, until now — until Hyperion, nuclear power and the many benefits it offers: clean, emission-

Important Energy Facts

provided by wind, solar & geothermal

But Nuclear power provides over 20 percent of the electricity generated in the US

For providing large amounts of affordable electricity for communities and industry, no alternative is as reliable as nuclear power

Nuclear medicine is an essential

Sign up here for Updates on Hyperion Power Generation

Email Address:

Go

Learn about Clean Energy Technology that's Available Today!

Clean and Safe Energy — CASEnergy web site: www.cleansafeenergy.org

Terrestrial Energy: How Nuclear Energy Will Lead the Green Revolution and End America's Energy Odyssey — William Tucker. www.terrestrialenergy.org. Amazon

Face It, Nukes Are the Most Climate-Friendly Industrial-Scale Form of Energy ... from the latest issue of [WIRED Magazine!](#)

[Power to Save the World: The Truth About Nuclear Energy](#) — by Gwyneth Cravens.

[A Brighter Tomorrow: Fulfilling the Promise of Nuclear Energy](#) — by Senator Pete V. Domenici

Nuclear Energy Institute web site: www.nei.org

American Nuclear Society web site: www.ans.org

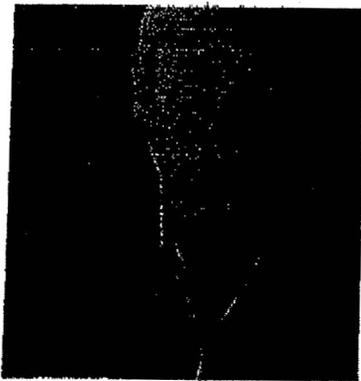
free, affordable energy — was only available from large, expensive nuclear power plants that took 10 years or more to build. And, many locations that could have benefited from nuclear power were not appropriate — the land was not available or the population was not large enough to warrant a huge power plant.

Invented at the famed Los Alamos National Laboratory, Hyperion small modular power reactors make all the benefits of safe, clean nuclear power available for remote locations. For both industrial and community applications, Hyperion offers reliable energy with no greenhouse gas emissions. Hyperion power is also cheaper than fossil fuels and, when you consider the cost of land and materials, watt to watt, Hyperion's innovative energy technology is even more affordable than many developing "alternative" energy technologies.

Small enough to be transported on a ship, truck or train, Hyperion power modules are about the size of a "hot tub" — approximately 1.5 meters wide. Out of sight and safe from nefarious threats, Hyperion power modules are buried far underground and guarded by a security detail. Like a power battery, Hyperion modules have no moving parts to wear down, and are delivered factory sealed. They are never opened on site. Even if one were compromised, the material inside would not be appropriate for proliferation purposes. Further, due to the unique, yet proven science upon which this new technology is based, it is impossible for the module to go supercritical, "melt down" or create any type of emergency situation. If opened, the very small amount of fuel that is enclosed would immediately cool. The waste produced after five years of operation is approximately the size of a softball and is a good candidate for fuel recycling.

Perfect for moderately-sized projects, Hyperion produces only 25 MWe — enough to provide electricity for about 20,000 average American sized homes or its industrial equivalent. Ganged or teamed together, the modules can produce even more consistent energy for larger projects.

The Hyperion team is committed to helping make the clean and safe benefits of nuclear power — benefits that could assist in solving the worst of our planet's problems — available in even the most remote locations. We hope you will enjoy learning about Hyperion through our web site!



A Renegade Against Greenpeace

Why he says they're wrong to view nuclear energy as 'evil'

PATRICK MOORE IS A CRITIC OF THE ENVIRONMENTAL MOVEMENT—AN unlikely one at that. He was one of the cofounders of Greenpeace, and sailed into the Aleutian Islands on the organization's inaugural mission in 1971, to protest U.S. nuclear tests taking place there. After leading the group for 15 years he left abruptly, and, in a controversial reversal, has become an outspoken advocate of some of the environmental movement's most detested causes, chief among them nuclear energy. NEWSWEEK's Fareed Zakaria spoke to Moore about his sparring with the green movement, and why he thinks nuclear power is the energy of the future. Excerpts:

ZAKARIA: At Greenpeace, you fought against nuclear energy. What changed?

