



UNIVERSITY OF HAWAI'I AT MĀNOA

HAWAII ENERGY POLICY FORUM

Final Report On

Hawaii Energy Utility Regulation and Taxation

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July 2003

HAWAII ENERGY UTILITY REGULATION AND TAXATION

**Practice, Policy and Incentives for
Energy Efficiency, Renewable and Distributed
Energy Resources**

A Report for the Hawaii Energy Policy Project

July 11, 2003

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Hawaii Energy Utility Regulation and Taxation

Practice, Policy and Incentives for Energy Efficiency, Renewable and Distributed Energy Resources

EXECUTIVE SUMMARY

This report on Hawaii Energy Utility Regulation and Taxation is one of a series of technical and policy papers sponsored by the Hawaii Energy Policy Project (HEPP) in support of the Hawaii Energy Forum (Forum). The objective of these studies is to prepare for an energy "Summit" and ultimately to propose legislation to the 2004 Hawaii Legislature. The Summit is intended to bring together a broad spectrum of Hawaii energy sector stakeholders sometime in the Fall of 2003. The technical and policy papers sponsored as part of the HEPP include:

- Hawaii Hydrocarbon Outlook
- Renewable and Unconventional Energy
- Regulation, Taxation and Incentives (this report)
- Environmental Requirements on Energy Producers
- Social, Economic, and Cultural Features
- Reducing Hawaii's Energy Demand Through Increased Efficiency

The primary objective of this report is to provide the Forum with background, analysis and a selection of options that could serve as a basis for making recommendations to the 2004 Legislature.

This report addresses the Hawaii government's role in directing the future of utility energy production and consumption. Particular emphasis is given to the consideration of energy efficiency, renewable and distributed energy resources. The consulting team was directed to determine the status of Hawaii's energy regulatory agencies and how the functions of these agencies could be improved, either by incremental changes or by substantial reforms. To meet these objectives the report focuses on identifying issues and providing a palette of recommended actions and options for consideration.

How does government regulate and tax energy production and use? What incentives does it provide to energy producers and users? Are these incentives consistent with the state's energy policies? And most importantly, what actions can be taken to improve the regulation and taxation to further the objectives of Hawaii's energy policies? These questions are the focus of this report.

A LISTENING APPROACH

An important part of preparing this report was a "listening" effort in which various persons and agencies with experience and/or involvement with the regulation process were consulted and interviewed. Over one hundred persons and agencies were contacted. These stakeholder interviews were valuable in focusing and informing the consulting team regarding important issues and providing feedback regarding some of the suggested actions.

A recurrent sentiment expressed in the stakeholder interviews was widespread disappointment that renewable energy resources have not been implemented to a greater extent in Hawaii. Hawaii has plentiful renewable resources, high electricity costs and is very dependent on imported oil. Why then aren't renewable and efficiency resources being more aggressively implemented? There are many aspects to this recurrent question. Certainly the costs of renewable technologies, the availability of sites and the technical potential of these resources are important factors, but they are not the primary focus of this report. This report focuses on the governmental and institutional aspects of this question and the issues of energy regulation and taxation more generally.

THE ROLE OF GOVERNMENT

Energy regulation is often seen as an exercise in cutting up a pie. The regulators guide the knife through the pie and hopefully provide a fair balance between the interests of utility customers and utility shareholders. This view is accurate, in the respect that it captures a central function of utility regulation: the balancing of public interests versus private monopoly interests. But it is also a simplistic view. Regulatory agencies have a much larger role, not only in determining how the pie is divided, but in determining the ingredients and the recipe. Good regulation addresses not only fairness of the division of the pie but also its overall cost, sources and distribution.

In addition to determining utility rates, utility regulatory agencies have very important policy responsibilities. They play an important role in maintaining a stable, predictable regulatory climate that facilitates the financial health of the regulated utilities. Regulatory stability helps reduce energy costs by reducing utility risks perceived by financial markets. Regulatory agencies enforce public policies to ensure that all consumers receive service, not just those that are the most profitable. And regulatory agencies oversee the evaluation, selection and procurement of resources to ensure that public policy interests are met effectively and economically.

Despite these essential policy responsibilities, Hawaii's regulatory agencies have been focused primarily on cutting up the pie without giving too much attention to governing the ingredients and determining recipes. The Public Utilities Commission has not conducted any proceedings primarily or explicitly addressing the substance of state energy planning policy for many years and has not used rulemaking proceedings for these purposes for decades. Public policy is not being addressed explicitly by the regulatory agencies in any obvious way.

This is largely a matter of the agencies having insufficient resources. Understaffed and underfunded, these agencies are consumed with substantial day to day workloads processing applications, complaints and filings that are not explicitly policy matters. As with any person or organization facing restrictions in time and resources, it is the policy and big picture matters that get pushed aside in order to deal with immediate tasks and brush fires.

Inattention to policy is also a matter of conceptualization and focus. Hawaii's utility regulatory agencies conceive of themselves primarily as adjudicatory bodies functioning to respond to applications and complaints that are brought before them for resolution. The more proactive legislative and policy making duties of these agencies are not being prioritized.

The integrity and effectiveness of the regulatory agencies is essential to a healthy utility industry and to the general welfare of the broader economy and population this industry serves. It is clear that Hawaii's utility regulatory agencies are in need of revitalization and improvement. This is especially true if these agencies are to play an effective role in the determination and implementation of energy policy.

In addition to its role in utility regulation, the Hawaii government expresses energy policy in several other roles. These include taxation, financing and consumption. How the state taxes fuels and energy, provides bonds or funds for energy projects and the decisions it makes as one

of the largest energy consumers in the state all are expressions of state energy policies. In this broader context Hawaii government must apply itself consistently to support effective implementation of state energy policies.

THE FATE OF HAWAII'S UTILITY ENERGY EFFICIENCY PROGRAMS

Most of Hawaii's existing utility sponsored energy efficiency programs may soon end unless some action is taken to resurrect or replace them. The PUC has ordered that several mechanisms that provide cost recovery and incentives for these efficiency programs will soon end.

Hawaii's electric utilities currently implement several conservation and load management programs by providing rebates to utility customers to install efficient appliances and equipment. These programs provide substantial benefits by reducing Hawaii fuel consumption and deferring the need for new generation units. These programs are a major component of what success Hawaii has had in implementing sound energy policy.

Recently the PUC has approved an agreement that will soon end the current implementation of the financial DSM cost recovery mechanisms for HECO , MECO and HELCO.¹ Unless these financial mechanisms are replaced with some form of mandate or alternate incentives the current utility DSM programs are in serious jeopardy. **Although the PUC's recent orders on this matter have received little notice, they represent a major reversal of an important part of Hawaii's energy policies.** The mechanisms being terminated quietly by the PUC were previously established by several years of collaborative efforts by Hawaii's energy sector stakeholders. (See page 110).

The PUC, in consultation with the IRP stakeholders, should promptly determine what alternate means of DSM implementation should replace the current programs. The PUC could reinstate some improved version of the existing financial mechanisms or provide any of several alternate methods of providing similar services by non-utility providers. Several alternatives have been successfully implemented in other jurisdictions. DSM services could be provided by government or non-profit agencies, by competitive bidding to unregulated private sector providers or by a regulated "DSM utility" as is currently done in Vermont. (See page 112). In any case, this matter should be promptly addressed by the PUC, otherwise an important successful component of Hawaii's energy policy implementation could be lost or impaired.

IMPENDING TURF WARS: COMBINED HEAT AND POWER INSTALLATIONS

A recent trend in the electric industry is the development and installation of small generators at locations where the waste heat from electricity generation can be used for beneficial purposes. These combined heat and power (CHP) installations can provide superior fuel use efficiency, utility system benefits and cost savings.

CHP can only be implemented in locations with beneficial uses for generation waste heat and where generation and fuel handling impacts are acceptable. Hawaii's potential "market" is limited by the number of acceptable sites, but is essentially untapped. This circumstance is rapidly changing, however, as several vendors as well as Hawaii's regulated utilities are aggressively vying to secure a share of the CHP market.

There are several ripe regulatory issues regarding this rapidly evolving market that should be promptly and decisively resolved by the PUC. It should be determined whether and to what extent the regulated electric utilities should compete with existing unregulated businesses to

¹ HECO, MECO and HELCO are, respectively, the Hawaiian Electric Company (Oahu), the Maui Electric Company (Maui) and the Hawaiian Electric and Light Company (Big Island). The energy efficiency programs of Kauai Island Utility Cooperative are not affected by these PUC orders.

supply and own CHP equipment. In a broader context, there are several important and impending rate making issues associated with customer-owned generation or utility owned generation at customer sites. Unless these issues are addressed promptly by the PUC these issues may escalate into “turf wars” between the utilities and existing CHP businesses and may deteriorate into litigation in the courts. (See discussions at pages 17 and 115).

NEED TO STRENGTHEN THE UTILITY REGULATORY AGENCIES

Hawaii’s Public Utilities Commission (PUC) and the Hawaii Division of Consumer Advocacy (DCA) comprise the core of Hawaii’s utility regulation program. The PUC is responsible for the supervision of all aspects of our public utilities. The DCA provides auditing and analysis functions for the PUC and is responsible for representing utility consumer interests.

A significant finding of this report is that these agencies are in need of strengthening and revitalization. If Hawaii expects its regulatory agencies to establish and implement progressive energy policies, these agencies need sufficient resources to overcome present backlogs of administrative work to tackle the substantive challenges posed by implementing energy policy. This report identifies several actions that can and should be taken immediately as well as several options that should be considered. (See section starting at page 35).

THE CONFLICTING ROLES OF THE DCA

The Division of Consumer Advocacy (DCA) currently serves two conflicting functions that in most states are not combined. This is an issue that was identified by a 1975 legislative audit of the public utilities regulation program but was not effectively resolved.

On one hand, the DCA is the primary auditing and litigating staff for the PUC in processing utility rate cases and other contested case proceedings. This function is essential to the PUC in fulfilling the PUC’s statutory duties to establish rates and supervise Hawaii’s public utilities. In executing this function it is most important for the DCA to be **objective** and examine whether utility applications are consistent with sound accepted regulatory principles and policies previously decided by the PUC.

On the other hand, the DCA is required to champion consumer interests in matters before the PUC. This is an **advocacy**, not an objective function and requires the DCA at times to take an adversarial position before the PUC with respect to the PUC’s previous decisions.

Because the DCA maintains these dual functions it cannot rigorously advocate consumer interests without excessively compromising its perceived objectivity before the PUC regarding its important auditing functions. Because the DCA sometimes advocates consumer interests, even if not rigorously, the PUC does not treat the DCA as an objective arm of the regulatory structure.

The conflicting functions of the DCA should be separated. Several alternatives are suggested in this report. (See section starting at page 41).

UTILITY RESOURCE EVALUATION AND SELECTION

Hawaii’s PUC has adopted a progressive Integrated Resource Planning (IRP) Framework that defines a process for evaluating and selecting the types of resources that will be procured by Hawaii’s energy utilities. The IRP process is certainly the PUC’s most explicit expression of energy policy and could, if rigorously implemented, provide a productive venue for implementing Hawaii’s energy policies. Unfortunately, the IRP process has not been implemented as diligently as originally intended by the PUC. Several IRP applications filed long ago by the utilities have not even been scheduled for review by the PUC.

The PUC should determine whether its IRP Framework is going to be implemented and enforced rigorously as a regulatory decision making tool as originally intended. If it is not going to be used as intended, the process should be abandoned or reduced to avoid wasting time and expense by the utilities and participating individuals and agencies. This report offers a list of suggestions regarding how the existing IRP Framework could be implemented effectively. (See section starting at page 82).

UTILITY RESOURCE PROCUREMENT

Hawaii presently does not have any methodical process for determining how utility generation resources should be procured. The current ambiguous process of utility resource procurement is slow, costly, wasteful and leads to sub-optimal decisions. Recent experience on the Island of Hawaii with procurement of HELCO's most recent and next generation units provides an example of a poor procurement process. (See page 46).

The PUC should initiate rulemaking proceedings to establish a methodical process for utility generation resource procurement. (See discussion starting at page 101).

ALIGNING RATE DESIGN WITH ENERGY POLICY

The design and structure of rates charged by utilities provide powerful incentives to both utility customers and utility managers. Rate design should be consistent with and encourage the implementation of Hawaii's energy policies.

Several improvements should be made to the rate design of Hawaii's utilities. Existing rate design provides utilities with strong incentives to increase energy sales. This is opposite to Hawaii energy policy and confounds the objectives of the utility conservation and efficiency programs. Existing standby service tariffs exceed what is justified on a utility cost basis and discourage CHP installations. The existing declining block rate structure for large customers provides inconsistent incentives regarding energy conservation and time of use. The existing fuel cost adjustment mechanism excessively insulates the utilities from changes in the cost of fuels.

The PUC should comprehensively review electric utility rate designs to insure that, to the extent possible, they provide incentives to customers and utility managers that are consistent with sound energy policy. Rate design issues are complex and interrelated. Rate tariffs should be considered collectively as an integrated purposeful design. (See section starting at page 60).

ALIGNING TAX POLICIES WITH ENERGY POLICIES

Taxation is a means of implementing policy. Hawaii uses taxes in several ways to encourage or discourage activities in the state. The primary tax structure mechanism used in Hawaii to promote energy policy is offering tax credits for desirable investments. Tax credits are effective tools in some applications. For example, tax credits are an important component of Hawaii's programs to encourage residential investment in solar hot water heaters. Tax credits are a direct subsidy by the state that result in lower tax revenues.²

It would be possible to make changes in Hawaii's tax structure that could promote renewable resource development that would be revenue neutral to the state. Currently, for example, Hawaii levies taxes on electric utility revenues equal to just over one cent per kilowatt-hour. Instead of basing this tax on utility revenues the tax could be based on utility fossil fuel use in such a way as to produce the same amount of revenue to the state. This would provide about a one cent per

² After careful analysis, the consulting team does not concur with recent studies asserting that tax credits result in increased state tax revenues.

kilowatt-hour advantage to renewable resources compared to fossil fueled resources without any cost to the state in tax revenues. (See discussion starting on page 125).

RECOMMENDATIONS FOR IMMEDIATE ACTIONS

The explicit objective of this report is to assist the Forum with its work in making productive recommendations for the Summit and ultimately to the 2004 Hawaii Legislature. We expect, however, that the report may have impacts that are achievable long before the Legislature finishes its work next year. The draft of the report has already found an audience with several state agencies, including the agencies it most directly concerns. Based on the comments received in response to the draft, it appears that the suggestions identified in the report are being constructively construed and seriously considered. Indeed, whether due to the circulation of the draft or not, some actions addressing the concerns identified in the report are already being implemented.

It certainly is intended that some recommendations should be implemented without action by the Forum or Legislature. Clearly the report is not restricted to suggestions requiring enabling legislation or legislative mandate.

Several pressing matters that should be resolved immediately are listed below:

- The Governor should assist the PUC and DCA with filling vacant staff positions with qualified personnel. Both agencies have vacancies in about one third of the existing staff positions. Filling these vacancies requires not only approval in light of the state's hiring freeze, but requires the support and cooperation of the Department of Human Resource Development to make necessary adjustments to job classifications. (See page 38).
- The PUC should continue its improvements in providing prompt public access to recent actions and orders by regularly and promptly posting these documents on its web site. In addition, access to **all** public documents should be provided and the cost and difficulty of identifying, viewing and copying these documents should be reduced. (See page 49).
- The PUC should promptly initiate proceedings to resolve several immediate pressing matters including the following:
 - Determine the fate of the HECO, MECO and HELCO energy efficiency program financial recovery mechanisms or establish alternative program implementation methods. (See page 110).
 - Establish clear policies and standards regarding distributed generation resources and combined heat and power installations. (See page 115).

Several important but less urgent matters should be addressed as resources permit:

- The PUC should identify some of its staff as energy policy staff to promote and provide continuity in addressing policy matters. (See page 34).
- The PUC should initiate proceedings to consider and resolve several matters including the following:
 - Determine whether Integrated Resource Planning will be implemented a regulatory instrument as intended or should be eliminated or reduced. (See page 86).
 - Require utilities to publicly provide sufficient avoided cost data to meet the intent of federal law. (See page 108).

- Increase the thresholds of utility capital expenditures triggering formal CIP review. (See page 39).
- Establish a methodical process for procurement of utility resources (competitive or otherwise). (See page 101).
- The PUC could take any of several actions to “level the playing field” between electric utilities and independent power producers (IPP’s), including resolving outstanding policy dockets, considering standard offer contracts, providing an expedited process for resolving formal IPP complaints. (See section starting on page 104).
- Resolve or reopen several outstanding dockets addressing energy policy. (See page 33).
- Access to the regulatory process should be improved by several means including providing an adequate system for intervenor funding and using rulemaking rather than contested case proceedings for resolving broadly applicable policy issues. (See page 55).

A complete listing of the actions and options suggested in this report is provided in the Table of Contents and in a Cross Reference section at the end of the report.

CONCLUSION

The Hawaii Energy Forum has a challenging task at a time of great opportunity. Several studies have been prepared and presented. It will soon be time for the Forum to synthesize some constructive proposals to make improvements in Hawaii’s energy sector. The consulting team hopes and believes it has made a useful contribution to this effort.

INTERVIEWS WITH HAWAII'S ENERGY SECTOR STAKEHOLDERS

An important part of this report was a “listening” effort in which various persons and agencies with a role in Hawaii’s regulation process were consulted and interviewed. This was an information gathering process. The stakeholder interviews were not conducted to document statements of position or attempt reaching consensus on issues. The purpose of this effort was to inform and focus the consulting team regarding the scope and nature of concerns and to obtain comments from stakeholders regarding several of the suggestions proposed in the report.

In order to facilitate an open interchange of ideas, the source of all comments provided in the interviews remains confidential. Some suggestions and observations from the interviews are included in the report, but none are ascribed to source. Where statements of position or opinions of specific parties are identified in the report, these are based on documented public record, not the interview process.

Over one hundred persons and agencies were contacted by the consulting team. These include:

- Hawaii regulatory agencies
- Hawaii energy utilities
- Hawaii legislators and county council members
- ex-Hawaii PUC Commissioners and DCA executive directors
- County Energy Coordinators
- public interest groups and knowledgeable citizens
- independent power producers and energy project developers
- mainland public utility commissioners and regulatory staff

The stakeholder interviews were very informative. The consulting team is thankful to all of the many individuals who offered their time, expertise and candor to this effort.

A Divergence of Perspectives

One pervasive finding from the stakeholder interviews was a wide divergence between several views expressed by those persons and agencies most closely involved with the PUC regulatory process and those who consider themselves outsiders to the process.

The “infield” view of the regulatory process is shared by the PUC³, the DCA and the regulatory affairs staffs of the larger energy utilities. This view is molded and characterized by direct participation in contested case proceedings before the PUC. In this realm, truth is defined by “defensible facts” asserted by experts who are subject to rigorous discovery, rebuttal and cross-examination. Matters are examined in technical detail. Numerical analysis is the predominant currency.

The “outfield” view is shared by those who do not perpetually participate in the utility regulatory process, including the Legislature, DBEDT, independent power producers, public interest groups

³ The views of the PUC are gleaned primarily from decisions and orders and testimony to the Hawaii Legislature, not from the stakeholder interview process.

and consumers. In this realm, truth is defined by “obvious” facts and common knowledge. Public policy is an important standard.

The regulatory infield, accustomed to the rigor of its contested case review process, tends to look at the outfield generally as lacking in technical regulatory expertise and often “loose” with the assertion of facts. Familiarity with the practices and conventions typically used in utility regulatory affairs is considered a prerequisite to any stake on authority regarding utility energy policy matters. Assertions of public policy by the Legislature and DBEDT are perceived as an imposition and a distraction from the sound implementation of the clockwork of the regulatory process. There is a belief that those outside the regulatory process do not understand the ramifications of espoused policies and proposals. In other words, the belief is that energy regulation matters should be left to those who “really” understand energy regulation.

Conversely, the outfielders tend to look at the regulatory infield as lacking policy perspective and unwilling to embrace change. The rigor of the contested case process is perceived as hostile to the true merits of policies that are important, yet difficult to defend in contested case proceedings. Truth is seen as more and bigger than what can be technically proven with numbers and limited resources under dissection by expert technical cross-examination. The exclusive nature of the regulatory process is seen as a barrier to participation and a shield behind which insiders hide from political and policy imperatives.

It is certainly not the intention here to exaggerate the divergence of perspectives so strictly along “infield” and “outfield” lines. Admittedly the generalizations cited above are both simplistic and overstated for purposes of exposition. Indeed there are important cooperative endeavors and exchange of expertise between the agencies and entities characterized here so divergently. But the importance of understanding the existence of these differing perspectives cannot be overstated. Broad differences in perspective were pervasive throughout the comments heard in the stakeholder interviews. Of particular import, there is wide disagreement regarding a central and fundamental question: whether the PUC is sufficiently implementing Hawaii’s adopted energy policies.

On one hand, there is a widespread perception that renewable resources are not being implemented in Hawaii to the extent suggested and encouraged by Hawaii’s energy policies. This was a common theme heard in the stakeholder interviews and one that has been repeated in legislative findings in bills heard by the Hawaii Legislature each year since 1974. The PUC and the DCA (along with the larger electric utilities) are perceived to be roadblocks to the implementation of renewable energy resources. There have been repeated efforts before the Legislature to “fix” this matter.

On the other hand, there is a belief by many of the direct participants in the utility regulatory process that the PUC *is* properly balancing the various and sometimes conflicting objectives and energy policies identified by the Legislature. Although state energy policy identifies promotion of self-sufficiency and indigenous resources, it also stresses economics and reasonable prices. From this point of view the PUC is perceived to be balancing costs with other objectives and policies.

Similarly, divergence of opinion exists regarding some of the basic underlying assumptions regarding Hawaii’s energy future. For example, experts maintain that in the long run, oil prices will not increase drastically in the next several decades. This is one of the findings of the *Hawaii Hydrocarbon Outlook*, one of the previous studies performed for the Hawaii Energy Forum. This view is simply not credible to some of Hawaii’s energy sector stakeholders, including several

members of the Hawaii Energy Forum⁴. According to several statutes, this view is also not consistent with findings made by the Hawaii Legislature.⁵

Although these diverging perspectives may not be reconciled, understanding the existence of these differing perspectives is essential to understanding the political and rhetorical landscape of any discussions regarding state energy policy and the extent to which the legislature should provide mandatory guidance to the PUC in the implementation of state energy policy.

What We Heard in the Stakeholder Interviews

The primary purpose of the stakeholder interviews was to inform and focus the consulting team regarding the scope and nature of concerns and to obtain comments from stakeholders regarding several of the suggestions proposed in the report. In the process of conducting the interviews several themes became apparent in the views expressed by stakeholders. It was not an explicit objective of the interview process to present a report of what we heard. Nevertheless, we believe that briefly characterizing the themes that emerged from this process serves several constructive purposes.

One important task of the Hawaii Energy Forum is the formulation of an energy strategy that ultimately may serve as a platform to make recommendations to improve Hawaii's energy sector. This task will require some determination of the common ground and differences between the perspectives of Hawaii's energy sector stakeholders. We hope that relating some of the themes in the views expressed by stakeholders may facilitate some understanding (or at least a starting point for some discussion) of some existing perspectives.

We emphasize that we are paraphrasing the comments we heard in the stakeholder interviews. These are not conclusions reached by the consulting team. Our recommendations are clear in the later sections of this report.

We also emphasize that the interview process was not conducted as a methodical or comprehensive survey. Nor are the interviews cited as an analytical basis to justify the options and actions recommended in the report. Our characterization of what we heard in the stakeholder interviews should be interpreted as no more or less than our own subjective observations.

Having exhausted most conceivable caveats, here are some of the themes we heard in the stakeholder interview process:

- There is widespread disappointment with the amount of renewable energy resource implementation in Hawaii.
 - We have wind, we have sun, we have high electricity rates, we are dependent on oil... Why don't we have more renewable energy resources?
 - The PUC, DCA and larger electric utilities are perceived by many as roadblocks to the implementation of renewable energy resources.
 - This was expressed primarily by stakeholders "outside" the regulatory process.

⁴ Disagreement was expressed by several Forum members on this matter at the March 12, 2003 meeting of the Hawaii Energy Forum.

⁵ Findings of impending petroleum shortages are documented in several statutes. See, for example, HRS 196-1(1): "There is widespread shortage of petroleum and its derivatives which has caused severe economic hardships throughout the State and which threatens to impair the public health, safety and welfare. ..." (1974)

- There is widespread disappointment with the PUC, but for divergent reasons.
 - The PUC is perceived as ambivalent to public energy policies that support renewable resources and discourage dependence on oil.
 - The PUC is perceived to be understaffed, slow and cumbersome.
 - There were common complaints that PUC documents are not available and not indexed.
 - Proceedings before the PUC are considered inaccessible by several stakeholders.
- There is widespread and unanimous support for additional funding of the PUC and DCA.
 - There is widespread belief that providing the PUC with additional resources is essential to its proper function and that improving the functioning of the PUC and DCA is important and would be beneficial.
 - There is frustration that the special fund for the PUC and DCA collected from utility rates is being diverted to the state general fund.
 - Most of the criticisms of the PUC and DCA were acknowledged as resulting from insufficient resources.
- There is an apparent lack of coordination and cooperation between Hawaii state agencies.
 - DBEDT is perceived as being at cross purposes with the PUC and DCA.
 - The Department of Health and the Department of Land and Natural Resources have roles in energy resource siting but not in the public utility regulation process.
 - There is frustration with the multiplicity of non-coordinated permitting agencies with jurisdiction over energy facility siting and construction.
- There is widespread “envy” of HECO and its subsidiaries.
 - HECO is doing such a good job of covering all the bases that other stakeholders are left in the dust.
 - HECO is perceived as having direct access to PUC information and influence on PUC staff that is not enjoyed by other stakeholders.
 - There is a perception that HECO spends lots of money out-staffing, out-lawyering and out-maneuvering everyone and that this is done at its ratepayers’ expense.
- There is a perception that the utility energy efficiency programs are not adequate.
 - Current programs are perceived as “favoring the rich” since they all require substantial customer contributions.
 - Current programs are limited to utility-run rebate programs that are not available to renters or low income customers.

