

HAWAII'S GEOTHERMAL ENERGY EFFORTS (Senate - June 26, 1990)

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Mr. INOUE. Mr. President, I rise today to speak on the State of Hawaii's geothermal energy development efforts. Over the past several months, we have been accused of demolishing Hawaii's rain forests, and of demolishing its picturesque skies and pristine environment. The State of Hawaii is not in the demolition business. Rather, we are in the business of creating and building a system of environmentally acceptable and economically feasible energy alternatives to decrease our dependency on fossil fuel as we guide Hawaii into the 21st century. The State of Hawaii should be commended, not condemned for its goal of energy self-sufficiency.

Mr. President, I want to set the record straight. I want my colleagues to know that Hawaii is at the forefront of forest preservation; one-fourth of all our land is forest and park reserves, and we are actively protecting our pristine rain forests. Second, Hawaii is sensitive to the religious practices of native Hawaiians. Third, Hawaii is striving to develop all forms of alternative energy sources to achieve energy self-sufficiency and reduce our dependency on imported oil. And fourth, Hawaii is aggressively working to reduce all forms of pollution.

The Rain Forest Action Network charges that geothermal development will destroy the Wao Kele O Puna Rain Forest. This claim is totally without merit. The proposed geothermal facility would require the clearing of about 300 acres of nonpristine forest. This is one-half of 1 percent of the 60,000 contiguous acres of the Puna Forest, and eight one-hundredths of 1 percent of the total 375,000 acres of rain forest on the island of Hawaii. No pristine rain forest will be destroyed by geothermal development. In fact, some of the Ormat Energy Systems Inc. sites are on barren lava flats, removed from any type of forest.

We in Hawaii are blessed with nine rain forests. As defined by the Hawaii State Forestry Service, a rain forest is an area which receives 100 inches or more of rain per year, and a canopy consisting of 50 percent or more of native vegetation. Using this definition, the island of Kauai has 95,000 acres of rain forest, Oahu has 56,000 acres, Maui has 66,000 acres, Molokai has 19,000 acres, and the island of Hawaii has 375,000 acres. Mr. President, this is a total of 611,000 acres of rain forest in the State of Hawaii. The clearing of 300 acres of a nonpristine portion of the Puna Forest for geothermal development amounts to five one-hundredths of 1 percent of Hawaii's rain forests.

Mr. President, we would not recklessly destroy our lush tropical havens and clear blue skies that visitors from around the world come to experience and enjoy. Because of this sensitivity, the Hawaii State Legislature created geothermal resource subzones to ensure that geothermal development would not intrude on nature's precious creations. Further, it exchanged 27,000 acres of nonpristine forest, much of which has been destroyed by recent lava flows, for 25,000 acres of privately owned pristine forests. Once title was secured, the State immediately placed the 25,000 acres of pristine forest under the protection of its forest reserve. This is a net gain of pristine forest to our reserves. Within last year alone, the State of Hawaii placed an additional 14,000 acres of wooded lands on the island of Hawaii into its forest reserves. Furthermore, it is now in the process of placing another 12,500 acres into the reserves.

The State of Hawaii is at the forefront of forest and park preservation. Of the total 4 million square acres of land, there are over 270,000 acres of national parks and wildlife refuges, and 900,000 acres of State parks and forest reserves. Another 46,000 acres of pristine land are protected under the private management of the nature conservancy. Mr. President, this amounts to 1.26 million acres. Therefore, 30 percent of Hawaii's total acreage is

preserved and protected. How many other States can make this claim?

Our State motto, given to the Hawaiian Kingdom by King Kamehameha III in 1843, conveys most eloquently the importance we place upon the preservation of our land. `Ua mau ke ea o ka aina i ka pono,' which translated means, `The life of the land is perpetuated in righteousness.'

There has been much misrepresentation by a well-meaning, but misled, environmental movement. To suggest that the State of Hawaii is a villain for recklessly demolishing its rain forests, is insulting and unfair.

Mr. President, the State's geothermal energy initiative has also been called sacrilegious and insensitive to native Hawaiian religious practices. The basis of these practices is founded in Hawaiian legends that speak of the goddess Pele who is said to reside in the Kilauea volcano. Pele is thought of as `mother nature' with the power to create as well as destroy. Pele practitioners claim that the construction of geothermal energy plants will desecrate the body of Pele by digging into the ground and robbing her of her body heat.

When this concern was first raised, the State thoroughly studied the matter, consulting numerous experts. Geologists were consulted. They concluded that the tapping of the volcanic heat source would not diminish the eruptive nature of the Kilauea volcano.