MOORE: My belief, in retrospect, is that because we were so focused on the destructive aspect of nuclear technology and nuclear war, we made the mistake of lumping nuclear energy in with nuclear weapons, as if all things nuclear were evil. And indeed today, Greenpeace still uses the word "evil" to describe nuclear energy. I think that's as big a mistake as if you lumped nuclear medicine in with nuclear weapons. Nuclear medicine uses radioactive isotopes to successfully treat millions of people every year, and those isotopes are all produced in nuclear reactors. That's why I left Greenpeace: I could see that my fellow directors, none of whom had any science education, were starting to deal with issues around chemicals and biology and genetics, which they had no formal training in, and they were taking the organization into what I call "pop environmentalism," which uses sensationalism, misinformation, fear tactics, etc., to deal with people on an emotional level rather than an intellectual level.

Why do you favor nuclear energy over other non-carbon-based sources of energy?

Other than hydroelectric energy—which I also strongly support—nuclear is the only technology besides fossil fuels available as a large-scale continuous power source, and I mean one you can rely on to be running 24 hours a day, seven days a week. Wind and solar energy are intermittent and thus unreliable. How can you run hospitals and factories and schools and even a house on an electricity supply that disappears for three or four days at a

time? Wind can play a minor role in reducing the amount of fossil fuels we use, because you can turn the fossil fuels off when the wind is blowing. And solar is completely ridiculous. The cost is so high—California's \$3.2 billion in solar subsidies is all just going into Silicon Valley companies and consultants. It's ridiculous.

A number of analyses say that nuclear power isn't cost competitive, and that without government subsidies, there's no real market for it.

That's simply not true. Where the massive government subsidies are is in wind and solar. I know that France, which produces 80 percent of its electricity with nuclear,

'Gas costs three times as much as nuclear, at least ... Solar costs 10 times as much.'

does not have high energy costs. Sweden, which produces 50 percent of its energy with nuclear and 50 percent with hydro, has very reasonable energy costs. I know that the cost of production of electricity among the 104 nuclear plants operating in the United States is 1.68 cents per kilowatt-hour. That's not including the capital costs, but the cost of production of electricity from nuclear is very low, and competitive with dirty coal. Gas costs three times as much as nuclear, at least. Wind costs five times as

much, and solar costs 10 times as much. **What about the issue of nuclear waste?**

As is now planned, I'd establish a recycling industry for nuclear fuel, which reduces the amount of waste to less than 1 percent of what it would be without recycling. How many Americans know that 5 percent of the nuclear energy being produced in the U.S. is now coming from dismantled Russian nuclear warheads? The environmental movement is going on about how terrible it will be if someone does something destructive with these materials. Well, actually the opposite is occurring: all over the world, people are using former nuclear-weapons material for peaceful purposes—swords into plowshares. This constant propaganda about the cost of nuclear energy—that's just activists looking for the right buttons to push, and one of the key buttons to push to make consumers afraid that their electricity prices will go up if nuclear energy's built. In fact, it's natural gas that is causing [energy] prices to go up.

Don't you worry about proliferation?

You do not need a nuclear reactor to make a nuclear weapon. With centrifuge technology, it is far easier, quicker and cheaper to make a nuclear weapon by enriching uranium directly. No nuclear reactor was involved in making the Hiroshima bomb. You'll never change the fact that there are evil people in the world. The most deaths in combat in the last 20 years have not been caused by nuclear weapons or car bombs or rifles or land mines or any of the usual suspects, but the machete. And yet the machete is the most important tool for farmers in the developing world. Hundreds of millions of people use it to clear their land, to cut their firewood and harvest their crops. Banning the machete is not an option.

Are you optimistic that there will be an aggressive move toward nuclear power in the industrial world, and in particular in the United States?

