Creative Conflict Solutions

A Clean Energy Future for Maui and Hawaii: Conversations with Key Players

Issues, Interests and Solutions

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Acknowledgements

This paper could only be written because numerous people generously gave of their time to offer us the information and perspective we sought. These people shared our desire to fully inform the public of the complexity and exciting potential of the present Renewable Energy movement in our state. In particular, we'd like to thank David Fisher, of Hawaii Small Business Development Center, who encouraged us to take on this project in the first place and guided us through the process. The Interviewees are listed below and are the source of the majority of what is in this paper. Their passion and commitment to a strong and sustainable RE movement for our state and county fueled our own commitment to completing this project.

We'd also like to thank Carl Freedman who helped us form the questions and hone our purpose, and provided insight into the political climate in our state. To those who read and gave us feedback on the drafts of this paper, including: Beth Marcil, Ariel Stephens-Ladd, Rob Parsons, Ethan Fierro, we gratefully acknowledge the key role that played.

Lastly, we'd like to thank our readers, those, who like us, find the subject of a new energy paradigm exciting, whether you've been waiting impatiently for decades for this change or are recently discovering the importance of RE for the future of our county and state.

List of Interviewees

Robbie Alm, Vice President of Public Affairs, Hawaiian Electric Company (HECO)

Brad Albert and Matias Besasso, co-owners, Rising Sun Solar

Irene Bowie, Executive Director, Maui Tomorrow

Leo Caires, Owner, Maui Energy Co. (Residential Wind)

Alex DeRoode, Sustainable Living Institute of Maui (SLIM),
Maui Community College, Chair of the Maui County Energy Alliance Working Group Two, Education and Workforce Development

Mark Duda, President, Hawaii Solar Energy Association, & Partner/Finance, Distributed Energy Partners

J. Carl Freedman, Haiku Design and Analysis, Integrated Resource Planning, Public Utility Regulatory Affairs

David Fisher, Director, Hawaii Small Business Development Center on Maui

Mike Gresham, Former Director of First Wind

Ruby A. Hamili, Maui Attorney

John Harrison, Administrator, Maui Economic Development Board, Maui County

Kelly King, Co-owner, Pacific Bio-Diesel

Chris Mentzel, Owner, Clean Energy Maui

Rob Parsons, Former Environmental Coordinator of Maui County, Vice President of Maui Tomorrow, and Conservation Chair of Sierra Club of Maui

Ed Reinhardt, President and **Sharon Suzuki**, Renewable Energy Division
Maui Electric Company, Limited (MECO).

Ronald "Skeeter" Stebbins, of Maui Real Estate Company, representing Southland Community Development Corporation in the purchase of the Hana Ranch.

Charmaine Tavares, Mayor, Maui County and founder of the Maui County Energy Alliance (MCEA)

EXECUTIVE SUMMARY

An historic movement is afoot in Hawaii that will have a profound impact on all of us. It is the intention of our State, and Maui County leadership to remove the nearly total reliance we have on fossil fuels as our source of energy. The plan is to replace diesel and coal with renewables such as wind, sun, waves, geothermal and bio-fuels: sources we could develop in abundance on our islands. These renewables can be tapped, hopefully without violating the host culture, risking our food security, or harming our delicate environment, while rescuing us from the fickle commodity market of petroleum. They even have the potential to improve our faltering economy. In just the last year, Governor Linda Lingle and Maui's Mayor Charmaine Tavares have both spearheaded major planning initiatives, and set state and county goals to help with this transition. The Renewable Energy (RE) movement has the potential for monumental impact, while Hawaii has an opportunity to be a testing ground for potential RE solutions for the rest of the country and the world.

Our paper documents the opinions of key stakeholders in Hawaii's clean energy movement, including: solar, wind and geothermal contractors, a bio-fuel company owner, electric utility administrators, the Mayor of Maui County, leaders of non-profits invested in sustainable living and energy innovation, environmentalists and native Hawaiians. Through an in-depth interview process, each of these stakeholders spoke to us of their visions, their interests and their issues.

As owners of *Creative Conflict Solutions*, our purpose is to highlight the need for ongoing, productive dialogue between all stakeholders in the renewable energy movement. We envision an outcome that can truly work for everyone. We are concerned with the quality of communication in these discussions and deliberations, which is and will continue to be necessary in order to reach agreements on how to move forward together. The quality of communication will have an impact on the success of the outcomes.

Issues

The key informants in our interviews identified challenges, the greatest of which is the inertia of 'business as usual'. This was followed closely by an expressed need for major innovation and technological advances in order to achieve these bold RE goals in a timely way. We also discovered that the many stakeholders to this change, including consumers and the public, hold a variety of other interests and they are: economic sustainability and regulatory considerations, environmental concerns, educational and workforce needs, equity, accessibility, and fairness.

The Interviewee/Stakeholders and Their Interests

Citizens of Hawaii and interest groups made up of these citizens

Several interviewees felt that although the public is a key stakeholder in this movement, there has **not** been a significant effort to involve them. For example, it was pointed out to us that, as the 'host culture', Native Hawaiians should be the first people consulted about RE projects and yet have not been broadly included in the planning process, to date. One of the native culture's 'interests' is that there be ongoing awareness and deep respect in the 'relationship' all of us have with the sun, the wind, the earth, the sky/air, and the ocean/water. This is just one interest of one group in a sea of diverse interest groups of citizen stakeholders that will be affected by the

transition to RE. Without adequate information or knowledge of what format their ideas and concerns can be aired, the general public, their groups and organizations and their 'interests' may not be presently included in the planning process or potential decisions. However, a public forum and media campaign on RE is planned in Maui County on September 10 and 11, which may be an opportunity to bring the public and their interests into the conversation. It is our hope that this paper will serve to lay the groundwork for their informed participation.

Renewable Energy Contractors

Solar, wind, geo-thermal and bio-fuels contractors of both large and small installations are excited about the momentum being initiated by the Governor and the Mayor and are extremely interested in being involved in planning for Hawaii's energy future. They are aware that energy has been historically provided by monopolies, and that monopolies have a hard time giving up shares in their interests. The smaller contractors interviewed want small-scale, local, distributed production and generation of power to be seen as a crucial ingredient for success. Why do they want this? Because their interests are: sustainability, providing local jobs over time, feeding money into the local economy, and requiring less long-distance transportation, reducing the carbon footprint as well as individual homeowners having control over their own power source and income from that power source. All contractors, large and small are interested in streamlined permitting, land use variances, incentives for investment and in providing benefit to the local population. There is an interest on the part of some contractors in creating or continuing to create RE models for the rest of the country.

All contractors, local or mainland, are concerned about access to information between the government, the utilities and themselves, information that might make their power sources as usable as possible. At the same time, they acknowledge the limitations of the present technology of the power grid to manage fluctuating power. Contractors large and small want to have detailed information from the utilities about just how much distributed power the utility's circuits can safely hold, hoping this will increase the current limits. Local contractors have ideas about making RE investments attractive to investors as well as homeowners, and wish to make every dollar invested be efficiently used for the long-term benefit of the islands. All contractors foresee cost effective innovations in technology, such as batteries and capacitors, that will provide storage capabilities so that their power sources can provide firm power to homeowners and the utilities.

Public Utilities, such as Hawaiian Electrical Company (HECO) and Maui Electric Company (MECO)

The representatives from HECO and MECO we interviewed stated that their primary mission is to provide safe, reliable power to their customers. They know the transition to RE must happen and are working with government officials to get off their decades-long use of oil, and thus avoid federal penalties for carbon emissions. Some of their interests include: satisfying their shareholders (who control ownership), making their grid 'smart' and more flexible to manage fluctuating power such as solar and wind, using bio-fuels as backup for fluctuating power, finding power storage technology that can even out the fluctuations of wind and solar power, developing RE leasing arrangements to capitalize on RE potential, improving their infrastructure to make cutting edge RE projects welcome on the islands, and providing a model for other

communities around the world. They would like to be seen as open to working with other stakeholders to move forward.

Government Officials, Agencies and Commissions

The government and its agencies provide leadership, regulation, and incentives and penalties to make an RE future possible. Government officials are currently negotiating with the utilities to plan for the transition to RE. Historically, it is much easier for government policy developers to deal with one or two parties rather than with hundreds. However, this approach leaves out all of the other parties and their interests. The legislature has the ability to create legislation to give incentives for RE investment. Their interest in fiscal responsibility may be shown to override their interest in an RE future. The Public Utilities Commission (PUC) is hearing comments by interested parties as interveners in docket proceedings. This is in preparation for its decisions that will separate the utility's profits from the number of kilowatt hours a customer uses ('decoupling'), actually providing the utilities incentives to promote efficiency and conservation in order to achieve the 30% reduction in power usage that the State and County initiatives call for. The PUC is also leading up to decisions on the 'feed-in tariff' that establishes rates the utilities will pay power producers of any scale that feed power back to the utility, based on the type of RE system. Tariffs are to be set for each renewable source to be sufficient to pay for the cost of developing the resource plus a profit.

Research, Education, and Workforce Development

Plans are taking shape at Maui Community College, in Maui's high schools, and even at the elementary school level to create career track training and degree programs that will educate not only future RE technicians, but leaders in the RE field. There will be just as much need for strategic leadership skills as technical skills in RE. Leadership in this dynamic field requires those who have honed their communication, negotiation, and relationship building skills. Also, those workers who have been involved in the petrochemical industries, including car mechanics and utility workers, will need re-training to make them marketable in a new RE economy.