LONG TERM TRENDS IN THE UTILITY INDUSTRY.

This section focuses primarily on trends in the electric utility industry. Trends in primary hydrocarbon fuels are addressed at some length in the first of this series of reports prepared for the Hawaii Energy Policy Project: *Hawaii Hydrocarbons Outlook*.

The electric industry in the United States is in a state of rapid transition. This is not a unique state of affairs for an industry that has been in one or another state of transitions since its inception in the late nineteenth century. Several historical trends in the electric industry are outlined below, followed by a discussion of current and future industry trends.

Brief History of Trends in the Electric Industry

Rapid Growth

The U.S. electric industry had its start around 1882 when Thomas Edison opened the Pearl Street Station in New York City to generate electricity for several large commercial customers. The City of New York soon became a customer for purposes of street lighting. The electric power industry grew quickly as cities across the country encouraged private investment by offering entrepreneurs franchises to produce electricity locally. By 1885, merely three years later, there were 151 private electric generating and distribution companies.⁶ Municipal generation enterprises were started in many smaller cities unable to successfully encourage private investment. By 1890, less than ten years after the opening of Edison's first power station there were over 2500 private companies and over 700 public generation systems.

Competition and Instability

This was an era of rapid growth, innovation and economic instability. In some cities multiple franchises pitted generating companies against one another resulting in intense competition. Chicago, for example, awarded 45 separate franchises, many for overlapping service territories. In these areas prices were forced low enough that companies could cover only short run marginal costs and could not provide for the high capital investment costs that characterize the electric industry. In other areas where only single companies provided electricity, unregulated monopoly economics resulted in excessively high prices. Profitability grew conspicuously to the extent that companies feared being taken over by municipalities.

State Regulation

In 1907 the concept of state utility regulation was first implemented as a mechanism to stabilize prices and control monopolies. Within ten years almost all states had established utility regulatory agencies. The initial concept of utility regulation, even at its inception, was similar to modern cost-based regulation. State commissions were authorized to set rates at a reasonable level sufficient to provide for utility expenses and capital needs.

Consolidation and Holding Companies

During the same decade that saw the establishment of utility regulation the number of utilities continued to grow to a total of over 4200 private regulated utilities and 2400 municipal utilities by 1917. The following decade, however, was characterized by rapid consolidation and conglomeration of utility ownership. By 1927 the number of private utilities was reduced by about

⁶ The statistics and historical citations in this brief history are distilled from the introductory chapter of *Power Structure - Ownership, Integration, and Competition in the U.S. Electric Industry*, by John E. Kwoka, Jr. 1996

half to 2137. This trend was partly due to realization of economic efficiencies as duplicative transmission and distribution systems were eliminated and engineering economies of scale were realized. The trend was also part of a wider national trend of corporate consolidations. Large holding companies grew to control a large part of the electric power industry. By 1932, sixteen holding companies generated three-quarters of all power produced in the country.

Federal Regulation and Project Development

In 1935 the Federal Power Act and the Public Utility Holding Company Act (PUCHA) were passed by the U.S. Congress. The Federal Power Act established the Federal Power Commission (now the Federal Energy Regulatory Commission (FERC)) to oversee interstate wholesale power transactions.⁷ PUCHA established oversight of the industry by the Securities and Exchange Commission and established standards for conduct between utility affiliates. This was the birth of federal influence in the field of utility regulation. This decade also saw the birth of extensive federal financing of electric power projects. The Rural Electrification Administration brought electric power to rural areas resulting in the establishment of about 800 electrical cooperatives, most of which still exist today. Large federal hydroelectric projects were also initiated including the Bonneville Power Administration in the Pacific Northwest and the Tennessee Valley Authority. These projects produced low-cost power that was provided on a wholesale basis, giving first claim to the publicly owned utilities and rural electric cooperatives.

Consolidation of Private Utilities

In the next several decades, as the electric power industry continued to grow, the number of private utilities continued to shrink as the average size of private utilities grew. By 1975 the number of private electric companies was reduced to 256. The number of municipal and rural cooperative utilities remained relatively constant and by 1975 numbered 2224 and 982 respectively. The relative size of the private companies is evident in the fact that the 256 private utilities, numbering less than 8% of the total, generated over 85% of the electric power.

Economies of Scale and Interconnection

In addition to the growth in the average size of the private utilities, interconnected power pools and coordination agreements established vast utility generation and transmission systems. The growth of individual utilities and the development of power pools with common ownership of generation resources capitalized on growing engineering economies of scale for increasing sizes of power plants. Most power was generated in fossil fueled thermal power plants with a smaller component of nuclear generation. Typical power plant size had increased to over 1000 megawatts.

PURPA

In 1978, in response to concerns about national energy security and reliance upon foreign fossil fuels, the U.S. Congress passed the Public Utilities Regulatory Policies Act (PURPA). PURPA made several amendments to the Federal Power Act relating to regulatory processes, electric rate design and resource development. The most influential provision was a requirement that utilities must purchase power generated by certain "qualified facilities" including cogeneration and renewable energy facilities. PURPA required FERC to adopt implementing rules and required state regulatory agencies to adopt rules consistent with the FERC rules. These rules establish the terms, considerations and rates for purchase of power generated by qualifying facilities. PURPA was challenged by the State of Mississippi resulting in a U.S. Supreme Court ruling that, among other things, clearly establishes that PURPA's provisions are applicable to all states (and

⁷ The provisions of the Federal Power Act are not generally applicable to Hawaii or Alaska due to a lack of sales or resale in interstate commerce.

hence Hawaii) and are not confined within the scope of the interstate commerce clause of the U.S. Constitution as are most Federal Power Act provisions.

Mainland Wholesale Competition

In the 1980's FERC encouraged the growth of non-utility generation by provisions that increased access to interstate transmission systems. The federal Energy Policy Act of 1992 increased FERC's authority to require utilities to "wheel" power openly according to tariff on all transmission facilities. In conjunction with rules established by FERC in 1996, a wholesale energy market was effectively created on the U.S. mainland.

State Electric Industry Restructuring, Competition and Deregulation

In the 1990's several states implemented electric industry restructuring measures introducing varying degrees of competition and deregulation. This sweeping reform is the predominant trend in the U.S. electric industry today.

Electric Power Industry in Hawaii

The history of the electric power industry in Hawaii reflects some, but not all of the same trends as the mainland history. Hawaii was not a latecomer to the electric industry. King Kalakaua visited Thomas Edison in New York in 1881, the year before Edison opened his Pearl Street Station. By 1886 Iolani Palace was lit with electricity generated by a small steam engine and generator. By 1888 a hydroelectric generator driven by water from Nuuanu stream provided street lighting in Honolulu. Two years later hundreds of homes in Honolulu had electricity.

By 1890 Hawaii had its own distributed generation business. E.O. Hall & Son marketed small home generation plants for installation in residences or industries. This business enterprise evolved into a partnership that in 1891 became the Hawaiian Electric Company.

The sugar industry was quick to adapt many engineering innovations developed on the mainland. The sugar mills were ideal cogeneration facilities producing electricity using steam produced by burning bagasse for boiling sugar. Until the recent demise of the sugar industry in Hawaii, sugar companies were (and one continues to be) major suppliers of electrical power. As sugar companies retire, some of the boilers and generation equipment have been converted to coal fuels. Sugar mill sites continue to be candidate sites for new power generation because of compliant zoning and proximity to electrical transmission.

Current and Future Trends

Competition and Deregulation

Certainly the dominant trend in the electric utility industry in the past several years has been the opening of mainland wholesale and retail electricity markets to competition and deregulation. This trend continues as several states and regions proceed with the process of industry restructuring and deregulation.

The process of deregulation has been more successful in some jurisdictions than others. Problems with price stability, resource planning/development and equity of services to smaller customers remain substantial challenges.

The extent to which competition will replace the "natural monopoly" regulated utility industry framework in Hawaii is not clear. Some of the "preconditions" of competition and deregulation do not exist in Hawaii to the same extent as the mainland. These are discussed in greater detail in a section dedicated to this subject later in this report. Hawaii seems to be taking a prudent cautious approach to electric industry restructuring.

Clearly there are increasing competitive forces in Hawaii's energy sector even without any formal restructuring of Hawaii's regulatory framework. Competitive forces result from several of the trends noted below including decreasing economies of scale, distributed energy generation and combined heat and power technologies, availability of alternate fuels and diversification of energy services.

Decreasing Economies of Scale

One of the predominant trends in much of the history of the electric industry has been increasing institutional and engineering economies of scale in electricity production and transmission. For many decades "larger and larger" meant "cheaper and cheaper." This trend began to see its limits in the 1970's as high interest rates compounded by long construction lead times exacerbated by environmental permitting delays led to unexpectedly high financing costs for large thermal power plants.

On the mainland, where average generation facility sizes are much larger than in Hawaii and where natural gas is plentiful, new smaller and less expensive combined cycle combustion turbine facilities undercut the costs of larger coal and nuclear plants. Hawaii will continue to benefit from increasing efficiencies for smaller generation units. In Hawaii, however, utility generation units that are "small" by mainland standards are still relatively large in proportion to the size of Hawaii's utility systems.

More recently, much smaller modular generation units have been developed that can be installed on the premises of electric utility customers. Although these units are not as efficient as state of the art utility scale generation equipment (strictly from the standpoint of electricity production), by beneficial use of the waste heat from the generation equipment at the customer's location, these units can achieve superior overall combined heat and power efficiencies.

Natural Gas as an Electric Generation Fuel

The availability of economically priced natural gas in conjunction with increasingly efficient gas turbine technologies has revolutionized the economics of mainland electric power generation. Although natural gas is not indigenous or presently available in Hawaii,⁸ the recent rapid evolution of liquified natural gas (LNG) distribution technologies may change the economics of Hawaii's energy sector dramatically.

LNG delivery is now being assessed for Hawaii. Because the minimum economic scale of currently available LNG delivery vehicles is large compared to Hawaii's potential demand, delivery of LNG to Hawaii would require conversion and long term contractual commitment of essentially all Oahu oil-fired electric generation facilities to LNG fuel. The impacts of this conversion upon Hawaii's existing refineries and fuel infrastructure is uncertain. Even if LNG facilities are not implemented in Hawaii in the short term, the potential availability and probable continued decreasing minimum economic scale of LNG delivery will be an economic factor in fuel pricing and investment in Hawaii for the next several decades.

⁸ Synthetic natural gas (SNG) is manufactured on Oahu and is distributed by pipelines to some leeward areas. The SNG made and distributed in Hawaii is more expensive than mainland natural gas and does not offer the same potential as an economical fuel for electricity production.

Generation Efficiency Improvements.

Generation technologies will continue to increase in energy conversion efficiency. The extent of this trend, however, is limited by the immutable laws of thermodynamics.⁹ Generation efficiency will increase incrementally and perhaps eventually substantially, but certainly not by a large factor.

It is worth noting that the extreme economies realized by the recent revolution in telecommunications technologies are not possible on the same orders of magnitude in the energy sector. Unlike data transmission, which can be increased multiplicatively by dividing parcels into smaller and faster units, energy is a palpable entity that can be converted in form, but cannot be created or increased.

Distributed Generation

The availability of increasingly efficient, relatively small modular generation units is revitalizing a growing market for distributed generation. Running counterpoint to a long-standing trend towards larger central station power plants, distributed generation locates smaller generation units dispersed throughout the electric distribution system. Distributed generation offers several advantages including: reducing system transmission and distribution losses, providing local generation reliability, offering relatively quickly permitable contingency options and diversifying electrical generation impacts.

Distributed generation units can be owned by the utility, by independent power producers or by electric power consumers. Units can be located at utility-owned sites, such as transmission and distribution substations, or at non-utility sites, either on the utility or the customer "side of the meter".

In conjunction with combined heat and power (CHP) applications (described below) distributed generation units can provide superior thermodynamic energy efficiencies. Concerns with distributed generation include transmission and distribution maintenance safety (effectively mitigated by proper interconnection standards and equipment) and land use impacts associated with fuel transportation and location of generation and fuel storage equipment in non-heavy-industrial zones.¹⁰

One important regulatory issue associated with distributed generation is utility standby services and associated rate tariffs and interconnection standards¹¹. When generation units are located on the customer side of the meter, the amount of energy used and purchased from the utility is reduced. The amount of utility capacity¹² required to serve the customer may also be reduced to some extent, but generally the utility is expected to maintain sufficient capacity to provide

⁹ Current electrical utility generation thermodynamic efficiencies range from about 25% to 50%. Older units tend to be at the lower end of this range and newer units at the higher end. For these energy conversion technologies maximum efficiencies are absolutely limited to less than 100% and for practical purposes substantially less. This refers to limits in electric energy generation (conversion) efficiency. This should not be confused with increased efficiencies in energy use. There are large potentials for increased efficiencies in *how* energy is used that are not limited by laws that apply to energy conversion.

¹⁰ There is also some concern from a consumer advocacy perspective that consumers investing or contracting but not accustomed to owning and operating generation equipment, may not fully realize the long term maintenance costs and operational concerns associated with aging equipment.

¹¹ The PUC has recently (March 2003) approved interconnection standards that are now part of the tariffs for HECO, MECO and HELCO.

¹² The term "capacity" as it is used here refers to the amount of utility generation, transmission and distribution equipment necessary to meet the peak demands of the customer.

“standby” service to the customer when the customer’s generation equipment is not operating. Establishing appropriate standby service tariffs is important to allow and/or encourage distributed generation and to fairly compensate the utility for costs of providing standby service capacity.¹³ (The subject of standby rates is discussed in a later section of this report starting at page 65).

As the efficiency, size, costs, impacts and operating characteristics of generation equipment continue to be optimized, distributed generation will continue as a growing trend in decades to come. As an option available to energy consumers to mitigate utility energy costs and provide local reliability and/or CHP applications, distributed generation will exert competitive pressures on utilities to control commercial/industrial electricity costs.

Combined Heat and Power Applications

Combined heat and power (CHP) applications are a special instance of distributed generation described above. Installation of generation equipment at a location where the “waste” heat produced can be used for beneficial purposes offers opportunities for superior fuel use efficiency and consumer economics. Typical uses for generation equipment heat are water heating and industrial process heat. Several projects have been installed in Hawaii resulting in fuel and cost savings.

The CHP “market” in Hawaii is limited, but essentially unexploited.¹⁴ CHP can be implemented effectively only where generation equipment can be operated without prohibitive impacts and where appropriate beneficial uses can be made for generation equipment heat.

Several vendors, including most of Hawaii’s electric utilities, are actively engaged in securing a share of the CHP market. There are several ripe regulatory issues associated with the impending development of the CHP market:

- There is a question of whether and to what extent the regulated electric utilities or affiliates will be allowed to compete with non-regulated vendors or non-regulated utility affiliates in the CHP market.
- As described above in the discussion of distributed generation, an important regulatory issue is the establishment of appropriate standby service standards, tariffs and interconnection protocols. (See discussions starting at page 65 and page 115).
- For utility-owned generation equipment on the customer side of the meter an appropriate treatment of standby tariffs would need to be established¹⁵ as well as a tariff for any charges for the provision of heat to the customer as a regulated utility commodity.¹⁶

¹³ Standby service tariffs need to consider numerous factors including whether the customer agrees to coordinate generation maintenance schedules with the utility, the extent to which the customer’s (or customer class) peak demand is coincident with utility system peak demand, the extent to which the customer’s generation outages are expected to be coincident with other generation equipment billed on the standby tariff and the extent to which utility capacity costs are embedded in the customer’s energy-based tariff charges.

¹⁴ There are several CHP installations on the Islands including industrial customers, shopping centers and hotels.

¹⁵ Existing standby tariffs pertain to customer operation of generation equipment on the customer side of the meter. It is not clear how the existing tariffs would apply to utility-owned generation on the customer side of the meter. In any event, clearly the standby tariffs should not be applied differentially in a manner that would provide inappropriate competitive advantage to the utility for distributed energy or CHP market share.

¹⁶ HRS 269-1 includes delivery of heat as one of the commodities identified in the definition of a public utility. At this time, however, there are no rules, standards or tariffs that govern the delivery of heat by electric utilities.

Because of the immediate favorable economics and active vendor and customer interest, CHP is likely to be a rapidly growing application in Hawaii. This trend will be limited, however, by the size and number of site-specific applications with favorable CHP potential.

Diversification of Electric Services, Reliability, Power Quality

As electronic and data processing equipment continues to gain importance and penetration in our economy, the demands for special electric service reliability and power quality will increase. These demands are often currently met by back up and power conditioning equipment installed at the consumer premises. Some utilities on the mainland are offering more precisely regulated and more reliable power supplies to customers needing this service (at premium prices).

Economics of Renewable Resources

The costs of renewable energy resources have been declining consistently and will continue to decline in decades to come. The pace of the reduction in renewable resource costs has been frustratingly slow to many proponents of these technologies, but substantial economies are ultimately certain. As often noted, it is a logical certainty that eventually all energy will be supplied by renewable technologies.

There are several factors that affect the economics of renewable energy resources. These include the basic costs of the resources, the financing costs of the resources, and the costs of competing (existing fossil fuel) technologies.

The basic costs of renewable resources are affected primarily by technological and engineering innovations and by the scale of manufacture (number of units produced). Both of these factors have the potential to reduce renewable resource costs substantially. In coming decades the basic costs of some renewable technologies may be only a fraction of current costs.

Renewable resources are characteristically capital intensive. Compared to fossil fuel technologies renewable technologies typically have high “up front” capital costs and lower operational costs.¹⁷ The capital intensive nature of these resources makes financial factors commensurately important. The financial priorities associated with these capital intensive projects is a dominant concern of utilities and independent power producers negotiating contractual terms for renewable resources. The availability of low interest sources of capital (such as public bond financing) is of particular importance to capital intensive resources.

The cost of conventional fossil fuel generation is generally the benchmark against which renewable energy resources compete. For renewable “qualifying facilities”¹⁸ negotiating prices determined by utility avoided costs this is quite literally true. Renewable generation is considered to be economically viable when it costs the same or less than conventional generation resources. According to most experts, the thirty-year outlook for fossil fuel prices is relatively flat, with only moderate real cost escalation.

Renewable generation will continue to become more cost effective. This trend will be persistent and ultimately may be a predominant trend in electric industry economics. In the short term some technologies, particularly wind generation, are cost effective in Hawaii with existing tax credit subsidies. Subsidies will continue to be important for renewable technologies until costs decline further.

¹⁷ There are notable exceptions. Biomass and ethanol technologies, for example, have appreciable operation costs.

¹⁸ The term “qualifying facilities” refers here to projects that qualify under the terms of the Public Utilities Reform Policies Act of 1978 (PURPA) which requires utilities to purchase power at the utility “avoided cost”. The avoided cost of utilities in Hawaii is, basically, the cost of fossil fuel generation.

Carbon Economics and Environmental Taxes

“Notwithstanding current political uncertainties affecting the Kyoto Protocol process, greenhouse gas emissions and climate change are poised to become the dominant energy-environment problem facing Hawaii and the developed world.”

The statement above is the very first sentence of the previous report prepared for the Hawaii Energy Forum, *Environmental Requirements on Energy Producers*. Despite the current posture of the United States, a consensus amongst international economists seems to indicate that carbon emissions are likely to be penalized or taxed within the next decade.

Whether, when, and how carbon emissions and other environmental impacts might be taxed in Hawaii is, of course, uncertain. Nevertheless, the expected probability of these taxes, however small or large, should be considered in Hawaii’s energy resource development decisions.

THE HAWAII ENERGY REGULATION FRAMEWORK

THE ROLE OF GOVERNMENT IN THE ENERGY SECTOR

Federal, state and county governments play several important roles in Hawaii's energy sector:

- As **regulators**, governments control the actions of constituents by passing and enforcing laws and by the actions of regulatory agencies.
- As **tax collectors**, governments affect the costs of energy resources.
- As a **financiers**, governments provide funding for energy resources by issuing, sponsoring or guaranteeing bonds, offering tax credits and/or by directly developing energy resources and R&D projects.
- As large **consumers** of energy, governments affect how much energy is used, both by setting an example and by direct consumption.

Regardless of how or what governments officially adopt as written energy policies, the actual implementation of energy policy is accomplished in how governments perform in each of these roles. Everything that governments do in each of these capacities provides incentives (or disincentives) regarding the implementation of energy resources in Hawaii.

HAWAII ENERGY REGULATORY AGENCIES

The **Public Utilities Commission** (PUC) is the primary energy regulatory agency in Hawaii. The PUC has broad authority over the rates, finances, operation and management of all public utilities in Hawaii. In addition, recent legislation adds duties to regulate gasoline prices.

The **Division of Consumer Advocacy** (DCA) is an important agency in utility regulation as the principal government party in all matters that come before the PUC. The DCA has the dual responsibility of:

- representing consumer interests before the PUC
- providing audit and litigation functions that support PUC statutory duties.

The Director of the Department of Business, Economic Development and Tourism (DBEDT) is designated as the **Energy Resources Coordinator** (ERC). The ERC has duties to promote Hawaii energy policies as an advisor to the legislature and governor and has some regulatory duties¹⁹ including:

- enforcement of regulations regarding compliance with hot water heater efficiency standards and regulations prohibiting continuous pilot burners on new gas appliances
- regulation of state agency energy use efficiency standards and procedures

The administrator of the Energy, Research and Technology division of DBEDT is designated the **Petroleum Commissioner** with duties to:

- oversee the reporting and evaluation of information from petroleum suppliers

¹⁹ The DBEDT and the ERC have extensive duties that are not itemized here. Only duties that are regulatory in nature are identified.

- adopt rules requiring ten percent ethanol content in gasoline in Hawaii
- implement recent legislation requiring regulation of gasoline prices

Several **county, state and federal agencies** have regulatory duties regarding a formidable list of permits required for siting and construction of energy facilities.²⁰ The actions of these agencies are not a primary focus of this report. The principal local agencies with regulatory duties regarding energy facility siting and construction are:

- Department of Health (implementing federal and state air, water, noise and hazardous waste regulations)
- OSP (Coastal Zone Management regulations)
- Department of Land and Natural Resources (ocean, reservoir and geothermal permitting and stewardship of state lands)
- Department of Transportation (harbors and ocean construction permitting)
- County Governments (zoning, Shoreline Management Area, building permitting and implementing energy codes)

Each of the County governments have rulemaking authority regarding a limited scope of electric utility activities by way of each utility franchise.²¹

PUBLIC UTILITY REGULATION - HRS CHAPTER 269

The framework for the regulation of public utilities in Hawaii is specified primarily in Chapter 269 of the Hawaii Revised Statutes. This chapter:

- provides for the appointment and defines the powers and duties of the PUC,
- defines the powers and duties of the DCA,
- defines public utilities that fall under the PUC's jurisdiction, and
- includes extensive statutes regarding the regulation of public utilities.

The Public Utilities Commission.

The PUC is comprised of three members appointed by the governor and confirmed by the senate. Each commissioner serves a six year term. The terms are staggered by two year intervals to provide continuity.

The PUC has broadly defined powers and duties to exercise "general supervision... over all public utilities." including the determination of utility tariffs and fees and all aspects of the operation, financing and management of public utilities.

The PUC has extensive powers to carry out its duties, including the authority to adopt rules and adjudicate contested case proceedings consistent with the administrative procedures act (HRS Chapter 91), conduct investigations into any aspect of the affairs of public utilities and to enforce all parts of Chapter 269. The PUC and each commissioner individually have the same authority

²⁰ A list of permits and permitting agencies is provided in the appendix.

²¹ The scope of rulemaking authority is limited to specific matters listed in the statutes codifying the franchise for each electric utility in each county. For example, see MECO's franchise, Act 12 of the Hawaii Legislature (1991) in the CD appendix to this report.

as the circuit courts to subpoena and examine witnesses, order the production of information or documents and punish for contempt.

Recent legislation provides for regulation of gasoline prices by the PUC.

The PUC is placed in the Department of Budget and Finance for administrative purposes.

Appeals to orders by the PUC are heard by the Supreme Court of Hawaii.

The Consumer Advocate and the DCA

HRS 269 designates the director of the DCCA as the "consumer advocate" and provides for a Division of Consumer Advocacy (DCA) within the DCCA. As a matter of past practice the substantive powers and duties designated by statute to the DCCA director have been delegated to the executive director of the DCA.²² With the exception of this section which refers to the specific language of the statute, this report refers to the consumer advocate as the DCA unless specifically referring to the director of the DCCA in this role.