There are 32 nuclear plants on the drawing boards right now. Last year four applied for their licenses and this year we expect 10 or 11 more. That's just in the United States. There are hundreds of nuclear plants on the drawing boards around the world. This is a completely new thing: the term "nuclear renaissance" didn't exist three years ago, and now it's a widely known term. Unfortunately, the environmental movement now is the primary obstacle here. If it weren't for their opposition to nuclear energy, there would be a lot fewer coal-fired power plants in the United States and other parts of the world today.

Mail Call

Mr. Alan S Lloyd
383 Kaelepulu Drive Apt. B
Kailua, HI 96734
PHONE / FAX 808 261-7064

"A Far More Critical Issue"

The article by Neil C. Livingstone in the February issue of *Sea Power* raised critical issues related to the illegal trafficking in sensitive nuclear materials that appears to be taking place in Eastern Europe and the Middle East. However, his discussion of the cargo of the *Akatsuki Maru*, the ship carrying reprocessed plutonium from France back to Japan, requires clarification with respect to the difference between "reactor-grade" and "weapons-grade" plutonium and uranium. The various grades of these two fissionable elements depend on the percentage of the "fissile" isotopes contained in a given consignment of uranium or plutonium. The following table lists the approximate U-235 or fissile content (enrichment) of the various grades of uranium:

Depleted uranium tailings	0.2%
Natural uranium	0.7%
Reactor grade (commercial fuel)	3% or 4%
Weapons-grade uranium	Over 90%

The grade or enrichment of uranium is controlled by how much of the U-238 is removed during the isotopic separation process. Fissile plutonium Pu-239 is produced as a result of uranium U-238 capturing and retaining a neutron. Pu-239 also can capture a neutron and become Pu-240, which is not fissile and is a neutron emitter. The proportion of Pu-240 is determined by how long the fuel rod remains in the reactor. This Pu-240 content determines whether or not the plutonium is suitable for weapons use. For this reason, weapons-grade plutonium was produced in dedicated production reactors like the N reactor at Hanford, where the rods remained in the reactor for relatively short periods. As a result, the Pu-240 content was kept to an absolute minimum. By comparison, the fuel rods in modern

light water reactor power plants, such as those in Japan, remain in the reactor for three to five years. During this period the content of the Pu-240 can build up to as much as 30 percent. The following table indicates the various plutonium isotopes that build up in the spent fuel in commercial power plant reactors. The indicated Pu-240 concentration is typical for reactor-grade plutonium.

Pu-239	58%
Pu-240	24%
Pu-241	13%
Pu-242	5%

Because of a phenomenon called predetonation, this high Pu-240 content renders reactor-grade plutonium unsuitable for practical nuclear weapons use. However, this reactor-grade plutonium is perfectly satisfactory for enriching fresh fuel for conventional nuclear power plants and is particularly desirable for use in breeder reactors. The *Akatsuki Maru* was in fact returning the reactor-grade plutonium that had been separated from the spent fuel of Japan's nuclear power plants. The U.S. Committee of Energy Awareness estimates the Pu-240 content of the *Akatsuki Maru*'s cargo at between 21 and 22 percent. This policy of utilizing recovered plutonium from spent fuel is a spectacular example of recycling valuable resources. For example, one ton of reactor-grade plutonium should produce about the same amount of electricity as approximately 3,000,000 tons of coal or 12,000,000 barrels of oil. As noted in Mr. Livingstone's article, the critical issue is the control of weapons-grade fissionable materials. This is particularly true for highly enriched uranium. The 11 January 1993 issue of *Aviation Week and Space Technology* reports that the Russians have about 500 tons of weapons-grade uranium (and about 96 tons of weapons-grade plutonium) that will become available from dis-

mantling their nuclear weapons. This extremely sensitive material has been offered for sale to the West. Because uranium-type bombs are relatively easy to fabricate, this uranium must be acquired as quickly as possible, diluted to reactor-grade enrichment levels, and consumed as power-plant fuel. The prompt dilution and consumption of this Russian weapons-grade material is a far more critical issue than commercial reactor-grade material being returned to Japan by the *Akatsuki Maru*.