Recommendations

As the stories of contention, promise and collaboration emerged in conversation, our profession required that we frame them within a context and methodology of conflict management.

Recommendation One: Use interest-based negotiation

In our view, every stakeholder's issues and interests are legitimate and deserve attention. When all stakeholders share the value of achieving a clean energy future that works for everyone, each stakeholder must treat everyone else's issues and interests as just as necessary as their own; all issues must be brought to the table and the interests of those who have a stake in their outcome must be aired, along with all other relevant information, which is then used as the basis for considering solutions and coming to decisions. This process is called: **Interest-based Negotiation.** In 'Interest-Based Negotiation' stakeholders commit together to work towards solutions that satisfy all the other stakeholders' interests, rather than trying to 'win' their own positions.

Bio-fuels: A Candidate for Interest-Based Negotiation

The media coverage of the use of bio-fuels as an RE option for Hawaii has revealed strong opinions about sources and usage. In our interviews with two utility administrators, a local bio-fuel producer, and an two environmentalists, their interests surrounding this issue were identified:

MECO and HECO had interests which include: ending reliance on fossil fuels, having a 'firm' RE source, assuring fuel compatibility with their machinery, keeping their shareholders satisfied, meeting customer needs, supporting farmers, keeping their emissions low to avoid federal penalties and protect the environment, and serving as a model for other states, islands and nations. **Pacific Bio-Diesel, Inc.** a local producer/refiner of bio-fuels currently provides fuel for all diesel applications but focuses mainly on bio-diesel for transportation, farm equipment and emergency back-up power. In addition it has interests in the sustainability of local production over a long period of time based on Hawaii farmers' input and reasonable land-use planning, lowering Hawaii's carbon footprint by minimizing the transportation of bio-fuels over long distances, avoiding the fluctuations of commodity markets, stabilizing the costs of production to ensure stable prices, as well as their own financial health.

Although this is an oversimplified list of only a few of the many interests of stakeholders in bio-fuel use in Hawaii, we include: the **Water Department**, which would have interests in choosing crops for bio-fuels such as algae, palm or Jatropha, or growing techniques and locations that conserve water. **Farmers** would want a favorable market for their crops, while the **Government,** among other things, would want zoning and environmental regulations obeyed. **Environmentalists** want food security such that bio-fuels are not competing with food crops or destroying habitats and reefs, while **Landowners** leasing their land for bio-fuels would want preservation of land values and soil quality. **Hawaiian Cultural Leaders** would want malama `aina, a respect and reverence for the land and the crops being grown. **Large Bio-fuel Producers and Refiners** would want financial profitability, predictable, stable government regulations, and the sustainability of foreign production that follows NRDC-Roundtable on Sustainable Palm Oil Principles and Criteria. **Consumers** would have an interest in a reasonable price for fuel, availability and incentives for the transition to diesel-powered equipment.

Having identified many of the issues and interests, new ideas for solutions could then be generated by all that satisfy the interests of everyone.

Along with the recommendation of Interest-Based Negotiation we offer four other recommendations to make the complexity of this movement manageable and productive:

Recommendation Two: Commit to transparency for information exchange

Transparency and information sharing are prerequisites for trust and good, long-term working relationships. All necessary information should be disclosed between stakeholders so that negotiations, planning and decision-making is based on an accurate understanding of the situation. We realize that competition may interrupt total transparency when it comes to proprietary technology and processes. In addition, details of the progress being made in planning should be made public in a variety of ways on a frequent basis.

Recommendation Three: Use a 'whole-systems' approach

Every change Hawaii makes, policy, projects etc., will affect countless sectors of our island economy and culture. Foreseeing short and long-term effects, both positive and negative, and possible unintended consequences can be achieved through whole-systems mapping to gain insight into the multiple connections that exist and the impact each change will cause on the Hawaiian Islands, as well as illuminating where positive inputs can be leveraged to improve outcomes. We understand that Maui Economic Development Board (MEDB) has entered into a contractual relationship with the Millennium Institute to create simulations for different energy scenarios that may include a whole-systems mapping of our Maui Clean Energy Alliance goals and strategies to maximize their success. We suggest that local Maui County stakeholders be included in this process.

Recommendation Four: Commit to full public and stakeholder involvement

Every citizen is a stakeholder in this movement and will be affected by its outcome. In order to generate interest and involvement, the public needs ongoing access to factual, understandable information about how the RE movement will directly affect them. This information should include guidelines for how to get involved. Without the option of involvement, the movement runs the risk of meeting resistance when solutions are proposed that may not fully meet the needs of Hawaii's citizens.

The National Research Council, in its research into the advisability of public involvement in policy decisions and public projects, says it perfectly:

> *Public participation should be fully incorporated into environmental assessment and decision-making processes, and it should be recognized by government agencies and other organizers of the processes as a requisite of effective action, not merely a formal procedural requirement…Participatory processes convened as a superficial formality or without adequate support by decision makers increase the public's distrust of government when, almost inevitably, the results have little impact.*

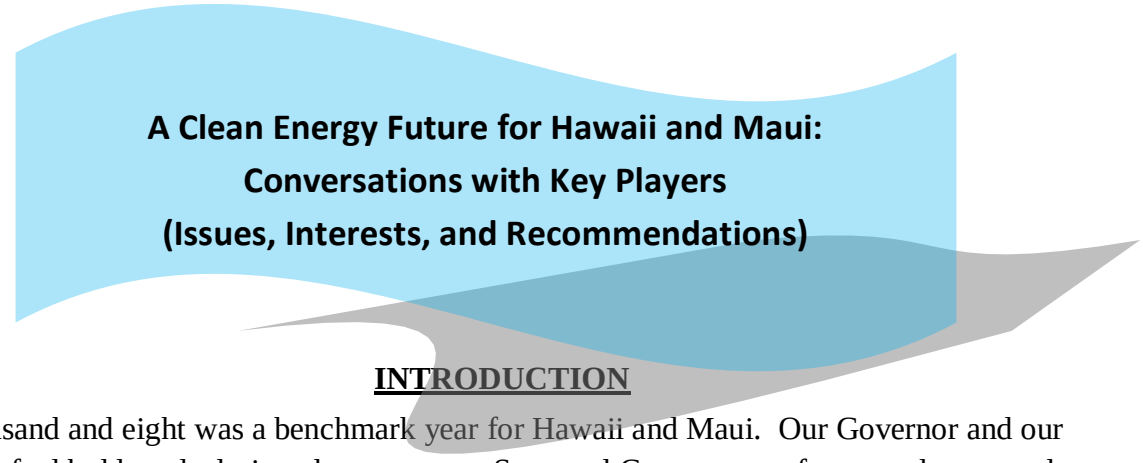
Effective public participation processes include: web-based information and discussion forums, public meetings with small breakout sessions, food being served, interactive media coverage, and clear feedback on consideration of public input. A neutral non-political entity should be used that would be a watchdog for all interests to be represented.

Recommendation Five: Promote diverse leadership

For a movement to succeed, a broad cross-section of the community need to be engaged in making it progress. Including and empowering representatives of all stakeholder groups and relying on their ability to promote buy-in and enthusiasm among their groups, as each group's interests are addressed, will build a coalition that can overcome inertia, financial constraints, seemingly incompatible interests, and the limitations of present technology. A tsunami of that size finds its own way.

Conclusion

The RE movement has become so multi-faceted it is impossible to identify and describe every part of it; it has blossomed out across the state. There will be new issues arising and old issues that get resolved. The bird's eye view offered here represents one short period of an evolving, dynamic occurrence. The stakeholders will remain. How they work together now and in the future will be an ingredient in the success and health of Hawaii as an 'ohana.



INTRODUCTION

Two thousand and eight was a benchmark year for Hawaii and Maui. Our Governor and our Mayor crafted bold goals designed to move our State and County away from an almost total reliance on fossil fuels. Nearly ninety percent of our energy needs in Hawaii are currently being met from petroleum and 96% of this comes from foreign sources. Maui alone burns 1.5 million gallons of petroleum weekly and Hawaiian Commercial and Sugar's (HC & S) Pu`unene Plant on Maui burns 60,000 tons of coal yearly. [1]

On January 31, 2008 Governor Linda Lingle unveiled the Hawaii Clean Energy Initiative (HCEI). Partnering with the U.S. Department of Energy, the Governor committed Hawaii to meeting 70% of our state's energy demand through efficiency and renewable energy (RE) resources by 2030[2]. Now there is an act before our State legislature (HB1464) to align Hawaii's energy policy laws with the State's energy goals, including a policy that requires the fast tracking of certain renewable energy (RE) pricing regulations within the State's Public Utility Commission (PUC)[3].

Maui County Mayor, Charmaine Tavares made an even bolder statement of goals for RE. Through the formation of the Maui County Energy Alliance (MCEA), she stated that, "by the year 2020, 95% of all energy needs in Maui County will be met sustainably, together with a

[1] House of Representatives H.B. no. 1464, Twenty-fifth Legislature, 2009, H.D. 3,State of Hawaii

[2] (Department of Business, Economic Development and Tourism, Web site: http://hawaii.gov/dbedt/programs/

[3] See the following web site http://plonedev.hawaii.gov/budget/puc/PUC%20Announcements/PUC%20opens%20proceeding%20relating%20to%20Feed-In%20Tariffs.PDF/at_download/file

carbon-neutral footprint." [4] Currently, five working groups have spent the past year drafting ideas for a series of action plans for Maui County ready to be aired and commented on by the public in a forum on September 10th and 11th, 2009 at the Grand Wailea Hotel and Spa.

