BEFORE THE PUBLIC UTILITIES COMMISSION

OF THE STATE OF HAWAII

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| In the Matter of the Application of | ) | PUC Docket 03-0371 |
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| PUBLIC UTILITIES COMMISSION | ) | |
| | ) | |
| Instituting a Proceeding to | ) | |
| Investigating Distributed Generation | ) | |
| in Hawaii | ) | |
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LIFE OF THE LAND'S

STATEMENT OF POSITION

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CERTIFICATE OF SERVICE

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May 7, 2004

Aloha Commissioners:

The Hawaii Public Utilities Commission ("commission") opened Docket 96-0493 on December 30, 1996 to examine the issues related to the introduction of competition in the electric utility industry. Life of the Land's Motion to Intervene was granted. The commission closed the docket on October 21, 2003, stating in part:

> Electric industry restructuring should only be initiated if it is in the public interest. Developments in other states indicate that, at best, implementation of retail, access would be premature. In addition, projections of any potential benefits of restructuring Hawaii's electric industry are too speculative and it has not been sufficiently demonstrated that all consumers in Hawaii would continue to receive adequate, safe, reliable, and efficient energy services at fair and reasonable prices under a restructured market, at this time. Accordingly, the commission does not find it is in the public interest to completely restructure the electric industry at this time. We will continue, however, to keep a watchful eye on restructuring experiences in other states. In the alternative, the commission finds that it is in the public interest to work within the current regulatory scheme to strive to improve efficiency within the electric industry.

In late 2003 the commission opened docket 03-0371 to focus on distributed generation. Life of the Land's Motion to Intervene was granted.

The Legislature passed Senate Concurrent Resolution 180 SD1 on April 30, 2004. The Concurrent Resolution states in part: "The Public Utilities Commission is requested to explore HOW TO implement the concept of intra-governmental wheeling to facilitate

government wheeling of electricity." Wheeling should be one part of the Distributed generation framework.

Life of the Land strongly believes that replacing imported fuel with indigenous fuel has an enormous positive impact on local jobs and on economic prosperity. These twin economic externalities are often ignored in limited costs and benefits analyses of alternative energy futures. For Hawai`i, switching from imported fuels to indigenous fuels is equivalent to switching from fossil fuels to renewables, which also has positive environmental externalities. Life of the Land believes that a full appreciation of these economic and environmental externalities is crucial to building the proper framework for Distributed Generation. Our Statement of Position starts with an Economic Analysis.

Which energy future maximizes state GDP, has the largest increase in employment, diversifies the economy, and offers the greatest opportunity to prevent external economic shocks from damaging our local economy? Is this the path that we are on? If the current energy strategy is different from the economic maximizing strategy, then what does the current strategy maximize and who does it benefit? If the current energy strategy is different, what is the most effective way for shifting our current system to the ideal future system?

The answer is that renewable energy DG maximizes the economy. This docket will enable the PUC to establish Hawaii Administrative Rules ("HAR") to facilitate this transformation.

Historically, fossil fuels transformed the world from a pre-industrial era to a post-industrial era and into the information/technology era. However, the rapid

advancement of society has come with enormous negative externalities brought about by our unsustainable energy policy. It is imperative that we move beyond fossil fuels. The answer to our twin dilemmas (maximizing GDP, creating a sustainable future) has a common answer: Distributed Energy Resources ("DER").

The use of Fossil Fuel Based Combined Heat and Power ("CHP") will provide a key role in developing, creating and implementing a new energy internet. This interactive grid will contain numerous suppliers (generators) and demanders (load). When Renewable Energy Based Fuel Cells are price competitive, many of the Fossil Fuel Based CHP plants can be retrofitted with Fuel Cells.

Life of the Land specifically chose not to use the term "cost-effective" in the above paragraph. The key term -- "cost effective" -- does not connote a common sense view of comparing the cost of one technology to another. Rather, it has an idiomatic meaning that is counter-intuitive: comparing the price of two or more technologies after stripping away crucial cost/benefit valuations, thus totally altering, and make meaningless, the price comparison. Its not just the removal of environmental externalities, but also the removal of extremely important economic and financial analyses.

Enterprise Honolulu (formerly known as the Oahu Economic Development Board) published a series of reports called the Economic Development Series ("EDS"). Two of the installments are important is this discussion: Installment #10: Imports, Exports and Economic Development (August 28, 2003)[1] and Installment #11: Export Enhancement

[1] www.enterprisehonolulu.com/html/pdf/EHeseries10.pdf

and Import Substitution - Key Strategies for Hawai`i's Prosperity (September 4, 2003)[2].

EDS 10: Imports, Exports and Economic Development:

"A Key characteristic of a healthy economy is that it exports more than it imports. This is especially important for an island economy with no land-based contiguous markets. These goods arrive each day in containers at Sand Island and at the airport via cargo planes from global suppliers in other parts of the world.

We pay for all of these overseas shipments ... with the money available to us. Imagine if we had to pay for all these products with hard cash, and that no cash was coming into the state. How long would it take before we had no money left in the islands?

In order to pay for the things we import, we need a flow of exports to keep refilling our coffers. And the flow of payments for the goods and services we import should be at least balanced by the flow of goods and services we export. If payments for imports exceed payments for exports, we have a 'trade deficit'. Just like a negative balance in your checking account impacts your household, if a trade deficit continues too long, a region's quality of life begins a downward slide.