HRS 269 provides that "the consumer advocate shall represent, protect, and advance the interests of all consumers, including small businesses, of utility services." The Consumer Advocate is given the right to participate as a party in all proceedings before the PUC. The Consumer Advocate is given powers to:

- (1) Adopt rules pursuant to chapter 91 necessary to effectuate the purposes of this part.
- (2) Conduct investigations to secure information useful in lawful administration of any provision of this part.
- (3) Assist, advise, and cooperate with federal, state, and local agencies and officials to protect and promote the interests of the consumer in the public utilities field.
- (4) Study the operation of laws affecting all consumers, including small businesses, of utility services and recommend to the governor and the legislature new laws and amendments of laws in the consumers' interest in the public utilities field.
- (5) Organize and hold conferences on problems affecting consumers of utility services.
- (6) Perform such other acts as may be incidental to the exercise of the functions, powers, and duties set forth in this section.
- (7) Represent the interests of consumers of utility services before any state or federal agency or instrumentality having jurisdiction over matters which affect those interests. [HRS 269-54(b)]

The Consumer Advocate is given the power to initiate proceedings before the PUC if it believes that there is any violation of any state or federal law or rule of any state or federal agency or if the rates or rules of any public utility are not reasonable. The Consumer Advocate has extensive powers of discovery regarding any matter before the PUC. The power to enforce these powers, however, is left with the PUC.

²² This is a matter of past practice but is not specified by statute. The powers and duties associated with the DCA actually reside with the director of the DCCA..

Hawaii's Regulated Public Utilities

Public utilities in Hawaii are regulated by the PUC. Public utilities are currently defined in detail by statute and include the following principal general categories:²³

- transportation of passengers and freight (excluding certain common carriers)
- telecommunications
- storage or warehousing of goods (when found necessary by the PUC)
- private sewage disposal
- provision (generally) of light, power, heat, cold, water, gas or oil (excluding nonfossil fuel sources and wholesale power production)

Of particular relevance to the scope of this report, Hawaii's regulated **energy** public utilities are:

Hawaiian Electric Company (HECO)

Maui Electric Company (MECO)

Hawaii Electric Light Company (HELCO)

Kauai Island Utility Cooperative (KIUC)²⁴

The Gas Company (TGC), pipeline-distributed activities only

The relative sizes of Hawaii's regulated energy utilities is portrayed in the chart below compared in terms of annual revenues.²⁵ HECO is by far the largest utility, followed by HELCO and MECO which are both HECO subsidiaries. HECO and its subsidiaries together comprise about 90% of the state's regulated utilities on the basis of revenues. The electric utilities collectively are predominant with about 96% of revenues. TGC is the only gas utility with remaining 4% of revenues.²⁶

²³ The Hawaii Supreme Court has determined that the generation of electricity for sale to one or more individual customers on a contractual basis does not fall within the definition of a public utility unless the generation is offered to the general public.

²⁴ KIUC is a recently formed cooperative owned by most of its customers. In accordance with the terms of its formation, KIUC will remain a regulated public utility for at least seven years and as long as it provides utility services to the general public (customers who are not members of the cooperative).

²⁵ Revenues are used as the basis of comparison rather than quantity of energy meaningfully compare both gas and electric utility services. Electric utility revenues in the chart include generation provided by independent power producers sold to the utilities on a wholesale basis.

²⁶ The scope of this report includes all of Hawaii's regulated utilities. The predominance of the electric utilities and of the HECO family of subsidiaries in particular within this scope results in more emphasis on these utilities in this report.

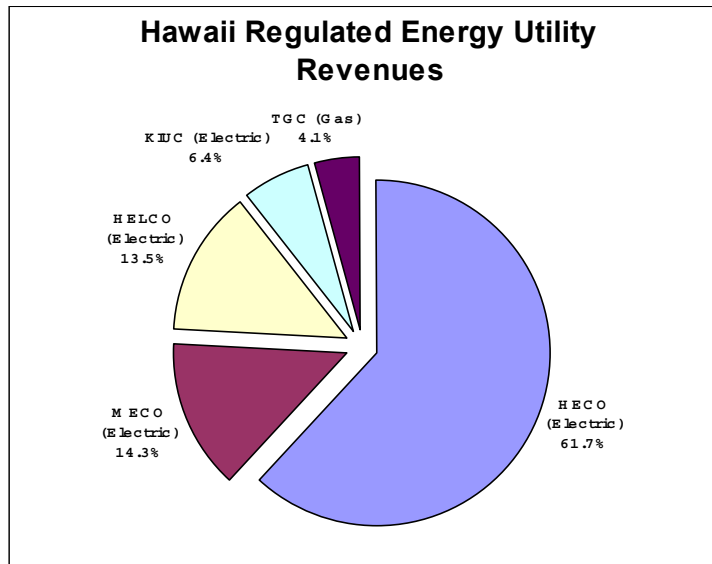


Figure 1 Revenues of Hawaii Regulated Energy Utilities

Non-Utility Energy Sector Activities

Several important components of Hawaii's energy sector are not regulated by the PUC. These include:

- Distribution of bottled gas
- Refining or distribution of fuels for ground, air and marine transportation
- Non-utility electricity generation and distribution.

Examples: Sugar company generation and distribution
 Off-grid photovoltaic systems
 Generation equipment on customer side of the electric meter

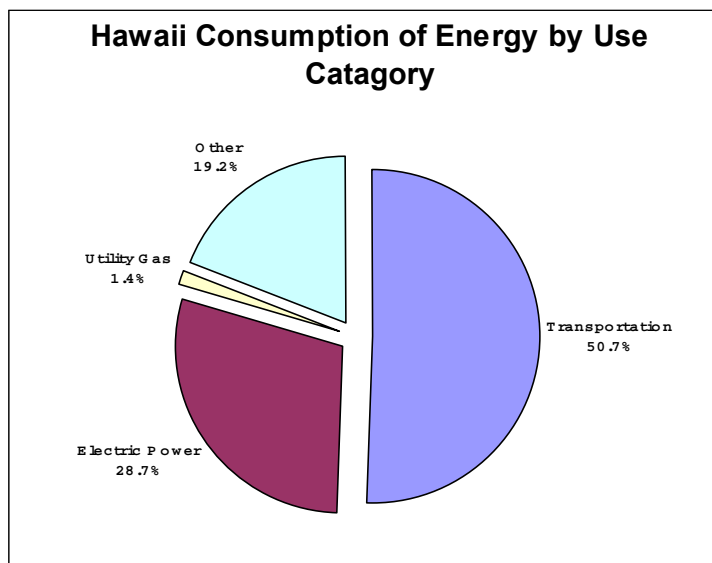


Figure 2 Hawaii Energy Use by Category (BTU basis)

The chart above shows the relative amounts of energy used in Hawaii in various categories. The largest category is the transportation sector which uses close to half of the energy consumed in Hawaii. The regulated gas and electric utilities together account for just over 30% of Hawaii's energy use. Unregulated use is about 70% of the total.

THE ENERGY RESOURCES COORDINATOR

HRS Chapter 196 designates the Director of the DBEDT as the Energy Resources Coordinator (ERC). The ERC has duties generally to promote the optimum development of the state's energy resources and specifically to formulate plans and proposals, conduct analyses, conduct public education programs, assist and regulate state agencies in implementing energy conservation, contract for services, advise the Legislature and Governor, prepare an annual report and adopt rules subject to legislative approval.

The ERC has limited regulatory duties including enforcement of regulations for compliance with hot water heater efficiency standards, regulations prohibiting pilots on gas appliances and regulation of state agency energy use efficiency standards and procedures.

STATE ENERGY POLICY AND LEGISLATIVE MANDATE

A primary function of this report is to provide groundwork and suggestions to the Hawaii Energy Forum regarding one of Forum's primary objectives: to provide possible recommendations to the 2004 Hawaii Legislature. This section of the report serves as a preamble to the next: *Improving Energy Regulation in Hawaii*, in which a spectrum of actions and options are identified for consideration by the Forum.

In making recommendations to the Legislature the Forum will have to determine what changes are necessary and the extent to which these changes should be executed by legislative means. This section provides a generic discussion of the extent to which state energy policy is being effectively implemented in Hawaii and the extent and form in which the Legislature might provide guidance or mandate to Hawaii's regulatory agencies.

The following questions are addressed in turn:

- To what extent are Hawaii's regulatory agencies effectively implementing the state's energy planning objectives and policies?
- Is the PUC fulfilling its legislative policy and rulemaking duties?
- To what extent and in what forms might the Legislature further delegate or mandate the determination of energy policy to the PUC?

State Energy Objectives and Policies

Because the state's formally adopted energy planning objectives and policies are a recurring theme in all discussions of energy policy implementation they are recited here for reference. The Hawaii Constitution sets the broad underlying context for policies regarding the management of the state's energy resources:

Article XI, Section 1, Conservation and Development of Resources. "For the benefit of present and future generations, the State and its political subdivisions shall conserve and protect Hawaii's natural beauty and all natural resources, including land, water, air, minerals and energy sources, and shall promote the development and utilization of these resources in a manner consistent with their conservation and in furtherance of the self-sufficiency of the State."

The Legislature has expressed more specific objectives and policies regarding energy facility systems in HRS 226-18:

§226-18 Objectives and policies for facility systems--energy.

(a) Planning for the State's facility systems with regard to energy shall be directed toward the achievement of the following objectives, giving due consideration to all:

- (1) Dependable, efficient, and economical statewide energy systems capable of supporting the needs of the people;*
- (2) Increased energy self-sufficiency where the ratio of indigenous to imported energy use is increased;*
- (3) Greater energy security in the face of threats to Hawaii's energy supplies and systems; and*

- (4) Reduction, avoidance, or sequestration of greenhouse gas emissions from energy supply and use.*
- (b) To achieve the energy objectives, it shall be the policy of this State to ensure the provision of adequate, reasonably priced, and dependable energy services to accommodate demand.*
- (c) To further achieve the energy objectives, it shall be the policy of this State to:*
- (1) Support research and development as well as promote the use of renewable energy sources;*
- (2) Ensure that the combination of energy supplies and energy-saving systems is sufficient to support the demands of growth;*
- (3) Base decisions of least-cost supply-side and demand-side energy resource options on a comparison of their total costs and benefits when a least-cost is determined by a reasonably comprehensive, quantitative, and qualitative accounting of their long-term, direct and indirect economic, environmental, social, cultural, and public health costs and benefits;*
- (4) Promote all cost-effective conservation of power and fuel supplies through measures including:*
- (A) Development of cost-effective demand-side management programs;*
- (B) Education; and*
- (C) Adoption of energy-efficient practices and technologies;*
- (5) Ensure to the extent that new supply-side resources are needed, the development or expansion of energy systems utilizes the least-cost energy supply option and maximizes efficient technologies;*
- (6) Support research, development, and demonstration of energy efficiency, load management, and other demand-side management programs, practices, and technologies;*
- (7) Promote alternate fuels and energy efficiency by encouraging diversification of transportation modes and infrastructure;*
- (8) Support actions that reduce, avoid, or sequester greenhouse gases in utility, transportation, and industrial sector applications; and*
- (9) Support actions that reduce, avoid, or sequester Hawaii's greenhouse gas emissions through agriculture and forestry initiatives. [L 1978, c 100, pt of §2; am L 1986, c 276, §17; am L 1990, c 319, §2; am L 1994, c 96, §4; am L 2000, c 176, §1]*

There is substantial disagreement regarding whether or not these objectives and policies are being effectively implemented by Hawaii's regulatory agencies. As discussed above, the comments from the stakeholder interviews and testimony before the Legislature include widely diverging views on this matter. On one hand there is the opinion that Hawaii's objectives and policies promoting energy self-sufficiency, reliance on indigenous and renewable resources and discouragement of oil resources are not being properly or sufficiently implemented. On the other hand there is the opinion that these objectives are effectively being balanced by another explicitly stated objective: the provision of economical energy services at reasonable prices.

It is not the purpose here to resolve this divergence of opinion conclusively one way or the other. Several observations regarding the planning objectives and PUC policies are noted below.

It is clear that the state's planning objectives for energy systems include economics and reasonable price as important considerations as well as calling for increased self-sufficiency, reliance on renewable resources and energy efficiency. The statute requires "due consideration" to be given to all of the objectives but does not provide any clear methods or standards to determine priorities between the various objectives. To the extent that these objectives may conflict with one another, the statute is not definitively resolute, leaving discretion to the implementing agencies to resolve ambiguities within the broader meaning of the statute.

For example, extensive implementation of renewable resources might cost more than conventional resources in today's economy but provide increased energy security, self-sufficiency and reduce greenhouse gas emissions. How is the PUC or any other agency to determine the proper balance between these conflicting objectives? Without some guidance from the statute regarding how the objectives should be prioritized, how can it be determined whether or not the PUC or other agencies are properly giving "due consideration" to all of the planning objectives?

If it is the intent of the Legislature to obtain some more specific or extensive results regarding the implementation of renewable resources, self-sufficiency and energy efficiency, it behooves the Legislature to make its intent more explicit and specific. Otherwise the Legislature should withhold any reproof and be satisfied that the ambiguity it has allowed in the statute is being realized within the resulting discretion it has allowed to the implementing agencies.

To its credit, the PUC has adopted a progressive Integrated Resource Planning Framework that provides a methodical procedure to determine how various objectives might best be fulfilled and how conflicting objectives might be resolved. However, as discussed at some length later in this report, unfortunately the PUC has not been thorough in its implementation of the Integrated Resource Planning Framework. In recent years the PUC has not even taken up review of several utility applications that have been filed pursuant to the Framework. In this regard the PUC has been diligent in establishing its own energy system planning policy-making framework, but has been remiss in implementing policy within the context of its own framework.

The Legislative Duties of the PUC

The formulation and expression of policy are important and necessary legislative functions of the PUC. These functions derive generally from the practical need to establish specific policies or rules necessary to implement the powers and duties provided by statute in a form too general to implement without interpretation.

The PUC can set policies either by formal rulemaking procedures or "on-the-record" by establishing precedents in its decisions resolving contested case proceedings. Specific procedures for either approach are dictated by the Hawaii Administrative Procedures Act²⁷ and the associated body of case law.

Formal rulemaking proceedings are open to all members of the public and anyone may present testimony to the agency. An agency is not restricted to adopt rules within the confines or according to the testimony presented at hearings. Once adopted, however, the rules are binding on the agency and must be followed unless later changed by established rulemaking procedures.

Contested case proceedings are used to make decisions on specific cases. This process is designed to protect the rights of parties to fair hearing and ensure that decisions are documented

²⁷ HRS Chapter 91, Administrative Procedure

and can be appealed if necessary. Parties with an “interest” in the outcome of the proceeding are allowed to participate, but not the general public. Only those members of the public requesting and receiving Intervenor status are provided access to much of the information and documents in these proceedings. A formal “quasi-judicial” process is followed in order to create a legally correct record of fact upon which the agency must base its decision and upon which the agency’s decision is reviewed by a court when and if it is appealed.

Although it is not explicitly provided for in the HAPA, agencies may establish rules in the context of contested case proceedings. In most jurisdictions with well defined case law on this subject, policies and rules identified in a specific contested case proceeding that are more broadly applicable are considered rules that are binding on the agency and must be applied uniformly just as rules adopted by formal rulemaking procedures.

In the best of worlds, a party that comes before an agency should be able to determine prior to a proceeding what is expected and what standards will be used to determine the outcome of the proceeding. This requires that an agency should establish policies before implementing them and also that the policies established by the agency are expressed in some form that is clear and accessible to the general public. Both of these purposes are served better by formal rulemaking procedures than by on-the-record rulemaking in contested case proceedings addressing specific cases. Decisions made in specific contested cases are “hidden” in several respects.

First, when policies are set by precedent in the context of a specific case, it can be difficult to determine the extent to which the agency decision is specific to the circumstance of that case or is more generally applicable. Unless identified by the agency explicitly as a broadly applicable policy in the decision and order, the applicability of the policy must be interpreted by examination and consideration of the issues and scope of the specific case. This is often not simple or straightforward.

Second, policies established in specific contested cases are difficult to find. This is especially true in the case of the Hawaii PUC which has very little indexing and no cross-referencing of what matters were decided in prior contested cases. By contrast, formal rulemaking results in a clear set of rules that can be located easily.

The PUC has not conducted any proceedings primarily or explicitly addressing the substance of state energy planning policy for many years. The PUC has not used rulemaking proceedings for purposes related to state energy policies for decades. Policy is generally determined implicitly in contested case decisions made case by case.

When the PUC has addressed energy policy explicitly, it has done so in the context of generic contested cases. Examples include the generic dockets opened to consider integrated resource planning (1990), barriers to the development of renewable resources (1994) and electric industry restructuring and competition (1996). These are proceedings for considering policies to be applied generally to all utilities within their scope. This is also exactly the purpose of formal rulemaking proceedings. One reason for using generic contested case rather than rulemaking proceedings is the technical nature of the subject matter. An unacknowledged but more persuasive reason is that, by using contested case proceedings, the PUC is not obligated to abide by its ad hoc “rules” as explicitly as it would if formal rules were adopted. By adopting policy “on the record” in a contested case proceeding the PUC can alter or amend its policies within the context of later individual contested cases without as much risk of remand or reversal upon appeal.²⁸

²⁸ The body of case law on this subject supports the interpretation that rules adopted on-the-record are binding on agencies in the same way as formally adopted rules. However, in practice, the case law regarding on-the-record rulemaking is obeyed less diligently than the more explicit statutes regarding formal rulemaking procedures.

An alternative to using generic contested cases for determining policy is formal rulemaking. Adopting policy by formal rulemaking would allow more participation by the general public, would make the process and adopted rules more transparent and would more explicitly require the PUC to implement adopted policies consistently than policies adopted in generic contested cases. The rulemaking venue would allow the Commissioners to participate directly in discussions with stakeholders and to participate in any collaborative proceedings associated with rulemaking proceedings.

In any case, whether by rulemaking or by contested case procedures, it is essential that the PUC perform its legislative duties to establish and implement policy generally and to express energy planning objectives and policies specifically. According to the exemplary objectives of administrative law, the PUC should be expressing its policies clearly, explicitly and formally in terms that can be clearly understood by the potential applicants and complainants who may come before the PUC for administrative relief. In short, the PUC needs to find and wear its legislative hat.

Legislative Mandate Versus Delegation of Discretion to the PUC

To what extent should the legislature delegate discretion with respect to policy matters to the PUC? To what extent should the legislature dictate whether the PUC addresses policy case by case, by setting standards, or by formally adopted rule? To what extent should the legislature dictate policies to the PUC and make specific statutes that the PUC must implement?

In the simplest original constitutional terms, legislatures make laws (including policies), executive agencies implement laws, and judicial agencies ensure that laws are followed. History has proven that this complete separation of powers is not entirely practical. It turns out that there are just too many details to be worked out in lawmaking for the legislative branch to handle alone. In the evolution of our governmental system, legislatures have delegated to some executive agencies prescribed legislative powers to establish policies and to adopt rules to implement policies.

Legislatures tend to delegate legislative powers when and to the extent that practicality demands. In the field of public utility regulation, legislatures generally delegate authority broadly to commissions due to the technical and detailed nature of the subject matter and the need to consider policy in the context of individual circumstances which require extensive “fact finding.”

The Hawaii PUC has broad powers to establish and enforce policy regarding all aspects of public utility financing, operation, management and resource selection and procurement. These powers include rulemaking authority provided explicitly by statute, limited only by applicability to the broad purposes of Chapter 269 and the conventions of the Administrative Procedures Act. The PUC’s authority in these matters derives from the Legislature and its statutes. The Legislature retains its own authority to enable, suggest, encourage or mandate policy to be implemented by the PUC.

A Continuum of Levels of Legislative Guidance is Available

The Legislature can provide various levels of specificity and mandate to the PUC. Examples are listed below with some deliberate laborious attention to nuance, from the most “advisory” to the most “mandatory”:

- Statutes can provide no specific guidance, relying entirely on the agency’s discretion in policy matters within the agency’s proscribed powers and duties.

The Hawaii Administrative Procedures Act states explicit procedures that must be followed in order to change a formally adopted rule. There are no explicitly defined procedures to change a rule adopted on-the-record.

- Statutes can give powers to the agency to consider specific factors or take specific actions.
- Statutes can give general direction to the agency to consider specific factors or take specific actions.
- Statutes can require agencies to consider specific factors.
- Statutes can require agencies to determine and adopt rules to consider specific factors.
- Statutes can require agencies to determine and adopt standards.
- Statutes can require agencies to determine and adopt standards as rules.²⁹
- Statutes can require agencies to determine and adopt standards with minimum or specific characteristics as rules.
- Statutes specify standards, make decisions for the agency or require specific agency actions.

In addition, legislative oversight hearings can determine if the guidance provided by the statutes is being adhered to by the PUC and other agencies.

The range of alternatives identified here allows the Legislature to provide policy guidance to the PUC and/or DCA with an appropriate level of mandate. Statutes can specify policy and yet allow these agencies varying levels of discretion in determining and implementing policy. Generally, the Legislature must decide whether and the extent to which guidance to the regulatory agencies is necessary regarding the implementation of state energy policy.

There is good reason to delegate substantial aspects of the determination and implementation of energy policy to the regulatory agencies. The Legislature is not a particularly good venue for making determinations of fact on technically complex issues. In matters that require technical analysis and fact-finding, the PUC is a viable venue for setting policy. It may take some action by the legislature, however, to require the PUC to assertively determine and or implement policy.

In the following section of this report a broad spectrum of actions and options to improve regulation in Hawaii is provided. Most of these actions and options could be implemented by the administrative agencies identified. Some would require enabling legislation. For each of the options identified that are not sufficiently implemented by the administrative agencies, the Legislature could consider some level of action to provide guidance, direction or mandate to the agencies to provide necessary impetus.

For example, the Legislature could require the PUC to adopt rules or standards regarding particular energy policy matters. These could be general or specific requirements. The legislature could apply any of several alternative levels of mandate. It could specify whether rules should be required and, if so, whether they should consider particular factors, should include standards generally or should include particular standards identified in the statute. The legislature could allow the PUC to determine as little or as much of the policy regarding rulemaking as deemed appropriate.

²⁹ A deliberate distinction is made here between standards and rules. Standards refer to the specificity of language that provides some requirement, threshold or yardstick to determine compliance. Rules refer to policies to be applied broadly and uniformly. Rules can be adopted by formal rulemaking proceedings as provided in the Administrative Procedures Act or “on-the-record” when an agency identifies policies to be broadly applied in the context of a contested case proceeding. When a statute requires an agency to adopt rules this is usually interpreted to mean by formal rulemaking procedures. Rules may or may not contain standards.

Generally, it is the intention that each of the actions and options identified in the following section should be considered with the possibility in mind that, if not otherwise implemented by the identified agencies, these could be encouraged, modified or implemented by action by the Legislature.

IMPROVING ENERGY REGULATION IN HAWAII

An objective of this report is to identify ways that energy regulation can be improved in Hawaii, either by incremental improvements to the existing regulatory framework or by broader regulatory reforms. In making its assessment of Hawaii's energy regulatory framework the consulting team was asked to give special consideration to the implementation and encouragement of energy efficiency, renewable and distributed energy resources.

The format of this section is designed to facilitate the primary purpose of the report: to provide source material for considering proposed legislation for the 2004 Hawaii Legislature. For each of several general topics that follow, several courses of action are identified that could improve energy regulation in Hawaii. Some of these are recommendations, referred to as "Actions", that could and should be implemented immediately. Some, referred to as "Options", are identified for consideration. Some options are referred to as "Alternatives" where options are identified that are clearly mutually exclusive.

Some of the options could be implemented immediately. Some would require enabling legislation. Some may require legislation to provide the guidance, impetus or endorsement that may be necessary to go forward. For each action or option the implementing agency is identified. A Cross-Reference section is also provided at the end of this report that lists the actions and options according to immediacy, sorted by implementing agency.

The authors certainly do not endorse the implementation of all of the options identified. Indeed some of the options are mutually exclusive or redundant. Some are included for purposes of discussion or because they are included in the Terms of Reference that provide the Scope of Work for the report. In each case, the position and recommendations of the consulting team should be apparent in the text.

Many of the actions and options identified below could be implemented by the PUC ***provided that sufficient resources are available***. An important conclusion of this report is that the resources of the PUC and DCA need to be but are not presently sufficient to perform required duties. All of the actions and options suggested in this report that require commitment of additional regulatory agency resources should be implicitly predicated with this important caveat.

GETTING POLICY ISSUES ONTO THE PUC AGENDA

There is a widespread perception that the PUC and DCA are not addressing policy matters actively or directly. The actions of these agencies are primarily reactive, in response to applications and complaints filed by utilities and occasionally by other affected parties³⁰. The PUC has not initiated any investigations or rulemaking proceedings to consider policy issues for

³⁰ This was also a finding of both the 1975 and 1989 Management Audit[s] of the Public Utilities Program of the State of Hawaii prepared for the Hawaii Legislature.

many years. Several important generic dockets to address policy matters initiated under the chairmanship of Yukio Naito many years ago remain open and unresolved.

To a certain extent the PUC sets policy implicitly as it disposes of issues in the context of individual contested case proceedings. Even in this context, however, the PUC has been less than assertive or decisive in addressing policy in recent years.