Both of these movements imply a near total transformation of our current energy system. Change at this level is both drastic and inspirational. This paper seeks to investigate the promise of this possibility by revealing the viewpoints of key stakeholders on important issues that will need to be addressed in order to succeed in this endeavor. We were interested in the dynamics of system-level change from within a conflict management perspective. This involves identifying all stakeholders, all issues, and the interests each stakeholder has about the issues (what is important to them and that they would like to have considered). In doing this, ideas and options can be developed that will satisfy all stakeholders. This describes **interest-based negotiation**. Two issues, Bio-Fuels and Distributed vs. Centralized Power Generation, will be dissected at the end of the paper to illustrate how the first steps of interest-based negotiation work.

Who are we? As business partners in *Creative Conflict Solutions*, we aim to bring our skills and experience in conflict management to the state of Hawaii. Conflict is often a misinterpreted concept. It implies that something has broken between people and needs to be fixed. We take a different view of conflict. We see it instead as a precious opportunity - an opportunity to address needs, have misunderstandings understood, and allow differences to be aired and negotiated in order to come to mutually satisfying solutions.

In the past few months, *Creative Conflict Solutions,* with the guidance of David Fisher at the *Hawaii Small Business Development Center (HSBDC)* on Maui, has had the opportunity to interview a number of key players in this movement (see list of interviewees on p.4). We chose representatives from a variety of RE companies, organizational personnel involved in the transition to clean energy, current and former county officials, environmentalists, a Native Hawaiian attorney, as well as top administrators from both HECO and MECO.

We believe that the solutions to the actual issues that stand before the RE movement can only come from all those who will be affected by its future: the stakeholders and citizens of Hawaii. With this in mind, the reader will **not** find recommendations for solutions by the authors in this paper. Our recommendations will center on the process of arriving at those solutions, hoping to maximize the effectiveness of that process.

[4] County of Maui, Office of Economic Development, Environmental Coordinator. See web site: http://www.co.maui.hi.us/index.aspx?NID=1172,

ISSUES

In the short term, what we (HECO) have available to us is large scale wind and solar – those are daunting resources when you consider what our other obligations are, which is having to deliver reliable electricity, day in, day out, 24 hours a day, 365 days per year. We as a community, we as a company and we as a society have to figure out what the rest of the world is going to take the next 10-20 years to do, and do it in the next 3-5. It is daunting, but it's also great.

Robbie Alm, Senior Vice President of Public Affairs, Hawaii Electric Company, Spring, 2009

The following are the 'issues' identified by our interviewees that represent what will have to be resolved in order for the RE movement to progress. There are many issues and we haven't named them all, but one thing is clear, each will have its own set of stakeholders with their own set of interests, which will have to be negotiated.

Inertia

In our view, a transition to RE will take a massive amount of effort from thousands of people and hundreds of institutions. It means changing the way things have worked for decades, and that may be one of the biggest challenges of all. Mayor Tavares told us that RE has been on the agenda of government for decades and it is only very recently that it has been given more focused attention. Ironically, the motivation for change usually comes from pain, when the status quo becomes uncomfortable enough that the effort required for change begins to feel worth it. In this case, leaders are seeing the writing on the wall: the decline of our present petrochemical resources, shortages, high prices, a threatened economy, a depleted environment, and the suffering this would cause for Hawaii's citizens. The full pain isn't here yet, but as the price of oil begins climbing again, we know it's coming. The question is, 'Can all of us be forethoughtful enough to plan and carry through this massive change, so that we, and our islands, may prosper?' And Kelly King of Pacific Bio-Diesel adds another question, "is this all about price, or is our environment and energy security worth paying more for RE, or at least providing subsidies equal to those of the petroleum industry."

Inclusion of Hawaiian Perspectives

"As the host culture, Hawaiians who embody the spirit of aloha should be the first people consulted about RE projects," believes Hawaiian cultural advocate, Ruby Hamili. At the speed in which this transformation to RE is taking place, she does not see this happening. "There is a lack of 'ahonui' (patience), because when time is of the essence, patience is often overlooked. When the emphasis is on a timeline, those who are not quick to articulate or respond, are not included. The unheard voice is lost and so is the gateway to partnership and trust."

The involvement of Hawaiians, and the respect for the host culture in business and the business of government has been steadily improving over the years. However, Hamili noted that their

involvement can be token. She counsels that it will require an extra effort on the part of key players in the RE field to bring people to the table that wouldn't necessarily speak up. She suggested small gatherings at first, with food and drink to find out what people at all levels of the totem pole feel about RE. Then, she suggests, invite a spokesperson from these small groups to present at larger public forums. "When people know that they aren't going to be excluded, then there is a sense of freedom, a state of ease. Freedom includes the responsibility of doing no harm now, and forever," she explains.

Hamili also suggested that there needs to be a protocol in place - a reminder of reverence, appreciation, and a deep sense of responsibility by all that use RE. "No one has a second thought about switching on a light, she reminded us, we take it for granted and there is no relationship. It is all about relationships. We must always be mindful of the deep relationship between ourselves and the sources of the energy we are proposing to use, such as the ocean, the earth, the wind, the sun. This mindfulness is the Hawaiian way of being. We have to begin to open our arms to everything, embracing the air, for without the air, we could not breathe; and remembering that even oil is a precious resource of the earth." She contends that most RE proposals neglect to address these significant relationships. She sees the focus of many of the RE relationships as man to man…presenting itself in the form of a power struggle between opposing parties, exclusive groups wanting control. In this equation, 'qualities of being' are omitted. "The transition to RE is a change that needs to happen…there is a huge responsibility for all of us to be certain that any change we make is for the good of ALL CONCERNED," she concludes.

Ruby Hamili's opinion is not an isolated one, instead it is a shared sentiment as is evidenced by the following on page 8 of the State of Hawaii 2050 Sustainability Plan which names the Hawaiian ahupua'a system as one of the "critical concepts" of the plan: "the values of the ahupua'a system ensures that people respect the air, land, water and other scarce natural resources that make life sustainable from the mountains to the sea."

Environmental Impact

While moving to RE is the dream of environmentalists, there are still environmental concerns, especially on islands with limited land space, fragile coastlines and delicate balances. Every citing of a larger RE project requires an Environmental Impact Study (EIS). Mike Gresham, formerly of First Wind, described a 400-megawatt wind installation planned for Kauai that would have threatened the nesting grounds of the Shearwater, an endangered seabird. Wind turbines have to be sited carefully to avoid fly areas for migrating or nesting birds. Wind turbines are accused of creating visual pollution and the sound of their blades is considered by some to be noise pollution. Any ocean technology, including the laying of large cables to transmit power from island to island, raises concerns about fish, reefs and water quality, just as some geo-thermal installations can put noxious fumes in the air and earth. Bio-fuels have raised

many environmental concerns such as land use, food security, transportation and carbon emissions issues. Bio-fuels are discussed on page 23.

Irene Bowie, Executive Director of Maui Tomorrow, sees the need for a change in consciousness on the part of consumers and businesses alike. She believes that viewing any energy source as a public trust would help people appreciate our access to these sources. "We don't own these things. We need to embrace the philosophy of the Hawaiians, to conserve energy and not blindly use it up."

Rob Parsons, of Maui Tomorrow and the Sierra Club, says one critical priority is that, "we have to stop burning things! No matter what the fuel is, diesel, bagasse from sugar cane production, or bio-fuels from palm oil or algae, if we're going to stop climate change, we have to stop putting emissions into the air."

Dependability of Power and Flexibility of the Grid

It was said by nearly every interviewee that the most important thing to Hawaii customers is having reliable power to run their homes, businesses and institutions. MECO and HECO, our present central sources for electricity on Maui and Oahu, are mandated to provide that reliable power. As Robbie Alm of HECO put it, "We would be happy if the public understood that we appreciate our obligation to deliver reliable service, as well as our obligation to get Hawaii off oil. Every day, we try to balance the two as effectively as we can."[5] Liquid fuel provides reliability and is usable in the existing generators, we learned, which is why HECO and MECO are attracted to RE bio-fuels from crops and algae.

However, Ocean Thermal Energy Conversion (OTEC)[6] and heat exchange power[7] are also firm sources of power that our utilities would consider and could make use of more easily. According to Ronald Stebbins of Maui County Real Estate who is working with Southland Development Corporation in a proposed closed system geo-thermal project in Hana, their system can deliver substantial amounts of stable power to MECO and lessen the challenge to the present utility grid.