So how are we doing? According to the State's Department of Business, Economic Development and Tourism, not do well:

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| Imports (goods and services) | $14.954 billion |
| Exports (goods and services) | $ 2.194 billion |
| Deficit (goods and services) | -$12.760 billion |

This massive deficit could bankrupt us in no time. Fortunately, tourism overshadows Hawaii's export business and greatly reduces the trade deficit:

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| Deficit (goods and services) | -$12.760 billion |
| Tourism (goods and services) | $10.033 billion |
| Net Deficit (goods and services) | -$2.727 billion |

Federal expenditures of over $9 billion per year also keeps us from hitting bottom. However, the fragility of the tourism industry combined with the dependence upon the federal government makes our whole economy fragile. To overcome these challenges, Hawaii must design new strategies which will result in sustainable prosperity for our state.

[2] www.enterprisehonolulu.com/html/pdf/EHeseries11.pdf

EDS 11: Export Enhancement and Import Substitution - Key Strategies for Hawaii's Prosperity:

> Key strategies to overcome the deficit and protect us from volatility of the tourism industry and dependence on the federal government include economic diversification to achieve: ... Export Enhancement - Increasing the volume of goods and services we sell outside Hawaii. ... Import Substitution - Replacing goods and services bought outside the region.

There have been numerous analytical studies on the relationship between increasing the use of indigenous fuels and its effect on economic growth and job creation. The relationship holds true for whatever type of fuel exists locally. As renewable resources are plentiful in Hawai`i, the following discussion will be focused on renewable energy. One method for supporting local Renewable Energy is via the Renewable Portfolio Standard ("RPS") mechanism.

> **Center for Business and Economic Research at the University of Nevada, Las Vegas (2003)**[3] Carson City, Nevada – Nevada could realize nearly $21.5 billion in gross state product (GSP) and grow thousands of jobs through the year 2035 by simply meeting the state's renewable portfolio standard – according to a study commissioned by the Nevada Renewable Energy and Energy Conservation Task Force. The study, conducted by Mary Riddel, Ph.D., and Keith Schwer, Ph.D., of the Center for Business and Economic Research at the University of Nevada, Las Vegas, examined the potential for energy generation using renewable energy sources within Nevada.
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> **Black & Veatch: Economic Impact of Renewable Energy in Pennsylvania (March 5, 2004).** The economic impacts of the RPS portfolio [10% renewable energy] were compared to 'business as usual' (BAU) case of building all fossil fuel resources. The analysis revealed that over 20 years the RPS portfolio would cost $1.23 billion greater than the BAU case on a present value basis. Relatively speaking, the cost is minimal. When spread over all retail electric customers, this increase in cost would result in an **increase in electric rates of only 0.036 cents/kWh**, or about 29 cents per month for the average residential customer. However, the RPS portfolio would result in **$10.1 billion more in gross state output over 20 years** than the BAU portfolio. In addition, the RPS portfolio would provide **a $2.8 billion advantage in**

[3]Over $21 Billion In Gross State Product Attributable To Renewable Energy Through 2035. Interstate Renewable Energy Council. www.irecusa.org/articles/static/1/1050579107_1006793937.html. The Potential Economic Impact of Nevada's Renewable Energy Resources. Mary Riddel, R. Keith Schwer. Center for Business and Economic Research. University of Nevada, Las Vegas energy.state.nv.us/ taskforce/Executive%20SummaS%20Only%20Final.doc

**earnings** and generate about **85,000 more job-years over 20 years** than the BAU portfolio. In addition, a review of recent studies revealed that there is strong evidence for fossil fuel price and consumption decreases as a result of renewable energy development. This analysis revealed than even a 1 percent reduction in fossil fuel prices would lead to a $140 million reduction in annual fossil fuel expenditures for power generation, or 50 percent of the RPS cost premium in 2015.

**Australia: Clean Energy's Jobs Bonus (2003)**[4] A sustainable energy industry could deliver up to 4,000 jobs to the NSW economy if the government was to seize the challenge of promoting clean power, according to a new report. Prepared by the Allen Consulting Group for the Sustainable Energy Development Authority, the Report models the potential economic impact of sustainable energy options.

**Hawaii Department of Business, Economic Development, and Tourism (DBEDT) (2001)**[5]**:** During the 2000 Legislative Session, a concern of some Legislators was whether a RPS would increase electricity costs to ratepayers, adding to Hawai`i's already high rates. DBEDT asked GDS to determine at what percentage a RPS for Hawai`i would be practical and cost effective in comparison to the current utility IRPs. GDS developed a computer spreadsheet-based cost model for the purpose of evaluating potential renewable portfolio standards. The model calculates annual costs of producing electricity to meet each utility's annual requirements for a period of twenty years (2001-2020).

The GDS Study found that Hawai`i would spend $3.172B on energy from 2001-2010. Hawai`i would save $43M by switching to 10.5% renewables. Unfortunately, his analysis was lacking in our view, because it assumed that the cost of oil was $25/barrel and that balance of trade impacts were irrelevant.

**The Economic Impacts of Renewable Energy Use in Wisconsin (Wisconsin Energy Bureau, 1994):** A study done for the State of Wisconsin found that displacement of fossil fuel energy by local renewable energy would prevent the loss of $6 billion from the state to pay for extraction, refinement, and transportation of fossil fuels.