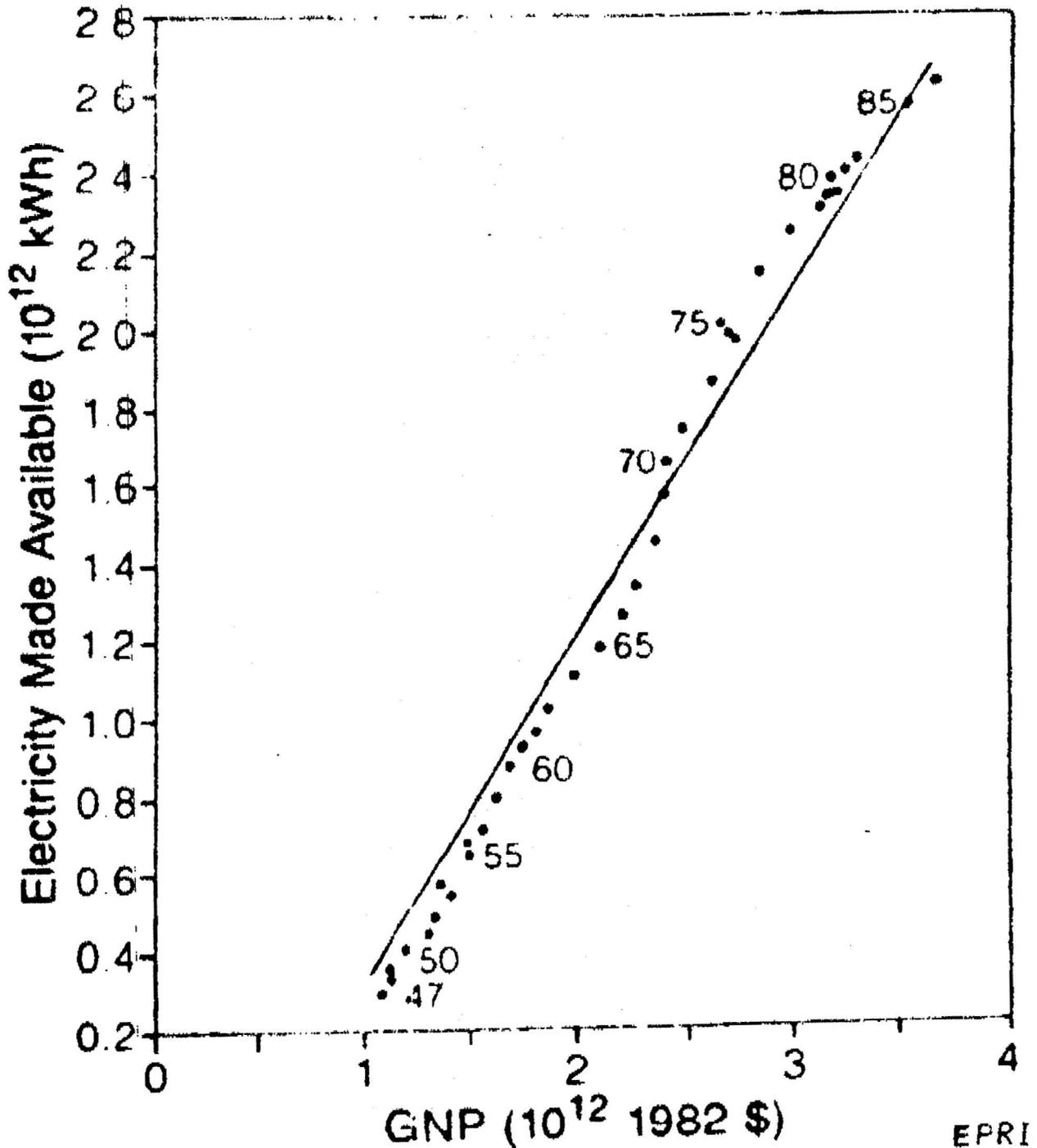
Alan S. Lloyd
Kailua, Hawaii

Mr. Livingstone replies:

I thank Mr. Lloyd for taking the time to write. Unfortunately, I relied on newspaper articles which were incorrect in referring to the Akatsuki Maru's cargo; however, I should have been alert enough to draw the distinction between weapons and non-weapons grade plutonium. I am in his debt for his clear and concise explanation of the difference between the two.
—Neil C. Livingstone.