MECO President, Ed Reinhardt clarified that the reason why the current grid can't take on unlimited power from solar photovoltaic systems and wind generators is that they fluctuate, for example, when the cloud shields the sun from the photovoltaic panels or the wind suddenly stops

[5] About 7%* of the electricity sold to customers of Hawaiian Electric Company (HECO) and its subsidiaries, Hawaii Electric Light Company (HELCO) and Maui Electric Company (MECO), comes from renewable energy in the form of wind, solar, bagasse, and hydro. See MECO website for details. www.mauielectric.com

[6] The energy arising from the temperature difference between warm surface water of oceans and cold deep-ocean current is converted into electrical energy. Source: Wikipedia

[7] A patent-pending single well technology that uses heat conductive fluids in a completely sealed closed loop system. The heat conducting fluids are not released into the environment. Source: Southland Community Development Corporation Handout

blowing. Presently, the Public Utilities Commission (described below) only allows 3% of Maui's electrical production to come from individual solar units. Brad Albert says that the island's solar industry is already half way to that percentage and the PUC is considering increasing this cap to 15% of electrical production[8]. If the current technology for battery or capacitor-type storage were farther along, or our power grid was better designed for fluctuating power this would not be a problem. Reinhardt told us that MECO looks to bio-fuels (a liquid fuel potentially suitable for current generators) because "presently we provide back up source with our diesel-powered turbine generators running in stand-by mode in case the wind drops down."

All of this may be changing, however, as experts from all over the world are trying to help Hawaii use "wind (or solar) on an isolated grid that isn't being attempted anywhere on the planet. "They are all here to help us", said HECO's Robbie Alm. 'What you are trying, no one else on earth is trying, and we are going to help you do it'" he quoted these experts as saying. Because Hawaii can't 'interconnect' with other states and their power grids, there is little flexibility when a power source surges or fades. This means the grid must be upgraded to be 'smarter' and better able to manage fluctuations, which is cutting edge technology. MECO and HECO are currently working with a research team from General Electric on a "smart grid" for Hawaii that is seeking to address many of our utilities' current RE management, storage, and grid flexibility issues including how we will manage the proposed big wind from Molokai and Lanai coming to Oahu via undersea cable.[9] The GE research includes the deployment of a battery energy storage system that is charged during times of excess wind energy production and be discharged via smart grid automation technologies when energy demand exceeds supply[10].

Another aspect of the proposed new technology is the use of 'smart meters' that wirelessly send information about electricity use to utility billing departments and could help consumers control energy use. Proponents of smart meters say that when these meters are teamed up with an in-home display that shows current energy usage, as well as a communicating thermostat and software that harvest and analyze that information,consumers can see how much consumption drives cost -- and will consume less as a result. Smart Meters will be made widely available to consumers on Maui from MECO by approximately 2012, and from HECO anytime between now and 2015[11].

Within ten years, Mark Duda, Partner in Finance for Distributed Energy Partners on Oahu and also the President of the Hawaii Solar Energy Association, foresees a cutting edge storage technology called the 'ultra-capacitor' that could potentially have high enough energy density to

[8] Chris Hamilton, *Presentation Casts Sunlight on Island Solar Possibilities,* Maui News, July 12th, 2009.
[9] Visit http://www.grcblog.com/?cat=54 for details
[10] http://www.grcblog.com/?cat=54 From Edison's Desk, GE's Global Research Blo
[11] http://www.energyefficiencynews.com/i/1751/

be an attractive replacement for batteries in all-electric cars and plug-in hybrids, and help utility companies with their fluctuation issues.

When asked about the role of independent suppliers of wind and solar power who would, in the future have access to batteries or ultra capacitors that could store, and therefore stabilize, this form of energy, Ed Reinhardt of MECO replied, "you make your power more stable and we'll take it into our grid." "However", he went on to say, "in the present state of the grid, when the power source fluctuates, there is a limit where the grid reaches a saturation point and the additional stand-by generation we provide to stabilize the electrical system, is actually exceeded by the power source fluctuation. We have to protect the grid from this kind of unstable condition which would impact our individual customers." The exact nature of this current 'limit' is not known by RE contractors, which Brad Albert and Matias Besasso of Rising Sun Solar see as a barrier to the present maximum use of wind and solar power. Many of these issues are going to take time to figure out, and for Hawaii businesses like Rising Sun, this can be a frustrating and costly wait. The Hawaii Solar Energy Association and The Hawaii Renewable Energy Association has submitted a plan to the PUC to adopt a 15% per circuit cap for any type of distributed generation RE source.[12] According to a Hawaii PV Coalition informational flyer, the implications of this decision by the PUC for the solar, (and wind and hydro-power) industries in Hawaii would mean "a greater positive effect on the economy and on energy conservation…"

Mayor Tavares suggests that there is also a benefit of building multiple small utility power stations around the county to decentralize the power system and make it less vulnerable to an event that could shut down one central plant and knock out power everywhere. It also allows power to be generated closer to the community that would use it and thus reduce transmission costs.

Public Utility Commission (PUC) Decisions

The PUC is an independent commission in charge of regulating the public utilities in Hawaii. It decides rates, determines earnings, and issues guidelines about the general management of HECO, MECO, etc. It is presently deliberating on two important changes to the utilities to make way for the transition to RE.

> **Feed-in Tariff (FIT)**- Involved in the docket process, Chris Mentzel of Clean Energy Maui explains that FIT is an incentive process to encourage the adoption of RE; it means that the utility must pay RE producers above-market rates set by the PUC. Each type of RE will receive a different set rate, depending on the cost of that form of RE and this rate will remain constant for 20 years. This helps overcome the higher cost of buying and constructing RE installations, paving the way for 'distributed' power installations (as described on page 26

[12] See their websites for further information: www.hawaiipvcoalition.org or www.hsea.org.

below), he explained, and provides assurance to investors and bank lenders because it guarantees a set price for each power source for 20 years. The FIT may replace the Net Metering agreement that presently exists between smaller RE producers and the utilities, as well as replacing future Power Purchase agreements individually negotiated between larger-scale energy projects and the utilities. The PUC decision will be announced in August, 2009.

The effect of a FIT in Germany has been that 70% of its power comes from distributed power: 50% from small-scale producers, 20% from larger-scale private producers, according to Mentzel.

Ronald Stebbins of Maui County Real Estate, a coordinator of the aforementioned large 'heat-exchange' geothermal power system in Hana, voiced concern that the FIT docket may not cover all potential RE sources, but may only include solar and wind RE. He hopes that any promising RE innovations would be eligible for the FIT.

De-Coupling- Brad Albert of Rising Sun Solar and Robbie Alm of HECO, explained that de-coupling separates an energy utility's profits from its sales of energy, meaning the utility will be rewarded for promoting conservation of power usage by consumers. Through 'decoupling', the PUC declares that the utilities' fixed and variable costs are paid back by adjusting the rates a consumer pays for that power. This means ratepayers could expect to see their kilowatt-hours go down, while possibly paying a higher rate for those fewer hours. This might raise questions for consumers, but the change in what we actually pay for our electric bill will be affected by a number of factors. It is difficult to predict, at this early stage, how our utility bill will end up looking.

Rob Parsons, of Maui Tomorrow and the Sierra Club, worries that the PUC will be swamped by the volume of new rules and regulations that will be needed to give form to the RE transition. He added that the length of the decision-making process could create a logjam while this commission deliberates over essential considerations.

Streamlined Regulation

There are many rules and regulations that must be satisfied to go forward with any project in Hawaii. This process can move slowly. According to Mike Gresham, it has already taken 2 years of the regulation process for the 2nd stage of the Kaheawa Wind Farm in West Maui to begin building. The new wind turbines have been purchased and are sitting in storage at the Maui Technology Park. The interviewees all agreed: the process needs to be streamlined so that RE projects can become functional quickly, in order to meet the ambitious goals of the HCEI and the MCEA. In addition, this streamlining will affect financing, as described below. In our opinion, the balance between protecting the environment and people, while making the process clear, efficient and time-effective must be reached.

Financing

Funding for Hawaii Clean Energy Initiative (HCEI) and Maui Clean Energy Alliance (MCEA)- Both State and County of Maui planning efforts will try to produce action steps. For these to be do-able, there will have to be funding for coordinated planning, supervision, labor, office space and materials. When asked where this money will come from, John Harrison of Maui Economic Development Board (MEDB) predicted that a lot of the funding will be in venture capital and private investment and some will have to come from the state and county, "but this isn't the best time", he said, referring to our current economic crisis. David Fisher of HSBDC states, "While some venture capital will be needed and used—especially where new technology is deployed; much of the financing can come from banks (as it has already) especially where there are power purchase agreements in place. Much of this bank financing is, can, and will be guaranteed (with incentives) by the federal government with tax credits that are a part of the stimulus program." There may also be a need for local government incentives**.** Mayor Tavares foresees some public/private partnerships, but believes federal, state and county funds will be needed to get things started. Company owners interviewed questioned whether there is a way that Hawaii can make private and public funding more attractive to lenders and grantors. Chris Mentzel, CEO of Clean Energy Maui believes that the passage of the Feed-in Tariff, as described above, will do just that. Rob Parsons states that millions of dollars will be available in federal block grants for conservation efforts. He hopes the State and County will keep the public informed of how this money will be used. Mayor Tavares told us that federal block grant money is being sought by Maui County government for RE and recently attended a mainland meeting of U.S. Mayors for this very purpose.

Cost Effectiveness- Matias Besasso, co-owner of Rising Sun Solar suggested that all planning take the long view. This means making sure that today's financial decisions will have the best 'pay-off' over time. Besasso feels that sustainability and economic benefit should be top priorities, along with a streamlined regulatory process. At the same time, he believes that local businesses that are currently offering RE systems could grow quickly and sustainably, moving through the permitting process more easily than larger projects, while stimulating the local economy with added jobs.