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[4] workers.labor.net.au/169/news63_energy.html

[5] Analysis of Renewable Portfolio Standard Options for Hawaii. (March 2001). Submitted to the State of Hawaii Department of Business, Economic Development & Tourism by GDS Associates, Inc. ("GDS")

> By accelerating economic growth (by keeping the $6 billion in state), renewables located in the state could provide between 48,202 and 63,234 new job-years. (Steve Clemmer and Don Wichert, The Economic Impacts of Renewable Energy Use in Wisconsin.)[6]

**Life of the Land (2000):** Energy policy can not be separated from economic policy, nor should it. Chapter 17 of DBEDT's Hawaii Energy Strategy 2000 contains comments made by reviewers. Life of the Land commented: "The plan correctly points out that increasing the use of indigenous energy sources would be a better economic choice than our current 'bleed' of our economy to purchase foreign fossil fuel. Exporting money from our economy only drains our local economy and provides for employment for workers in other countries. Hawaii needs to become more self-sufficient."

**Economic Multipliers:** The economic multiplier effect means that one dollar invested in Hawai`i generates additional dollars to the state economy, and one dollar exported decreases the state GNP by more than one dollar. Institutions, such as DBEDT, use economic multipliers in their economic analysis. Each dollar that a tourist brings into Hawai`i ripples through the economy, each dollar exported for oil is a potential ripple that never materialized. The economic multiplier is calculated by analyzing money flows via an Input-Output Model. The analysis looks at both direct spending and indirect spending. Two related issues are foreign investment and leakage. Foreign investment refers to out-of-state money that is invested within the local economy. Leakage refers to all the ways money in the economy leaks out of the economy.

**Hawai`i Gross Domestic Product (GDP):** For Hawai`i, we could bring money into the economy by providing markets for foreign (outside Hawai`i) investors, such as wind companies; keep money in Hawai`i by using renewables such as solar water heaters

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[6]Analysis of Renewable Portfolio Standard Options for Hawaii. (March 2001). Submitted to the State of Hawaii Department of Business, Economic Development & Tourism by GDS Associates, Inc. ("GDS")

and photovoltaic panels; or continuing to export money for oil and coal. This comparative analysis is never used in evaluating alternative technologies. Even DBEDT's 2001 study on RPS by GDS Associates did not evaluate these impacts. One easy to understand metric for comparing different alternatives is to compare their relative impacts to the state's future GDP[7].

**Security, Volatility, Fuel Diversification:** Price volatility has a direct and negative short-term and long-term impact on the economy. Price volatility creates hardships for consumers, especially those on fixed income. Businesses are uncertain about their future business costs. Importers and exporters are especially hard. Over the short-term, price volatility can disrupt the economy, raise the cost of doing business, and increase the cost of investment capital. Over the long-term, price volatility creates a significant drag on economic growth.

**Correlation.** If energy prices of components move in parallel to each other, rising and falling in price at the same time (high coefficient of correlation), then the portfolio will be volatile. If energy prices of components move in a random way (low coefficient of correlation), then the volatility is leveled out. Adding components with fixed and known costs further reduces volatility. A measure of volatility in the stock market is called beta. A stock which tends to rise (or fall) twice as fast as the market has a beta of two. That is, the bond has a higher risk. A stock which tends to rise (or fall) half as fast as the market has a beta of zero point five. Junk bonds (and risky stocks) have high betas, special purpose revenue bonds have low betas. Within the energy field, oil is like a junk bond. Its price is volatile. Renewables are like governmental bonds.

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[7]The Gross Domestic Product (GDP) measures all economic activity done within an area, regardless of whether it is done by locals or foreigners. This contrasts with Gross State Product (GSP) which measures all economic activity by residents regardless of where they currently live, that is, locally or abroad.

Renewables have known and fixed costs. Their presence stabilizes portfolios. Effective Portfolio Diversification can reduce the volatility from individual components depending on the coefficient of correlation for the individual components.

This relative risk is artificially offset to some extent by the clout and muscle of the trillion dollar fossil fuel industry, which wants America to continue its dependence on highly polluting, global warming, disease causing fossil fuels. The fossil fuel industry sees the writing on the wall and artificially raises the cost of renewable energy facilities by stalling, reneging on promises and making unnecessary (and sometimes impossible) demands that they themselves could never meet.

The Sum of Squares is a useful statistic in measuring the concentration of a portfolio. In antitrust regulation, the government calls this statistic the Herfindahl-Hirschman Index (HHI). For example, if there were three firms with 50%, 30% and 20% of the market, the HHI would be calculated by adding together the squares of 50, 30, and 20; that is, 2500 + 900 + 400 = 3800. The Department of Justice's Horizontal Merger Guidelines (1992) has three major categories: unconcentrated (1-999), moderately concentrated (1000-1800) and highly concentrated (1800-10,000). Low HHI indicates a free market, a high HHI indicates a monopoly. Not surprisingly, Hawai`i's utilities are monopolies. However, a startling result pops out when analyzing the fuel diversity of each state. Hawai`i's fuel diversity HHI is above 6000 and is over 1000 points higher than any other state.[8]

[8]Life of the Land raised this issue in our Final Position Statement, dated October 15, 1998 in PUC Docket 96-0493 Instituting a Proceeding on Electric Competition, Including an Investigation of the Electric Utility Infrastructure in the State of Hawaii

Hawai`i is more dependent on oil than any other state is dependent on any one fuel source. The HHI is highest for the monopoly: Hawai`i's utilities use oil to generate over 99.6% of their self-generated electricity.