Listed below are several actions to put policy issues more squarely on the PUC action agenda. All of these could be implemented by the PUC on its own initiative.

Action: (PUC) Resolve Outstanding Dockets Addressing Energy Policy.

There are several aspects of energy policy that are now open and ripe before the PUC. In terms of long-unresolved dockets these include many policy issues in the review of utility integrated resource plans³¹, methods for determining avoided costs for as-available energy providers³², competition and restructuring options for the electric industry³³ and application of external costs and benefits in the determination of avoided costs³⁴.

Except for limitations of staff resources (which are an important consideration), the PUC has an opportunity to resolve many policy issues without any actions by the legislature or any other entities. The specific matters listed above are ripe for disposition by the PUC. In order to take effective action to implement policy in these matters, however, the PUC would need not only to put these matters on its agenda for action, but to exert a deliberate effort to consider the issues assertively and decisively.

Each of these outstanding dockets could be resolved by the PUC by

- issuing a decision based on the existing evidentiary record,
- amending the schedule of proceedings to receive updated evidence or pleadings or to conduct evidentiary hearings, or
- opening a new docket or rulemaking proceeding to resolve the issues.

Action: (PUC) Open Generic Dockets or Use Rulemaking to Address Policy Matters

In addition to resolution of outstanding dockets there are important policy matters that could be addressed by the PUC under its own initiative. Some unresolved policy issues that have been brought before the PUC and deferred to future dockets could be the subject of generic investigative dockets or rulemaking proceedings. These include establishing new financial policies and mechanisms for utility DSM programs (cost recovery, lost margins and shareholder incentives)³⁵, treatment of external costs and benefits in IRP evaluation³⁶, and the establishment of a process for procurement of utility resources. (See page 136 for a list of options identified in

³¹ Docket Nos. 96-0266(Kauai Electric, now KIUC), 97-0349(HELCO), 99-0004(MECO)

³² Docket No. 7310

³³ Docket No. 96-0493

³⁴ Docket No. 7310, referred from Docket No. 6742

³⁵ Stipulated agreements in all HECO, MECO and HELCO DSM program application dockets terminate the existing lost margins and shareholder incentives recovery mechanisms within one year of HECO's next general rate case.

³⁶ Docket No. 95-0347

this report that would require opening or resolving investigative or rulemaking proceedings by the PUC).

Generally, most important utility policy matters could be effectively addressed by the PUC on its own initiative. Given capable, inspired and assertive commissioners knowledgeable in the field of public utility regulation and empowered by sufficient staff and resources, most of the regulatory and policy issues identified in this report could be addressed and resolved without legislative action.

Action: (PUC, Governor³⁷) Create an Energy Policy Staff Within the PUC

The PUC does not currently have an energy policy staff that specializes in energy policy matters. Most regulatory bodies have come to recognize the value of a policy staff. Creating an energy policy staff within the PUC would be efficient and productive and would assist the PUC to address its duties to establish, maintain and implement energy objectives and policies in Hawaii's regulated utility sector.

The PUC currently has an existing backlog of energy policy matters that remain unaddressed. As identified above, these include several integrated resource planning dockets and dockets considering electric industry restructuring and competition, determination of avoided costs and application of externalities in resource evaluation and pricing. There are several additional important policy matters that the PUC needs to address, including the disposition of utility demand side management programs, utility resource procurement procedures, distributed energy regulation policies and utility rate design and cost allocation policies.

The PUC does not presently interact or coordinate with other state agencies or energy stakeholders to ensure that the PUC implements policies and practices which help to achieve state energy goals. Elsewhere, this report recommends several approaches to create some cohesive coordination between state agencies. If any of these options would be implemented, a policy staff within the PUC would be an efficient means to coordinate activities with other state agencies and energy stakeholders.

Currently the staff resources of the PUC are constrained. Nevertheless it will be necessary for the PUC to dedicate some resources to address impending policy matters if any of the pressing issues identified in this report are to be addressed. In the longer term, assuming more sufficient overall staffing of the PUC, a policy staff could be comprised of three to five policy professionals reporting directly to the Commissioners.

IMPROVE THE EFFECTIVENESS AND EFFICIENCY OF REGULATION

The effectiveness and efficiency of Hawaii's regulatory agencies could be considerably improved. This is especially important if these agencies are expected to more assertively establish and implement energy planning objectives and policies. Currently the PUC and DCA are understaffed, underfunded and overwhelmed by "everyday" workload and the superior resources of the utilities and transportation companies they regulate.

³⁷ It may be possible for practical purposes for the PUC to establish a functional energy policy staff without any formal changes to the PUC organizational structure. The governor is identified here as an implementing agent to the extent that formal changes are necessary requiring the support and cooperation of the Department of Human Resources Development.

Hawaii's larger utilities currently have a disproportionate amount of control of the regulatory process. Only the larger utilities have the resources and the information needed to cover all of the necessary bases of the process. The PUC is relatively weak because it is understaffed and underfunded to perform all the functions assigned to it, and because it is charged with regulating too many trivial matters. The DCA is relatively weak, because it does not currently have an administrative director to guide policy, because it is understaffed to perform all of the functions assigned to it, and because the PUC does not defer to it as the "objective" entity in the rate making process. In rate making proceedings the utilities can stonewall the DCA, delaying or withholding data, until interim rate relief deadlines are met. The additional resources needed to pursue this data detract from the DCA's ability to perform its duties.

The options discussed below would help to improve the effectiveness and efficiency of utility regulation by strengthening the Commission, strengthening the DCA, and improving the effectiveness of their collective functions.

Increase the Resources and Productivity of the Commission

The ability of the PUC to address policy matters is dependent upon its resources and productivity. The PUC has a substantial day to day workload processing applications, complaints and filings that are not policy matters. As with any person or organization facing restrictions in time and resources, it is the policy and big picture matters that get pushed aside in order to deal with immediate tasks and brush fires.

If the PUC is expected to address and implement policy effectively, the Governor and Legislature must provide it with the necessary resources to execute its duties. This cannot be overemphasized. Many options and actions are identified in this report that would require additional commitment of staff resources by the PUC. Indeed many of the recommendations in this report will not be feasible without providing additional resources to the PUC. Several specific options to increase the resources and productivity of the PUC are identified below.

Option: (Governor, Legislature) Increase Staff and Funding for the PUC

It is very clear that the PUC and DCA need additional resources in order to fulfill their duties. Currently there are several aspects of utility regulation that are not being implemented as required due to insufficient PUC and DCA resources. There are not sufficient staff or resources to provide access to documents as required by law or to provide timely or prompt review of all matters brought before the Commission. Policy matters and generic dockets are pushed to the back burner with PUC and DCA staff already fully consumed with immediate business and brushier issues. If any of the actions and options suggested in this report requiring additional PUC and DCA resources are expected to be implemented, additional staff and funding resources need to be provided.

Hawaii presently has the smallest ratio of regulatory commission employees to population of all small states. This is evident from the chart below showing the number of staff positions for the commissions for states with a population of less than two million.

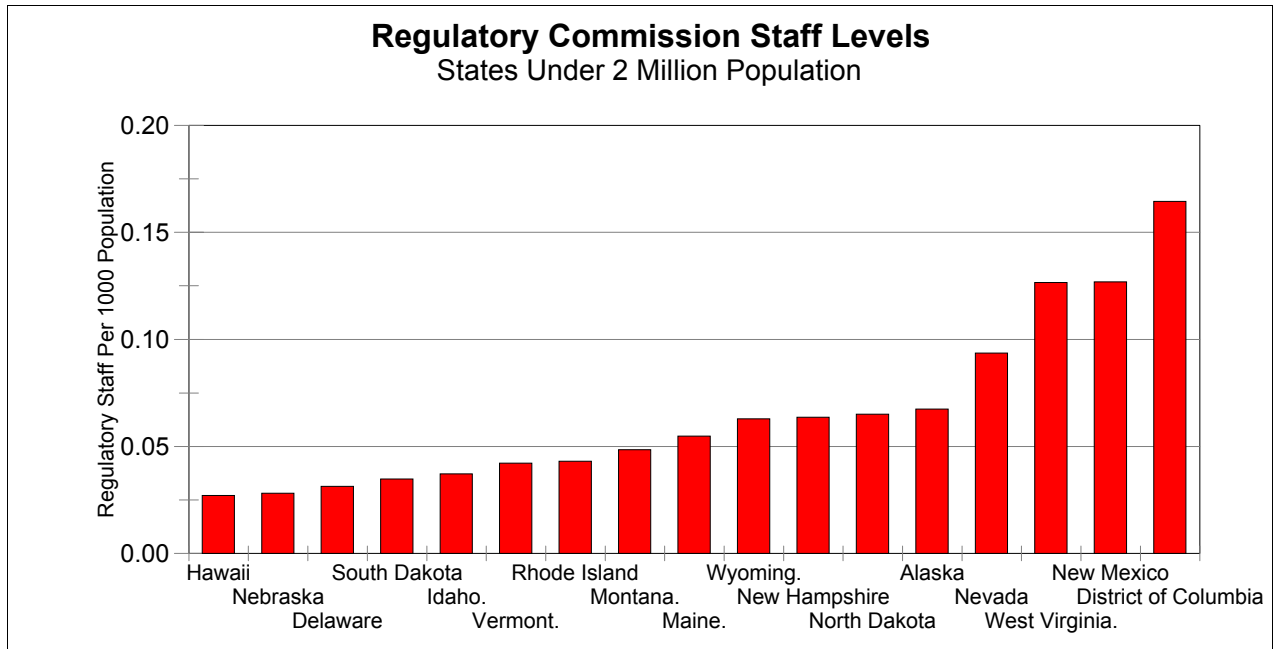


Figure 3 Regulatory Commission Staff Levels for Small States

With the with the DCA staff included, Hawaii has the fifth lowest number of staff positions for regulatory and advocacy staff combined totals. This is depicted in the chart below.

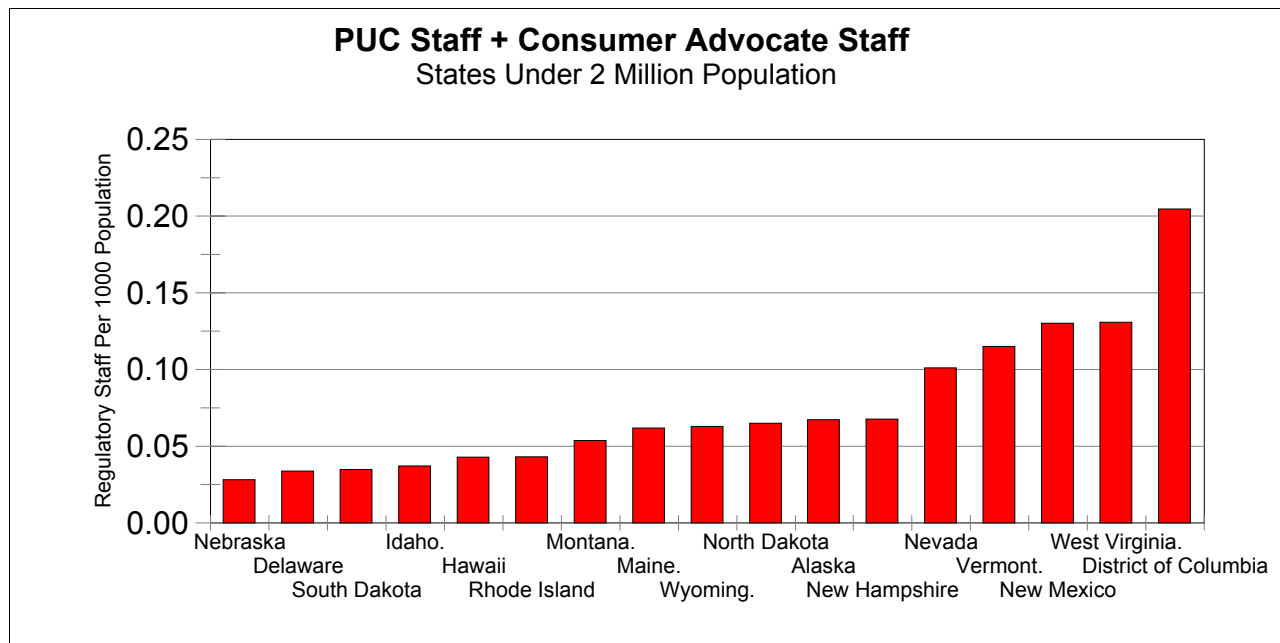


Figure 4 Total Regulatory Program Staff Levels for Small States

These statistics are exacerbated by several additional factors:

- The Hawaii PUC regulates more industries and activities than most other state commissions. This is discussed in more detail in a section below recommending reducing the number of activities regulated by Hawaii’s PUC. (See page 39).
- Many existing positions included in the comparisons and charts above are not currently filled in Hawaii’s PUC and DCA. Of the PUC’s 44 existing positions, only 30 are filled. Of the DCA’s 23 existing positions only 14 filled. Although the regulatory agencies in other states are likely to have some unfilled positions, Hawaii’s current proportion of unfilled positions is extreme.
- Recent legislation assigns additional recurring duties to the PUC to regulate gasoline prices. These duties are not typically included within the scope of utility regulatory agency responsibilities.

In the immediate time frame, providing the PUC and DCA with sufficient resources is primarily a matter of filling existing vacant staff positions. There are several substantial obstacles faced by these agencies in recruiting and retaining qualified staff. As discussed below, existing job descriptions and job classifications do not match the necessary job requirements and compensation levels are below industry standards. In addition there is currently a state hiring freeze requiring the PUC and DCA to obtain explicit permission from department directors and the governor’s office to proceed with filling vacant existing positions. The Governor’s office could and should play an active role in facilitating the necessary cooperation of the Department of Human Resources to mitigate these immediate obstacles.

In the long term, the size of the PUC and DCA staffs should be expanded to be commensurate to their duties. As explained above, Hawaii’s regulatory agencies are severely undersized by industry standards even with all existing positions filled.

Currently the PUC and DCA have a sum total of 67 positions. To be on par with other small states, a reasonable complement of staff for the PUC and DCA (sum total) could be about 70 to 75 positions. This does not include positions for regulating transportation and small water companies (consistent with recommendations below). Listed below is an example of regulatory staff configuration used to estimate this level of staff requirements:

Commissioners and decision making staff	
Commissioners	3
Administrative assistants	3
Hearings examiners	4
Accounting and engineering advisors	4
Energy policy staff	4
Consumer complaints	10
Staff counsel ³⁸	6
Document management and support staff	15
Audit and case litigation	20
<u>Consumer Advocacy</u>	<u>6</u>
Total	75

³⁸ In addition to staff counsel identified explicitly here, there would be counsel positions in other categories.

This configuration is very general and does not presume any specific continuation, modification or restructuring of the PUC, audit and case litigation and consumer advocate functions described in later sections of this report.

Action: (Governor) Allow More Reasonable Staff Compensation

Hawaii's utilities maintain a substantial advantage over the PUC and DCA because they pay much higher salaries and consultant fees, and can attract the best available talent. Utility regulation is a specialized field that requires special expertise that is not sufficiently compensated by the state's existing pay scales. It should be no surprise that the best agency staff personnel sometimes move to the utilities leaving vacancies in the regulatory agencies that are difficult to fill.

The annual compensation for the experts presented by utilities can often be two or three times as great as the experts presented by state regulatory commission staff. At times, consultants paid \$400 or more per hour are juxtaposed with staff auditors and engineers earning between one-tenth or one-twentieth that amount. Appearing as an expert witness in a PUC proceeding and being subjected to cross-examination by utility attorneys is a skill and stress factor not recognized in public agency compensation scales.

There are three approaches to levelizing this playing field. One is to ensure that public servants are compensated at levels commensurate with private sector employers. A second is to use outside consultants instead of full-time staff for regulatory work. The third is to constrain the compensation levels that utilities can pay (or recover) for their employees and experts. None of these are entirely pragmatic, but some combination of the concepts is essential to developing a system of regulation in which the regulatory agencies' less-than-equal status is addressed.

Implementation of this option would require some combination of salary augmentation, increased funding for consultants to the Case Audit and Litigation staff and the Consumer Advocacy staff, and regulatory control of excessive allowed expenses for rate case expertise incurred by utilities.

Action: (Governor) Provide Realistic Job Descriptions and Classifications

Both the PUC and DCA have several important unfilled staff positions. Both agencies are have difficulty attracting qualified personnel to fill and remain in these positions. This is not only because compensation levels are lower than industry standards, but because the job descriptions and classifications do not sufficiently represent the specialized work ordinarily performed by these regulatory agencies. Regulatory agency personnel requirements are not typical of other state agencies and are not matched by existing state job classifications.

For example, engineering and auditing job classifications are the closest existing classifications to the regulatory agencies' need for specialized technical utility regulatory analysts. This personnel requirement includes skills in several disciplines including economics, public policy and law. In addition, some staff are required to testify as expert witnesses before the PUC and undergo stressful cross-examination under oath. The state's current job classifications do not characterize the existing job descriptions (or actual job requirements) sufficiently to recruit or retain qualified staff.

In order to make adjustments to job classifications, job descriptions or agency organization charts the approval, cooperation and support of the Department of Human Resource Development is necessary. This is not happening. The Governor could mitigate this situation by facilitating necessary cooperation and assistance of the Department of Human Resource Development to promptly and diligently assist the PUC and DCA to develop effective job classifications and update job descriptions and agency organization. Without the assistance of the Governor it does not appear likely that these agencies will resolve this matter efficiently, if at all. It is essential that the PUC and DCA fill vacant positions with qualified personnel in order to perform required duties.

Option: (Legislature) Restrict Use of PUC Special Fund to Utility Regulation Only

The PUC and DCA are funded by a Special Fund deriving revenue from a one half percent “tax” on gross public utility revenues. Only about one half of the revenues accruing to the Special Fund each year are allocated to the PUC and DCA. The remainder is transferred to the state’s general fund.

Transfers of the funds derived from utility revenues to the state general fund was a subject of much frustration and consternation expressed in the stakeholder interviews, especially in light of unanimous and ubiquitous support for additional funding for the regulatory agencies.

To the extent that additional resources are required by the PUC and DCA the revenues in the Special Fund should be used. These revenues are sufficient and should be considered available for the purposes originally intended by the Legislature when the Special Fund was created. One very simple measure that would facilitate this result would be for the Legislature to specify that revenues collected by the Special Fund are to be used only for utility regulatory purposes.

Option: (Legislature) Take the PUC out from under B&F

It is well-recognized by the stakeholders that the oversight and management of the PUC by the Department of Budget and Finance creates internal conflicts, in which the revenue sources available to the PUC to support the regulatory functions are diverted to support state general fund functions. One way to address this would be to transfer the oversight of the PUC to a different department of state government or to let the PUC stand on its own for administrative purposes. If the special fund revenues intended to finance the PUC and DCA are restricted to use for these purposes (as suggested in the previous option) the current placement of the PUC under the Department of Budget and Finance may be less of an issue.

Action: (PUC) Increase the Thresholds Triggering CIP Review

Currently the PUC’s General Order #7 requires review and approval of all electric utility budget items over \$500,000 prior to utility expenditure of funds.³⁹ This means that every transmission line, every distribution substation, and every power plant retrofit must be approved by the PUC prior to implementation. In most states regulatory statutes require the Commission to review minor utility actions only at the time of general rate reviews, reserving the option to initiate a review on a particular matter at any time.

Implementing this option would involve limiting the PUC pre-approval process to major items, such as construction of generating facilities, or development of new power transmission corridors. Even these might be addressed through creation of an Energy Facility Siting Council (see later section on this subject).

The effect of this would be to reduce the amount of work that the PUC and DCA face between major rate proceedings. It would tend to increase the amount of workload within rate proceedings, since many items now subject to preapproval would be examined only in the general rate proceedings.

Option: (Legislature) Reduce the Number of Activities That Are Regulated

The legislature should consider whether all of the industries it now directs the PUC to regulate need to be subject to regulation. In addition to electric utilities, gas utilities, and telecommunication providers, the PUC regulates water utilities, sewer utilities, motor freight, motor passenger, and

³⁹ The PUC is in the process of considering amending this threshold, however no docket or rulemaking proceedings have been formally initiated.

water carriers. Most states have abandoned regulation of many or all transportation functions, and many have eliminated most oversight of water and sewer utilities with rates below a threshold deemed “reasonable.”

The consulting team is aware that there are political reasons that some transportation activities have not been deregulated. The Legislature should determine whether the use of PUC regulation as an industry price support mechanism is justified and practical in light of the burdens required of agency resources.

A substantial portion of PUC resources is now dedicated to rote execution of non-controversial regulation of matters that have been deregulated in most other states. Deregulating these activities or transferring regulation to other state or county agencies would reduce the workload of the PUC and make more resources available to other matters.

Option: (PUC, Governor) Provide Education to PUC and DCA Appointees

Appointees to the PUC and DCA often have little or no prior experience in the field of public utility regulation. These individuals have broad powers and responsibilities in a field that is complex and must address specific and peculiar aspects of several disciplines including management, economics, engineering, accounting, planning and public policy. It is not necessary for appointees to be expert in all of these fields, but some familiarity with aspects of each of these disciplines is necessary to optimize the quality of regulation. Opportunities are available for training in the field of public utility regulation.

The importance of experience in management should not be overlooked, both in the selection and appointment process and in prioritizing training of appointees. Appointees must address utility management issues as jurisdictional subject matter in their oversight of utility companies and, very importantly, also must serve as managers of a vital public agency. These management challenges are exacerbated by a generic institutional friction between appointed commissioners (and consumer advocate agency directors) and the perennial agency staff. As stated by one of the principal national analysts of the regulatory process:

With high levels of stress being placed on the regulatory process, the tension between commissioners and staff is increasing. There has always been a difference in role and perspective between commissioners and staff; in the past, those differences gave a richness to the regulatory process providing a blend of technical expertise with broader policy level oversight. Today, however, the differences between commissioners and staff are more pronounced than in the past and potentially disruptive. Commissioners, sometimes appointed by the governor with a mandate to make change, too often see staff as wedded to the existing regulatory process and unwilling to change. Staff, who have weathered the regulatory battles, see commissioners as unwilling to consider the benefits of deliberative, sometimes confrontational regulation. The result is a bifurcation of the resources necessary for effective oversight.⁴⁰

Management of the PUC is an important aspect of improving and maintaining the productivity of the Commission.

While some training programs are available through the National Association of Regulatory and Utility Commissioners (NARUC) and other bodies, Hawaii may participate inadequately in these due to time, distance, and cost constraints. Unfortunately, private sector vendors and non-governmental organizations which provide training and seminars on energy issues are hesitant to

⁴⁰ David Wyrick, New Models of Regulatory Commission Performance, National Regulatory Research Institute, 1999

offer programs in Hawaii due to limited enrollment and high costs. Nevertheless, training and education are essential to maintain the quality, effectiveness and efficiency of regulation in Hawaii.

Option: (PUC, DCA) Empower the DCA to Obtain Effective Discovery

Existing statutes give both the PUC and the DCA very broad powers of discovery with respect to all public utility matters, documents, property and personnel. The PUC has the authority of a circuit court to enforce discovery requests. The DCA, however, must petition the PUC by a motion to compel discovery to enforce its discovery powers. In practice, this is a significant impediment to the DCA.

The DCA gets differing degrees of cooperation by different contested case parties in obtaining requested information. In very important respects the power of the DCA to conduct discovery is often effectively abridged by tactical recalcitrance. This sort of stonewalling never occurs in response to PUC discovery requests.

The DCA can file a motion to compel discovery with the PUC when it is not obtaining response to its discovery requests. This process takes time and wastes resources. Time and resources are scarce agency commodities in general and are particularly scarce in the midst of rate making proceedings with statutory deadlines.

The effectiveness and productivity of the DCA could be improved by the PUC providing clear signals that the DCA's discovery powers will be broadly and firmly enforced. This could be done by rulemaking or by setting examples by punitive actions against any abuses of the discovery process. Imposition of substantial fines for frivolous negligence in providing diligent discovery have been effective in other states at maintaining full and prompt discovery compliance.⁴¹

It is also necessary to make it clear that any time that is required to hear, implement and obtain relief from a motion to compel discovery should be added to the schedule of proceedings (regardless of statutory deadlines) unless this is punitive to parties other than the recalcitrant party. This is necessary to prevent tactical abuse of the discovery process.

Separate the Dual Roles of the DCA

The DCA currently has two functions which most states do not combine. The first is an "Audit and Case Litigation" function, that prepares a complete accounting analysis of a utility rate filing, applying objective criteria reflecting the principles of regulatory law, standards, and precedents. This function is basically to enforce decisions already made in the past by the Commission. The second is a true "Consumer Advocacy" function, proposing changes to the tradition of regulation designed to reduce costs to consumers (while still allowing a fair rate of return), and to introduce new policy initiatives into the regulatory process.⁴²

In almost all other states that have a consumer advocate there is another state agency, usually under the administrative direction of the utility regulatory commission, to provide the primary Audit and Case Litigation functions. In Hawaii the DCA is the only state agency that regularly presents an evidentiary case to the PUC in rate making or other contested case proceedings. The PUC

⁴¹ See, for example, Washington Utilities and Transportation Commission Docket No. TO-011472, involving Olympic Pipeline Company. In that docket, the Company's failure to respond in a complete and timely fashion to discovery requests was part of the basis for denying substantially all of a requested rate increase.