Lag Time Between Application and Actual Building- Mike Gresham, formerly of First Wind, claimed that because a RE project needs to go through an application process that can take a while, it can be hard to guess what it will cost to build that project. "Costs" he said, "go up over time. Getting investors to commit to a larger project can be challenging because firm costs are hard to predict into the future and funding has to be in place in order to go through the regulatory process. This can be a disincentive for investors."

Bank Lending- Several RE contractors interviewed said that lending for homeowner RE projects can be hard to get. Without this lending, fairly expensive RE installations can be impossible for homeowners to afford. In addition, bank lenders need to know what a business' or homeowner's actual return on investment will be. As stated and described above, the Feed-in

Tariff (FIT) should address this. Mayor Tavares said there are smaller lending institutions that are offering flexibility in their lending to make RE installations possible. She believes lenders will support RE projects as these projects become more commonplace.

Incentives & Penalties

Many experts say that change will come when the penalties for business-as-usual become too great, and the incentives to change become most favorable.

Robbie Alm, of HECO, says of the PUC decisions, "If the PUC gives us the incentives to stop being a zebra and start being a giraffe, we'll be giraffes… Monopolies will go exactly where they are compensated to go. Utilities live in an environment where every power we have or don't have is dictated by the PUC." Burning diesel creates a lot of carbon emissions and will cost the utilities too much in the new era. Both HECO and MECO officials believe that the probability of a Federal cap-and-trade program[13] or carbon tax on carbon emissions in the very near future means they must transition away from carbon-producing fossil fuels to RE now.

Brad Albert and Matias Besasso, of Rising Sun Solar, see that potential business investors and homeowners, who want to put up RE installations, have been waiting for the tax incentives and rebates to make these installations offer a sure payback. This reality gives government entities, the power to make change by making it painful or attractive for utilities, citizens and RE power contractors to use RE. Mayor Tavares mentioned that RE installations increase property value and thus property taxes. She suggests the County forego the RE portion of the property tax.

The present state tax credit allows 35% of the cost of a PV system and 20% of the cost of a wind turbine system to be credited back to the property owner. These credits can rollover from year to year until the full credit has been gained. Neither Chris Mentzel of Clean Energy Maui nor Mark Duda, of Sunetric feel that this tax credit provides a meaningful incentive, unless the property owner generates a lot of income and therefore income tax liability. On the other hand, according David Fisher, "in order to finance projects where there are power purchase agreements, private investor groups with tax credit appetites are being put together made up of those who do not have enough individual income to benefit from tax credits. Duda is also promoting a tax rebate in a bill before the legislature that would give incentives regardless of income. He believes this would "generate a ton of activity."

[13] "Cap-and-trade" means a government authority establishes a cap that limits the total amount of pollution allowed, and then distributes permits for a "right to pollute" the global atmosphere, which can be traded as private property. The amount of greenhouse gas emissions permitted *declines each year*, creating demand for a new commodity: carbon permits. When offered enough money (or faced with high enough costs), polluters who own permits (or need permits) will reduce their emissions. These trades establish a market price for greenhouse gas pollution.

Equitable Access to RE

"How will RE power be affordable to lower-income people?" asked Jerzy Kokurewicz, a solar energy contractor in Kihei. In Massachusetts, he told us that the state government provides grants for RE systems for this purpose. He recommended that Hawaii do the same. Interviewees expressed concern that as more RE owners sell power to the utilities, there will be fewer ratepayers to pay for the utility's costs; in effect, those who can't afford to buy RE systems could be shouldering more of the burden of keeping the utilities profitable.

There are other possibilities being considered that could take care of this problem:

- Leo Caires owner of a wind company for residential wind installations suggests that landowners could lease their land to investors in RE and part of their payback could be in power. Or his business, Maui Energy Company, could own an installation and have the land or homeowner pay back the company over time.
- Kokurewicz suggested that the utility could lease rooftops from customers, or lease equipment to customers for solar PV installations.
- The County could offer property tax rebates for RE installations such as the Berkeley Financing Initiative for Renewable and Solar Technology - or Berkeley FIRST [14].
- Mayor Tavares wants to be sure to create incentives for property owners who rent their property and the renters themselves to invest in RE.

Irene Bowie, of Maui Tomorrow, believes making RE available and affordable to homeowners will have the added benefit of increasing their 'buy-in' for a RE future.

Efficiency and Conservation

Efficiency and conservation are typically called the 'low hanging fruit', two solutions that are less expensive and more immediately possible than transforming our power structure. Mayor Tavares gave an example of a $300,000 per year electrical cost saving for the County when the Wastewater and Water Departments purchased updated, more efficient equipment. MECO and HECO offer energy-saving advice on their websites as well as providing energy audits to pinpoint energy waste, says Ed Reinhardt of MECO.

The HCEI agreement, signed by HECO, "is 40% renewable energy generation, but 30% greater efficiency or conservation. So, we have to decrease sales by 30% over the next couple of decades," stated Robbie Alm of HECO. The PUC has installed a 'third party administrator' whose job it is to oversee contracted programs (this could be the utilities' or others') that will make this 30% reduction in usage happen. As described above, the PUC's decision to

[14] Property owners will get a state-approved solar installer to choose the best installation for their property. The city will then cut the property owner a check to cover the installation, and add an assessment to their property tax assessed value, to be paid off over 20 years. With an average residential solar installation running about $20,000, that amounts to about $1,000 a year in extra property taxes.

'decouple' the utility's profits from the sale of electricity will create an incentive for the utilities to focus on technology and pricing strategies that promote efficiency and conservation. At that point, homeowners and businesses should have the tools and incentives to make this goal reality. David Fisher advocates "that either the county or 'a new renewable energy stakeholder partner group' promote, document, track and celebrate individual contributions to conservation."

Brad Albert of Rising Sun Solar says its typical for a family that invests in an RE system to cut their electricity usage by 20%, just because they become more aware of their usage when they are producing their own power. In addition, Alm says the PUC is requesting that the utilities install 'smart meters' in new houses to manage the home's energy use more efficiently, while converting older meters over time. There will also be "pricing programs that will reward people for moving your energy use out of our peak hours," says Alm. The use of electric cars through contracts with Better Place and Phoenix Motors on Maui will study how the charging of these cars can move power usage to off-peak hours (after going to bed) creating efficiency because power usage is more even over a 24-hour period. The utility would be able to draw from the storage of power in these batteries to manage fluctuations without using fossil fuels.

Local or Out-of-State Projects

The State needs to support local businesses. Keep the money in the state. Shore up our own companies; let the state step in to keep local businesses going.

Kelly King, Pacific Bio-Diesel, winter, 2009

It's good business for the State to offer tax incentives to local RE projects. When the State invests in a $1 tax incentive, $1.50 is returned to the local economy.

Brad Albert, Rising Sun Solar, winter, 2009

There is a lack of sustainability looming over our head all the time. Money is going out all the time and the biggest of these is fossil fuels…it's all money going off-shore. Keep those funds circulating within our shores. Keep the jobs here.

Charmaine Tavares, Mayor of Maui County, summer, 2009

In order to meet the goals of HCEI and MCEA, both local and out of state businesses that design, construct and manage RE projects, will be needed. Local contractors understandably want to keep things local and yet, there is also universal recognition that outside knowledge and technology will be essential. Everyone appreciated the Department of Energy consultants that are dedicating their time to making the HCEI happen; likewise, the smart grid and electric car innovations and Kaheawa Wind Farm.

Besides economics, other values should be seen as important, so says Alex DeRoode, of the Sustainable Living Institute of Maui. He cited the 'triple bottom line' criteria for responsible

business practices: economics, environment and social benefits as an example. He believes consumers want to support businesses that take this concept to heart. Ruby Hamili would hope that spirit and respect for the host culture would also play a role.

Local companies such as Rising Sun Solar, Maui Energy Company and Pacific Bio-Diesel believe that their on-the-ground expertise and commitment to local prosperity give them unique knowledge about what will benefit Maui and Hawaii. They know the islands. Kelly King of Pacific Bio-Diesel noted that it has only been recently that she and her husband, Bob King, were asked to provide information for a plan for the use of local sources of bio-fuels for the State. In the HCEI and MCEA planning, local contractors want a seat at the table and recognition of what they have to offer.

This issue also raises the question of the size of projects. Out-of-state projects tend to be larger, with more megawatt potential, while smaller projects are owned by homeowners and local businesses and produce smaller amounts of extra power. Chris Mentzel explained that many smaller RE installations have the advantage of spreading out the risk when one system goes down, and stabilizing the power fluctuations affecting the grid (wind and sun won't disappear everywhere at the same time). On the other hand, Mentzel pointed out that larger installations have the advantage of a reduced number of permits, hookups, and monitoring sites. In terms of placement, one large installation may disrupt fewer neighborhoods with towers or solar arrays than many smaller ones would.

There are several large mainland-owned RE companies in Hawaii that have arrangements with our utilities in the form of power purchase agreements (this is where the utility offers to buy power at a given rate per KWH from a power-producing company). The most well-known of this kind of arrangement is MECO's agreement with First Wind, owner and operator of Kaheawa Wind, which operates 20 wind turbines on the slopes of the West Maui Mountains, providing approximately 9% of Maui's total energy needs annually. Other large contractors are awaiting similar arrangements, however, the future of power purchase agreements remains uncertain given the proposed Feed-in Tariff.

