The Freiburg Factor

By Senator Will Espero

Clean energy gives more than just an environmental benefit. The police cars of Hoover, Alabama run on biodiesel made from wood waste that ordinarily would have gone into the city landfills, helping the city save on gas bills and landfill costs. Because the wood-based fuel burns cleaner, the cars run longer between oil changes, so the city next saves on car maintenance expenses. Hoover bought two pieces of cooking oil-to-biodiesel equipment to divert more waste away from the landfill and give a second life to used cooking oil. The city collects the oil from its 75,000 residents and processes the oil to become fuel for its heavy equipment and trucks. When all the savings in equipment, operating, and maintenance are accounted for, Hoover's cost for making the biodiesel is 91 cents a gallon. That's the price gas was a decade ago, and it's not subject to price hikes as petroleum supplies dwindle.

Hoover's kind of forward thinking policy is something we could use here in Hawaii. Our counties often must deal with landfill and budget issues. Diverting biowaste and foodwaste away from our landfills would lengthen its lifespan. While the City and County of Honolulu mandates recycling of restaurant cooking oil, collecting it from residents as well to make fuel for city vehicles could be a useful budget helper and landfill extender. Lower operating expenses, longer landfill life, and cleaner air makes using clean energy a win-win solution.

Creating jobs and boosting the economy are other reasons why we should pursue clean energy. Germany's solar industry employs more than 60,000 people and contributes 10 billion euro (nearly $14 billion) per year. In the German city of Freiburg, almost 10,000 residents work for the 1,500 companies in the environmental and science sector, contributing close to $700 million to the economy. Denmark is a leader in wind turbine production while Germany leads in solar-powered cooling systems. France, England, Germany, and other European countries are beginning to tap their geothermal resources. Geothermal power plants have high initial costs but are said to be cheap and cost-efficient in the long run.

Let's look at Freiburg to see what's possible. There, solar panels are on everything from homes to the soccer stadium. Here's three projects built in Freiburg, designed by solar architect Rolf Disch.

(Image via Inhabitat – home of architect Rolf Disch) The Heliotrope near Freiburg, Germany, is a rotating solar tree-house that follows the movement of the sun.

The solar power plant on the roof of the Badenova Stadium. Winfried Rothermel (AP)

The Sonnenschiff (Solar Ship) community center is completely powered by renewable energy.
Winfried Rothermel (AP)

Disch's home, the Heliotrope, is c energy homes; it generates five times the energy it uses. It's not up the sun. The exterior hand rails serve double duty as solar therm and radiators in the house. Disch has designed many solar-powere ccomplishment that entire neighborhoods in Freiburg produce more electricity than they consume. His Schlierberg Sonnenschiff is a three-story townhouse and commercial complex that generate a collective 420,000 kWh each year. Each of its 59 homes produces more electricity than they use, creating a source of income for the settlement. The commercial portion contains a supermarket, pharmacy/convenience store, café, offices, studios, and clinical practices.

Disch's Munzingen Solar Garden is a 43-townhome complex that earned the German Architecture Prize and 1994 European Solar Prize. The beautifully landscaped Burke-Bleiche Senior Center includes 59 apartments and a caretaker's home for old age living. Ovolution is a pre-fabricated, modular building design that won the 1997 European Solar Prize. Besides homes, he also designed solar cars to demonstrate its potential, which he introduced in 1986.

Many renewable energy efforts started from the OPEC oil crisis of the '70s. Disch explained that the rise in energy costs led people to search out other solutions. When Freiburg proposed a nuclear alternative, Disch and others protested vigorously against it. The 1986 Chernobyl disaster led the municipal council to abandon its plans for using nuclear power. The city actively began integrating other forms of renewable energy. There are photovoltaic panels on City Hall, the Trade Centre, schools, churches, private houses, facades, apartment buildings, commercial centers, and towers. Wind turbines in the nearby Black Forest harness the power of the wind. Badenova Stadium is the first stadium in the world to have its own solar plant.

Even the oil-rich Middle East is capitalizing on solar. Several solar-gas turbine hybrid plants (ISCC – integrated solar combined cycle) are being built, using mature technologies with proven track records and more than 50% efficiency. Morocco, Algeria, Egypt, and Iran are sites of some of these ISCC facilities. Because the electricity is generated exactly like conventional fossil fuels, except that solar power is used to heat the boiler, the systems are said to be easily integrated into conventional fossil-fuel thermal plants at relatively low cost.

A few years ago I introduced a bill to have personal financial planning taught in schools so students would be able to create and live within a budget to achieve their goals. That same planning is needed for other issues we face. Some experts predict that the global supply of petroleum will start declining in about five years. Prices have risen from 90 cents a gallon in 2001 to over $4 a gallon now, just ten years later. We don't have to invent the wheel, and we don't need to guess whether our investment will be a good one. Other cities have already shown that switching to renewable saves money, saves landfill space, and saves our natural resources. We must continue moving in this direction if we are to have affordable, alternative energy in the future.