They also consulted Hawaiian studies and religious experts. Respected Kupuna, or Hawaiian elder, Rev. Leon Sterling stated:

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Pele practitioners do not speak for all Native Hawaiians. They characterize Kilauea's eruption as Pele's anger. But how do they know this? The eruption and lava flow may be her way of creating and helping Hawaii to grow. Let us graciously accept her power as a precious gift.

Mr. President, notwithstanding the favorable recommendations and conclusions, the State of Hawaii, sensitive to the concerns of the Pele practitioners, voluntarily moved the proposed geothermal development an additional 5 to 10 miles away from the Halema'uma'u crater where tradition suggests that Pele resides. This small group of native Hawaiians was not satisfied with the State's accommodations, and sued on the grounds that the geothermal initiative violated their first amendment right to the free exercise of religion. The Hawaii Supreme Court ruled that the State's geothermal development plans did not infringe upon the Pele practitioners' freedom to exercise their religion. It was undisputed that they had never actually used the premises for religious practices, and presented no objective evidence of harm to the practice of their religion. I concur with the wisdom of Hawaii's high court.

Mr. President, I am not a stranger to the issue of protecting and preserving native Hawaiian religious practices. As chairman of the Select Committee on Indian Affairs, I introduced S. 1979, Amendments to the Native American Religious Freedom Act to restore to Native Americans, including native Hawaiians, the full scope of rights and remedies available under the free exercise clause of the first amendment of the U.S. Constitution, and to clarify, as a matter of Federal law and policy, the fundamental rights of Native Americans to practice their unique religions.

I am committed to serving our Nation's native American peoples. I have great respect for their religion, culture and values. With regard to the Pele practitioners, I believe that Mr. Abraham Piiania, former director of Hawaiian studies at the University of Hawaii, and respected historian, put it most eloquently when he stated:

Pele practitioners want to return Hawaii to the days of long ago. However, those days are gone. We, as Hawaiians, have undying respect for the great power of Pele. If Pele believes that sharing her volcanic heat to provide an energy source is not in the best interest of Hawaii's people, she has the power to destroy whatever is built. If she does not destroy it, we should accept it with her blessing.

Mr. President, I state the obvious when I say that Hawaii is an island State. As such, we are dependent on 130,000 barrels of oil per day. The energy crises of the 1970's made Hawaii acutely aware of the importance of developing renewable energy sources, and of the dangers of relying on fossil fuel. We vowed to pursue every means possible to reduce Hawaii's dependence on fossil fuel. And that we did.

Today, Hawaii is a leader in developing and utilizing alternative energy sources. We are serious about harnessing the energy of the wind, Sun, sea, and Earth--abundant resources in Hawaii. In 1989, Hawaii's use of alternative energy sources saved approximately 3.5 million barrels of oil which would have produced about 1.6 million tons of carbon dioxide.

In recent nationwide study by the Public Citizen, a national consumer advocacy group, Hawaii ranked second for its production of energy from wind farms, and is among the top five States in its use of biomass energy generated from agricultural waste, which in our case is sugarcane. We have the highest per capita use of residential solar and heat-pump water heaters. We also reduced our consumer demand for energy by 21 percent over the past two decades.

Hawaii generates 13 percent of its electricity needs from alternative energy sources, and is looking to substantially increase that percentage. However, when we sought to increase it through the development of geothermal energy, we were condemned. We were condemned by the same environmentally conscious groups that urged Hawaii to reduce its dependency on fossil fuel. We were condemned by the same environmentally conscious groups that urged Hawaii to develop clean, renewable sources of energy.

Geothermal energy is a clean, safe and reliable form of renewable energy. It heats homes and fuels businesses in California, Nevada, as well as Italy, New Zealand, Japan, and the Philippines. After decades of research and experimentation, geothermal energy was determined to be the most technically and economically feasible source of alternative

energy to pursue in Hawaii on a large scale basis.

Ocean Thermal Energy Conversion [OTEC], while a promising technology, is not yet ready for commercial application. It is estimated that another decade of experimentation and approximately \$400 million is needed to harness the power of the sea. In fact, it would cost three times the amount to generate OTEC energy as it would geothermal energy. The same is true for solar energy.

The primary drawback of solar and wind energy is mother nature itself. Wind plants on rural Oahu operate at approximately 5 percent of capable outputs because of inconsistent wind availability. A similar situation exists with solar energy. Many Hawaii residents have solar water heaters, but must rely on fossil fuel to supplement their energy needs in the evening. Until scientists are able to make sunshine 24 hours a day, and get the wind to turn the turbine round the clock, we know that there is much to be done before we can harness the power of the Sun and the wind as reliable and sufficient sources of alternative energy.