Ronald Stebbins, of Maui County Real Estate, representing Southland Community Development Corporation, proposes one large 'heat exchange' project in Hana that could power all of Maui County and have a lower per kWh price than current utility rates. He predicts that lower customer utility rates will be a high priority if the public has any decision-making power in types of RE power.

Workforce Education and Retraining

According to Alex Deroode, Director of SLIM and Chair of the MCEA Working Group Two on RE Workforce Development and Education, plans are taking shape at MCC and Maui's high schools, and even the elementary school level to create career track training and degree programs

that will educate not only future RE technicians, but leaders in the RE field.

David Fisher of the Hawaii Small Business Development Center on Maui told us that there will be just as much need for strategic leadership skills as technical skills. In his experience, leadership in this dynamic field requires leaders who have honed their analytical, communication, negotiation, and relationship building skills – important for both local and off-island contractors because of increased dealings with off-island suppliers and corporate headquarters. He listed for us some of the possible job training categories that workforce development at the County and State levels should consider:

- MECO and HECO Smart Grid engineers
- Electric Car Company - manufacturing and sales
- Farmers Growing Bio-fuels – research and experimentation with different crops and locations
- Technology Innovation – understanding of Smart Grid technology, Smart Meters, and more…
- Efficiency in Green Building (LEED) – Architects and Designers
- Development of Forest Stewardship Council (FSC) Wood Suppliers

David Fisher say that we need to give special emphasis on developing and supporting local companies if there are to be jobs for those trained by our educators. Local companies, by definition are rooted here and will less likely move away when a contract is over.

John Harrison of MEDB and the crafter of the master document drawing together the work of the MCEA Working Groups, told us that there is a need for incubator space for RE on Maui. MEDB is also bringing businesses involved in the electric car such as Better Place and Phoenix Motor Cars to Maui as well as helping companies such as Oceanlinx, the creator of an offshore wave machine, interface with Maui government and the community.

Brad Albert told us that the Hawaii Solar Energy Association promotes certification for solar contractors, although many electrical contractors are presently installing solar systems without certification. MECO's Residential Solar Hot Water Loan Program has tried to promote certified solar contractors by requiring it as a condition for receiving a 0% interest loan for residential solar hot water.

Those workers who have been involved in the petrochemical industries, including car mechanics and utility workers, will need re-training to make them marketable in a new RE economy. Without help in getting this retraining, many of these workers could face hardship and could find it difficult to support an RE future.

Zoning Restrictions and Land Use

Leo Caires, of Maui Energy Co, pointed out that there are zoning restrictions on wind turbine towers. He said that in residential areas, the height of a tower is limited to 35 feet from base to top of blade. This takes into account the concerns of homeowners and their reluctance to view

wind towers, especially in their view sight. "For wind towers to be most effective, they need to be as high as possible to catch the upper winds", says Caires. He suggests that zoning should be adjusted to make areas of Maui that have good wind potential have zoning rules that allow taller wind turbines. Mayor Tavares also believes land use regulations such as the 35-foot height restriction will have to adjust to make way for RE projects. She spoke of innovations such as vertical axis wind turbines[15] that might help to alleviate height issues for home wind turbines.

The state of Hawaii permits the use of lands originally zoned as agricultural land use districts to be used for renewable energy production, storage, and distribution, including the production of biofuels. Biofuels production facilities must be integrated with an agricultural activity and may not adversely impact agricultural land and other agricultural uses in the vicinity. Biofuels production facilities include facilities that produce liquid or gaseous fuels from organic sources such as biomass crops, agricultural residues, food wastes, and oil crops including palm, canola, soybean, and waste cooking oils. [16] Caires commented that agricultural land should be able to be a site for solar and wind farms as a part of the agricultural zoning definition. According to interviewee, Kelly King of Pacific Bio-Diesel, land use planners will also have to figure out where agricultural land can support bio-fuels as well as food, but it is possible to grow crops that can provide both. She showed us a land use development plan revealing that Hawaii has about 1.3 million acres of zoned agricultural lands and forests. 675,000 acres are designated as prime agricultural lands of importance to the State of Hawaii (ALISH) of which less than 200,000 acres are under cultivation[17].

In the recommendations section, on pages 29-30, we took an illustrated look at the stakeholders and their interests of the issues of 'bio-fuels' and 'power generation'. The possible stakeholders and their interests are diagrammed, offering our readers an example of the first steps of interest-based negotiation. The descriptions of the issues are as follows:

Bio-fuels As a Renewable Energy Source

Bio-fuels as a RE source is an international issue that raises many questions:

- Where is the bio-fuel for electricity generation going to be grown?
- Do we want bio-fuels for electricity?
- How far does it need to travel (and therefore increase its carbon footprint) to where it will be refined and used?
- Is it taking the place of food crops being grown for people (especially poor people in developing countries)?

[15] http://www.treehugger.com/files/2007/01/magwind_vertica.php

[16] U.S. Department of Energy. (Reference Senate Bill 2849, 2008) http://www.eere.energy.gov/

[17] See HB 265 This Act shall take effect on July 1, 2020

- Will the demand for bio-fuels affect the price for food (especially in developing countries), as bio-fuels potentially compete with food production?
- What is the relationship between growing bio-fuels and the price of food? Are there other factors we aren't considering such as the cost of transporting food when oil prices spiked in 2008.
- Is the demand for bio-fuels causing poor people in developing countries to cut down their forests (especially species-rich, wildlife-dependent, oxygen-producing, carbon dioxide-holding rainforests) in order to grow more profitable bio-fuels? And is this replacing crops such as palm which is a food source with growing palm for fuel?
- Does the type of bio-fuel produce significantly more power than it takes to make it, and does it lower carbon emissions?
- Which types of bio-fuel can be grown over a long period of time without degrading the land its grown on?
- Is algae a viable alternative to other crops and is it economically feasible?
- What kind of a strain will the growing of bio-fuels put on water supplies?
- Can the health of cropland be guaranteed growing bio-fuels?

In our interview, Kelly King of Pacific Bio-Diesel makes a distinction between 'renewable' and 'sustainable,' defined as "living in harmony with the resources of our island," and argues that sustainability should be the top priority in considering the future use of bio-fuels. She also wants to end Hawaii's dependence on outside suppliers where fuel is a commodity. "The market fluctuations that affect commodity prices are irrational and the opposite of the set production costs of a local producer's price structure where "production is matched to local resources and demand, and there is a short line between the producers and the customers," she claims. King pictures "building a much more sustainable system with smaller facilities on each island where you don't even have to ship the oil inter-island… It's a lot more efficient, uses less energy, has a positive environmental balance, creates more jobs and energy security, and supports the agriculture and the economy of each island."

This issue can be divided into two parts: transportation and power generation. Kelly King sees transportation, back-up power generation, and farm equipment as the best future use for bio-fuels. As long as power generation is provided by RE, she believes cars should be powered electrically. Everyone seems to agree that bio-fuel has a place in transportation. King is researching the available land for growing bio-fuels on Maui and believes there is plenty of land not presently being used to grow approximately 9 million gallons of bio-diesel she estimates are needed for transportation and farming per year. Because so many different plants can provide bio-diesel, King believes a variety of crops can be grown, dependent on weather and soil conditions, and the preference and ingenuity of farmers. Rob Parsons has looked into the

likeliest bio-fuels crops, jatropha and palm, and talked to Warren Watanabe[18] of the Maui County Farm Bureau. Watanabe doesn't presently see the financial potential for these crops without adding value to them beyond their use as a fuel source. For this reason, he questions whether farmers would be willing to grow them, even if the crops are subsidized. In fact, Pacific Bio-Diesel is networking with farmers beginning to grow quantities of jatropha on the Big Island.

In terms of power generation, Ed Reinhardt would like to be able to "source (bio-fuels) from local sources…so we don't have to be relying on unstable oil prices. It can be more predictable for us and for our customers…with farmers providing crops that create income for their farms." Beyond transportation needs, Parsons doesn't see the land on Maui being available to provide the current one million gallons of fuel per week needed by MECO's Ma'alaea plant, or 76 million gallons in total each year (2007). He has greater concerns about buying bio-fuels from Indonesia or another international producer. These are: the carbon created in shipping the fuel to Hawaii, the land use practices of bio-fuel producers in Indonesia and Malaysia, the carbon emissions produced as rain forests are burned to clear land, the threat to endangered species due to habitat destruction, and the potential human rights issues that have arisen in developing countries due to the production and exportation of bio-fuel. In the end, Parsons hopes that future energy sources will limit burning of any fuel to stop climate change, and hopes that food will take precedence over fuel for agricultural land use[19].

Reinhardt also spoke of a long-range plan to use algae as a source of oil for bio-fuel for MECO's generators. MECO is planning a 5-acre pilot project to test algae's potential and its compatibility with their existing infrastructure. Algae can produce ten times the amount of oil per acre as any 'terrestrial plant'. However, the commercialization of this bio-fuel source is 5-10 years from being realized.[20] Mayor Tavares wants Maui County to be a testing ground for numerous RE possibilities such as algae that will be tested here for its financial and operational practicality, as well as its power generating ability. Environmentalists Rob Parsons and Irene Bowie voice several concerns about algae: whether a large-scale algae project is economically feasible, what impact the fuel algae might have on nearby ocean algae, whether genetically modified algae would be used, and the prospect of burning anything to produce electricity, no matter what its source.