Announcement

Britanis/Monterey Documentary: The production company Au Large de L'Eden is working on an hour-long documentary for French television on the American ocean liner *Britanis* which served during World War II as a troop and weapons carrier. The company would like to interview Navy officers or crewmembers who served aboard the *Monterey* (as it was called during the war) or its sister ships *Mariposa* and *Lurline*. Anyone with information on the ship, its crew, or an existing division association may write to: Au Large de L'Eden, c/o Tele-Europe, 50 rue Croix des Petits Champs, 75002 Paris, France, or call Stephanie Mingasson at 0-11-33-1-44-58-18-52, or fax 0-11-33-1-40-15-92-25.



EPRI

GNP and electricity use have been highly correlated for decades

TO: Rep. Heremina Morita, Chair
Rep. Denny Coffman, Vice-Chair
and Members
Energy and Environmental Protection Committee
Hawaii State House of Representatives

Re: HB1 Nuclear Energy

I urge your support of this bill. Examples of successful use of nuclear energy are abundant world wide. It is essential that Hawaii become energy independent, and this would be a fast, clean way to achieve that goal.

Thank you for your consideration.

Shirley Hasenyager
235 Kuuhoa Place
Kailua HI 96734-2734
262-5069
shirleyinhi@aol.com

January 27, 2009

Gwen F. Haban
76-6182 Alii Drive
Kailua-Kona, HI 96740
808.329.1912

Committee on Energy & Environmental Protection
Committee on Water, Land & Ocean Resources
Date: Thursday, January 29, 2009
Time: 10:00 a.m.
Place: Conference Room 325
HB1
5 copies (including an original)

I strongly oppose this bill.

The legislature should reconsider using nuclear energy as an alternative to fossil fuels. Nuclear energy is known to have safety problems and the issue with disposing of nuclear waste is monumental.

As an island state, we don't need to deal with those issues. The resources of solar, wind and ocean are endless. It would behoove the state legislature to consider using those natural resources rather than uranium to power up a nuclear generation facility within our state. Directing the department of business, economic development, and tourism to develop proposed legislation and rules to establish the permitting process for the construction and operation of a nuclear generation facility is a waste of the taxpayer's moneys.

Mahalo nui loa for your time. Please consider opposing this bill.

Aloha,

Gwen F. Haban

EEPtestimony

From: tom macdonald [tjmacdonald@earthlink.net]
Sent: Monday, January 26, 2009 2:33 PM
To: EEPtestimony
Subject: TESTIMONY IN FAVOR OF H.B. 1: RELATING TO NUCLEAR ENERGY
Attachments: Beauty shot_2.JPG

TESTIMONY OF TOM MACDONALD ON HB 1 RELATING TO NUCLEAR ENERGY

tjmacdonald@earthlink.net 234-0218 46-428 Holokaa St., Kaneohe 96744

I AM TESTIFYING IN FAVOR OF THIS BILL WHICH WOULD START THE PROCESS OF BRINGING SAFE, CLEAN, RENEWABLE NUCLEAR POWER TO HAWAII.

I AM NOT AN ENGINEER, BUT I HAVE HAD SOME CONNECTION WITH NUCLEAR POWER THRU MY BROTHER, WHO SPENT OVER 10 YEARS AS A REACTOR OPERATOR ON THE NUCLEAR SUBMARINE USS THOMAS A EDISON. HE WENT ON TO A CAREER IN CIVILIAN LIFE AS A REACTOR OPERATOR AT THE MAINE YANKEE NUCLEAR PLANT IN NEW ENGLAND, AS AN INSTRUCTOR IN TRAINING PROGRAMS FOR REACTOR OPERATORS, AND AS A REACTOR OPERATOR AT THE SAN ONOFRE NUCLEAR PLANT IN SAN DIEGO.

