

The Mentzel Plan

Energy Independence
for Maui by 2020

"2020 - Maui no ka oil"

A \$3 billion project to give every Maui resident
low-cost electricity, \$1 gasoline and an electric car.

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Guidelines

To build a future of energy security, we must trust in the creative genius of American researchers and entrepreneurs and empower them to pioneer a new generation of clean energy technology. Our security, our prosperity, and our environment all require reducing our dependence on oil.

President Bush, State of the Union Address, Jan. 28, 2008

Today, Hawai'i is the most oil-dependent state in America...and this has to change! It means moving away from our current over-dependence on oil in favor of renewable energy...and that we do it more rapidly than some would like and others believe possible.

Governor Linda Lingle, State of the State Address, Jan 22, 2008

As you know, our precarious dependence on imported fossil fuel is beginning to affect our way of life. This forum ... will bring together business, government and community members as partners working toward a more secure and sustainable energy future for Maui County.

Mayor Charmaine Tavares' invitation Maui Energy Expo 11-7, 2007

All the planets are aligned for something significant to happen.
Mayor Charmaine Tavares on Feb.1, 2008

Welcome

The Mentzel Plan is a bold and visionary proposal to replace 100% of all fossil fuels on Maui with cheap, clean, renewable energies by the year 2020. That is a huge and worldwide unique goal and this plan explains how it can be done in a way that benefits everyone and creates many well paid jobs on Maui.

The people of Maui will benefit from reduced costs for gas and electricity, secure energy supplies and will receive electric cars.

The island of Maui will benefit from clean air, international recognition and from not sending 500 million dollars per year to oil producing countries like Saudi Arabia, China or Vietnam.

Government leaders of Maui and the State of Hawaii will benefit from being viewed as courageous world leaders and from expanded economies and budget gains.

Maui Electric Inc. will benefit from greatly expanding its business beyond the current customers to charging electric cars.

Businesses and workers on Maui will benefit from billions in new investments, clean energy construction projects and becoming a hub for clean technologies.

The tourist economy will benefit from an increased visibility and attractiveness of Maui, new tourists and reduced costs.

The Earth will benefit from the complete elimination of greenhouse gases on Maui and if it happens here, it can happen throughout the United States, China, and the entire world.

Will you join us?

The case for clean energy

Currently 85% of Maui's electricity and all it's gasoline is made from oil. The Mentzel Plan envisions replacing all this with electricity from sun, wind and waves. The cost advantages for generating and distributing 1 kWh of electricity are as follows:

	Oil	Sun
Fuel Costs:	15.5 cents	0 cents
Other Costs:	10 cents	8 cents
Total:	25.5 cents	8 cents

Clean energy costs less than a third of the current oil energy.

(These numbers are for the year 2006. Fuel costs have risen 10-20% every year. If we continue with business-as-usual, we can be sure that fuel costs will increase. Clean energy costs will be the same or go down with better technology.)

Maui spends \$653 million per year for energy, an extraordinary amount, far higher than the entire county budget. Local gas stations and Maui Electric earn part of this, but an estimated \$500 million leaves the island to the benefit of oil countries like Saudi Arabia, Venezuela, Vietnam and China.

(In 2005 Maui drivers used 62 million gallons of gasoline. In 2006 Maui Electric sold 1,277 million kWh. At 2008 prices we can expect to pay \$653 million for electricity and gas combined.)

By switching to electric cars powered by batteries or hydrogen fuel cells, driving will become so cheap that gasoline would need to be sold at \$1 per gallon to remain competitive. This is why the Mentzel Plan speaks of \$1 gas.

(Maui's drivers spend \$257 million for the gasoline to drive 1.4 billion miles. With electric cars these miles could be driven at 5 miles per kWh for a total of 280 million kWh. At 22 cents per kWh this is equivalent to a gas price of \$1. Actually as seen above, a kWh will be generated at 8 cents only, leaving room for investments and profit for the gas/charging stations.)

Maui has huge amounts of natural energies. Rough estimates tell us that the environment provides 15,000 times the energy available that we use today. By switching to clean energies we can take advantage of that abundance.

Within a few generations, as fossil fuels and uranium are used up, the whole world will create a low-cost solar energy economy. Maui can start saving today.

With clean energies there is no scarcity.

Why this is important

It has become urgent to think about our energy supply, mostly because we have neglected to do so since the 1980's cheap oil.

Four emergencies have developed:

1. Energy costs are suffocating Maui's residents with \$4 gas and \$150 electricity bills. Maui's prices are at the top of the nation. We send more than \$500 million off-island for oil energy. That is \$5,000 per adult per year. At the same time, sun, wind and waves shower us with the best free clean energy on the planet.
2. Global Warming is real and much faster than predicted. It will eat our beaches and low lying areas within decades. While our actions are small, being a highly visible example has the potential to inspire others to turn global warming around.
3. Around 200 young Maui heroes are fighting in Iraq and Afghanistan. We buy oil from Saudi Arabia and some of that money goes to fund terrorists. Russia's new oil wealth enables it to build intercontinental missiles. America would be safer without oil imports.
4. U.S. oil production reached its peak in 1971 and the world production will be peaking soon, reducing supply and increasing prices yearly.