**Fuel Diversification** provides a cushion against market tremors because each fuel class has different risks, rewards, and tolerance to economic events. Fuels whose price movements are opposite each other are negatively correlated. When negatively correlated fuels are combined within a portfolio, the portfolio volatility is reduced. For Hawai`i, the overwhelming concentration in one type of fuel -- oil -- means that world oil price fluctuations have enormous impact on our commercial, governmental, tourist and residential sectors.

This risk has been known to the state for 3 decades. The statement of risk was codified into Hawai`i's laws by the 1974 Hawai`i State Legislature (Act 237): "The State of Hawaii, with its total dependence for energy on imported fossil fuel, is particularly vulnerable to dislocations in the global energy market. This is an anomalous situation, as there are few places in the world so generously endowed with natural energy: geothermal, solar radiation, ocean temperature differential, wind, waves, and currents--all potential non-polluting power sources." HRS **§196-1.1**

HECO created (1981-83) the Hawaiian Electric Industries ("HEI") holding company to deal with this imbalance. Hawaiian Electric Industries (1984)[9]: "Hawaii is dependent on oil for the generation of over 90 percent of its electrical supply. This dependency makes the state vulnerable to oil supply disruptions and to price increases. Citizens,

[9] Alternative Energy Development Efforts (1984). Hawaiian Electric Industries (HEI). Legislative Reference Bureau Library * Hawaii State Capitol, Chamber Level * KFH 421.5 R47 A85 * LRB 86-49

utilities and state government have little or no control over these events. ... Because Hawaii is susceptible to short-term supply disruption and long-term price escalation, there has been a concerted effort to develop indigenous, renewable energy resources. Energy self-sufficiency is Hawaii's ultimate goal. ... Wind, sugar cane waste, geothermal steam and municipal refuse are all sources of renewable energy that can help Hawaii 'get off oil.'"

**Integrated Resource Planning.** The existing Integrated Resource Planning ("IRP") process is owner-neutral. It assumes that an answer to a future energy need can be planned for, and who builds it is irrelevant. That is, the cost to implement is identical regardless of whether a ratepayer-financed monopoly with a guaranteed profit margin builds it, or whether a venture-capitalist financed independent power producer builds it. Under such conditions, the costs are never the same, nor the desire. This conflict between innovation and the status quo can be best seen in the two following articles from the United States Department of Justice[10] and the Federal Energy Regulatory Commission:[11]

**Department of Justice: Promoting Competition in Telecommunications (1995)**

> It is common these days to talk about the "telecommunications revolution" and how it is transforming our lives. Indeed, the changes in the past ten years have been breathtaking. Services that were novel a decade ago are taken for granted today. None of us thinks twice, for example, about faxing a document across the country -- or around the world. Cellular phones, cable television, a choice of long distance carrier -- all are a part of everyday life in the United States.
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> America is the world leader in this revolution in no small part because we were the first nation to commit to opening our telecommunications markets to competition, which we did when we dismantled AT&T's vertically integrated telephone monopoly.

[10] Address by Anne E. Bingaman, Assistant Attorney General, Antitrust Division, U.S. Department of Justice. Before The National Press Club. Washington, D.C. February 28, 1995. www.usdoj.gov/atr/public/speeches/telecomp.htm

[11] Promoting Wholesale Competition Through Open Access Nondiscriminatory Transmission Services by Public Utilities Docket No. RM958000. Recovery of Stranded Costs by Public Utilities and Transmitting Utilities Docket No. RM947001

We should not forget, however, the hurdles that effectively slowed competition before the success in 1982 of the Justice Department's antitrust suit.

Long after competition in long distance service and communications equipment became technologically and economically feasible, AT&T frustrated consumer choice and actual competition through abuse of its monopoly control over local networks. ...

Competitors detected AT&T's anticompetitive conduct and fought it in the courts and before regulators. The result more often than not was one step forward, one step back -- incremental progress that rarely could keep up with AT&T's ability to find new ways of impeding access to the local networks or disadvantaging other equipment manufacturers. ...

AT&T succeeded in imposing such burdensome conditions on the interconnection of non- AT&T equipment that evidence of those conditions was an important part of the monopolization case that the Justice Department presented in 1981. As long as AT&T controlled the strategic bottleneck of a local telephone monopoly, litigation and regulation could not hope to promote free competition in long distance and equipment markets or protect captive ratepayers from inflated prices.

Indeed, the problem was related partly to the nature of regulation itself. With regulation constraining rates in the local market, AT&T had the incentive to use the local monopoly to increase profits in the long distance and equipment markets. As long as consumers had no choice of local service provider, structural separation that prevented the regulated monopolist from participating in the other markets was necessary to prevent the abuses that plagued the industry and thwarted competition.

Regulators and would-be competitors were not the only ones stymied by the problem of the AT&T telecommunications monopoly. The Justice Department sued AT&T twice, in 1913 and in 1949, before bringing the suit that resulted in the MFJ. Those first two efforts to protect competition in telephone markets ultimately failed, because the relief obtained was not comprehensive enough.