I WAS ABLE TO VISIT THE SAN DIEGO PLANT AND SEE FIRST HAND HOW SUCH PLANTS OPERATE AND THE INTENSE SECURITY THEY ARE SUBJECT TO. FOR SEVERAL YEARS I HAVE FOLLOWED THE DEVELOPMENT OF NUCLEAR POWER IN OTHER STATES AND IN FOREIGN COUNTRIES.

I WILL LEAVE TESTIMONY ON THE TECHNICAL ADVANTAGES OF NUCLEAR POWER FOR HAWAII TO THOSE MORE TECHNICALLY KNOWLEDGEABLE THAN I AM.

YOU WILL DEFINITELY RECEIVE INTENSE OPPOSITION TO THIS BILL FROM ENVIRONMENTAL ADVOCATES AND OTHERS. YOU SHOULD BE AWARE, HOWEVER, THAT IN A REAL BREAKTHROUGH STATEMENT, THE ENVIRONMENTAL DEFENSE FUND AND THE WORLD RESOURCES INSTITUTE NOW TALK FAVORABLY ABOUT NUCLEAR POWER AS ONE WAY OF SLOWING GLOBAL WARMING: NUCLEAR PLANTS EMIT ZERO CARBON DIOXIDE. THEY EMIT ONLY WATER VAPOR. AS A RESULT, VERMONT, ONE OF THE "GREENEST" STATES IN THE U.S., GENERATES OVER 70 % OF ITS ELECTRICITY IN NUCLEAR PLANTS.

ONE OF THE MAIN REASONS THAT HECO HAS GIVEN FOR NOT GOING NUCLEAR IS THAT THE FEDS WILL PERMIT ONLY PLANTS 600 MEGAWATTS OR BIGGER, WHICH WOULD CAUSE "BACKUP" PROBLEMS IF A PLANT OF THAT SIZE WERE TO FAIL, SINCE HAWAII CAN NOT CALL ON TEMPORARY EMERGENCY POWER BACKUP FROM ADJOINING STATES, AS MANY MAINLAND STATES CAN. BUT NOW THE U.S. NATIONAL LABORATORY AT LOS ALAMOS, NEW MEXICO, HAS LICENSED THE HYPERION COMPANY TO PRODUCE SELF-CONTAINED 25 MEGAWATT REACTOR PLANTS THAT CAN SUPPLY 10,000 HOUSEHOLDS FOR 7 TO 10 YEARS BEFORE REQUIRING REFUELING THEY EXPECT TO PRODUCE ELECTRICITY FOR 10 CENTS A KILOWATT HOUR. THE COST PER PLANT WILL BE \$25 MILION, OR ONLY \$250 PER HOUSEHOLD SERVED. THESE WOULD BE IDEAL FOR NEIGHBOR ISLAND OR RURAL OAHU USE.

AND A NEW ULTRA-SAFE 200 MW REACTOR, CALLED A PEBBLE BED REACTOR, DESIGNED AND SUPERVISED FROM THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY, IS ABOUT TO START A PILOT RUN IN SOUTH AFRICA. SO SIZE IS NO LONGER A VALID ARGUMENT AGAINST NUCLEAR POWER HERE.

YOU WILL ALSO HEAR THAT NUCLEAR POWER IS TOO EXPENSIVE. NUCLEAR PLANTS DO COST ABOUT TWICE AS MUCH TO BUILD AS COAL-POWERED PLANTS. BUT THEN THE SAVINGS ON FUEL AND OPERATION KICK IN. EXELON, A CHICAGO UTILITY COMPANY, CURRENTLY OPERATES 17 NUCLEAR REACTORS QUITE PROFITABLY. THE NUCLEAR ENERGY INSTITUTE REPORTS THAT IN 2007, THE NUCLEAR GENERATING COST WAS ONLY 1.76 CENTS PER KILOWATT-HOUR.

FINALLY, YOU WILL HEAR THAT NUCLEAR WASTE DISPOSAL IS A BIG PROBLEM. THAT PROBLEM CAN BE SOLVED BY A STROKE OF THE PRESIDENT'S PEN ON A BILL REPEALING JIMMY CARTER'S PROHIBITION ON RECYCLING SPENT NUCLEAR FUEL. FRANCE, WHICH PRODUCES OVER 80 % OF ITS ELECTRICITY IN NUCLEAR PLANTS, RECYCLES ITS FUEL AND STORES ALL ITS WASTE IN ONE ROOM IN LE HAVRE.