These problems have been visible for decades. The people need to show widespread interest and support for a change in energy policy to effect a solution. And NOW is the time.

Maui can lead the world

With abundant natural energies, a small island topography that includes almost all of the world's climate zones and an outdated oil-based electricity system that has become the nation's most expensive, Maui is the ideal place in the world for developing and showcasing the clean energy future. By presenting our solutions to almost 2.3 million affluent visitors, we can inspire and change people all over the world.

By declaring it a county and state policy to make Maui oil-free by 2020, government can set the stage for a surge of innovation at the private and public level. Maui can be the center of the world for clean energy technologies, attracting visitors from all over the planet to study our model economy and bring technologies and investments with them.

By implementing the simple fee structure outlined below, Maui can provide \$3 billion in funding that will pay for the new infrastructure and provide an electric car for every resident.

No place on earth has a policy to become oil-free by 2020. Iceland with its leading hydrogen economy plans to be off oil in 2050. Sweden with its unique zeal for independence has a plan for 2020 to reduce oil use by 70%. In the U.S. the states of Hawaii and California are leading with their planned emission reductions.

Let's go 100%! Maui can be the first oil-free economy in the world and benefit from the enormous publicity and worldwide attention that comes with it. We need to act now, before someone else has the same idea.

The Mentzel Plan

The Mentzel Plan has three elements:

1. Policies

County and state governments adopt the plan with broad support by the population. Certain policy changes are needed.

2. Financing

A fee structure is set in place that will provide a 3 billion dollar fund for the infrastructure investments. This will allow Maui to own its generation facilities and electric cars free and clear.

3. Implementation

Solar, wind and wave power projects are developed in a public-private partnership. Electric cars and electric kits are provided to residents.

This plan contains numbers for the island of Maui, not Maui county. It would not be a problem to extend it to the county. The plan is concerned with on-island uses of oil and does not yet consider fuel for airplanes and shipping. However, there will be research done regarding airplane fuel supplies. Airplane emissions can be offset by local reforestation projects. The website CleanEnergyMaui.com contain citations for all facts.

Mentzel Plan Policies

1. Declare it a county and state policy to make Maui fossil fuel free by 2020 funded by \$3 billion in fees suggested by this plan.
2. Create a county department for the implementation of the Mentzel Plan.
3. Reduce administrative hurdles by allowing low impact energy projects on agricultural land.
4. Hire additional planners at the Planning Department to expedite energy project permits.
5. Set aside county and state owned lands for energy projects, as well as reforestation with native plants and food forests.
6. Increase subsidies and simplify permitting for distributed generation, solar hot water, photovoltaic and wind systems.
7. Develop policies for load control programs that allow the utility to turn off less important appliances in peak situations.
8. Encourage higher efficiency for all types of energy use.
9. Increase Maui-based research and development for clean energy and related fields and fund related programs at Maui Community College.
10. Allocate funding to finance the transition of oil-related businesses to clean energy.
11. Allocate funds for public relation campaigns to get the word out about clean energy on Maui. Create a large, highly visible information center on clean energies.

Mentzel Plan Financing

The project will operate for 13 years from 2008 to 2020 and will invest \$3 billion. This seems like a staggering sum for such a small island with 139,000 residents, but it can be done with the following \$50 fee rule.

During the 13 years from 2008 to 2020, every visitor will pay a fee of \$50 and every holder of a driver's license will pay an average \$50 fee a month. Adjusting rather moderately for 3% inflation and a 2% population and tourism growth, this fee system will provide \$3.13 billion.

There are different models how to distribute the resident's fees fairly. One possibility is a carbon tax of \$25 per ton of carbon dioxide levied by the county. This would link the plan to its goal of reducing pollution and global warming. It would encourage responsible energy use and maximize the savings as non-polluting energy sources come online.

An important objective is to make sure that people with low incomes are not overly taxed. For some of Maui's residents, \$50 a month is a lot of money. For others it's less than a cup of coffee per day. In any case, the \$50 fee per month amounts to much less than the \$20,000 electric car. A typical Maui resident today already pays \$50 per month more for gas and electricity than last year.

The benefits from lower energy costs will start to show after the first few years and by far outgrow the fee shortly afterwards.

Mentzel Plan Implementation

With solid policies and solid financing in place, clean energy systems can be built rapidly. Without a doubt, technology will advance quickly in the next years and the implementation plan needs to reflect the power of innovation and investment that private industry will bring forward.

However, we can shape the things to come, and will demand from all contracted parties that Maui benefits by using local talent, that local factories will be built wherever preferable and that ownership remains local. Community ownership of renewable energy projects keeps far more money - perhaps three or four times more - circulating in the local economy than absentee ownership.