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[18] 2008 Planning Committee panel discussion, convened by Gladys Baisa, titled, *Considering Biomass Energy*

[19] Kelly King further notes that renewable fuels like bio-diesel, produced from recycled oils and fats have recently been given an 80% greenhouse gas reduction count by the EPA in their life-cycle analysis.

[20] Hawaii Energy Policy Forum: http://hawaiienergypolicyforum.blogspot.com/2009/03/fuel-food-and-fiber-potential-promise.html

Reinhardt explained that bio-fuels provide a crucial RE source of dependable liquid fuel for the backup of less stable power such as wind and solar, whereas, King questions the long-term sustainability of growing bio-fuels for power production. "While the grid has existing equipment that must burn bio-diesel to meet emission standards, the use of bio-diesel makes sense," say King. But she doesn't support plans to build new "liquid-fuel" plants for the power company. Mayor Tavares also questions whether Maui has the land capacity to provide for all potential bio-fuel needs.

Reinhardt says MECO wants to use imported bio-fuels to test them now to see whether they will work in the present equipment. HECO and MECO have worked with the Natural Resources Defense Council (NRDC) to import only bio-fuels that meet or exceed all of the Roundtable on Sustainable Palm Oil ("RSPO") Principles and Criteria. In the longer term, the state is developing an 'energy feedstock program' to make bio-fuels a viable crop in Hawaii. The utilities have agreed "in principle that paying a reasonable cost premium for locally-produced bio-fuels is acceptable[21]."

One final piece of the bio-fuels issue, which is also a concern in the future use of electric cars, is the infrastructure that presently surrounds fossil fuel-based transportation. Businesses such as car dealerships, car rental companies, gas stations and repair shops have a lot at stake in the transition to RE. How will their concerns be addressed? What will help them buy-in to RE rather than block its progress?

Power Generation: Distributed and Centralized?

I favor Distributed generation. Ever since 9/11, the vulnerability of centralized systems has been a security concern. If there's one system and it goes out, the effect is too drastic.

Mayor Charmaine Tavares, summer, 2009

As stated above, customers are used to having one reliable power system that generates and transmits power to homes and businesses: a centralized power system owned and run by a utility company.

With the rise in RE sources of energy, this scenario is changing: large-scale wind, ocean and solar installations, as well as homeowner RE systems, are providing power to the utility for profit. One of the benefits of small-scale RE, in the opinion of Rising Sun Solar owners Besasso and Albert, is that the homeowner can become the producer of his/her own electricity, as well as a supplier to the utility of power for other people's use. Hundreds, if not thousands, of homes

[21] http://hawaii.gov/hdoa/meetings_reports/special-reports-1/2008%20Energy%20Feedstock%20Report%2012.9.08%20-%20final.pdf

and businesses could become power producers. These are considered 'distributed' power producers, individually feeding into the utility's grid.

We were told by the RE contractors we spoke with that they, and homeowners wanting to invest in a PV or wind system, would like distributed power to play a large role in Hawaii's energy future. Mark Duda, of Sunetric, feels the HCEI "just hasn't considered distributed energy." Duda and other RE contractors see that having the generation of power in homeowners' hands provides a security and stability for individuals that haven't been possible before. The contractors also believe this homegrown power is more efficient because the power is used closer to its generation, decreasing the loss of electricity that happens when it has to travel a long way to be used. However, as previously discussed, solar and wind are less predictable sources of power, which means the utility needs to manage them more carefully.

The question of the limits of the present grid's capability to receive fluctuating power, as well as potential limits when the grid is improved is a critical one for local contractors. Currently, the utility will only be able to take a relatively small percentage of distributed power. The future limit is unknown. Ed Reinhardt speaks of a present "maximum limit" for receiving solar and wind power above which circuit breakers would need to be upgraded to protect the grid. Besasso and Albert are frustrated because they don't know the utility's current "limitations and capabilities." Duda wants to know "how much can we connect with now, how much in 5 years?" "What would it cost to make the grid 20% open to distributed generated RE?" asks Albert.

The future potential of battery storage or ultra-capacitors would even out the fluctuations, making it easier for the utility to depend on these RE sources, as would the upgrade of the grid. These technologies are new, which means the percentage of distributed power the utility can receive will be a hot issue into the near future.

RECOMMENDATIONS

As described, there are many issues to be resolved in order for the RE movement to succeed. Undoubtedly there are other issues we have not identified, as well as other stakeholders and interests. What follows are five recommendations to strengthen the planning process and the relationships of those affected by the outcome.

Recommendation 1: Use Interest-Based Negotiation Strategies

Many of the present processes for resolving the different opinions held by the parties involved are 'rights-based', meaning the differences are settled by referring to rules and laws. Although PUC decisions and laws passed by the legislature concerning RE, such as HB1464, do involve citizen input, parties are typically only interested in having their positions win.

In interest-based processes, all parties who view themselves as affected by a project, issue or initiative have a stake in the discussion. All parties are understood to have 'interests', the ideas and concerns they want considered as the discussions progress, and all parties accept that every other party's interests will factor into the discussion as much as their own. Therefore, any solution will be based on the interests of all concerned. Another way to state this is that the solution is guaranteed to be workable for all parties involved because they and their concerns are part of the decision-making process.

A benefit of interest-based negotiation is the ability to include hundreds of stakeholders. Stakeholder groups, such as stockholders, unions, or environmental and native Hawaiian groups, can choose representatives to take part in discussions. These representatives can keep their groups up to date with information, and also bring back to the discussions any concerns or ideas of their group.

Another benefit of decisions based on interests is the trust and long-term working relationships that develop when all parties literally work together to satisfy each other. It can be argued that Hawaii and Maui will need all parties to work together in order for some version of the ambitious goals of the Energy Initiative and the Energy Alliance to come to being.

A skilled facilitator knows how to manage these intricate discussions to keep them productive.

Suggested Steps for Interest-Based Negotiation

1. Commit to working together to solve the issues in ways that meet everyone's needs
2. Gather representatives of every stakeholder group and identify each of their specific interests that must be addressed.
3. Share all needed information, identify sources and agree on criteria to gain further information.
4. Brainstorm and evaluate ideas and options, focusing on how to make ideas work.
5. Choose promising ideas to develop in detail, moving toward final agreement for a holistic plan.
6. Document the plan. Plan for stakeholder oversight and evaluation[22].

See diagramed example of two issues with probable stakeholders and their interests below:

[22] With thanks to the U.S. Department of Transportation Federal Highway Administration

PERCENTAGE OF DISTRIBUTED & CENTRALIZED POWER

Stakeholders and Their Interests

PUC

- Fair pricing for utility customers
- Fair regulation of utilities, with adherence

Landowners and Farmers

- Land use zoning favorable to RE
- Viable lease agreements for RE projects
- Incentives for use of land for RE projects

Government

- To be a model for other states, islands and nations
- Transition to RE
- Protect the environment
- Satisfy citizens
- Meet the goals of HCEI and MCEA plans
- A healthy, competitive RE economic environment, supporting innovation
- Federal incentives and grants
- Good relationships
- Adherence to regulations
- Conservation & efficiency
- Adequate staffing for RE future
- Smart grid for utilities

Individual Power Producers

- Control over their own power
- Viable income from extra power
- Lowered carbon footprint
- Smart grid for the utilities
- Smart meters on home to efficiently manage power usage
- Clear and streamlined decisions on rules, laws and regulations
- Return on RE equipment investment
- Tax incentives & Rebates for RE
- Ability to gain bank lending
- Zoning laws that support RE

Electric Company

* Financial viability/ satisfying shareholders
* Fulfillment of their charter to provide reliable, stable power
* Lowering emissions for environmental preservation and for avoidance of future cap & trade costs
* Obeying PUC rules
* Getting the most out of their investment in present equipment
* Protection of equipment
* Training for workers on new equipment
* Tax incentives for RE
* Good relations
* Satisfied customers
* Conservation & efficiency
* Updated grid and equipment
* To be a model for other states, islands and nations

