

STEAMY APPROACH

"We have formulated the vision and ambition to get rid of fossil fuel completely in a reasonably short time." – President Olafur Grimsson of Iceland, the world's first country using 100% renewable energy

Geothermal can play a key role in Hawaii's transition to renewable energy. Our current state policy is that geothermal energy will be exclusively for use on the Big Island, which has the highest proportion of renewable energy sources in the Hawaii. Puna Geothermal is contracted for up to 30 MW (megawatts) of energy, meeting close to 20% of the annual electricity needs of the Big Island. Its output, however, is curtailed to deliver about 22 MW in off-peak hours.

Puna Geothermal has received permits to expand its output to 60 MW, double its current contribution, and is negotiating with HELCO to provide another 8 MW. As a locally available, natural source of energy, geothermal is cheaper than imported oil, which is priced on the world market. If Puna Geothermal were to turn out its full permitted amount of 60 MW, it could provide two-thirds of the power the Big Island needs at night, and 30% of the power needed by day. Expanding geothermal would allow the Big Island to reduce its dependence on imported fossil fuels and reduce greenhouse gas emissions, thereby increasing its energy security. The Big Island also uses hydropower (3%) and wind power (9%). If Hawaii County were to use modern technology to produce biodiesel from the biowaste it now sends to landfills, this could provide a locally available, lower cost source of electricity feedstock, which can further reduce the amount of oil it imports.

I'm looking to introduce legislation to increase the usage of geothermal power on the Big Island. As a framework for understanding the numbers involved, one megawatt equals 1000 kilowatts and is enough to provide electricity for about 1000 homes. HECO reports that Oahu's total need is 1200 MW. Let's look at what's being done elsewhere.

When Iceland's cars, public transportation, and fishing boats become fully operational on hydrogen, as they will soon, it will become the world's first completely energy-independent country in the world, using 100% renewable energy sources. Geothermal sources supply 89% of heat for buildings. Geothermal supplies 26% of the country's electricity, with hydroelectric power supplying the remaining 74%. By phasing out fossil fuel and turning to renewable energy, Iceland will become a zero carbon economy, and become a model for tackling the problem of global warming.

In the 1960s, coal and oil powered Iceland. President Olafur Grimsson says Iceland's transition from 100% fossil fuel to 100% renewable energy within 40

years, is "proof that it is possible within the lifetime of one generation to transform the energy systems of our countries because I don't accept that we are so special that only we can do it." Five major geothermal power plants produce 630 MW, providing 26% of the country's energy. Two of those plants produce both electricity and hot water for heating purposes, while the other three produce only electricity.

President Grimsson, who has been president of Iceland since 1996, and was unopposed and re-elected to his fourth term as president this year, said:

Energy is the most fundamental question of the 21st Century, with all due respect to all the other problems. There is no challenge as fundamental as energy. How we meet that demand will have as we all know have a great impact on the climate and so on. So that is why we need to marshal every source of energy. We tend to forget that we are blessed with two fundamental long lasting sources of energy - one is the fire inside the earth. We sit on it, we sleep on it, we walk on it, but we need to harness it. Geothermal: we learn about it in school and then we tend to forget about it. And the other is the sun above our head. These energy sources will last long after the oil has been exhausted. If we combine that with wind and wave power and other resources like bioenergy we will have the possibility of meeting the energy demands required to sustain a growing economy for every country in the world, not only in this century but the centuries to come.

Geothermal provides nearly 1/3 of the energy in the Philippines, which is the second largest producer of geothermal energy in the world, with an output of over 1,900 MW. The U.S., the world's largest producer of geothermal energy, in comparison, turns out 2,936 MW. That's amazing when you consider that the Philippines has less than one-third the population of the U.S. To get an idea of what this translates out to, one-fifth of the light bulbs in the Philippines are powered by geothermal energy.

California is the big leader in geothermal in the U.S. Though Nevada has more plants (45), California's 21 plants are the largest sources of geothermal energy in the country. Southern California Edison, the nation's leader in renewable energy, uses 906 MW of geothermal power in its portfolio mix.

New projects have long been permitted in Alaska, Arizona, California, Idaho, New Mexico, Nevada, Oregon, Texas, Utah, Washington and Wyoming, according to the Geothermal Energy Association, which could provide up to 3,368 MW of new electric power, bringing the U.S. geothermal total up to nearly 6,304 MW. The Geothermal Research Council reports that tens of thousands of acres of federal have been leased for geothermal exploration and/or drilling, with 80% in Nevada. Each year, 60 drill permits are issued for geothermal projects in

Nevada. It takes 8-13 months to get a geothermal drill permit approved, but by comparison, only 30 days to get an oil well drill approved.

Even Google is in on it. Dan Reicher, Google's Director of Climate Change, said his company invested \$10 million as part of a plan to develop "enhanced geothermal systems" technology to generate energy, calling geothermal is "the sleeping giant of renewable energy."