Here is a short overview of how an energy system could be built with today's technologies:

Create a highly visible "Clean Technologies Center" to educate residents and tourists.

Develop the planned wind projects and extensions to achieve 91 MW installed capacity. Then double these to 200 MW. Based on past experience, this will create 840 million kWh/yr.

Designate 1 square mile above Kihei as a solar park. Invite different suppliers to install 100 MW of solar. At 16% efficiency this will generate 638 million kWh/yr.

Develop the planned biodiesel refinery, but it may need to be scaled down. Require that it only uses local feedstock, which may be algae grown in square miles of shallow ponds.

Develop the planned sugarcane-to-ethanol facility and develop waste-to-energy and methane-burning facilities for the landfill.

Develop one or more pumped storage systems, capable of storing 2.4 million kWh. These consist of two reservoirs with a 3000 feet height difference. 233 million gallons of water will be pumped up when extra energy is available and run down, driving a turbine when energy is needed. Being 60 ft deep, each reservoir covers 11 acres. Existing reservoirs and the new 150 million gallon reservoir may be a part of this.

Give residents an incentive to install solar hot water heaters and photovoltaic systems on their homes.

Design demand side management systems into commercial operations and expand residential load management.

Encourage efficiency measures. Although there is no need to reduce energy use, it is still absurd to waste it.

Keep the existing Maui Electric generators as a bad weather backup that can be run by biodiesel. There will be several hours available for starting them up.

This system will cost less than one billion dollars and produce enough energy at 100% reliability to cover current needs plus power all the future electric cars on Maui. That's just two year of fuel cost at today's rates.

Provide electric cars to Maui residents and develop the necessary infrastructure, such as charging stations and power lines. Power heavy equipment with biodiesel and ethanol.

Study how to provide fuel for airplanes and shipping needs.

Electric cars

In the future, gasoline cars will be seen as an aberration, given that they waste 93% of their energy as heat. Electric cars are by far more efficient, reliable and easy to manufacture. Their only critical part is the battery and recently there have been significant breakthroughs that promise to give us mass produced vehicles in the next years.

There have been several announcements. The Chevrolet Volt is coming out next year, the Tesla roadster is almost ready and Phoenix motorcars has developed a very useful pickup truck.

However, these electric cars have a deployment problem stemming from their need to recharge every 100-200 miles. On the mainland this presents a chicken-and-egg problem. People won't buy the cars without recharging stations and stations will not be built without the cars on the road.

Part of the Mentzel Plan is to install chargers at the current gas stations and power them with clean energy. Since it is not possible to drive off the island, every car will be near a charging station at all times.

This will make Maui a great initial market for electric cars. Maui will also be an ideal testing ground, given the different climates and altitudes. The Mentzel Plan includes an invitation to electric car companies to test their vehicles here and offer them for sale.

This will stimulate a lot of economic activity, which will add to the subventions for the current industry built around gasoline cars (oil companies, gas stations, repair shops, dealerships) for

the costs of switching over to electric cars. In fact, they will have an excellent opportunity for fast growth and extra income from the switch.

Not everyone will find a suitable electric model or may prefer to keep his/her old car. For these, there will be electric kits that will convert gasoline cars to electric.

We can only achieve 100% oil independence if we include electric cars in the Mentzel Plan. And their batteries act as a buffer that will balance out the uneven production of the wind and solar farms.

In order to do this, the Mentzel Plan allocates \$20,000 for each of the 100,000 licensed drivers. Each driver can use these funds to buy a standard electric car, aid in the purchase of a pricier model or buy an electric kit to convert a gasoline car.

To prevent misuse, the cars will remain on Maui, the county will be a lienholder and there will be policies governing resale and disassembly. The funds will be allocated as they become available from 2012 to 2020.

Heavy equipment and vehicles that does not lend themselves to electric conversion will be powered by biodiesel and ethanol.

False ideas

In the discussion that will follow this plan you will see the following erroneous concepts show up in various forms. It is important to see that these are based on wrong presumptions that both the energy experts and the public have held for many years, often decades. Don't believe the experts, make up your own mind.

1 - Clean energies are not able to meet our demand. NOT TRUE! In Maui we could make our electricity from the wind with 220 windmills on just a few acres. Or harvest it from the sun on 2 square miles. Or from ocean temperature differences or waves with no land use at all. In fact we are living in an ocean of energy with 15,000 times our current needs. You don't need oil to produce electricity.

2 - It takes a lot of time and money to switch to clean energy. NOT TRUE! It would take 2 years to build a wind farm at a cost of less than we pay for oil in those 2 years. After that it generates our electricity for free.

3 - Clean energy needs government subsidies. NOT TRUE! Wind power is far cheaper than oil - actually it is free. Maui has proven with the existing wind farm at Maalea that wind is cheaper than oil.

4 - We all have to reduce our comfort. NOT TRUE! First of all, there is such an abundance of natural energy that it will not matter if you leave the lights on. Second, there is a confusion between efficiency, which simply means better engineered

appliances, and reduction which means less usage with less comfort.