I hope to see the day when Hawaii is able to harness mother nature's valuable resources in the ocean, Sun, and wind. Until then, we must utilize and develop what we have--an energy source from the Earth which is ready to be harnessed to light up the island of Hawaii.

The first commercial geothermal plant on the island of Hawaii, a 25,000-kilowatt plant in Puna, will reduce our dependence by 480,000 barrels of oil a year. Over its 30-year lifespan, it will cut oil import costs by more than \$200 million or 14 million barrels. It will keep 10 billion pounds of carbon dioxide and 60 million pounds of sulfur dioxide out of our environment, that would otherwise be produced by burning oil. This is twice the carbon dioxide reduction targets set at a recent global warming conference in Washington, DC. The generation of geothermal energy is a clean, renewable source of energy which helps to reduce the effects of global warming.

Our Nation's strategic petroleum reserve is located in Louisiana. Other states have very easy access to this reserve in the State of Hawaii. However, we cannot simply deploy a fleet of trucks to bring oil to Hawaii; we must ship it. Disastrous oil spills, the *Exxon Valdez* in Alaska and the *Mega Borg* off the coast of Texas, have further fueled our commitment to develop alternative energy sources. The *Exxon Valdez* spewed 240,000 barrels of oil onto Alaska's coastline. That was less than a 2-day supply of Hawaii's energy needs. I shudder at the thought of an *Exxon Valdez* or a *Mega Borg* disaster in Hawaii. I cannot begin to imagine the devastating effect of an oil spill on Waikiki beach or the NaPali coastline on the island of Kauai. The renowned black sands beach on the island of Hawaii would truly be black, not from sand made of finely washed particles of lava, but of the ooze of black oil. Such a spill would destroy tourism, Hawaii's number one industry, with one blow. We are constantly under this threat.

Opponents of geothermal development contend that there will be harmful chemical emissions from geothermal plants. A 25,000-kilowatt project, which will provide electrical service to approximately 18,500 houses, will emit 40 pounds

of hydrogen sulfide and 75 pounds of sulfur dioxide per day. At first blush, one may say, 'that is horrible, much too much to be beneficial to our environment.' However, within 5

miles of this plant is the Kilauea volcano which emits 72 tons of hydrogen sulfide, not 40 tons, and 1,850 tons of sulfur dioxide per day, not 75 pounds. This is 3,600 times the amount of hydrogen sulfide and almost 50,000 times the amount of sulfur dioxide. The Kilauea volcano, like the geysers at Yellowstone, is a phenomenon of nature. The Pu'u o'o vent of Kilauea has been erupting continuously since 1986. Depending on the direction of the trade winds, Hawaii residents experience haze, ash and the smell of sulfur, which is not pleasant. There is not much that can be done about it. This is nature.

If environmentalists are serious about reducing sulfur dioxide and hydrogen sulfide emission, they should embark to contain these emissions from the Kilauea volcano. I would not recommend this, but if someone really wanted to do this, it would require the pouring of nearly 5 billion cubic yards of concrete at a cost of nearly \$330 billion to cap the volcano. Mr. President, I say this to demonstrate the absurdity of the environmentalists' contention that geothermal energy causes pollution.

No scientist would suggest that the geothermal project will contribute, in any appreciable way, to pollution. Nonetheless, the State of Hawaii will demand that the geothermal powerplants meet the strictest air emissions and ground pollution standards. Only the most innovative and environmentally safe technology will be used. Virtually all gaseous and liquid byproducts will be returned to the ground.

In the wise words of President Theodore Roosevelt:

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To waste our natural resource * * * instead of using it so as to increase its usefulness, will result in undermining in the days of our children, the very prosperity which we ought by right to hand down * * *.

I am convinced that the development of geothermal energy is the best means of meeting Hawaii's energy demands. It is a clean, safe, and renewable source of alternative energy which, I believe, will preserve our crisp, clean skies, and beautiful landscapes filled with flowers of every color of the rainbow, as well as the clear, blue Pacific Ocean that surrounds us. This is what I would like to hand down to Hawaii's children.

For this reason, I find the recent attacks on the State of Hawaii's geothermal energy initiative most troubling. At the urging of environmentalists, Hawaii strived to develop alternative energy sources to reduce its dependence of imported oil. We found it in geothermal energy--the most technically and economically feasible, and environmentally safe energy source Hawaii has at its disposal.

Mr. President, I came to the Senate floor to set the record straight. I hope I have succeeded.

I yield the floor.

The PRESIDING OFFICER. Under the previous order, the Senator from Ohio is recognized for up to 30 minutes.

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