⁴² For example, the first integrated resource planning procedures adopted by a state commission were the result of a proposal by a state consumer advocate agency seeking to reduce the need for expensive coal and nuclear power plant construction. This sort of innovative testimony is not the responsibility of a case audit and litigation staff.

staff does not conduct comprehensive discovery, analysis, or auditing functions in utility rate filings.⁴³ These activities are executed by the DCA.

In most states, when a utility files a request for a rate increase, the commission staff is the principal analytical body that reviews the application for consistency with regulatory laws, standards, and precedents. This Audit and Case Litigation staff is restricted from discussing substantive matters inappropriately (ex parte) with commissioners and provides its analysis only in the form of expert evidence presented in public hearings. The commissions tend to respect the recommendations of their own staff as neutral, objective and correct, with other parties functionally bearing a burden of demonstrating that a different interpretation is correct.

In most of these states, the consumer advocate has a relatively small staff (3 - 10 people), and presents only issues where regulatory law, standards, and precedents do not provide appropriate guidance as to the (evolving) public interest. Basically, the commission staff is the “enforcement” entity of tradition, while the consumer advocate is an agent of change. In this form of organization, the utilities recognize the commission staff as the agents of the regulators themselves, and tend to be highly cooperative in providing data and analysis to support the regulatory process.

As an example of how this relationship typically works, the consumer advocate in one proceeding might persuade the commission to adopt a principle that advertising expenses are not allowable for rate making purposes. Once adopted as a regulatory principle, in subsequent rate proceedings, it would fall to the Audit and Case Litigation staff to enforce this principle uniformly.

The dual functions currently performed by the DCA are in some respects conflicting and problematic. This issue is not new. In fact, the existing regulatory framework was devised in part as an attempt to address similar concerns expressed by a management audit of the utility regulatory program conducted in 1975 (1975 Audit).⁴⁴ A brief history of this matter is provided below.

SOME HISTORY, THE 1975 AUDIT AND CHANGES IN THE ROLES OF THE PUC AND DCA

The Hawaii PUC was created by the Territorial Legislature in 1913. The first PUC was comprised of three persons serving on a part-time basis. Commissioners were appointed by the Governor and confirmed by the Senate. In 1933 the number of commissioners was increased to five part-time positions with required representation for the Islands of Maui, Kauai and Hawaii.

In 1975 a rigorous management audit of Hawaii’s public utilities regulation program was performed for the Legislature. The 1975 Audit identified several problems with the administrative structure of the regulatory program. At that time both the PUC and the Public Utilities Division (PUD) were under the administrative direction of the Department of Regulatory Agencies (DRA). The DRA was the predecessor to the Department of Commerce and Consumer Affairs (DCCA). The PUC was a part-time body that did not have its own staff. The PUD had duties that included all administrative support for the PUC as well as representing consumer interests before the Commission. The PUD was under the administrative direction of the DRA but had duties that were designated by statute to the PUC.

⁴³ The PUC staff does provide advice and performs analysis for the Commissioners in adjudicating contested case proceedings. These functions, however, are primarily limited to interpreting the evidentiary record after the hearings process is complete to assist the Commissioners in making findings of fact, conclusions of law and an ultimate decision.

⁴⁴ *Management Audit of the Public Utilities Program*, Legislative Auditor of the State of Hawaii (1975 Audit). This report was submitted in three volumes. The issues cited here are addressed in *Volume I, The Organization for the General Management of the Public Utilities Program*, March 1975. Volumes I and II are provided in the CD Appendix to this report.

The 1975 Audit determined that there was confusion that resulted from the PUD serving two masters. The PUD was under the administrative authority of the DRA but also provided the support services to the PUC necessary to fulfill the PUC's statutory duties. The audit also identified conflict and ambiguity between the PUD's dual duties of representing consumer interests and serving as staff to the PUC.⁴⁵ The Audit stated that the PUD was "constantly facing the dilemma of whether it is the servant of the commission, a protagonist before the commission, or an opponent against the commission."⁴⁶

The Audit made several recommendations for changes to the regulatory structure including:

- transfer of several regulatory functions to other state agencies
- deregulation of motor carriers
- transfer of regulation of private water and sewage disposal systems to the counties
- **placing the staff for the PUC directly under the supervision of the PUC**
- **maintaining a separate staff under the DRA to represent consumer interests in proceedings before the Commission.**
- making the PUC a "full-time body" (full time positions for Commissioners)
- moving the PUC out from under the same departmental administration as the DRA⁴⁷

In 1976 the Legislature implemented some, but not all of the recommendations made by the Audit. The Legislature:

- transferred several regulatory functions to other state agencies
- established the current configuration of three full-time Commissioners appointed by the Governor and confirmed by the Senate for staggered six-year terms
- moved the PUC out from under the DRA to its current position under the Department of Budget and Finance
- **maintained a separate staff (now the DCA) under the DRA (now the DCCA) to represent consumer interests before the PUC**

Although it was clearly the intent of the Audit, the staff that had been providing support for the PUC was **not** moved under the direct supervision of the PUC. Instead the PUD retained a staff of 29 positions while the PUC was provided five staff positions, including an administrative director, an auditor, a clerk, a secretary and one staff attorney. By failing to move the staff that had been serving the PUC to the PUC's supervision, some important objectives of the recommendations of the Audit were not realized.

- First, since the bulk of the regulatory staff remained with the PUD, so did the dual duties of consumer protection and PUC support that the Audit recommended should be separated. The PUD retained (and the DCA still retains) these dual responsibilities described by the Audit as conflicting and confusing.
- Second, since the PUD retained (and the DCA still retains) the responsibility to present the only state agency case before the PUC in rate making and other contested case

⁴⁵ See the discussion of these issues generally in the 1975 Audit, Volume I at pages 27-34.

⁴⁶ 1975 Audit, Volume I, p. 29.

⁴⁷ 1975 Audit, Volume I, p.49.

proceedings, the PUC does not benefit from presentation of an evidentiary case that it can trust as objective. Since the DCA maintains consumer advocacy responsibilities it is not clear to the PUC whether or to what extent the DCA is being objective (balancing all interests based on precedents set by the Commission) or is specifically advocating consumer interests.

- Third, the PUD remained under the administrative direction of the DRA but still retained important audit and case litigation functions that are part of and essential to the statutory functions of the PUC. In this respect the PUD retained (and the DCA maintains) the potentially conflicting allegiance to both the DRA and the PUC that was identified as a problem in the Audit.⁴⁸

In short, the changes made by the Legislature in 1976 made the PUC more independent as a full-time body with its own small staff, but did not move the bulk of what was previously functioning as its own staff under its own supervision as intended by the Audit. The PUC had to depend on another agency with potentially conflicting consumer advocacy duties to perform its statutory duties. In the ensuing years, the staff size of the PUC substantially increased with the addition of three outer-island representatives and additional technical and clerical staff. The audit and case litigation functions, however, remain with the DCA.

RECOMMENDATIONS

The consulting team recommends that one way or another, the existing dual functions of the DCA be separated. This would implement more completely the recommendations of the 1975 Audit regarding conflict and ambiguity with respect to the role of the DCA (then referred to as the PUD). Providing a “pure” Audit and Case Litigation staff will increase regulatory productivity and effectiveness by providing the PUC with a staff that it can trust to implement its prior determinations and policies balancing the interests of utilities and consumers. Providing a separate “pure” consumer advocacy staff will allow progressive and advocating positions to be promoted without compromising the objectivity of the audit and case litigation functions. Several options are suggested below. These are identified as “alternatives” to indicate that they are mutually exclusive.

Alternative: (Legislature) Create a case audit and litigation staff within the PUC with a separate reduced consumer advocacy staff

Implementing this option would involve creating an audit and litigation group within the PUC staff. It would be logical to take a portion of this staff from the existing DCA audit staff, downsizing the consumer advocacy staff in the process. However, as noted in our discussion of overall regulatory staff size, Hawaii is understaffed at present, and we would expect this eventually to result in an increased total regulatory staff.

The audit and analysis group would act as a “party” in contested case proceedings and would appear before the Commissioners by presenting testimony, sponsoring witnesses, conducting discovery and cross-examination and presenting briefs in the same manner as other parties to the proceedings. As in other states that implement this format, an internal management protocol

⁴⁸ The director of the DCCA in the official role as the Consumer Advocate has maintained a “hands-off” policy regarding the substantive affairs of the DCA for many years. The DCA has been allowed to perform more as an independent agency than as an implementor of specific policies prescribed by the DCCA director. But this situation has been maintained only as a result of past practice, not agency framework structure or statute. The potential exists for the DCA to face conflicting mandates between execution of its consumer advocacy duties as directed by the authority of the DCCA director and its responsibilities to perform objective audit and case litigation functions essential to fulfilling the statutory duties of the PUC.

would be maintained that would prevent the audit and litigation group from communicating inappropriately with the Commissioners outside of the public hearing process.

Alternative: (Legislature) Rename and redefine the DCA case audit and litigation staff as a neutral case audit and litigation staff and create a separate smaller agency with a pure consumer advocacy and public information duty.

This approach to addressing this concern would divide the current DCA staff into two separate groups that would present separate recommendations to the PUC. One group would perform typical Commission staff functions of case audit and litigation. The other group would perform duties more typical of state consumer advocates, including challenging regulatory traditions, proposing new approaches which are beneficial to consumers and assisting the public with access and participation in the regulatory process.

Implementing this option would require the Legislature to redefine the statutory duties and administrative structure of the DCA.

Alternative: (Legislature) Transfer the PUC to the DCCA and consolidate and augment the staff as appropriate.

It is well-recognized by the stakeholders that the oversight and management of the PUC by the Department of Budget and Finance creates internal conflicts, in which the revenue sources available to the PUC to support the regulatory functions are diverted to support state general fund functions. One way to address this would be to transfer the oversight of the PUC to a different department of state government.

If the PUC and the DCA were both under the management of the same department (recognizing that the PUC would remain a governor-appointed independent quasi-judicial board), it would be possible to coordinate the DCCA Audit and Litigation staff with the PUC staff, and both would carry the mantle of legitimacy that association with the same agency as the Commissioners carries, perhaps with slightly less effect than creating an Audit and Litigation staff within the PUC would achieve.

Implementing this option would involve transferring administrative management of the PUC to DCCA, separating the DCA's staff into an audit and case litigation group (20 - 40 staff) and a consumer advocacy group (3-10 staff). The new smaller consumer advocacy group could be moved to another department to maintain more separation from the PUC.

This would not be a return to the status of the pre-1976 regulatory framework. The consumer advocacy group would have separate and clearly differentiated functions than the audit and litigation staff. This was a primary but not sufficiently attained objective of the changes made to the regulatory framework in 1976.

The State of California, where the Office of Ratepayer Advocate is housed within the same agency as the Commission, is an example of this form of organization.

CREATING A MORE COHESIVE ENERGY POLICY FRAMEWORK

The current regulatory framework in Hawaii suffers in part because the role of different agencies is not clearly delineated or coordinated. The state energy policy function is vested within multiple agencies, including the DBEDT (strategic planning; energy efficiency and renewable energy), DLNR (geothermal promotion), DOH (air emissions), and others. The PUC unavoidably is involved in energy policy decisions, because it regulates what resources the utilities acquire, how they price

their service, and the terms and conditions under which they provide service, including line extension policies, billing, collection, termination of service, special treatment of customers with limited income, and other elements of utility service.

The stakeholder interviews elicited numerous concerns about lack of coordination and cooperation on achieving a consistent set of state energy policy goals. Principal among these are development and promotion of renewable energy resources, the policies used to price electricity, and the discord between agencies of state government involved in energy policy. To resolve this, some clarification of the role of different agencies, and a means for all of these agencies to coordinate and cooperate is important.

Coordinating the Interaction of State Agencies

Option: (Governor, Legislature) Consider the Creation of an Interagency Energy Cabinet

A venue for coordinating state energy policy would be useful for Hawaii, where responsibilities for implementing energy policy is shared by multiple agencies. The Governor or Legislature could provide for representatives of energy policy implementing agencies to meet periodically as a group.

Implementing this Option would involve creating an interagency energy cabinet. This would consist of the Chair of the PUC, the Executive Director of the DCA and relevant officials from the DBEDT, Department of Health, Department of Land and Natural Resources, and perhaps others. This group would meet periodically, and provide policy direction to all state agencies on energy matters. During an energy supply emergency, this group could meet more frequently to guide the state's response.

Option: (Legislature) Consider the Creation of an Energy Facility Siting Council

The process of obtaining all necessary permits and approvals for a major energy facility is formidably difficult. The response of state agencies to applications in Hawaii is not coordinated or efficient.

An example is the recent process on the Island of Hawaii to select, permit and build HELCO's latest large power generation unit addition. HELCO was not able to build its own proposed expansion at its Keahole plant site. DLNR and HELCO battled in court regarding Keahole permitting issues. Several independent power producers (IPP's) clamored for the opportunity to force HELCO to negotiate a contract under the provisions of federal law. Each IPP filed a complaint docket with the PUC. The utility was forced to simultaneously negotiate with several IPP's and appear before the PUC regarding the complaints as well as respond in a docket investigating contingency options for delays in adding new generation. Even though it was clear that only one power plant would eventually be built, the Hawaii Department of Health was forced to process several simultaneous voluminous PSD air quality permit applications which severely overtaxed its staff. Meanwhile, in lieu of timely addition of new generation, HELCO was forced to build contingency generation units, utilize high-cost and polluting power sources and its electric system reliability was reduced. This was not a model of regulatory efficiency.

This sort of energy facility development debacle is not uncommon in other jurisdictions. Many states have dealt with the need for efficient energy facility siting by creating a single agency to make the decision on behalf of all state agencies regarding what energy resources should be developed and what mitigation measures should be required. In some states this is a stand-alone agency, and in others, an ad-hoc agency. One example, the State of Washington's Energy Facility Site Evaluation Council, consists of representatives of each agency of state government having

regulatory authority over any part of the energy facility approval process. The joint agency is empowered to issue a single ruling that preempts the constituent agencies in all permitting matters. It does not preempt the utility regulatory commission from examining the prudence of the utility's ultimate expenditure for purposes of rate making.⁴⁹

An example of the potential need for mitigating permitting inefficiencies in Hawaii might be the siting of a Liquefied Natural Gas facility and associated high-pressure gas transmission facilities. Actions by the Commission, the utilities, the Department of Land and Natural Resources, and the Department of Health and a list of other agencies would be required in order to bring the potential economic and environmental benefits of a new fuel source to Hawaii. Under the current framework, some estimates of the time required are as high as twelve years, due to environmental permitting, land use, contractual processes, and other requirements. With efficient siting, there is no reason these facilities could not be sited, designed, constructed, and placed into service in a third or half of this period of time.

Implementing this EFSC option would involve creating a separate or ad-hoc agency with representatives from all current agency stakeholders, with authority to issue the required approvals now subject to separate agency approval. At a minimum, representatives from the PUC, DBEDT, CA, DLNR, DOH, Department of Public Safety, Department of Transportation and the affected county governments should be represented.

An important consideration is whether Hawaii government is mature and responsible enough to undertake such a substantial concentration of government powers into a single state agency. Hawaii's administrative procedures and public document procedures are not as well developed (in either practice or case law) as in other jurisdictions with siting councils. Any concentration of government power needs to be cautiously weighed considering the potential for abuse.

A siting council would need to be provided with substantial statutory guidelines and standards in the implementing legislation. Statutes should define the powers, process and duties of the siting council, which should include the authority and a requirement to adopt formal standards as rules. Rules should include standards examining the need, prudence, impacts and effectiveness of proposed sites or facilities. The siting council should be required to strictly abide by established administrative procedures.⁵⁰

The state EFSC model used in other states could be modified for Hawaii's purposes. In Hawaii it might be more appropriate to have county based energy facility siting agencies. In most states large energy facilities serve a number of county and municipal governments. Siting councils are created to allow a state agency to abridge local government authority in aid of wider geographical benefits. In Hawaii, however, utility resources provide benefits and impacts that do not cross county lines. Each utility system exists within the jurisdiction of a single county. One of the reasons for statewide siting councils on the mainland does not exist in Hawaii. In Hawaii, consideration should be made to implementing siting councils as an extension of county governments or county/state agencies with participation of state agencies to the extent that state agency permits are required.

⁴⁹ See CD Appendices for Washington EFSEC law and rules.

⁵⁰ A siting council abridges the authority of multiple agencies in multiple jurisdictions regarding contentious issues. If administrative procedures are not carefully followed, the purpose of the siting council (to efficiently site energy resources) is certain to founder on time consuming judicial appeals.

Option: (Governor, State Agencies) Increase State Agency Participation in the IRP

Process

The IRP process is discussed in detail in a later section of this report dedicated to that topic. The IRP process is the primary and most publicly accessible regulatory venue for examining the evaluation and selection of utility resources.

The IRP process is currently implemented under the jurisdiction of the PUC. The DCA regularly participates in the review of utility IRP's in its capacity as an automatically specified party to PUC proceedings. Other state agencies, however, do not regularly participate in the IRP contested case proceedings.

DBEDT has actively participated in several utility IRP dockets as a party appearing before the PUC. Although DBEDT presented a case asserting Hawaii's adopted energy policies, the PUC rejected these policies summarily as not binding upon the PUC.⁵¹ DBEDT no longer appears before the PUC as an intervenor in IRP (or any other) proceedings, although it still participates in the utility IRP advisory group process.

Several state agencies have jurisdiction regarding energy utility planning matters. DBEDT is responsible for promoting state energy policies generally. The Department of Health implements federal and state air and water quality statutes that pertain to energy facilities. DLNR oversees state property including harbors and lands potentially used for siting energy facilities. Similarly the Office of State Planning and the Office of Environmental Quality participate in the planning, evaluation and permitting of energy facilities.

Some or all of these agencies could participate in the utility IRP process. This could be implemented by the initiative of the individual agencies by requesting participation on the utility advisory groups or by petitioning the PUC to participate or intervene in IRP application reviews. The Governor could encourage agency participation.

In order to participate effectively an agency would need sufficient resources. To participate in a contested case before the PUC these resources would need to include representation by qualified counsel.

Clarifying the Role of the Energy Resources Coordinator

Option: (Legislature) Reassign the ERC to Be the Administrator of an Energy Division

Currently the Energy Resource Coordinator is the Director of the DBEDT. The Director has many responsibilities other than energy policy concerns. Placing the ERC responsibilities with an administrator with more direct energy related responsibilities and closer to the energy policy staff could increase the effectiveness of this position.

Option: (Governor, Legislature, DBEDT) Assign the ERC Duties to Advocate Energy Policy in Matters Before the PUC

The DCA is assigned the duty and is given standing to represent consumer interests in any matters that come before the PUC. Neither the DCA or any other agency, however, is assigned a similar role explicitly representing state energy policies in the utility regulatory process.

⁵¹ See for example Docket No. 7257, Decision and Order No. 14707 at pages 34-35 and Docket No. 7257, Decision and Order No. 13839.

DBEDT has intervened before the PUC in several energy policy related dockets but has not done so in many years. Assigning the ERC with specific duties and standing to advocate energy policy in matters before the PUC would clarify and empower this role. To implement this option effectively the ERC would need access to the services of qualified legal counsel.

Clarifying Legislative Energy Policy

Option: (Legislature) Update Legislative Findings Regarding Energy Policies

The Hawaii Revised Statutes include several statements of energy policies that include legislative findings that were written several decades ago. For example, consider HRS 196-1(1). This statute refers to a “widespread shortage of petroleum... which threatens to impair the public health, safety and welfare. ...”. This legislative finding refers to a situation that existed thirty years ago in 1974 when the statute was written. Does this finding of a petroleum shortage and imminent dire threat to Hawaii’s welfare accurately represent the facts that underpin legislative policy today? Is there a more current characterization of circumstances that would more accurately state the basis for our energy policies?

The legislative findings associated with Hawaii’s energy policies should be reviewed and where appropriate should be updated to reflect current circumstances.

Option: (Legislature) Clarify Priorities in Hawaii’s Energy Policies

As discussed at some length in earlier sections of this report there is substantial controversy regarding whether or not state agencies are effectively implementing the state’s energy policies.⁵² Hawaii’s energy policies are stated in terms of many objectives that are in some respects conflicting. The statutes offer little guidance regarding how conflicting objectives should be prioritized. Substantial discretion is therefore left to implementing agencies regarding the interpretation of the policies and objectives.

Hawaii’s existing energy policies should be reviewed. If clear priorities regarding the energy policy objectives are determined these should be made explicit. If the legislature is unable to determine clear priorities between the energy planning objectives or wishes to delegate the interpretation of the energy policies to implementing agencies this could also be made explicit.

IMPROVING PUBLIC ACCESS TO THE REGULATORY PROCESS

Access to Documents and Information

The PUC is the official repository for documents pertaining to public utility regulation in Hawaii. Unfortunately, public access to documents at the PUC is now difficult, inconvenient and expensive. Sometimes documents are simply not available⁵³.

⁵² See the discussions of this issue starting at page 8 and at page 26.

⁵³ In preparing this regulatory report the consulting team wanted several documents in the public domain from the PUC. Several documents from several dockets were requested from the Chief Clerk by way of the established procedure for public procurement of documents. Some documents were made available and some copies were made by the established procedures. Most of the requested information, however, was not provided and was declared to be unavailable for an indeterminate period (at least a few weeks), due to limitations of PUC staff. The consulting team was able to obtain copies of these documents only by requests to other parties.

By ironic contrast, some documents NOT ordinarily provided to the public were generously and promptly provided to the consulting team by the PUC as a courtesy after making a personal polite request to the Chairman and

In order to view or copy PUC documents a written request must be filed with the PUC chief clerk identifying the documents. It is necessary to specify a docket number for the materials requested. The chief clerk does not provide assistance in determining the docket number if it is not already known by the requesting party. The docket number can sometimes be determined with the assistance of other PUC staff⁵⁴ but this is not straightforward and is not always possible. There is no list of documents or index of dockets available to the public.

Documents can be viewed after prior arrangement in the viewing room of the PUC office in Honolulu. The materials in each docket are provided in one or more folders. Contents are organized with the most recent documents on top. Each folder includes a list of the documents it contains. In those dockets for which there was an evidentiary hearing, the transcripts of the evidentiary hearing are usually available.

Copies of PUC documents can be procured by informing the clerk which pages are to be copied. Paper clips for marking pages to be copied are provided at the viewing desks. Copies are made by the PUC staff. There is a fee of \$0.50 per page for copies. Copies can be picked up at the PUC viewing room when complete.

Documents older than several years are archived on microfilm. These documents can be viewed by borrowing the microfilms from the PUC on a one day basis. These can be viewed at a nearby law library or at a public library. There is no present means to obtain hard paper copies or electronic copies of documents that have been archived to microfilm from the PUC.

Action: (PUC) Provide Improved Public Access to PUC Documents

The effective inaccessibility of documents experienced by the consulting team in preparing this report is a serious shortcoming and is in apparent violation of the intent of Hawaii's public document statutes and rules. The consulting team is informed that the PUC is taking some actions to improve the accessibility of public documents. These efforts should certainly be given immediate priority.

In no case should a member of the public be informed that a public document is not going to be made available. It is a duty of the PUC to provide the necessary resources to provide unrestricted access to its public documents.

A means should be provided for an interested member of the public to determine the information now required by the PUC to obtain information. Since knowledge of a docket number is now necessary to obtain documents, some publicly accessible method to determine the docket number(s) of matters of interest should be provided. Generally, it would be helpful for the PUC to provide a list of dockets, indexed by utility and date, with titles or captions sufficient to determine each docket's scope for purposes of specifying requests for public information.

Action: (PUC) Provide Anonymous Access to PUC Documents

It is important that members of the public and competing or rival businesses be able to have anonymous access to documents. This is essential to maintain a fair business environment that is

Commissioners. In general, many of the PUC staff are polite and helpful in providing small requests for specific information if requested by phone with regards to a particular matter.

⁵⁴ Conversation with PUC engineers or staff assigned to a particular matter is often necessary to determine the docket numbers for dockets to be requested from the clerk. To a member of the public without some prior specific knowledge of a particular action before the PUC or to someone unfamiliar with the regulatory vocabulary ("docket", "application", "D&O"...), access to PUC documents is formidably difficult.

conducive to the beneficial aspects of competitive forces in the existing energy utility sector⁵⁵. To the extent that competition is presently and will become a more important aspect of Hawaii's energy sector economics, rival firms must have open and anonymous access to necessary information.

Access to information from the PUC is not now anonymous. Requests for information by one firm or individual are known to rival firms⁵⁶. PUC staff should not reveal to inquiring parties the scope or content of other parties' document requests. If all documents held by the PUC were accessible on its internet web site, as suggested below, this issue would be resolved.

Action: (PUC) Provide More Accessible Public Notice of New Dockets

The PUC should have a means to provide regular or immediate public notice of new dockets that are opened. This is especially important because there is a limited time period after a docket is opened in which interested persons have an opportunity to intervene before the PUC on matters affecting their interests. It should be possible for any interested party to ascertain promptly and efficiently when actions are initiated that could affect their interests or their opportunity to participate in PUC proceedings.