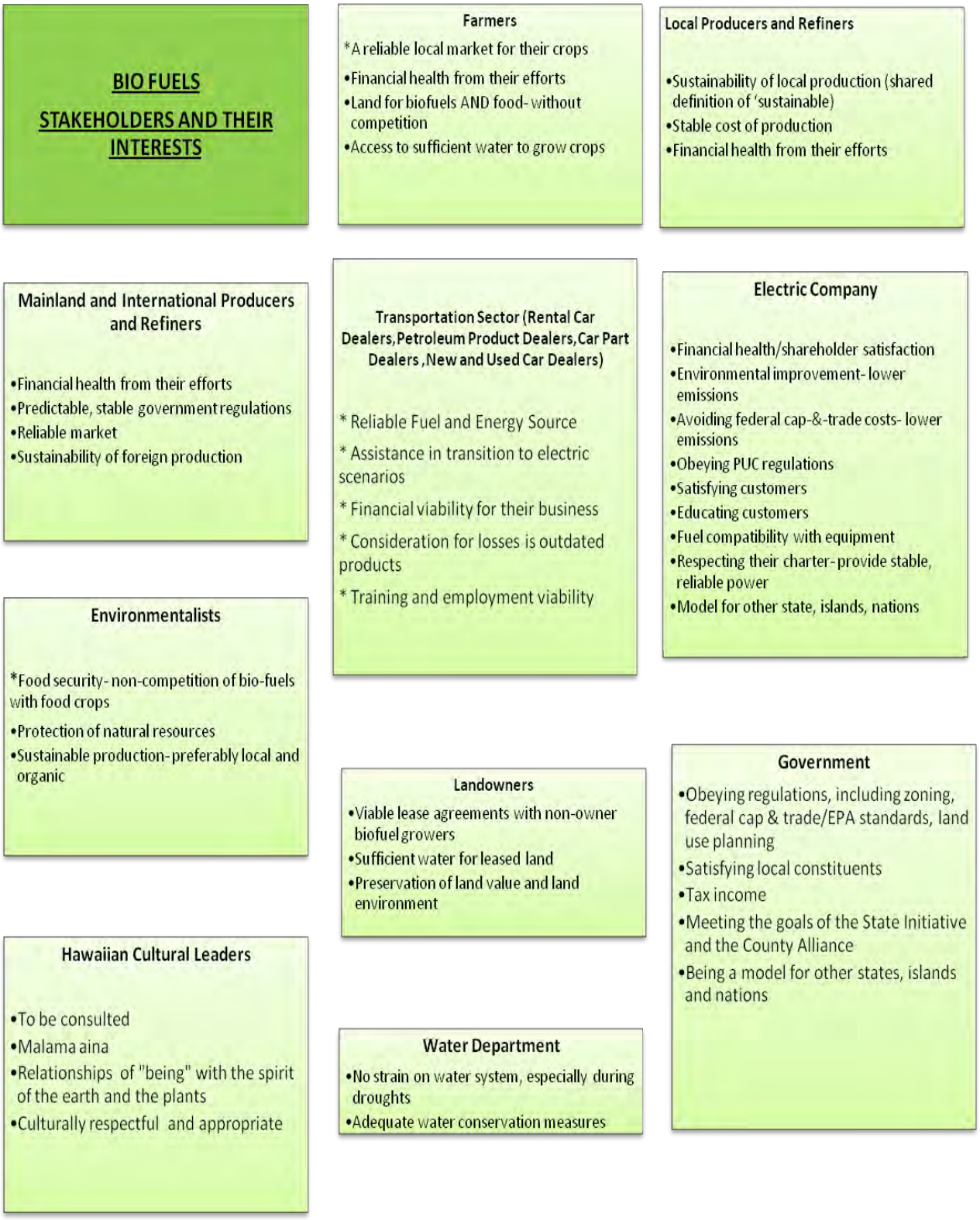
Renewable Energy Contractors

- Financial viability
- Full disclosure of all relevant information
- Easy communication
- Clear and streamlined decisions on rules, laws and regulations
- Predictable fee rates on extra power production
- To be a model for other states, islands and nations
- Happy customers
- Reliable power
- Transition to state-wide RE production
- Good community relations
- Updated grid and equipment for utility
- Understood and enforced requirements for electrical contractors
- Tax incentives for RE

•Specific to local contractors

- Local prosperity
- Understood and enforced requirements for electrical contractors
- Efficiency of power use- short distances between generation and use

Creative Conflict Solutions, 2009



Creative Conflict Solutions, 2009

Recommendation 2: Commit to Transparency for Information Exchange

Access to information is vital to good communication and strong trust between parties. Without the sharing of data relevant to the issues, people have to start guessing, at which point accurate decision-making is impossible and distrust flourishes. Information can be power. By sharing information, deeper trust can be gained that creates good working relationships for now and the future. Negotiating without all needed information will promote animosity. It is acknowledged that competition may preclude total transparency when it comes to proprietary technology and processes.

From our interviews we found that many parties felt they didn't have complete information from other parties that was essential for their future planning. This issue could create serious roadblocks unless it is addressed. We suggest that all parties recognize their inter-dependence on each other in this endeavor. We urge that stakeholders be given the information they feel they need in order to plan and negotiate together. If Hawaii and Maui County are to reach their goals, information must flow freely.

Public access to information, including an understanding of what planning, negotiation and discussions are taking place, is another feature of transparency. Hawaii citizen's are stakeholders and thus need information in order to take part in the process and to build trust that government and businesses are acting with them in mind.

Recommendation 3: Use a Whole-Systems Approach

Every change Hawaii makes, policy, projects etc., will affect countless sectors of our island economy and culture. Foreseeing short and long-term effects, both positive and negative, and possible unintended consequences can be achieved through whole-systems mapping to gain insight into the multiple connections that exist and the impact each change will cause on the Hawaiian Islands, as well as illuminating where positive inputs can be leveraged to improve outcomes. As the Rocky Mountain Institute advised in its whole systems project report on Big Island food security[23], "in an island ecosystem and economy… the size of land and population and resource constraints produce extremely fast feedback loops. Any one decision will have multiple consequences and they will come to pass quickly." The authors from RMI advised looking for these consequences and leverage points throughout the planning stages. We suggest that Maui County follow the lead of the Big Island and make use of the Rocky Mountain Institute or the Millenium Institute[24] in doing a whole-systems mapping of our MCEA goals and

[23] Island of Hawaii Whole System Project, Phase I Report, Rocky Mountain Institute, by Christina Page, Lionel Bony, and Laura Schewel, March 2007

[24] We understand that the Maui Economic Development Board has entered into a contractual relationship with the Millenium Institute to help with simulated scenario for energy planning and to enhance "community conversations" around energy policy. www.milleniuminstitute.org

strategies to maximize their success.

Recommendation 4: Commit to Full Public and Stakeholder Involvement

Because this movement affects every Hawaii resident, the public is a huge stakeholder in its outcome and success. The concerns individual residents may have could include:

- Hawaiian cultural protocol violations
- how visible or loud the systems are
- the cost of utility bills from renewable energy sources
- the cost effectiveness of installing individual RE systems
- impact on the environment
- the ease or difficulty of using RE
- how the transition will affect their jobs

Every concern has merit. The public has the ability to help this movement fly, or block its forward motion. The public will need to be educated about the options that exist, how the options will affect them, and the consequences of action and inaction. The public will also need to be consulted so their concerns and ideas can be considered. Likewise, stakeholder groups that have not been included need to be invited to join the discussion. The U.S. court system has enabled individuals and groups to cause a halt to massive plans such as the Hawaii Superferry. Proactive inclusion of individuals and groups and their interests can avoid such situations.

The National Research Council was asked by the Environmental Protection Agency, the Department of Energy, the Food and Drug Administration and the Forest Service to conduct research on the importance of public participation in policy decisions and potential projects. This is the Council's first recommendation:

"Public participation should be fully incorporated into environmental assessment and decision-making processes, and it should be recognized by government agencies and other organizers of the processes as a requisite of effective action, **not merely a formal procedural requirement…** Participatory processes convened as a superficial formality or without adequate support by decision makers increase the public's distrust of government when, almost inevitably, the results have little impact."

We suggest that the State and County make this issue a priority by inviting interest groups who don't feel included to participate as soon as possible. We also suggest that a vigorous and multi-faceted public involvement campaign be planned and funded as soon as possible[25]. This would

[25] We learned during our interview with Mayor Tavares that a public forum is being planned for September 10th and 11th, 2009 that will feature the unveiling of the MCEA Working Group Recommendations for comment. The public will be informed of this through the media and there will be ways on the internet to respond to these recommendations as well.

include public meetings with small breakout sessions, on-line discussion capabilities, and TV, radio and print efforts to broadcast information and solicit input, interactive media coverage, and clear feedback on consideration of public input. A neutral, non-political entity should be used to facilitate discussions with all stakeholders and interests.

Recommendation 5: Promote Diverse Leadership

Bringing all stakeholders into the planning process has the added bonus of creating a wide variety of leaders for the RE movement. This is a step beyond public involvement. As people are brought into the movement they can be encouraged and invited to help engage others. Without active, passionate, widespread leadership, momentum is harder to achieve. From state and county, to business and community, to households, leadership will offer a vision and the steps to get there.

Hundreds of leaders who have the information to help educate others, and who understand the consequences of inaction, are essential. It's also important to counter the typical belief that RE, efficiency and conservation are too costly. Hunter Lovins recently spoke at a Dowling Focus Green lecture on Maui and gave dozens of examples of where these changes saved money and improved productivity. It will take leaders with a "can-do" approach who offer incentives along with a supportive climate for innovations; a leader who can articulate how moving to RE is well worth our effort. It will also take leaders who are environmental stewards, who demonstrate a deep respect for the host culture and can balance this stewardship and respect with an eye to our prosperous future.

Conclusion

The bird's eye view offered here represents one short period of an evolving, dynamic occurrence. As renewable energy blossoms out across the state, it is impossible to identify and describe every part of this multi-faceted, morphing movement. There will be new technologies and innovations that replace our outdated infrastructure, with new issues arising and old issues that get resolved. The stakeholders will remain: the people of Hawaii. The recommendations offered above, have everything to do with how the stakeholders work together, now and in the future. Good relationships and communication will be essential ingredients in the success and health of Hawaii as an energy-independent `ohana.