## US Federal Energy Regulatory Commission (1995)[12]

In today's electric industry, which is dominated by vertically integrated utilities, an owner or controller of transmission service can exclude generation competitors from the market, thereby favoring the transmission owner's own generation. This can occur through outright denial of transmission access, or, as is more likely, through access that is discriminatory as to rates, terms or conditions of service.

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[12]Promoting Wholesale Competition Through Open Access Nondiscriminatory Transmission Services by Public Utilities Docket No. RM958000. Recovery of Stranded Costs by Public Utilities and Transmitting Utilities Docket No. RM947001
Notice of Proposed Rulemaking and Supplemental Notice of Proposed Rulemaking. March 29, 1995
www.emanifesto.org/FERCNOPR/FERCiiid.htm

> Thus, in the absence of nondiscriminatory open access tariffs, the development of fully competitive bulk power markets cannot occur, and consumers will be deprived of the benefits that would be expected from such a competitive market. ...
>
> However, because utilities are naturally profit maximizers and monopoly suppliers to their native load, the vast majority of transmission owning utilities have not agreed to give up their market power voluntarily. Transmission owning utilities have an incentive to deny access either by not filing any open access tariff or by filing a tariff that offers services inferior to those used by the transmission owner.
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> This is particularly true for those utilities that emerged from the recent decades of technological and legal changes as high cost generation companies. Open access transmission places their existing generation at risk because their wholesale customers may seek alternative lower price suppliers. It is in their self-interest to maintain and use market power to retain (or expand) market share for their existing generation facilities, at least until they can get their generation costs in line with current market prices. ...
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> In the past, transmission owning utilities have discriminated against others seeking transmission access. Transmission owning utilities have denied access by outright refusals to deal. While such actions tend to be rare, likely because transmission owners fear they may trigger antitrust action, they have occurred.
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> More often, however, discrimination is likely to be manifested more subtly and indirectly. One such way would be for transmission owners to adopt a negotiating strategy that involves a sequence of informational and other requirements over a protracted period of time.
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> By the time all of the requirements are finally satisfied, the window for the customer's trade opportunity has closed. Another way of frustrating access is to substantially change the terms of negotiated agreements through protracted delay, including filings with regulatory agencies.
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> Another way for transmission owning utilities to frustrate access and competition is to allow access, but only on non-comparable or unsupportable terms and conditions that are inferior to the conditions under which the transmission owners themselves use or could use the transmission grid or on terms and conditions that have no operational or financial basis. ...
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> As the wholesale power markets become more competitive, delayed access becomes a matter of increasing concern.

The Integrated Resource Planning process is not only flawed in that it assumes that planning is owner-neutral. (Regulated, status-quo, business-as-usual entities with guaranteed profits always have higher costs that of unregulated entities.) The IRP process is also flawed in the consideration of renewables.

The huge negative economic externalities associated with the use of imported fossil fuels is separate and apart from the equally devastating negative environmental externalities associated with fossil fuels: ocean-based oil spills since 1970 totaling greater than 100 Exxon Valdez; extensive land-based spills far exceeding ocean-based spills, and even greater air releases, including the majority of the global warming gases released by mankind. The IRP process notes and ignores environmental impacts.

> **Global Warming: Chemical and Engineering News** (March 1, 2004)[13]: Climate Impacts: A Worst-Case View of Global Change. "Defense Department report warns of 'abrupt' global warming impact ... A pentagon report made public last week lays out the worst-case impact from an abrupt change in climate, driven by global warming. The report considers a scenario of a fast change in climate, rather than a more gradual one in which technological innovation could help stave off disaster."
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> **Global Warming: Fortune Magazine** (Feb 25, 2004)[14]: CLIMATE COLLAPSE. The Pentagon's Weather Nightmare: The climate could change radically, and fast. That would be the mother of all national security issues. By David Stipp
>
> Global warming may be bad news for future generations, but let's face it, most of us spend as little time worrying about it as we did about al Qaeda before 9/11. Like the terrorists, though, the seemingly remote climate risk may hit home sooner and harder than we ever imagined. In fact, the prospect has become so real that the Pentagon's strategic planners are grappling with it.
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> The threat that has riveted their attention is this: Global warming, rather than causing gradual, centuries-spanning change, may be pushing the climate to a tipping point. Growing evidence suggests the ocean-atmosphere system that controls the world's climate can lurch from one state to another in less than a decade -- like a canoe that's gradually tilted until suddenly it flips over. Scientists don't know how close the system is to a critical threshold. But abrupt climate change may well occur in the not-too-distant future. If it does, the need to rapidly adapt may overwhelm many societies -- thereby upsetting the geopolitical balance of power.
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> Though triggered by warming, such change would probably cause cooling in the Northern Hemisphere, leading to longer, harsher winters in much of the U.S. and Europe. Worse, it would cause massive droughts, turning farmland to dust bowls and forests to ashes. Picture last fall's California wildfires as a regular thing. Or imagine similar disasters destabilizing nuclear powers such as Pakistan or Russia; it's easy to see why the Pentagon has become interested in abrupt climate change.

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[13] Volume 82, Number 9. http://pubs.acs.org/cen/topstory/8209/8209notw9.html
[14] www.fortune.com/fortune/technology/articles/0,15114,582584,00.html

In recognition of the growing threat to both the environment and the economy caused by our over-dependence on foreign fossil fuel, the people of Hawai`i amended the state constitution in 1978.