NOT ONLY DOES NUCLEAR POWER MAKE ECONOMIC SENSE FOR HAWAII , BUT OAHU HAS AN IDEAL LOCATION FOR A NUCLEAR PLANT: THE FORMER NAVAL AIR STATION AT BARBERS POINT:
****IT HAS ACCESS TO SEAWATER FOR REACTOR COOLING ****IT IS IN AN ALREADY INDUSTRIAL AREA, CLOSE TO EXISTING HECO TRANSMISSION FACILITIES ****IT IS DOWNWIND FROM MAJOR POPULATION CENTERS ****IT CONTAINS LARGE TRACTS OF UNUSED OR UNDERUSED LAND THAT IS UNDER GOVERNMENT CONTROL

I AM ATTACHING A PHOTO , PROVIDED BY THE NUCLEAR ENERGY INSTITUTE, OF WHAT A PLANT COULD LOOK LIKE AT BARBERS POINT. THE N.E.I. WEBSITE-WWW.NEI.ORG-IS A MAJOR SOURCE OF RELIABLE INFORMATION ON NUCLEAR POWER.

IN CONCLUSION, NUCLEAR POWER IS AN IDEAL, TRIED AND PROVEN, POWER SOURCE READY TO BE ADDED TO THE RENEWABLES SUITABLE FOR USE IN HAWAII.

EEPttestimony

From: Bob Arthurs [bobarthurs@earthlink.net]
Sent: Wednesday, January 28, 2009 1:53 PM
To: EEPtestimony
Subject: For Nuclear Power

"Green" countries have used nuclear power successfully for decades. It is time in Hawaii for common sense to become more common.

Please allow it to happen.

Respectfully submitted,
Robert Arthurs
PO Box 409
Kurtistown, HI 96760

Honorable Representative Hermina Morita
Energy & Environment Protection Committee Chair

Honorable Representative Ken Ito
Water Land & Ocean Resources Committee Chair

**RE: HB 1 – relating to Nuclear Energy permitting process by DBEDT
IN SUPPORT**

Honorable Chairs Morita & Ito and members of the Committees:

I am Daisy Murai, a resident of Kapahulu and have previously testified to the State's Public Utilities Commission regarding a Hawaiian Electric Company's (HECO) project a few years ago. There were 2 island-wide blackout incidents (October 6, 2006 Earthquake & December 26, 2008 Lightening) in which most of Oahu residents & business were without electrical power and both were due to acts of nature. The HECO sub-station power generators shut down automatically to prevent further damages to the generators and it took hours and even to the following day to restore power to all it's Oahu customers.

HECO keeps mentioning that they are looking into alternative energy sources such as wind, solar, geo-thermo, nuclear and other sources of energy besides its dependency of fossil fuels used to generate electrical power, but very little changes have been done to use alternative energy sources. Some Oahu residents are driving hybrid cars, which does not solely depend of gasoline for fuel, others are using solar panels to heat their water and convert to electricity or even use generators as their power sources.

I understand, if and when the City's Rail Transit is in operation, the Transit tracks and trams will be powered by electrical power from HECO. If this happens, how will HECO be able to power the entire island of Oahu just by continuing to rely entire on fossil fuel technology. This should be the time to start thinking of using Nuclear Energy as another power source. If the Medical profession is already working with a form of nuclear power such as Ultrasound, MRI and others on its patients, the doses used must be safe. It makes sense to start with nuclear power technology, much research, testing and improvements must have been done since the 3 Mile Island project. I request that the power plant should not be constructed on important Agricultural or Conservation lands, nor in highly densely populated areas.

Thank you for the opportunity to speak in FAVOR of HB 1.

Daisy Murai
3039 Kaunaoa Street
Honolulu, HI 96815
Dated: January 28, 2009

FAX: 586-~~9068~~ 9608
Date: January 29, 2009 (Thursday)
Time: 10:00 am
Place: Conference Room 325