Small Modular Reactors: Creating Energy Independence for Hawaii

By Senator Fred Hemmings

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It has been said that "throughout human history, those that have had the wisdom and fortitude to innovate have been the agents of change and have spawned a better world for all humanity".[1][1] In America, our freedom is the fuel of innovation.

Opportunity abounds in Hawaii. We need to be honest with ourselves in considering the reality of energy in our state. The following is well documented. The cost of electricity in the state of Hawaii is our nation's highest.[2][2] At the height of the fuel crisis in 2008, when it was politically correct to bash the oil companies, gasoline in Hawaii cost 35 percent above the national average. [3][3] At the same time, electric prices were 180 percent more than the national average. [4][4] Another sad fact is that Hawaii is one of the states with the highest potential for wind, solar, and other renewable energies, yet it is one of the most dependent on fossil fuels, coal and oil. Instead of moving forward in energy independence, in the last 20 years Hawaii has regressed. We can change this, and we must change it!

Hawaii now has the goal of being 70 percent energy independent by 2030. I say that by 2030 we could be close to 100 percent energy independent from oil and coal for electricity and ground transportation. Does this sound bold? There is an innovative solution to our energy woes which needs to be seriously considered for Hawaii. This option is nuclear energy, and most specifically small modular reactors. For too long, fear and falsehoods have kept the genie of nuclear energy in the bottle.

Let me make it perfectly clear that the Hawaii State Constitution does not, as some would believe, ban nuclear energy from Hawaii. Our Constitution says that 2/3 majority of the House and Senate must approve the use of nuclear energy in our state. What makes this codicil ludicrous is that Hawaii already has the largest concentration of nuclear reactors of any location in the world.[5][5] Currently, sixteen nuclear submarines are based in Pearl Harbor and, at any

given time, there could be up to a half dozen or more nuclear reactors sitting in the harbor. [6][6]

What does the United States military know that we in Hawaii ignore? The answer is that nuclear energy is clean, reliable, and abundant and has the best safety record of any energy source. More people have died in one coal mine or oil related accident than have died in the history of nuclear energy. The financial costs are staggering. The pollution and degradation of our environment caused by coal and oil is incalculable. If carbon emissions are the world's most pressing environmental problem, then nuclear energy is the solution. Breaking technology is now offering a safe and affordable alternative to large nuclear reactors, called Small Modular Reactors, or SMRs. Even enlightened environmentalists have changed their minds about energy and now support nuclear. Greenpeace activist Patrick Moore, Gaia theorist James Lovelock, Greenpeace UK Executive Director Stephen Tindale, Friends of the Earth board member Bishop Hugh Montefiore and environmental icon Stewart Brand have all switched sides in the nuclear energy debate, notes reporter Steve Christ in a recent issue of *Wealth Daily*.[7][7]

Let me give you reasons why small modular reactors would work for Hawaii. Small modular reactors produce from 25 to 250 mw of energy. SMRs are safe for a number of reasons. Some SMRs use a helium-cooled high-temperature system with direct-cycle gas turbines which prevents meltdown[8][8], others are traditional designs. They can be sequestered underground, thus increasing safety and security. Small modular reactors also provide redundancy—if one goes offline for repair or maintenance, the others can keep energy flowing. Another reason that SMRs make sense is cost. I am a huge proponent of wind, solar and geothermal, but, since wind and solar do not provide firm capacity, other firm energy resources must be used. Wind and solar can also be land intensive. For instance, one small SMR producing 250mw of electricity will incorporate about five acres of land. To produce the same amount of energy will take about 578 acres of land for 12 wind turbines as illustrated by the new Kahuku wind farm. [9][9]

It may not be news to you that I oppose the proposed undersea cable which is a boondoggle we cannot afford. It would contribute to the monopoly grid and could create system wide blackouts. Projected cost is over a billion dollars and does not include the wind farms. Unfortunately there are some politicians that don't understand that all business costs are ultimately paid by the consumers. The genius of small modular reactors, solar panels on roofs and wind generation is that they do not have to be centralized. In the case of energy, big is not necessarily better. Energy independence for individual houses with solar panels, communities with wind mills and select small modular reactor energy plants will

be much more cost effective and efficient in the distribution of electricity and provide for security.

Speaking of security, it is unfathomable that America is buying fossil fuel from nation states that wish our country ill. You can be sure that some of the money we are spending in the Middle East for oil ends up in the hands of Islamic extremists who have declared and are waging the war of terror. Energy independence also means geopolitical security for our state, and our nation.