**Constitutional Convention (ConCon) of 1978**: The ConCon Committee Report # 77: "The consensus of your Committee with regard to self-sufficiency was to constitutionally recognize the growing concern and awareness of Hawaii as being overly dependent on outside sources for ... energy. ... it was concluded that ... the achievement of increased energy self-sufficiency would be adequately covered by the provisions of this section."

The Hawaii State Constitution, Article XI, now states: "the State ... shall conserve and protect ... natural resources, including ... energy sources, and shall promote the development and utilization of these resources ... in furtherance of the self-sufficiency of the State."

**Public Interest.** It is logical to assume that Hawai`i is the ideal place to begin the transformation from imported fossil fuels to indigenous renewable energy is a place where: (1) The Price of electricity is, and has been for at least a decade, relatively high; (2) Renewable Energy Resources are abundant, varied and cheap; and (3) Where Environmental damage from accidental oil spills could be devastating. Unfortunately, the true economic impact of relying of foreign resources has not been factored into the equation, thus abetting those who stand to profit from financial fallacies.

> **Solar Energy:** The sun showers the Earth with an amazingly large supply of energy. Each day more solar energy falls to the Earth than the total amount of energy the planet's 6.1 billion inhabitants would consume in 27 years. While it's neither possible nor necessary to use but a small portion of this energy, we've hardly begun to tap the potential of solar energy. Only in the last few decades — when growing energy demands, increasing environmental problems and declining fossil fuel

> resources made us look to alternative energy options — have we focused our attention on truly exploiting this tremendous resource. *National Renewable Energy Laboratories. www.nrel.gov/documents/solar_energy.html*

HEI's auditor, KPMG, found that existing rooftops in the Netherlands could provide **29%** of the nations electrical needs

> **Wind:** The US has enough wind resources to generate 3500 gigawatts (GW) of wind power, and has installed only 2.6 GW, revealing great potential for continued expansion in the use of wind power. ...The Pacific Northwest Laboratory (PNL) of the Department of Energy (DOE) has published estimates of the wind power resource available in the United States. PNNL estimates that 9% of the lower forty-eight states had "good" (class 4) or "excellent" (greater than class 4) wind resources. ... The total amount of US land with "excellent" wind characteristics, with moderate exclusions, is just over one percent of total land area. This would support approximately 3,500 gigawatts (GW) of wind capacity, with nearly eight megawatts (MW) of rated capacity per square kilometer. The rated (peak) wind capacity of 3,500 GW is about five times the 713 GW of 1999 installed conventional utility and non-utility generating capacity in the United States. The difference between the installed US capacity and the potential US capacity (3500 GW) reveals great potential for continued expansion in the use of wind power. www.thegreenpowergroup.org/wind.html
>
> The developable wind power resource of the US, that is, what could be developed without incurring undue impacts to birds, noise, or visibility, is estimated to be between 2 to10 times the entire electricity consumption of the US. www.cfcae.org/Wind_Power/Wind_Facts.htm

**Wave Power:** DBEDT's Feasibility of Developing Wave Power as a Renewable Energy Resource for Hawaii: Waves Power (buoys) could generate all (**100%**) of the state's electrical needs.

> **Energy Tourism**: "The Windy Hill wind farm on the Atherton Tablelands (Queensland) was visited by approximately 30,000 cars in the first three months of operation, while the Codrington wind farm in Victoria currently attracts 50,000 visitors per year. An AusPoll survey conducted by Pacific Hydro on the Portland Wind Energy Project showed that 94% of Portland residents described wind generators as 'interesting' and 74% as 'graceful'. In a separate survey, when asked if they would be more likely to visit the coast if there were wind farms in the area, 36% of Victorians surveyed said yes, 55% indicated that it would make no difference, while only 8% said they would be less likely to visit the area. www.auswea.com.au/about/myths.htm

In Hawai`i, people stop to take pictures of the wind mills at South Point, wonder why the wind towers at Kahuku are not spinning, and support proposed future wind farms

at Kaheawa and Maui Community College. On the other hand, there is wide-spread protest against proposed fossil fuel generators at Keahole, Waena and elsewhere.

**For the purposes of this docket, a few key terms must be defined:**

**Distributed Generation:** Locating generation in close proximity to the load being served. Distributed Generation can be located on-site, at distribution substations, or other locations. Related terms include Distributed Resources (DR), Distributed Energy Resources (DER); Dispersed Power (DP); Embedded Power (EP); Non-Centralized Generation (NCG).

**Distributed Energy Resources ("DER").** All ways of decreasing the transmission of electricity, including, but not limited to, Distributed Generation; Energy Efficiency; Conservation; and Demand Side Management.