The consulting team was informed that stakeholders have missed deadlines for intervening in matters brought before the PUC even though reasonable efforts were maintained to stay apprized of new filings. At the time this matter was originally investigated by the consulting team and reported in the draft report it was very difficult for interested parties to promptly determine what matters were recently brought before the PUC. The PUC has recently improved access to this information to a significant extent by providing several binders in its public document viewing room.⁵⁷ This recent improvement is helpful but should not be considered sufficient, especially in light of the simple, effective, available and economic opportunity to provide this information on the PUC website.

The PUC should consider providing regular notice of new dockets on its website. It would be helpful if the notice would identify the deadline for petitions to intervene and provide a link to the PUC's rules regarding petitions to intervene.⁵⁸

In addition to web site posting, some jurisdictions offer anyone expressing interest the opportunity to be notified by mail if matters of a particular nature are brought before the Commission.

Option: (PUC, Governor) Use Electronic Document Filing and Web Posting

Most documents submitted in utility filings with the PUC are originally drafted in electronic form, as word-processing documents, spreadsheet models or databases. The major utilities in Hawaii already provide electronic versions of their testimony and exhibits to the PUC and to other parties

⁵⁵ Although Hawaii's public energy utilities are regulated, there are competitive forces that currently provide some beneficial incentives to utilities to control prices. In the gas sector, unregulated companies compete with the regulated utility. In the electric sector, the gas utilities (regulated and unregulated) compete for market share and, more recently, distributed energy providers compete for customer loads by offering customer-owned generation options. Recent customer retention tariffs by Hawaii's electric utilities are evidence of competitive market forces that put downward pressures on electricity prices.

⁵⁶ This assertion is based on anecdotal statements from several stakeholders.

⁵⁷ At the time of our most recent check (June 13, 2003) these binders included recently updated lists of new applications (one year), decisions and orders (one year), monthly tariff orders (one year) as well as full copies of the past four months' decisions and orders and recent tariff filings for all utilities.

⁵⁸ HAR 6-61 Public Utilities Commission Rules of Practice and Procedure. These rules are currently accessible on the Department of Budget and Finance website and are provided in the appendix of this report.

to proceedings. The PUC could require that all documents filed in a regulatory docket be submitted electronically.⁵⁹ All documents filed, with the exception of proprietary material, could be available for review on-line by any interested party.

The Federal Energy Regulatory Commission has required electronic filing of all documents for more than a decade, and these are available on the FERC web site. Many state regulatory commissions require electronic filing, and make data available on the web as well.

The PUC has the authority to specify the format of filings already, and clarifying that all such filings must be in electronic and paper format would enable all documents to be made available on the internet. Existing requirements for the number of paper copies supplied to the PUC could be reduced if some PUC staff can rely on electronic access to documents. Some flexibility could be provided to citizens and low-budget participants in the process. With or without a rule requiring electronic filing, any documents submitted in writing can be quickly converted to electronic format (scanned to a Portable Document File, or PDF). In Washington State, the Commission simply scans any document not received electronically, so it can be accessed on the internet.

The PUC could establish a web site for all docketed information to be available, and promptly begin posting information as it arrives. In order to maintain an incentive for efficient posting of information, and submission of information in electronic format, the response date for other participants to any item filed could be measured from the date the document is posted by the Commission.

The specific data that should be available on the web site would include:

- Docket Information Sheet (identifying all filings and actions)
- Original Application
- Supporting Testimony and Exhibits
- All Information Requests (possibly not all Information Responses)
- Testimony and Exhibits filed by other parties
- All Motions and Written Argument
- Transcripts of all hearings
- All Decisions and Orders
- Any Reconsideration or Appeal documents

In addition, the PUC should make publicly available all correspondence it sends and receives from the public, from other agencies of state government, and from federal and local government.

Implementing this option would require only a change in PUC filing rules, and funding by the PUC of a process to ensure that all documents filed (except those accorded confidential status due to trade secrets or other sensitive items) are available on the PUC web site. This could be a net cost-saving practice, as Information Requests and Responses can be circulated among the parties electronically, avoiding printing and postage cost. A high-speed scanner is probably the only major piece of equipment needed to achieve this option.

⁵⁹ It would be a valuable aid to the discovery process if spreadsheets provided in testimony, supporting exhibits and workpapers would be provided in "live" format with internal formulas intact.

Washington Utilities and Transportation Commission Web Site

The Washington Utilities and Transportation Commission (WUTC) maintains a very complete website, with public access to nearly all public documents created in the past five years contained in the PUC's files. This example is presented to show how the Hawaii PUC could make more information available to the Public, and reduce the time and expense associated with providing key information to stakeholders.

All rate case documents filed electronically with the WUTC are posted on its web site, and many paper documents are converted to electronic format. This includes the initial Application, all testimony and exhibits, all briefs, and the final Orders. Discovery questions and discovery responses are not posted.

In addition, the site has an extensive amount of information relating to consumer affairs such as fact sheets and complaint procedures. It contains proposed rulemakings, and copies of most comments filed by the WUTC with federal regulatory agencies on behalf of the state are available on the web site. The Commission Mission Statement, Strategic Plan, and Performance Measurement documents are also available to the Public.

The Commission accomplishes this through the use of a Lotus Notes database system, with a single "check mark" field for whether any document in the PUC's computer system should be posted on the web site. If checked, it is automatically posted. Documents in the Records Management System (normally items related to specific dockets) are included in the Lotus Notes database. Selected documents from an On-Line Library of information shared by Commission staff may be included on the website. Finally, the Commission librarians have created a Web Library of useful and informative documents. Drafts or internal documents are the primary items not published on the web site.

When information arrives at the Commission it finds its way to the web in the following ways:

- 1) Electronic filing: all parties are required to submit electronic versions of their submissions; these are added to the Lotus Notes database as they arrive.
- 2) Scan to PDF: Exhibits that do not lend themselves to electronic presentation are received on paper, and scanned by the Records Center into Portable Document Files (PDF) if they are important and staff time is available. These are then added to the Lotus Notes database.
- 3) Pleadings, if received in electronic format, are posted directly. If received only in paper, they are first scanned to PDF in the Records Center, then added to the Lotus Notes database.
- 4) Documents created within the Commission are automatically included in the Lotus Notes database and transferred to web access by any employee with access to the document by clicking on the web access switch in the Lotus Notes cover sheet.⁶⁰

State of Oregon E-Filing

The State of Oregon is moving toward a system of E-dockets which are eventually intended to result in a virtually paperless regulatory system. The information in the text box describes the Oregon PUC electronic filing project. This project may be of particular interest because it includes a well described methodical process to migrate from a primarily paper format to a primarily electronic process. Details regarding the conversion process are posted on the Oregon PUC website and are included in the CD Appendix.

⁶⁰For more information on this system, contact: Jeffrey Showman, Knowledge Manager, Washington Utilities and Transportation Commission; 360-664-1212

ELECTRONIC FILING OF DOCUMENTS ELECTRONIC VIEWING OF DOCUMENTS WILL REDUCE, BUT NOT ELIMINATE, PAPER COPIES

- * PUC Staff and Parties will file docket-related documents electronically

- * Currently, parties may file electronic documents via e-mail or diskette

- * PUC is developing a secure internet form that will allow participants to upload documents via the PUC Web site

- * All electronically filed documents will be posted to the PUC Web site

- * Parties will be able to view documents through eDockets using the Docket/Tariff search or the daily filings page

- * Simply click on the PDF icon or the symbol [PDF] to view the document

- * The capability to file and view documents electronically will reduce the number of paper copies

- * Staff and parties will still be able to print hard copies of documents if needed for review

- * Parties without electronic capabilities will be allowed to file/receive hard copies

INCREASED SERVICE REDUCED PROCESSING TIME INCREASED EFFICIENCIES

- * Utility companies and other parties to PUC cases requesting greater electronic filing and access capabilities

- * Many large PUC cases already involve electronic filing of documents

- * Other state PUCs and federal agencies (i.e. FERC) moving to electronic filing

- * Fewer telephone to request status updates and document copies

- * Eliminates routine copying and distribution of case-related documents

- * Less time spent printing labels, stuffing envelopes, making copies, etc.

- * Parties and Staff will receive automatic notification of filed documents

- * All parties and public will have immediate electronic access to processed documents

- * Reduce cost of paper, envelopes, labels, etc. See example below

E-FILING TASK FORCE DOCKET BY DOCKET APPROACH CYCLE APPROACH

- * A team of representatives from each PUC program and IT staff manages project. (Task Force Members)

- * Task Force regularly meets to address legal, policy, and practical issues related to eFiling

- * Works closely with stakeholders affected by eFiling transition to address needs and concerns

- * PUC will transition to eFiling on a docket-by-docket approach, beginning with most suitable dockets

- * Task Force will work with stakeholders to learn process and identify problems/benefits of eFiling

- * Rulemaking may be required to fully implement eFiling requirements

- * Task Force will expand eFiling using cycle approach to develop implementation plans

- * Life Cycle Chart [PDF]

LEGAL ISSUES, PROCESSING ISSUES, OTHER ISSUES

- * Rule changes may be needed to enable eFiling of documents

- * The suitability of an electronic signature or password to replace original signature

- * Archiving and retention requirements

- * Reengineering of filing processes to accommodate eFiling

- * Service and notification issues

- * Need for redundant electronic copy to serve as back-up in case of server failure

- * Requirements for participation

Option: (PUC, DCA) Provide Information to Customers and the General Public

In order to participate in the utility regulatory process, consumers need timely information about the issues before the Commission. An adequate system of communication is needed to provide this. As discussed elsewhere, the PUC needs an energy policy affairs staff, and part of the role of that staff could be to distill information to the point where it is understandable to the public.

Most communication should now be electronic, as most interested members of the public will have internet access. Persons requesting written communication should receive it on request.

Several types of communications should be posted by the Commission, sent by email to all who have requested notice, and communicated to the media in each major tariff proceeding, including, but not limited to the following:

- A “bare bones” description of a tariff filing, prepared by the party making the filing. This should specify only the nature of the request, the impact it would have on different types of customers, and the timeline in which it will be addressed.
- A summary of the filing, prepared within two weeks of the initial filing, prepared jointly by the entity making the filing, the Case Audit and Litigation staff, the Consumer Advocate, other affected parties, if any, and the PUC Public Affairs staff. Where consensus cannot be reached, multiple perspectives can be reflected.
- At the time each entity files testimony and exhibits, a one-page summary of the presentation of each party, with reference to the availability of the entire contents of the testimony and exhibits on the web.
- Any notices of public hearings.
- A one-page summary of any Decisions and Orders issued by the Commission.
- A one-page summary of any motions for reconsideration, rehearing, or appeal.

Access to the Hearings Process

The utility regulatory process is extremely complex, and all-but-opaque to the public. Even entities with considerable technical and legal expertise can be completely befuddled by the unique language, accounting, and process of utility regulation. Measures to make the process more accessible, more understandable, and more responsive can be taken, and will help to ease the level of public confusion.

Option: (PUC, Legislature) Create a System for Intervenor Compensation

Participating in the utility regulatory process is complex and expensive. In order to participate in a rate proceeding in a meaningful way, expensive legal and technical expertise is required. The utilities are normally permitted to recover their legal and technical costs as a part of rates, even when these reach hundreds of thousands or even millions of dollars. The PUC and DCA budgets are much more restricted.

Currently, the largest customers, such as the Department of Defense, who pay millions of dollars nationwide per year for utility service, sometimes participate in rate proceedings, but citizen representatives seldom participate, in part due to a lack of funding.

One way to provide additional resources to represent public interests is to provide a well-defined and adequately-funded system for intervenor compensation. The process used in California, New York, and parts of Canada seems to work well, and consists, variously, of the following elements:

- At the initiation of a proceeding, intervenors submit a proposed budget, which is reviewed for reasonableness.
- During the proceeding, intervenors present experts and their attorneys engage in cross-examination, argument, and briefs.
- At the conclusion of the proceeding, intervenors submit a detailed invoice for their costs.
- The Commission determines if the intervenor made a meaningful contribution to the process, and if their costs are reasonable. A cost award is granted in full or in part, depending on whether these criteria are met.

The cost award is typically paid by the utility as a condition of the Commission decision in the proceeding. If the utility does not compensate the intervenors, it is not allowed to charge customers for service. Intervenor funding is not an adequate substitute for a well-funded Consumer Advocate. Intervenor typically have relatively narrow interests, such as energy efficiency, renewable energy, low-income issues, and other individual topics, while a state Consumer Advocate provides a consistent voice for the public interest over an extended period of time, and considers the interests of all consumers, not just those subgroups that organize to intervene.

The Public Utility Regulatory Policy Act (PURPA) includes a requirement for some form of intervenor funding for participation in regulatory processes. In some states, this is a formalized system where funding is made available by the regulatory commission. In the others, intervenors are left to seek reimbursement through the courts, and the cost of securing judicial awards under PURPA is discouraging to potential participants.

Implementing this option in Hawaii would probably not require legislative action.⁶¹ The PUC would then establish rules to guide the process, and intervenors would then be more likely to participate in the process. Based on experience in states with active programs, the probable cost would be a small fraction of one percent of the cost of utility service.

The following discussion describes some of the approaches used by a small selection of states in which intervenor funding is provided⁶².

California

The State of California has a very extensive program for representation of the public interest in utility regulation. First, the California Public Utilities Commission as an Office of Ratepayer Advocate, which participates as a party in regulatory proceedings, very much like the Hawaii DCA does. Second, it has a formal process for requesting and obtaining Intervenor Funding for eligible participants.

Numerous parties have requested and obtained funding in the two decades that this system has been in effect. These include large organizations representing residential consumers, such as Toward Utility Rate Normalization (TURN), and environmental organizations, such as the Natural Resources Defense Council (NRDC). A copy of the regulations applying to this funding is provided in the appendices to this report.

⁶¹ The Hawaii PUC has prescribed a process for intervenor funding in its IRP Framework. One award of funding was provided to one intervenor according to this provision. This provision applies only to the IRP process and is executed entirely on an ex poste basis.

⁶² The term “intervenor funding” means funding provided to non-governmental entities which participate in the regulatory process. It does not include state-funded consumer representation.

In addition the California PUC administers an Advocates Trust Fund, that provides funding for participants in proceedings where a specific utility is not clearly responsible for paying for the intervention. Awards are based upon consideration of four factors:

- the societal importance of the public policies considered by the litigation
- the need for private enforcement and the magnitude of the resultant burden on the complainant
- the number of people standing to benefit from the decision, and
- the magnitude of the party's own economic interest in the litigation.

New York

In New York, the Commission requires each applicant to make a cash deposit at the time a regulatory proceeding is filed to provide for intervenor funding. The amount is a function of the amount at issue, and multiple intervenors may apply for and compete for the limited funding. Requests of more than \$15,000 require a contract with the state Department of Public Service. In a recent power plant approval proceeding, a maximum of \$300,000 was made available, and the Commission issued an order allocating this among multiple intervenors.

Idaho

The state of Idaho created an intervenor funding program in the late 1980's. The costs are directly paid by the utility involved, upon a finding by the Commission at the conclusion of the proceeding that the intervenor "materially contributed" to the decision. The maximum amount of intervenor funding in any single proceeding is \$25,000; this limitation has had the practical effect of limiting intervention, given the cost of retaining counsel and expert witnesses.

Maine

In the state of Maine, if a party believes that their interest is not adequately represented by the Public Advocate or the Staff of the Public Utilities Commission, they may request intervenor funding. The Commission can make a determination of eligibility at an early stage of the proceeding; there is no statutory limit on the amount that may be awarded. The funding comes from the Commission's regulatory fees, not directly from the regulated utility.

Oregon, Wisconsin, Illinois: Citizen's Utility Boards or "CUB"

The states of Oregon, Wisconsin, and Illinois have formed "Citizen's Utility Boards" under state law. These are state-chartered non-profit organizations which have statutory roles in the regulatory process. Initially, the CUB laws provided for access to the utility billing envelope to recruit membership, but this access was rejected by the courts. They now obtain their members through access to state mailings (for example, the vehicle license renewal envelope in Illinois) and direct public membership appeals. The amount of funding is very limited, and the state of Oregon is pursuing a legislative change to facilitate intervenor funding similar to that in California.

British Columbia and Manitoba

Several Canadian provinces provide for intervenor funding. In British Columbia and Manitoba, an intervenor who expects to request intervenor funding must submit a budget to the Commission at the commencement of a proceeding. The Commission makes a determination of whether the budget is reasonable prior to the expenditure of significant amounts by the intervenor. The Commissions often request that multiple intervenors with similar interests consolidate their activity, may object to high-cost consultants, and may even indicate that the probability of success is low,

all in an effort to minimize the risk of non-recovery. At the conclusion of the proceeding, the Commissions issue a “cost award” to intervenors that have materially contributed to their decisions. The majority of requests are granted in full.

Option: (PUC) Hold Public Hearings After Expert Evidence Is Submitted

The PUC normally holds public hearings on utility rate increase requests in the service territory of the utility requesting the increase. Much of the time, these hearings are held at the beginning of the process, after the utility’s request has been filed, but before the DCA and other parties have reviewed the request and prepared their own recommendations to the Commission.

Several stakeholders commented that the effort the PUC now makes to travel to the outer islands for rate hearings in accordance with statute is wasteful because there is little substantial testimony provided by the public. In contrast, several public hearings by the PUC on more controversial issues have been well attended with spirited testimony.

Public hearings could be scheduled after testimony and exhibits of all parties has been filed, but prior to the closing arguments or briefs in a proceeding. This would provide the public the opportunity to benefit from the analysis of the utility’s request prepared by the other parties to the proceeding. Public hearings held without educating consumers often evokes little more than rhetoric, while those held after the issues are well understood can assist the PUC in understanding the real impact that various proposals will have on specific consumers and the state economy.

Some Commissions hold public hearings at both the outset of the proceeding and at the conclusion of the formal hearing record of expert testimony. This has the advantage of letting the public express itself and identify important issues that the parties may want to investigate as the proceeding goes forward.

Implementing this option is within the existing authority of the Commission. It would require only a change in the schedule for public hearings.

Option: (PUC) Use Adequately Funded Collaboratives as Appropriate

In several generic contested case dockets the PUC has directed the parties to engage in a collaborative process to reach agreement or determine the extent of agreement on the issues of the proceeding. These collaboratives have met with differing levels of success.

The collaboratives instituted by the PUC have been open to the parties in the contested case but not to members of the general public or the press. Usually a trained facilitator is provided. It is up to the collaborative participants to adopt ground rules and to draft any work product or documents to be forwarded to the PUC to become part of the contested case record. The proceedings of the collaborative are informal, are not recorded in transcripts and, except for final work product, do not become part of the public record of the proceeding.

Often the decision-making process of the collaborative is by consensus of all parties. This can be cumbersome, especially for participants not familiar with the concept or practice of consensus decision-making. Consensus decision-making is used because it promotes the bottom line objective of the collaborative: to reach agreement by all parties and resolve matters cooperatively. Compromise, rather than litigation is the method of the collaborative process.

The effectiveness of the collaborative process depends upon several factors.

- There must be common ground between the parties on the issues in the proceeding. If parties have intractable differences the collaborative may serve to identify these differences but is not likely to resolve them.

- Parties are more likely to reach agreement if it is clear that the ultimate arbitrator (the PUC) intends to take decisive action on the issues. Parties are most willing to compromise when a pending decision is certain and imminent.
- There must be time for the process to proceed and resources for all parties with effective standing to participate. Collaboratives are time consuming and, to the extent that agreement is not reached, add to the length of the “critical path” of administrative remedy.
- Facilitation must be fair and astute. The facilitator(s) should be neutral, patient, experienced and have some ability to follow the sometimes complex subject matter of the collaborative.
- Funding must be available for public interest participants for the large amount of resources necessary to participate constructively.

The PUC could take several actions to improve the effectiveness of collaboratives.

First, the collaborative process should be used when and only when circumstances are appropriate.

Second, the PUC and its staff could participate in the collaboratives directly when it is appropriate. In some cases this may not be appropriate if parties need to deliberate freely without the “ears” of the ultimate arbitrator present. The parties need to have the ability to meet without the presence of the PUC when necessary. In the past, however, the PUC on several occasions has been invited by the parties to attend and participate, but without response by the PUC. Direct participation in collaborative proceedings would be especially appropriate in conjunction with rulemaking proceedings.

Third, if parties are expected to compromise on the issues, the PUC must give some level of assurance that agreements reached by the parties will be addressed as an integral whole. It is important to recognize that consensus of the parties on the issues in a docket may include some quid pro quo compromise. One party may agree to “A” only so long as another agrees to “B.” For parties to be willing to agree on these terms, the PUC needs to give some assurance that it will respect the integrity of all terms. This is a difficult matter since the PUC must reserve its authority to make a decision based on the merits of the record in the contested case proceeding and cannot blindly abdicate its authority to collaborating parties without its own review. This can be significantly mitigated by direct participation by the PUC in the collaborative (to the extent invited and agreed by the parties), by interim hearing of specific issues before the PUC or by prescient framing of the issues by the PUC and parties in defining the charge and objectives of the collaborative.

Option: (PUC) Use Rulemaking Proceedings for General Policy Matters

The PUC could use rulemaking rather than contested case proceedings for considering policy matters. This would provide wider access to the public to participate and provide testimony to the Commission. The use of Collaboratives in conjunction with rulemaking proceedings would provide broad opportunities for public participation as well as an opportunity for the PUC and its staff to deliberate directly in discussions regarding energy policies. Using rulemaking procedures to adopt policies that will be applied broadly is consistent with the letter and intent of the Administrative Procedures Act.

Option: (PUC) Consider Web Simulcasting of PUC Hearings

An increasing number of public bodies now make their proceedings accessible electronically. The best known media for this is CSPAN – the cable network that provides coverage of federal

activities. Today it is also possible to watch or listen to the proceedings of the federal congress and most of the state legislatures live on the internet.

The PUC could make its proceedings accessible on the internet with a simple audio interlink from the existing hearings room recording system. Initially, this could be done in a listen-only mode, but as the technology evolves, it might be possible to provide live audio or even video teleconferencing of PUC proceedings. This would enable citizens to participate in the proceedings from their home communities and outer islands, reducing cost and increasing accessibility. It could also allow out-of-state experts retained by the utilities and other parties to appear by video teleconference, avoiding the time and expense of transportation.

Implementation of this option would initially require only that the PUC connect its existing recording system to a web media software program, and provide appropriate links on its web site to the public to access the listen-only mode. Creating the ability for two-way web teleconference of proceedings would be more difficult, time-consuming, and expensive, but could be investigated for future implementation.

GETTING THE INCENTIVES RIGHT IN RATE MAKING

This section is not intended to be a comprehensive treatment of rate making issues and practices. Only several specific rate making issues are addressed that are particularly germane to matters addressed elsewhere in this report.

Rate making is one of the primary functions of the PUC and DCA. The rate making process is commonly seen as a matter of maintaining fairness between ratepayer and monopoly utility interests. This is a limited view. The structure of utility rates and the rate making process itself also establish powerful incentives that affect utility and customer decisions and behavior. One important theme in this section is that rate making can be an effective instrument to compliment and encourage the implementation of broader energy policies.

All Regulation is Incentive Regulation

The existing regulatory framework of Hawaii is a traditional cost-based regulatory system, with an energy conservation incentive mechanism superimposed. This framework creates a number of incentives for utility behavior, and the Hawaii utilities have responded in a predictable fashion to many of these incentives.

Changing the rate making incentive framework must begin with a process to identify what different *results* are desirable, and then identifying techniques that will accentuate the probability of achieving these results. One cannot simply say, for example, that “we need performance-based regulation” and assume that this defines a new paradigm. The existing system rewards certain types of performance, and any modification to the framework may change that system of rewards – and may have either desirable or undesirable impacts which should be examined and understood before introducing change.

PERFORMANCE BASED REGULATION

Performance-based or “incentive” regulation is not at all the same thing as “deregulation.” It is a different approach to regulation that focuses on protecting the quality of utility service while giving the utility an opportunity to increase profits by reducing the total cost of energy services. The

Regulatory Assistance Project “Best Practices” guide⁶³ includes the following objectives with respect to incentive regulation:

To create strong incentives for cost containment;

To improve incentives for innovation;

To encourage increased energy efficiency in supply and in end use;

To encourage increased use of clean and renewable energy supplies;

To increase customer service and service quality.

The specific techniques recommended to achieve these objectives include:

Clearly define the objectives, and what you are trying to “incent.”

Decouple profits from sales volumes to eliminate throughput incentives

Develop “sharing” mechanisms for cost savings

Eliminate or radically restructure fuel adjustment mechanisms

Have periodic traditional rate proceedings to “reset” the base

Get the numbers right for inflation and productivity

Provided below are a series of issues and suggested options to align the incentives inherent in the practices and policies used in the rate making process with desired objectives.

Mitigate the Strategic Timing of Rate Applications by Utilities

The nature of the regulatory process is to respond to proposals from utilities, not to proactively engage in preemptive regulation. The gap in time between when an issue comes to the attention of a regulatory body and when that body takes action is known as “regulatory lag.” In the hyperinflationary era of the 1980's, this lag was thought to be adverse to utility interests, but in an era of low inflation, it can work to the benefit of utilities. If a utility's average unit costs decrease after a rate case test year the utility can recover profits that are higher than intended. This can occur due to load growth that utilizes excess capacity, retiring or refinancing of debt obligations or by reductions in operating costs. Under these circumstances the utility has a strong incentive to “stay out” of the process of regulatory rate review. This is an asymmetric incentive, as the utility can always file a rate proceeding when its profits are low, but Commissions are generally loathe to initiate rate reviews on their own motion, mindful of the limited resources the agencies have available.