Curiously, there is a rapidly developing interest in SMRs on a national level. I have been to Washington twice to give speeches on expediting Small Modular Reactor Legislation, one sponsored by the Nuclear Energy Institute in February, and most recently the Nuclear Energy Symposium in Alexandria Virginia. I also gave a similar talk to a Conference on Military Energy Independence in San Diego, California last March.

America needs to revamp the licensing of nuclear energy plants which I have outlined in suggested legislation. I have met with several congressmen who are considering the legislation to expedite licensing of SMRs. The problem in achieving this goal is a government bureaucracy called the Nuclear Regulatory Agency. Incredibly, a new nuclear energy plant is just now going online in the United States after 30 years. It takes over ten years to get a permit from the NRC, and may cost many millions of dollars. Recently a "Nuclear Caucus" has been formed in Congress.

Additionally, operating under archaic laws passed during the Jimmy Carter Administration, America is not recycling spent nuclear fuel. I'm not just speculating that recycling works. It does work. Look at France, where 80 percent of their energy comes from 59 nuclear plants and 90 percent of the waste is recycled. I'm here to tell you that with new technology and economies of scale, nuclear waste will not be a problem if we follow the example established by other countries such as France. I am holding in my hand legislation which was recently passed by the Commonwealth of the Northern Mariana Islands (CNMI). Let me read a portion of the findings cause. This was signed into law by their governor Benigno R. Fitial. CNMI has gone from an island nation that formerly banned nuclear energy to a nation and is now fast tracking its development through small modular reactors. America should lead the world in energy innovation and technology, and we can! The list of well respected companies developing SMRs includes Babcock and Wilcox, Bechtel, GE-Hitachi, Westinghouse, Toshiba, and a host of new companies such as Bill Gates' TerraPower and Hyperion.

Small modular reactors are extremely cost effective. The average cost of wind is

four to eighteen cents per kilowatt hour and solar is fourteen to thirty cents per kW hour.[10][10] These are both considered intermittent sources of power. Nuclear energy, which is a baseload source, can range from six to thirteen cents per kW hour.[11][11] Incredibly in Hawaii we are now paying about 27 cents per kW hour for electricity.[12][12]

Everyone is talking about the electric car company TESLA whose stock soared when they went public. America can once again gain world leadership in ground transportation rather than yielding to companies such as Toyota and Honda. How? Through the use of wind, sun and small modular reactors we can have enough electricity and firm capacity to energize our cars and have an entire electric fleet by 2030. Recently HECO has also agreed to generate more electricity at a reduced rate to energize electric cars. The punch line is that we don't currently have enough clean electricity in Hawaii and increased production will come from expensive fossil fuels. This doesn't make sense does it?

How about water? One small modular reactor electrical plant could provide enough energy to make an entire island, such as Kahoolawe, a virtual paradise. There would be enough excess energy produced to run a desalination plant. Water could be pumped up to a reservoir which could then irrigate the entire island or store energy. The production of abundant, clean water could be a reality statewide and contribute significantly to agriculture and food sustainability.

I freely admit that what I am proposing today may scare people and create a backlash, but we must make decisions based on fact, and not emotions based on falsehoods and outdated information. Look at the number of great initiatives that have been thwarted because of ill informed vocal opposition. The Big Island could have been energized with geothermal 25 years ago. In the eighties, I advocated to Governor Waihee what could have been a multibillion dollar industry for Hawaii. A space launch site on the southeast flank of the Big Island, which is the best place in the world for polar and equatorial launches, could have been a reality. The proposal never got off the ground, excuse the pun, because of a handful of opponents. Just recently, look what happened to the Super Ferry.

I am one state senator that sees great opportunity for our state to achieve sustainability in all its forms…food, energy, and security. We cannot stagnate. We must revolutionize energy generation in Hawaii.
Please remember the greatest strides in human history have been made by those who have not sustained the status quo, rather by those who have changed it. We can't wait for an energy evolution, we need an energy revolution. SMRs ARE revolutionary technology which could create energy independence for our

Recent response to email about nuclear reactors offshore.

I advocate SMR energy ships that could generate 250 MR
1. Military coastal bases (Pearl Harbor/Hickam) energy
2 . At low demand times Excess capacity at no additional
Costs could be used to desalinate water and
Energize electric vehicles.
3 this would make for independence, sustainability at
less costs in Hawaii than buying from HECO
Emery ships would be as safe or safer than nuclear
Submarines which have a perfect safety record. In addition that energy
Ships could be quickly out of port and at sea
Pending a natural or other disaster
Hopefully I can get invited to the Asian Pacific energy conference
To advocate SMRs in changing energy world