**Virtual Power Plant**: A concept whereby "existing emergency generators located at various County facilities can be electrically interconnected and used for limited peaking operations to the Maui electric grid at utility dispatch."[15]

**Renewable Energy**: Energy that is obtained from sources that are essentially inexhaustible and involving minimal environmental and cultural impacts. Examples of renewables include: Photovoltaic; Solar Thermal Energy; Wind, and Biomass. Some energy resources may be renewable: Hydroelectric (the impacts and not the size determines whether it is renewable); Geothermal (local cultural issues must be addressed); Garbage-To-Energy (the fuel used, the level or recycling, and the amount

[15]Maui County proposed the Virtual Power Plant. See: MECO Draft IRP-2000: Section 8.4.4.5 Distributed Generation and the Iniki Plan, page 8-26. This is similar to Life of the Land's proposed network of utility controlled Back-Up Generators to alleviate demand in high load areas during critical peak periods.

of emissions determines whether it is renewable); Wave Power; Ocean Thermal Energy Conversion (OTEC). Some energy resources are not renewable: Fossil Fuels (oil, gas, coal); Nuclear Power; Heat Recovery from the burning of fossil fuels; Energy Storage Devices (such as pumped storage hydro, where the electricity was originally made from fossil fuels); electricity generated by incineration of waste oil, plastic and other fossil fuel based products in a garbage-to-energy facility, etc.

**Load Management**: Activities designed to influence the timing and amount of electricity that customers may use. Examples include load balancing programs and time-of-use rate structures.

**Energy Efficiency**: Using less electricity to perform the same function or when there is increased or enhanced services for a given amount of energy inputs.

**Outages** can be momentary (zero to a few minutes), sustained (more than a few minutes, but not catastrophic), or catastrophic (wide-spread blackout due to an Act of God). Reliability metrics are derived only from sustained outage data. Thus reliability does not have a high correlation with a customers loss of power.

**Power Quality** refers to the existence or absence of frequency disturbances, voltage dips, voltage reductions, and outages, flickers, harmonics, transients, surges, spikes, etc. Electricity can be of high quality or low quality

**Retail Wheeling**: the process of transmitting electric power from a seller's point of generation across a third-party-owned transmission and distribution systems to the seller's retail customer[16]

**Intra-Governmental Wheeling**: using the concept of retail wheeling between: (1) Two or more county government agencies located on the same island; (2) Two or more state government agencies located on the same island; or (3) Two or more federal government agencies located on the same island.

**Statistics:** a branch of applied mathematics concerned with the collection and interpretation of quantitative data and the use of probability theory to estimate population parameters

**Probability:** A measure of how likely it is that some event will occur

**Confidence Interval Estimate**: the likelihood that a particular outcome will be within a given range.

**A. Planning Issues**

1. What forms of distributed generation (e.g., renewable energy facilities, hybrid renewable energy systems, generation, cogeneration) are feasible and viable for Hawaii? All forms of distributed generation are feasible and viable in Hawai`i. Priority should be given to those that provide baseload power (at one site or a combination of sites), those that are powered by real renewables (sun, moon, wave, wind), and those

[16]Definition from Senate Concurrent Resolution (SCR) 180 HD1, Hawaii State Legislature (2004)

that are supplied by indigenous (non-imported) fuel. It is well known that Hawai`i has a great opportunity to move from fossils to renewables:

**Donald Aitken**[17]**:** Hawaii has the greatest potential to use its own renewable energy resources of any state in the union.

**Amory Lovins,**[18] a co-founder of the Rocky Mountain Institute: "With renewables like wind and photovoltaic, the islands are blessed and have some of the best wind sites and some of the best solar sites in the country, in the world." (PBN January 26, 2001)

**Honolulu Advertiser Editorial:** Hawai'i has an opportunity to teach the nation a lesson about energy self-sufficiency and the potential to wean ourselves from dependence on oil and other nonrenewable resources. (January 30, 2001)

2. Who should own and operate distributed generation projects? Distributed Generation projects, like central station projects, must be owned and operated by Independent Power Producers (IPPs).

It is in the economic self-interest of the utility to use its resources to stymie Independent Power Producers. During the years of delay, the utility makes money, while the investor loses money. One way of delaying IPPs is by dragging out the negotiations regarding Interconnection Agreements and Power Purchase Agreements. The delays can be subtle: changing terms of contracts, raising new issues, delaying responses, offering financial deals customers who stay with the utility, etc. Some

[17]Former Senior research Scientist for the Union of Concerned Scientists
[18]Co-founder of the Rocky Mountain Institute.

have suggested firewalls between different functions within the utility. Utility firewalls have not worked in Hawai`i. The only reasonable solution is divestiture. Utilities must separate into two companies via a stock split or the utilities must divest themselves of generation[19]. The new generation company would simply be another unregulated Independent Power Producer. The new transmission and distribution company (T&DCO) would be regulated. The controversial issue of the true avoided cost disappears once the T&DCO is separated from all IPPs.

Currently the commission receives funding from utilities but not from IPPs. If utility generation divisions are spun off, the total funds to the commission would decrease. To maintain a constant level of funding, the commission could impose a per kilowatt-hour fee on all sales to the grid (excluding Net Metering arrangements).

Alternatively, the commission may determine that a firewall is the better way of proceeding. Firewalls would have to exist between the utilities grid division, the generation division, and related but unregulated entities. No employee or contractor should be permitted to straddle the firewall.

3. What is the role of the regulated electric utility companies and the Commission in the deployment of distributed generation in Hawaii? The T&DCO would manage the electric grid. The commission would regulate the T&DCO and monitor IPPs.