Option: (PUC) Establish Periodic Rate Case Schedules for Each Utility

The PUC and DCA can be overwhelmed by simultaneous filing of rate cases and other major matters. In 1992 - 93, for example, HECO, HELCO, MECO and Hawaiian Telephone Co. all filed rate increase requests at about the same time. Neither the PUC nor the DCA has the ability to increase their staff size or budgets on short notice. The regulatory agencies cannot extensively increase resources to meet a sudden increase in demands of the regulatory process. In

⁶³ Best Practices Guide: Implementing Power Sector Reform, The Regulatory Assistance Project (www.raponline.org), 2000. This document is provided in the CD Appendix.

conjunction with existing statutory constraints on the time allowed to process rate increase requests, the uneven timing of utility rate cases can present substantial stress on the regulatory agency resources.

This can be addressed by requiring each regulated utility to file a general rate case on a specified schedule. This would allow the PUC and other parties to plan and budget for a predictable and stable workload, and allow a more thorough evaluation of material submitted by the utility, and a better presentation of information by the Audit and Case Litigation staff and the Consumer Advocacy staff to the Commission.

Prior to its failed deregulation experiment, the California PUC had each major utility on a strict 3-year rotating schedule for general rate proceedings. This allowed the Commission, its staff, the Office of Ratepayer Advocate, and intervenors to schedule their activities to ensure adequate participation in the process. Utilities were also allowed to make additional filings if and when their financial condition met the standards for urgent rate relief, so this process did not deny them an opportunity to earn a fair rate of return. It simply exercised the Commission's authority, in advance, to require general rate filings.

Reduce Existing Incentives for Utilities to Maintain High Sales Levels

In the short run (between utility rate cases) Hawaii utilities' income and profits increase with increasing sales levels because retail rates are higher than the variable cost the utility typically incurs to serve additional usage. This clearly provides a powerful incentive for maintaining energy sales levels.

Rate making is not an accurate science. It is inevitable that many uncertainties need to be incorporated into the calculations necessary to prospectively determine rates which must serve for extended periods of time. If rate making proceedings were held much more frequently many of these uncertainties would be reduced, however, the extensive scope and magnitude of these proceedings precludes their more frequent adjudication.

During the course of a rate making proceeding many factors are taken into account regarding the economic and financial characteristics of the utility and its generating system. From these considerations the levels of revenues that the utility should be entitled to collect is determined, and based upon a projected forecast of energy sales, rates are set to provide the proper level of revenue to the utility.

According to existing practices, a utility must sell the amounts of energy predicted in the "test year" in order to recover the level of revenues approved in the rate making proceedings. Since the amount of revenues collected per unit of energy is greater than the marginal production cost of the energy, a utility will fall short of revenue projections if sales fall short of predicted levels and revenues will exceed projected levels if sales exceed predicted levels. Utilities have a strong financial incentive to maintain and increase energy sales levels to insure full collection of revenues.

In the years subsequent to the test year various conditions change, but rates remain the same until the next general rate case. During these intervening years utility profits are dependent upon energy sales levels. This serves as a significant disincentive to the utility to pursue effective energy conservation measures. If marginal revenues could be adjusted to be equal to marginal costs, this disincentive would disappear.

Option: (PUC) Decouple Utility Profits from Sales Levels

Decoupling profits from sales volumes is an adjustment to the method of determining rates that ensures that utilities will collect more precisely the level of revenues to which they are entitled

regardless of deviations in sales volumes. Several such strategies have been used in other jurisdictions to accomplish this goal.

Prior to its failed experiment in deregulation, California used an Energy Revenue Adjustment Mechanism (ERAM) which was administered annually along with its annual fuel cost adjustment process. Information was filed by the utilities annually and was reviewed by the PUC. The amount of revenue collected was adjusted to the approved revenue levels and customers were rebated or surcharged accordingly. The California ERAM method functioned in conjunction with annual attrition adjustments. Operational attrition adjustments were made to account for plant additions, customer growth and inflation on expenses. Financial attrition adjustments were made to adjust the utility's rate of return based upon changes in interest rates and financial conditions. Operational attrition or some similar adjustments are probably a necessary prerequisite for a fair ERAM type method of decoupling. Financial attrition adjustments are not necessary for ERAM to function properly. California is currently in the process of restoring a decoupling mechanism.

DECOUPLING VS SIMPLE RECOVERY OF LOST REVENUES

The Hawaii IRP Framework and utility DSM program applications included "lost margins" mechanisms to recover revenues lost by implementation of the DSM programs. An effective decoupling method would provide relief for the concern that underlies the lost margin recovery mechanisms. However, the currently approved recovery of these lost revenues by a method that simply provides for their return to the utility in increased rates does not satisfy the objectives of decoupling which include the removal of subsequent disincentives to maintain sales volumes. There is a valid concern that without some decoupling mechanism, the effects of DSM programs may be optimistically assessed in the context of rate making hearings when projecting test year sales, and less enthusiastically realized afterwards in a financial climate that discourages successful implementation of load reducing strategies.⁶⁴

Furthermore, a simple non-decoupling recovery method for lost revenues exacerbates a significant problem that would be largely alleviated by an effective decoupling mechanism. When lost revenues are calculated for each DSM program and used to determine adjustments to rates, then the tracking and monitoring of these revenue effects becomes a very sensitive and somewhat contentious issue in the rate making process. This is complicated by the fact that the effects of one DSM program may overlap with the effects of other programs sponsored by the utility and other entities and these effects may not be differentiable from price conservation effects or the effects of other governmental requirements such as energy codes or appliance efficiency standards. The tracking of these revenues becomes more complex and data intensive as time goes on and more programs are introduced. Sophisticated end-use forecasting becomes an element not only in program planning, but in the rate making process as well. The utility also stands to lose revenues resulting from the conservation measures instituted by non-utility entities that are not reflected in the test year.

Decoupling tends to de-emphasize the importance of the energy forecast in rate making and accounts for the effects of all DSM programs regardless of the sponsoring entity or incidental cause. With an effective decoupling mechanism in place an inaccurate test year forecast may

⁶⁴ At its worst, this provides an incentive for a utility to implement DSM programs that look good on paper but do not actually save much energy. Several existing utility programs arguably fall into this category. New construction and new appliance purchase DSM programs designed to encourage installation of energy efficient appliances serve also as incentives for customers with non-electric appliance alternatives to select electric appliances and thus increase electrical demand. In most states the rebates for this type of program (if allowed at all) are limited to some fraction of the incremental cost difference between the standard and high efficiency appliance. Several of Hawaii's new construction utility DSM rebates are far in excess of this standard.

cause the decoupling adjustments to be larger, but it should not appreciably effect the accuracy of the amounts of revenue collected. This ambivalence towards the forecast (for rate making purposes) would tend to eliminate the "gaming" aspect of forecasting in general rate cases.

The distinction between lost revenue recovery and decoupling is important. Decoupling methodologies require some deliberate and significant care and consideration to design, but these difficulties need to be weighed against the complexities and disadvantages of the methods that are being used in DSM cost recovery to solve part of the underlying problem: the sensitivity of utility profits to sales volume and the effects of load reducing DSM programs.

OBJECTIVES FOR A DECOUPLING MECHANISM FOR HAWAII

The following objectives are suggested as guidelines for the development of a decoupling mechanism for Hawaii. An appropriate decoupling procedure should be:

- effective in decoupling revenues from sales volumes (and demand charges from demand shape changes, if appropriate,)
- manageable, taking into account the size of Hawaii's utilities and PUC staff, and incorporating realistic demands on the logistics of billing procedures,
- accountable and resistant to abuse, incorporating appropriate review procedures,
- transparent to other rate design strategies, allowing rate structures designed to ensure equity or provide consumer incentives to function effectively,
- able to properly accommodate utility system growth, incorporating new customers, new supply contracts and new utility plant without skewing adjustment calculations,
- acceptable to customers, and
- free from "perverse" incentives or undesirable regulatory effects.

A PROPOSAL FOR HAWAII

There are various decoupling alternatives that could be considered for the State of Hawaii. The adoption of any decoupling methodology should be made only after substantial discussion between the utilities and affected parties.

The following proposal of a decoupling mechanism that might be an alternative acceptable for Hawaii is offered for purposes of example only, to demonstrate how such a mechanism might function:

Decoupling would be administered in a manner similar to the fuel adjustment procedure. Rates for non-fuel energy charges would be adjusted according to a predefined formula. Over and under-collections would be handled in similar manner to fuel adjustment revenues by deposit and balance in an independent account.

In a general rate case the monthly service charges, fuel energy charges, non-fuel energy charges and demand charges would be determined according to existing (or other evolving) policies and procedures except that non-fuel energy charges and demand charges would each be separated into fixed and variable components.

Non-fuel energy charges would be separated into (1) a fixed component that represents the revenues necessary to cover costs that remain constant to the utility with respect to fluctuations in energy sales and (2) a variable component that is proportional (or related by some other appropriate, simple function) to energy sales expressed in cost per kWh.

On an annual, quarterly or monthly basis, utilities would be authorized to recover revenues from non-fuel energy charges to be equal to:

$$\text{Fixed component} + (\text{Variable charge} / \text{KwH} * \text{KwH sales})$$

To recover this amount of revenue, each customer's bill would include non-fuel energy charges billed per KwH as follows:

$$\frac{\text{Fixed component}}{\text{Total \# of billed KwH}} + \text{variable charge} / \text{KwH} = \frac{\text{charge}}{\text{KwH}}$$

Additionally, the fixed component of non-fuel energy charges could be adjusted in proportion to growth in the number of customers or some other appropriate discrete statistic in order to serve as a proxy for operational attrition compensation.

By this procedure the variable costs of energy production would be passed straight through to the customer, but the fixed costs would be adjusted by the total number of KwH billed. If the energy production costs have been properly allocated to fixed and variable components, this should assure that the utility would recover its fixed costs even with reductions in load and would eliminate the opportunity for increasing profits by increasing sales volumes.

The breakdown of non-fuel energy charges into fixed and variable components would be similar to but distinctly different than the classification component in the cost-of-service study, and should be possible using either embedded or marginal cost classification and allocation.

The preceding example certainly may not be acceptable in the form proposed, and is offered only for expository purposes. It serves to illustrate the mechanics of a decoupling mechanism and some of the complexities involved.

An effective decoupling mechanism can serve to eliminate a significant disincentive to conservation, avoid a contentious and problematic treatment of DSM lost revenues, remove the "gaming" aspect of energy forecasting in rate making proceedings, increase the accuracy of the rate making process, and increase the financial health of the utilities without cost to ratepayers, by reducing overall utility financial risk exposure and evening out the effects of business cycles.

Establish Progressive Standby Rates

Standby rates are the prices paid by customers with their own generating facilities when they need to rely on the utility for supplemental power (beyond the capacity of their own resources) or for replacement power (when their own units are not operating). Standby rates need to be set fairly to provide reasonable opportunities for customers to generate their own power and to provide compensation to the utility for the costs of maintaining standby capacity.

There are several potential benefits of customer self-generation that should be considered in policies regarding standby rates. First, self generators can often take advantage of the waste heat of their generating units for beneficial purposes. For example, Mauna Loa uses the heat of its self-generators for the macadamia nut roasting process. Several hotels use the heat from generators

to heat water and thereby reduce total energy consumption. Second, the line losses for transmission and distribution are reduced in self-generation. Finally, some self-generators may be able to use renewable energy resources, including biomass, wind, or solar energy, displacing fossil fuel. The availability of affordable prices for standby energy is an essential consideration of any utility customer in determining whether or not to invest in their own generating resources.

Hawaii divides customers into two categories for the purpose of computing standby rates. Small commercial and residential customers are entitled to the equivalent of “net metering” of their power needs, and are charged the same price per kilowatt-hour as any other small user when they draw on the utility for power. Large commercial and industrial customers, in part because of a more complex rate structure, pay much higher prices for standby power.

Electric rates for large customers contain both “demand” charges based on the peak monthly demand, and “energy” charges based on the kilowatt-hours of consumption. The demand charge is designed to cover much of the fixed cost associated with power plants and transmission lines. The problem for self-generators in Hawaii is that they are required to pay rates equal or greater than the full “demand” charge paid by customers that do not have their own generation, even though they may need utility power for only a few hours per year. The utility defends this on the basis that it must stand ready to serve these self-generation customers, and therefore must have adequate standby capacity available.

It is generally recognized in the industry that customers with their own generation equipment do not impose the same costs on a utility as customers without their own generating facilities. There are numerous reasons to offer lower prices for standby service. First, it is exceedingly unlikely that multiple customers with self-generation will suffer equipment failures simultaneously, and therefore put their standby demands on the utility at the same time. Second, contractual language has been used in many jurisdictions to ensure that self-generators schedule their maintenance in cooperation with the utility, to ensure that facilities are not out of service unnecessarily during high-demand periods. Third, contractual language has been used in many jurisdictions to make it clear that the utility’s obligation to provide standby service is a best-efforts obligation, subordinate to their obligation to serve customers that purchase all of their power from the utility.

Option: (Electric Utilities, PUC) Establish Progressive Standby Rates

Two of Hawaii’s electric utilities, KIUC and HELCO, currently have tariffs for standby service. These tariffs are designed to recover about the same total amount of fixed generating costs as tariffs for customers who get all of their electricity from the utility.⁶⁵ This is inappropriate from a cost-based perspective, and serves to discourage the installation of distributed generation (DG) or combined heat and power (CHP) equipment at large customer facilities. Because DG facilities have advantages and CHP facilities can generally use fuel more efficiently than utility-owned generating plants, there are public policy reasons to encourage, rather than discourage, these resources.

We have examined standby rates imposed by utilities in areas of the country where CHP has been encouraged as a matter of policy, and have found that these jurisdictions impose fixed charges on standby customers that are much smaller than those imposed in Hawaii.

⁶⁵ These tariffs have higher monthly charges for the components of the customer’s bill that are billed on a demand (per KW) basis. Customers with standby generation equipment have lower metered demand and lower energy consumption in most months. The basis for the existing higher monthly charges for standby service is an attempt to recover the same amount of fixed generation costs (in order to compensate the utility for maintaining standby generation capacity) as customers without their own generation equipment.

Two examples of progressive mainland standby tariffs are documented in the Standby section of the CD Appendix to this report. The first are the standby rates of Southern California Edison, and the second are those of New York State Electric and Gas Company. The table below, based on a simple analysis, shows a rough approximation of the amount that a customer would pay in fixed demand-based charges if they used standby service for three months per year -- one month during the on-peak season, and two months during the off-peak season.⁶⁶

Standby Demand Charge Comparison Dollars per Standby KW	NYSEG Sched 11	SCE TOU-8 BU	KIUC Sched P Rider S	HELCO Sched P Rider A
Total Standby and Demand Charges in months when service not used:	\$1.75	\$0.00	\$12.84	\$11.40
Total Standby and Demand Charges in months when service is used:	\$4.38	\$17.95	\$15.45	\$11.40
Demand Ratchet:	NO	NO	YES	PARTIAL
Standby Ratchet:	NO	NO	YES	NO
Annual Cost Assuming Usage in 1 Peak & 2 Off-Peak Months	\$28.89	\$17.95	\$185.40	\$136.80

Figure 5 Comparison of Standby and Demand Charges

The annual costs of standby service provided by the two progressive mainland utilities in the comparison are only a fraction of the costs in the Hawaii utility tariffs. This dramatic difference results from the fact that the Hawaii tariffs are designed to recover enough revenue from each standby customer to provide utility standby generation and transmission capacity equivalent to the full standby capacity of the customer. The progressive tariffs recognize that customers with generation equipment do not require the same level of utility generation and transmission standby reserve capacity as ordinary customer.

If the Hawaii utilities had to maintain enough generation and transmission facilities to back up 100% of the cumulative installed capacity of all customer-owned generation, the approach being used in the existing Hawaii standby tariffs might be correct from a cost-of-service perspective.⁶⁷ However, the probability of actually needing that level of standby capacity is very small. It is not

⁶⁶ This comparison is simplistic in several important respects but nevertheless serves as a meaningful rough approximation of the general magnitude of costs of standby rates under different utility tariffs. Different utilities implement several aspects of regular and standby tariffs differently making exact comparisons difficult. A thorough and rigorous comparison would have to consider all aspects of each utility's rate structure, including customer, demand, energy and rider charges, ratchets and minimums along with detailed assumptions regarding customer consumption and generation patterns.

⁶⁷ In this respect the Hawaii approach to standby rate design might be appropriate if there were only one standby customer on the utility system. Indeed initially this may be close to actual circumstances and the context in which the existing tariffs are conceived. With more than one standby customer, however, and as larger numbers of standby customers are added to the system this approach becomes less reasonable, both from a system capacity planning perspective and from a rate making perspective. In any case, even with only one standby customer, the amount of standby generation and transmission equipment needed by the utility should take into consideration the relatively low probability of customer equipment outage occurring at the time of system peak demand.

reasonable for the utilities to actually maintain that level of reserve capacity and it is not therefore not appropriate to charge for it.

Standby customers typically rely on utility generating facilities for only a few hours per month, when their own equipment is out of service for unscheduled maintenance, and for a week or two each year during their scheduled maintenance period. Customers without their own generation equipment typically rely on utility generating facilities every day of the year. At least three different cost-based factors justify standby rates designed to recover a lower level revenue for utility capacity-related costs than are incorporated into regular rates.

- The probability of any individual standby customer's equipment failing requiring service from the utility at the time of the utility system peak demand is very low compared to ordinary customers.
- The probability of **all** standby customers' equipment failing simultaneously is vanishingly small.⁶⁸ The probability-weighted contribution of all combined standby customers to system peak demand is much less than a similar-sized group of “regular” customers.⁶⁹
- Standby customers typically agree to perform their scheduled maintenance in cooperation with the utility, to reduce the probability that they will impose demands on the utility at peak periods.

The Hawaii electric utilities, PUC and DCA should work to develop standby rates that encourage distributed generation, especially beneficial CHP applications, by emulating progressive utilities' existing rate designs. These rates should provide for protection of the utility with respect to generation and transmission capacity requirements considering maintenance scheduling, seasonality, time of day, and obligation to serve. They should provide benefits to self-generators compared with the rates applicable to utility-dependent customers.

STANDBY SERVICE SHOULD BE OFFERED AT TWO LEVELS OF RELIABILITY.

Firm standby service should be available for customers desiring it. The price should reflect all customer-specific facilities, and a probability-weighted assessment of all system costs associated with serving the expected level of maximum standby demand. The utility should construct and maintain the level of standby capacity needed, based on probabilistic analysis, to result in no diminished reliability to other retail customers. An example is provided below:

For standby customers needing backup service primarily to cover customer generation equipment maintenance periods (coordinated with the utility), firm combined standby and demand rates should normally be approximately one-quarter of the combined rates imposed

⁶⁸ The probability of an unplanned outage of electrical generation equipment is typically expressed as a “forced outage rate”(FOR). A generator can be typically be expected to be “forced” out of service due to unplanned problems for 2% to 8% of the time depending upon the service application, maintenance practices and the quality and condition of the equipment. The probability of two independent generation units being forced out of service simultaneously is the product of their forced outage rates. For example, two units with a 5% FOR would be expected to be forced out of service simultaneously for about one quarter of one percent of the time. The probability of all standby generators failing simultaneously is the product of all of their forced-outage rates. As the number of standby generators increases, the probability of simultaneous forced outage becomes infinitesimal.

⁶⁹ As the number of standby customers increases, the cumulative probability that one or more standby customers will require utility generation increases but never exceeds more than a small fraction of the probable demand of an equivalent number of similarly sized “regular” customer loads.

on “regular” customers receiving firm service.⁷⁰ This proportion should increase to equal the regular rate if the customer uses utility service more than 2,000 hours per year (i.e., about 25% of the time), and exceeding the regular rate beyond that point. This would ensure that if the customer uses standby service a significant amount of the time, they would pay more than a regular utility customer.

This could be implemented by establishing a relatively low standby demand charge (\$3 - \$5 /kw) reflecting the customer-specific system connection charges, that the customer would pay every month, and then including an additional \$.03/kWh in the energy charge paid by these customers. In this manner, if the customer used a large amount of energy (meaning they were taking standby for many hours of the year), they would pay more than a firm sales customer.

Interruptible standby service should be offered with a much lower cost commitment, reflecting only customer-specific connection costs, real-time variable costs, plus a contribution to system costs per kilowatt-hour similar to that in conventional rates. In the event that a customer's generating facility was not available at a time of system stress, the customer might not receive any standby service. An example is provided below:

This could be implemented by establishing a relatively low standby demand charge (\$3 - \$5 /kw) reflecting the customer-specific system connection charges, that the customer would pay every month, and then including an additional \$.01/kWh in the energy charge paid by these customers. In the event that the utility's variable operating cost at any hour exceeded the energy charge being paid by the customer (i.e., the utility was losing money providing service), the service would be interrupted. A very high "penalty" rate should be included if customers take service during such a period of interruption.

A customer should be able to mix the two levels of standby service, securing enough firm standby service for emergency and safety systems, and as-available standby for discretionary or production loads.

The table below compares the HELCO current standby rate with standby rates that are consistent with these recommendations.

⁷⁰ This refers to the total rates charged for demand and all standby-related charges. It does not include customer charges or ordinary energy charges.

HELCO Alternative Standby Rates	Current	Alternative Firm	Alternative Interruptible
Demand Charge (Against net metered demand)	See note 1	See note 1	See note 1
Standby Reservation Charge	\$11.40	\$5.00	\$3.00
Standby Ratchet	No	No	No
Standby Energy Charge Component			
First 200 kwh/kw	\$0.00	\$0.03	\$0.01
Next 200 kwh/kw	\$0.00	\$0.03	\$0.01
Over 400 kwh/kw	\$0.00	\$0.03	\$0.01
Total Energy Charge (rounded for simplification)			
First 200 kwh/kw	\$0.13	\$0.16	\$0.14
Next 200 kwh/kw	\$0.11	\$0.14	\$0.12
Over 400 kwh/kw	\$0.10	\$0.13	\$0.11
Annual Standby and Demand Cost Assuming Usage in 3 months; 300 hours per year (including energy charge premium)	\$136.80	\$69.00	\$39.00
Annual Standby and Demand Cost Assuming Usage in 9 months; 4300 hours per year (including energy charge premium)	\$136.80	\$189.00	\$79.00
Note 1: HELCO's existing standby tariff includes a minimum demand charge but no other demand charges billed against metered demand that is equal or less than the contract standby demand.			

Figure 6 Progressive Standby Rate Design Example

The table indicates the demand and standby charges for a customer with standby generation equal to (or more than) the customer's consumption requirements.⁷¹ Annual standby and demand costs are shown for two cases.

In the first case the customer uses company generation for some period in each of three months and uses none in the other nine months. This is typical of a customer that is using utility generation only as backup for scheduled maintenance occasional forced outage of customer generation equipment. In the second case the customer relies more heavily on the utility, requiring utility generation for some time in each of nine months and none in the other three months.

Under the alternative firm standby tariff a customer using standby service only for maintenance and occasional forced outage would pay substantially less than under the existing HELCO tariff. A customer relying more heavily on the utility, however, would pay more than under the HELCO tariff.

⁷¹ The table shows only the charges that are directly related to contract for and use of standby service. The table does not show the monthly customer charge, monthly minimum demand charge or regular energy charges. The annual totals include the standby energy charge component (amount above regular energy charges) but not the regular energy charges. Since the customer's metered demand is assumed to be no more than the standby contract demand there would be no demand charges billed against metered demand in any of the rate designs portrayed.

Under the alternative interruptible standby tariff the utility would not have to serve the customer in conditions when the utility was capacity constrained and would not have to maintain standby reserve capacity for the customer. A customer would pay less than the HELCO tariff in either case under this tariff.

Note that under HELCO’s existing standby tariff, a customer that relies on utility generation more often does not pay more demand or standby charges than a customer who relies on the system less often.

Time-Sensitive pricing

Utility costs in Hawaii vary by time of day, in part because the most fuel-efficient power plants are adequate to meet night-time demand for power, but less-efficient power plants (with lower fixed costs) are used to augment that supply during the peak hours.

The Hawaii utilities were relatively early pioneers of time-of-use (TOU) pricing for larger commercial customers, through their optional Schedule U and Riders M and T prices, but have not extended these rates more broadly. By comparison, the state of California requires that all customers or regulated utilities with peak demands in excess of 250 kilowatts be served with TOU rates.

Experience in other areas suggest that TOU rates can work reasonably well for large commercial and industrial customers, but are less desirable and cost-effective for residential customers, particularly smaller residential customers. For smaller customers, inverted-block pricing and/or interruptible service to specific loads are generally more effective at producing desired results, and are more acceptable to consumers.