[19]Life of the Land raised this issue in our Final Position Statement, dated October 15, 1998 in PUC Docket 96-0493 Instituting a Proceeding on Electric Competition, Including an Investigation of the Electric Utility Infrastructure in the State of Hawaii

**B. Impact Issues**

4. What impacts, if any, will distributed generation have on Hawaii's electric transmission and distribution systems and market? If large customers leave the grid there is a potential problem that remaining customers would be negatively impacted. On the other hand, use of distributed generation can offset new load and/or decrease congestion at peak periods without building ratepayer financed generators or installing additional overhead transmission lines causing visual blight. Obviously, planning is essential.

5. What are the impacts of distributed generation on power quality and reliability? The level or reliability required by different customers is different. Some customers -- for whom an outage is unacceptable -- should install on-site generators. This includes emergency services and some governmental and corporate activities. Having dispersed generation could allow the utility to guarantee higher levels of protection for all, including less momentary, sustained and catastrophic outages and greater power quality.

6. What utility costs can be avoided by distributed generation? Costs that can be avoided include; (1) the deferral or avoidance of transmission and distribution upgrades; (2) dramatic reductions in line losses during peaking periods; and (3) the ability to mitigate shifts in demand quickly, without making long-term investments.

7. What are the externalities costs and benefits of distributed generation? The world is in a crisis. Oil prices are going up. Hawai`i is the most oil dependent state in the nation. The oil-producing world is increasingly unstable. Hawai`i must become energy self-sufficient. Hawai`i's utility infrastructure is aging. We are poised at the perfect

moment in time to transform Hawai`i from centralized fossil fuel generators to decentralized distributed generation utilizing indigenous resources, and, to some extent, non-renewable cogeneration units.

External benefits of distributed generation include recovery of coastal lands (tearing down the Honolulu Power Plant and replacing it with on-site cogeneration frees up valuable harbor front lands. Distributed generation usually is more aesthetically pleasing, more earth-friendly, sustainable and, most important in these times, secure.

8. What is the potential for distributed generation to reduce the use of fossil fuels?
100%. Some distributed generation facilities could be wind/gas hybrid renewable energy systems, gas-powered combined heat and power systems, an aggressive Demand Side Management program and backup generators (such as the Virtual Power Plant). Virtually all of these forms use less fossil fuel.

**Implementation Issues**

9. What must be considered to allow a distributed generating facility to interconnect with the electric utility's grid? The grid operator should seek long term contracts with IPPs. The contracts should be open, transparent, and fair. The grid operator should prefer low cost IPPs first. The T&DCo should control the interconnection nodes for all grid-connection Distributed Generation Resources, including Back Up Generators, Virtual Power Plants, Generators involved in Wheeling. Arrangements should be made available so that the T&DCo can economically dispatch Back Up Generators and Virtual Power Plants during periods of peak demand.

10. What is the appropriate rate design and cost allocation issues that must be considered with the deployment of distributed generation facilities? IPPs may sell electricity directly to the T&DCo. This is sometimes referred to as renting or leasing the lines. The tariff should be location and time-of-use specific, costing more to the IPP when the lines are congested, and offering rebates to IPPs when the use of their generators are able to decrease transmission grid congestion during peak demand periods. This is consistent with Life of the Land's position during the sale of Kauai Electric to the Kauai Island utility Coop. We felt that there should be separate generation and T&D coops, as is found throughout the mainland.

11. What revisions should be made to the integrated resource planning process? The IRP process needs a complete overhaul. The IRP process needs real benchmarks, plans, goals, measures along the way. The plan must be written in plain, understandable English, so anyone can pick it up and understand Hawai`i's energy picture. The IRP should serve as a Master Plan,[20] so that every interested party would understand Hawai`i's energy future.

12. What forms of distributed generation (e.g., renewable energy facilities, hybrid renewable energy systems, generation, cogeneration) are feasible and viable for Hawaii? Distributed Generation will be implemented on a wide-scale only if its true costs and benefits are included.

13. What revisions should be made to state administrative rules and utility rules and practices to facilitate the successful deployment of distributed generation? HAR

[20]A Master Plan is not written in stone. Like other master plans (such as General Plans, Development Plans, and Zoning Codes), significant changes should require variances, amendments, or similar legal requirements.

6-74-7 (a): A cogeneration facility or small power production facility shall not be owned by a person engaged in the generation or sale of electric power. HECO's CHP proposal violates this section of HAR. However, with generation divestiture, this problem would disappear: HAR 6-74-7 (a): A cogeneration facility or small power production facility shall not be owned by a T&DCo.

14. Direction of New Electrical Generation? All new generation should be DG.

**Conclusion:** Change is coming very rapidly in the fields of computers, telecommunications, and energy. The personal computer made its debut in the mid 1970s. The telecommunications revolution started with the breakup of AT&T in 1982 and continued with the release of the world wide web in 1991. In just the past couple of years, cellular phones, email, laptop computers have dramatically changed the landscape. The age of distributed energy is just around the next corner. Every house, every car, every appliance will have its own on-site power source. Hawai`i can be the wave if it has the political will. Alternatively, Hawai`i could maintain the status quo (the highest utility rates in the nation, the most concentrated use of one fuel source in the nation) while the world passes us by.

This docket offers us the chance to TRANSFORM the future.

May 7, 2004

Henry Q Curtis
Executive Director

Certificate of Service

I hereby certify that I have this date served a copy of the foregoing Statement of Position Motion by Life of the Land, Docket Number 03-0371, upon the following parties. Furthermore, one electronic copy was sent to each email address listed below.

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