Large-Volume Customers (Schedule J and P)

For large volume customers other than those choosing TOU pricing, Hawaii uses what is known as a “Wright” rate design, with multiple load-factor blocks. These provide lower prices to customers with 24-hour per day operations, but not strictly based on the time of use. An example shows the difference:

Time of Use Rate:		
Energy Charge		
Priority Peak		\$0.0950
Shoulder Peak		\$0.0641
Off-Peak		\$0.0610
Wright Rate:		
Energy Charge		
First 200 kwh/kw		\$0.0721
Next 200 kwh/kw		\$0.0641
Over 400 kwh/kw		\$0.0610

Figure 7 Tariff block structures

To briefly explain the Wright rate, there are 720 hours in a 30-day month. A customer using only 200 kwh per kilowatt of demand is, on average, using about 28% of their peak usage, corresponding to a one-shift operation like an office building. This would be served in the first

block. One using 400 kwh per kilowatt of demand would, on average, be using about 56% of their peak usage. Only a customer operating three shifts, such as a supermarket, would have a significant amount of usage in the third block. In *general*, this type of rate is similar to a TOU rate, because only those customers with relatively high off-peak usage get the benefit of the last block. However, it is not a true TOU rate. It encourages stable usage throughout the day, what is known as a high “load factor” or a high ratio of average demand to peak demand, while a TOU rate encourages a high level of off-peak usage, but not necessarily stable usage throughout the day.

One problem with the Wright rate form is that a customer whose “natural” load shape includes a high level of usage at night, but a low level of usage during the day, must pay the higher price for their night-time usage, simply because they do not break the threshold into the third rate block. For example, an air-conditioned office building might be able to reduce the air conditioning level at 4 P.M. when most employees have left, but the Wright rate form puts them into a lower price at just the time of the day when the utility system hits its peak demand. Another is that a customer that has the ability to double up their usage during off-peak hours (for example, a hotel doing all of their laundry at night) does not get a rate break for any activity that causes their night-time demand to exceed their daytime demand.

In California, the utilities have TOU elements to both their demand charges (peak load is measured only during the day) and their energy charges. As a result, a customer with a low load factor, but that uses most of their power at night, pays the lowest rates, while that same customer in Hawaii would pay among the highest rates.

The benefits of TOU rates are often overstated, and we caution that the differential in Hawaii utility system costs by time of day can be quite modest. However, the hours when Hawaii utilities rely on their least economic power plants are very predictable, and TOU rates could easily be designed to provide appropriate price signals to consumers.

Small Customers (Residential, and Schedule G)

Small residential and commercial customers are less likely to save money (for themselves or for the utility system) with TOU pricing.

The reason for this is that TOU pricing requires special meters and more expensive meter reading and billing, and most studies have found that this is not cost-effective for small customers. In addition, the “hassle factor” associated with shifting the time for taking showers, doing laundry, and other electricity-intensive activities is not trivial, and so customer response to time-sensitive prices is limited.

Most recently, in 2001, Puget Sound Energy implemented a pilot program for 300,000 customers in the Seattle area. During the term of the pilot program, the savings in the form of lower power generation costs offset only about ten percent of the increased metering and billing cost. The program was originally received favorably, but this changed when participants were charged \$1.00 per month towards the incremental meter reading and billing costs. The program was discontinued after about one year due to customer dissatisfaction with the results. An evaluation prepared for the WUTC shows that the program was not cost-effective under nearly all sets of assumptions.⁷²

There are other alternatives, however, that do hold great promise for these customers. The first is inverted block pricing, and the second is interruptible service to specific loads.

An inverted block rate is one where the first block of kilowatt-hours is priced at a lower rate, and incremental usage at a higher rate. This is appropriate and cost-based because higher-use

⁷² May 1, 2003 filing by PSE TOU Collaborative (included in the appendices to this report)

residential consumers in Hawaii are typically those with electric water heat and air conditioning, and this type of usage is more concentrated in the on-peak period than usage for lighting, appliances, and other residential consumption. Therefore an inverted block rate serves many of the function of a time-of-use rate, without any need for special metering or more complex meter reading. An example of how this could be applied is shown below:

Current Rate Design	
Customer Charge	\$7.00
Energy Charge per kwh	\$0.1170
Inverted Block Design	
Customer Charge	\$7.00
Energy Charge per kwh	
First 300 kwh	\$0.0800
Additional kwh	\$0.1381

Figure 8 Inverted Block Rate

We estimate that this type of rate design would produce a 4% to 12% reduction⁷³ in residential usage, concentrated during the on-peak periods. This is roughly the magnitude of savings produced by all of the energy efficiency programs that HECO has offered to date.

Hawaii utilities have been experimenting with interruptible rates for residential customers.⁷⁴ Most attractive is the ability to interrupt residential water heaters during extreme peak hours. The technology to do this is relatively simple and cheap, and most customers do not even notice the interruption of service due to the hot water storage capacity of their water tanks. Utilities outside of Hawaii have experimented with remote control of residential air conditioners, changing the comfort setting a few degrees when the system is under stress. As air conditioning becomes more and more common in Hawaii, this type of program may become an attractive option.

Option: (PUC) Incorporate More Effective Time of Use Pricing in Utility Rate Design

For the larger commercial customer classes time of use rates could be implemented to provide proper price signals to consumers, probably replacing the current confusing declining block rate structure. Time of use rates should be designed in conjunction with and consistent with the other related utility rate design attributes.

For residential consumers, a combination of inverted-block rates and interruptible water heater service may also produce valuable savings for consumers and the system.⁷⁵

Fuel Cost Adjustment Mechanism

Fuel adjustment mechanisms evolved to provide some protection for utilities from volatile fuel costs over which they have little control. Generally these mechanisms adjust the rates charged to

⁷³ This reduction in loads would result from customer response to the higher marginal component of the inverted block residential energy rate. The 4% to 12% range results from estimates of price elasticity of demand of minus 0.1 to minus 0.3, respectively. This range is consistent with typical industry estimates.

⁷⁴ These rates could be implemented as a tariff rider or as a DSM program.

⁷⁵ See preceding discussion.

customers automatically on a periodic basis to account for fluctuations in fuel costs. This reduces the amount of financial risk born by the utility by passing fluctuations in fuel costs directly to utility customers and reduces the need for frequent general rate cases to account for changing fuel costs.

At times fuel adjustments are positive and at times negative, depending upon the current fuel prices compared to the prices memorialized in the base rates established at the time of a general rate case. If properly implemented, fuel adjustment clauses should not introduce any upward or downward bias, except that there may be some average net benefit to customers if, by reducing the financial risk to the utility, there is a reduction in the allowed utility cost of capital.

Notwithstanding these benefits, full recovery of fuel and purchased power expenses by an adjustment reconciliation process has been identified in some mainland jurisdictions as an obstacle to utility consideration of energy efficiency and renewable resources for several reasons. The Hawaii fuel adjustment clauses address some of the shortcomings of “fully-reconciled” fuel clauses, but some important concerns remain.

Insulating the utilities from fluctuations in fuel costs makes them less directly concerned about price volatility in deciding what types of resources to procure. One benefit of efficiency measures and non-petroleum consuming generation resources is that these resources reduce the amount of price volatility in electric generation costs. A fuel cost adjustment mechanism reduces the utility’s stake in addressing fuel volatility issues in the resource planning process.

Hawaii’s fuel adjustment mechanism includes an incentive for the fuel efficiency (heat rate) of power plants. This is a progressive attribute of the mechanism, but the current configuration of the mechanism provides some illogical incentives to “game” the mechanism, both in generation plant operations and in the context of general rate case revenue analysis.

Under the existing mechanism the utility has a “perverse” incentive to run higher cost diesel generating units in preference to low-cost steam units. This is because the existing mechanism fully compensates the utility for fuel price differences (including any increases in the composite, weighted-average fuel price that result from consuming a higher proportion of diesel versus fuel oil) and also rewards the utility according to the average efficiency of the utility system (enhanced by running additional diesel units).⁷⁶ We have no reason to believe that the utilities are actually taking tactical advantage of this aspect of the fuel adjustment clause. Utility resources are currently properly dispatched on the basis of lowest operating cost, not highest utility profit.

There is a more consequential aspect of this same attribute of the fuel cost adjustment mechanism. This creates an incentive to “game” the analyses used in determining the system heat rate embedded in rates during a general rate case. This issue is basically identical to the operational incentive described above, except that it pertains to how the operation of the utility system is simulated in the test year to determine the base system heat rate embedded in the fuel cost adjustment mechanism. There is an incentive for the utility to overestimate the amount of steam generation versus diesel fueled generation in the test year simulation analyses. Based upon empirical examination of simulated versus actual system operation, this aspect of the implementation of the mechanism has resulted in excess revenue collection by the utilities.

Many states have eliminated fuel adjustment clauses entirely, or set them to provide only partial recovery of fuel cost variations. Several options are identified below to address issues associated with Hawaii’s fuel cost adjustment mechanism.

⁷⁶ Shifting generation from fuel oil-fired steam units to diesel fueled units increases the thermodynamic efficiency of the utility system (decreases the system heat rate) but increases total fuel costs.

Option: (PUC) Differentiate Fuel Types in Fuel Cost Adjustments

It would be relatively simple to address the current lack of differentiation between fuel types in the existing mechanism. If this were done, then the incentive to run higher-cost, but higher-efficiency plants would be eliminated. Since HECO does not actually take advantage of this illogical characteristic of the current mechanism, this would probably not be controversial. A primary benefit of making this adjustment would be simplifying and reducing the “gaming” aspect of this issue in general rate case proceedings.

Option: (PUC) Provide Partial Rather than Full Cost Adjustment

The fuel cost adjustment mechanisms approved for Hawaii’s electric utilities are designed to fully compensate the utilities for fluctuations in fuel prices. Although the mechanisms are not straight **cost** pass-through mechanisms they are designed to pass all of the impacts of changes in fuel **prices** to the utility customers.

One drawback of full fuel price adjustment is that it provides no incentive to the utility to insulate its customers from the impacts of fuel price fluctuations. This is a particularly important factor in evaluating the merits of different types of generation resources in long-range utility planning. Long range planning studies use net present values of cost streams as evaluation criteria. These criteria are not currently sensitive to fuel price volatility. Neither is the utility bottom line. The utilities are currently the only businesses in Hawaii that are entirely insulated from fuel price fluctuations. All other residential, business and government entities are directly affected by fluctuations in the price of fuels used to generate electricity.

The fuel cost adjustment could be designed to make only partial adjustment for fluctuations in fuel costs. The objective would be to provide the present benefits of the fuel cost adjustment mechanism (reducing the need for frequent rate cases) and allow some of the fuel price fluctuation to go directly to the utility bottom line. This approach is used in other jurisdictions. Idaho Power and Light is allowed an 90% adjustment of its fuel and purchased power costs. This approach would provide the utility with a direct incentive to align its resource evaluation and selection decisions with state policies addressing mitigation of fuel price volatility, while still protecting the financial condition of the utility from volatile fuel and purchased power costs.

Levelized Rate making

Every utility customer has slightly different characteristics that have slightly different costs. Underground service is more expensive than overhead service, rural service is more expensive to provide than urban and suburban service, and different customers have different usage patterns that impose different costs on the utility. Rate making by its very nature averages some costs together in the process of creating a limited number of tariffs of general application.

The concept of “levelized” rate making has many different meanings, and we will attempt to discuss several of these.

Cost Levelization Across Customer Classes

It would be possible to charge all customers a single rate for electricity. This is generally not done, because different types of customers have sufficiently distinct usage characteristics that customers are typically divided into several different customer “classes.” In Hawaii, these are generally Residential, Small Commercial, Large Commercial, Extra-Large Commercial, and Street Lighting. Further distinctions are offered within some of these classes, with optional “riders” available to Large and Extra Large Commercial customers for time-of-use and interruptible service.

When utilities prepare general rate case applications, they prepare what are known as “cost of service” studies, which apportion the total utility cost between the different customer classes based on their respective use of the distribution system (customer count and peak demand) and their use of the generation and transmission facilities (peak demand and kilowatt-hour usage). These studies are both subjective and controversial, and there are numerous methods used by different utilities and regulatory commissions. Substantially all of the studies tend to show that larger Commercial and Industrial customers have lower costs per kilowatt-hour than do Residential and Small Commercial customers due to the inherent economies of scale in power distribution.

In some jurisdictions, rate levelization between customer classes is requested by the utility and/or imposed by the regulatory commission for a variety of reasons.

- One justification is the perception of equity and fairness, a well-recognized rate making principle.
- Another is that business customers receive tax benefits from energy expenditures that residential customers do not.
- “Gradualism” is a common reason for cross-class subsidization -- regulatory commissions tend to move only partway toward the result of any cost of service study, in part to preserve some sense of stability, and in part because the costs themselves are dynamic, and there is a risk of “over correction.”
- Finally, the relatively higher riskiness of large customers (susceptibility to the rise and fall of the business cycle creating financial risk for the utility) is a commonly-cited justification for assigning higher costs to these customers.

In nearly all cases, levelization results in larger customers paying more than the cost of service study suggests is appropriate, and small customers paying less.

RECOMMENDATION ON CROSS-CLASS COST LEVELIZATION

Absent legislative direction to the PUC to consider this type of cross-class subsidization or Levelization, the current process of the PUC seems to be typical and well within the range of outcomes experienced in other jurisdictions. While the cost of service methodology used by HECO, HELCO, and MECO is relatively favorable to large-use customer classes, the PUC has moved only gradually in the direction of the results suggested by the cost of service methodology. This reflects the judgment of the Commissioners, taking into account the factors discussed above, including perceptions of equity and fairness, gradualism, and relative risk.

Cost Levelization Across Geographic Areas

Hawaii’s utility systems serve one highly populated island (Oahu), three smaller and less-populated islands (Maui, Kauai, and Hawaii), and two very small and low-density islands (Molokai and Lanai). Currently separate rates are established for each of the islands. For Oahu, Kauai, and Hawaii, the rates charged on each island recover the costs attributable to service on each island. Maui, Molokai, and Lanai are all served by MECO, and while the rates are higher on Molokai and Lanai, a portion of the cost of serving these very small systems are borne by ratepayers in Maui. This averaging within Maui County has been approved by the PUC at the request of MECO and with the support of the DCA. Currently, rates on Molokai and Lanai are about 20% above the rates in Maui, but still about 20% below the actual cost of providing service on the smaller islands. The difference is made up with a small increment included in Maui island electric rates.

Other states and the Canadian provinces use very different systems for geographic averaging. On the mainland utility systems, where utilities are interconnected with transmission lines that

allow large centralized power generation facilities to serve a widespread geographic area, it is most common that customers in multiple counties served by the same utility will pay the same prices, regardless of location-specific transmission and distribution costs. Even island systems are often connected by transmission lines (for example, Orcas Power and Light in Washington, the Gulf Islands in British Columbia, and dozens of islands in the state of Maine), and pay electric rates identical to customers on mainland systems despite high costs to get the power to the islands.

The type of island-by-island rate making in Hawaii is relatively unique. This is in part driven by the fact that in Hawaii there is no interconnection between islands and the Companies are organized by County as separate utilities for rate making purposes. It therefore makes more sense to compare Hawaii to systems where there is a full electrical separation. There are several examples of this, and the rate levelization between areas varies from place to place.

In Alaska, a statewide fuel fund provides for cost averaging among all utility systems in the state. In Canada, customers living in remote “diesel” communities typically pay the main grid rate (typically based on low-cost hydropower generation) for a limited amount of power sufficient to meet basic residential needs, and then a higher rate for use in excess of that amount; commercial customers typically pay the full-cost rate of diesel-generated power. In Indonesia, a nationwide utility applies one rate schedule throughout the country, applying equally to main-grid power on the major islands of Java and Bali, and to hundreds of isolated diesel-power systems on small islands.

ANALYSIS

There are several approaches to geographic levelization used elsewhere that could be applied in Hawaii:

- Island by island rate making, with no inter-island subsidies
- County by county rate making, with partial inter-island melding (existing method in Hawaii)
- County by county rate making, with full inter-island melding (proposed by the DCA for MECO; used by Washington public utilities serving islands)
- Statewide levelization of “essential needs” levels of service, with cost-based prices for commercial usage and high-usage residential customers (common method in Canada)
- Statewide electric rate levelization, with partial subsidy of outer islands (used in Alaska statewide fuel equalization fund)
- Statewide electric rate levelization, with full cost melding (used in Indonesia)

The current system of geographic averaging in Hawaii is in one respect typical of mainland systems – rates are averaged within utilities, but not between utilities. The exceptions that exist are the result of specific legislative direction. Following Hurricane Iniki the PUC was given some flexibility in allocating costs between islands and utilities in disaster situations.

Currently, utility costs are lowest in Oahu, and highest on Lanai, Molokai, and Kauai. This generally reflects the relative economies of scale that the larger utility systems enjoy.

Currently electric customers on the Island of Maui bear a portion of the cost of utility service on the islands of Lanai and Molokai. There is no better logical justification for having customers on Maui bear a portion of these costs than there would be to have customers on Oahu bear these costs. It is simply a result of the financial organization of Hawaiian Electric Industries, with a separate utility for each County. This form of organization has a purpose, as discussed in the chapter on Utility Taxation.

In a recent Maui Electric Company rate proceeding, the DCA presented a proposal to fully consolidate the costs for Maui, Molokai, and Lanai, as though the islands were connected by power transmission lines and operated as a single system, much like large multi-community systems on the mainland. This proposal was not accepted by the PUC, but it continued the policy of partial melding of costs.

There are conflicting economic principles which should be considered with respect to inter-island cost levelization. First, the smaller islands typically have lower income levels, and the higher cost of electricity is a greater burden for citizens on these higher-cost systems. This suggests that cost levelization is progressive social policy. Conversely, the cost of providing electric service on the smaller islands is greater, and typically the fuel efficiency and environmental impact of electricity production is worse on the smaller systems. Providing a subsidy for energy consumption under these circumstances may be viewed as regressive environmental policy.

We do not recommend any particular approach to geographic levelization, but suggest that the Governor or Legislature could provide policy guidance to the PUC if it is considered a priority.

Option: (Governor, Legislature) Provide Guidance to the PUC Regarding Geographic Levelization

The Governor and Legislature of the State of Hawaii could consider whether geographic averaging is a desirable social policy, and give specific direction to the Hawaii PUC to pursue or avoid geographic levelization of electric rates. The options considered should include:

- County-wide levelization (status quo except for MECO)
- State-wide levelization of essential needs usage levels
- State-wide levelization of all utility rates

Cost Levelization Over Time

Under Generally Accepted Accounting Principles, utilities depreciate their investments in production, transmission, and distribution facilities using “straight line” depreciation over the life of the plant. This results in “front-loaded” recovery of capital investments by utilities.

This is best illustrated by a simple example using a hypothetical power plant investment costing \$1 million, with a five-year lifetime, and annual output of 5 million kilowatt-hours.⁷⁷ In the first year, the utility is allowed a return on the full investment, plus recovery of one-fifth of the investment through depreciation. In the subsequent years, the return decreases, because the investment has been depreciated. The table below shows how this affects the cost recovery trajectory over time:

⁷⁷ Most utility power plants have twenty to forty year lifetimes. This five-year caricature is provided for simplicity.

Year	Net Plant Service	Return @ 10%	Depreciation Expense	Total Allowance Cost	Cost/kWh
1	\$1,000,000	\$100,000	\$200,000	\$300,000	\$0.060
2	\$800,000	\$80,000	\$200,000	\$280,000	\$0.056
3	\$600,000	\$60,000	\$200,000	\$260,000	\$0.052
4	\$400,000	\$40,000	\$200,000	\$240,000	\$0.048
5	\$200,000	\$20,000	\$200,000	\$220,000	\$0.044

Figure 9 Straight-Line Utility Depreciation

There are a number of circumstances created by the front-loaded capital cost recovery accorded utilities under traditional regulation.

First, the utility gets an initial rate allowance that is higher than what is needed for subsequent years to pay for the investment. When a large new investment, typically a new power plant, comes into service, the utility requests and receives a rate increase to cover the cost of the new plant. In subsequent years, however, those rates remain in effect, but the cost of owning the power plant has declined due to depreciation.

Second, the cost per kilowatt-hour is highest in the early years due to the effect of straight-line depreciation. This is the opposite of what is most palatable to customers in light of the effects of inflation (which tends to alleviate the impact of prices in later years). In inflation-adjusted terms, the cost per kilowatt-hour goes down even faster than in nominal dollar terms. This means that customers using power during the first half of the operating lifetime of a new resource pay the lion's share of the capital costs, but those using power during the second half of the operating lifetime get equivalent benefits.

Finally, straight line depreciation creates a situation where the fair market value of a utility asset may greatly exceed its depreciated book value (as it does for HECO's older generating facilities). This circumstance has become apparent in the recent sale of Kauai Electric Company to KIUC and is poignant in wake of the Pacific Gas and Electric Company bankruptcy. Under these conditions, the utility may want to sell the assets and realize a capital gain. As long as the utility is fully regulated, the Commission can require that this gain be fairly directed to benefit ratepayers, but in the situation of a bankruptcy, it may be possible for the utility to sever ratepayer access and economic rights to assets for which they have pre-paid.

Recommendation on Cost Levelization Over Time

Most utility investments in transmission and distribution plant are only moderate in size, take place on a regular frequent basis, and are not particularly "lumpy" in nature. They do not tend to cause large rate increase pressure. With traditional front-loaded capital recovery, there is a continuum of such investments in rates at any point in time, including older, highly-depreciated low-cost facilities and newly-constructed high-cost facilities. These tend to average each other out, and there is little to be gained by converting them all to a different form of cost recovery.

Large new generating plant additions may be a different situation, particularly if the utility acquires capital-intensive facilities with low operating costs in order to minimize fuel cost and risk. Moving

from a resource base heavily weighted with oil-fired power plants with high current fuel costs to a mix including newer high capital-cost power facilities would create a period when all of the resources are high-cost in nature. The older plants would have high fuel costs, while the newer ones would have high front-loaded capital costs. In this situation, there is an argument for finding ways to levelize the capital recovery over time.

IPP's tend to utilize levelization of revenue streams as a part of their internal business plan. Accelerated depreciation tax benefits in the early years augment profitability when outstanding investment is highest. By the time the depreciation tax benefits are exhausted the plants have depreciated to the point where the levelized payments provide fair returns on the remaining investments. Regulated utilities are not able to flow through tax benefits as easily as non-regulated entities.

Hawaii could consider one or more forms of levelized cost recovery for new capital-intensive power supply facilities in order to mitigate the short-run rate impacts of such resources.

Sinking Fund Depreciation

An alternative to "straight-line" depreciation is "sinking-fund" depreciation. A sinking fund accumulates the required depreciation balance over the life of the asset, but in increments that grow annually as the plant investment depreciates, so as to levelize the total cost of the resource.

Most people are familiar with this concept in the context of home mortgages – the "payment" remains the same in nominal dollar terms for the life of the mortgage. In a mortgage, the amortization schedule is set up so that in the early years, you pay down only a tiny bit of principal, paying mostly interest. In the later years, the amount of principal increases, and by the end of the mortgage term, the entire amount of principal and interest is paid off. This is technically called "compound amortization" but it has precisely the same effect on the annual payments for a fixed-cost asset that sinking fund depreciation would have.

The two charts below compare revenue requirements of straight-line depreciation and levelized payments over a thirty year time period. The difference can be seen in the light colored area at the bottom of each chart which show the capital costs, including return on investment, taxes and depreciation.

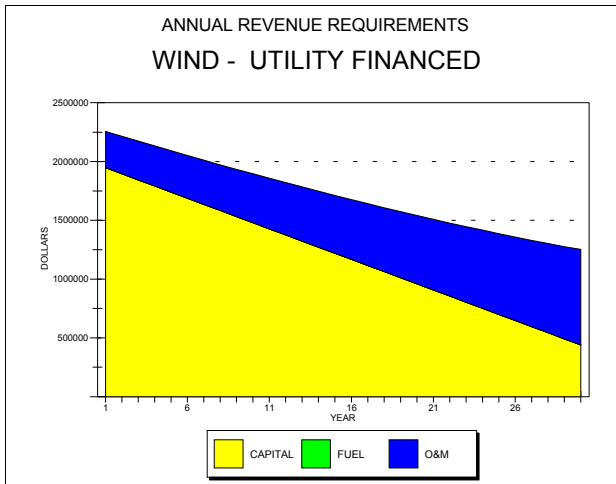


Figure 11 Depreciated Financing

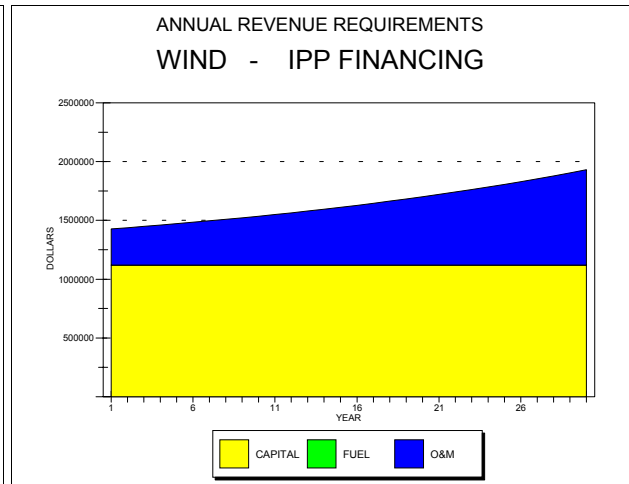


Figure 10 Levelized Financing

As with a home mortgage, however, sinking-fund depreciation does NOT take account of inflation. Just as a home mortgage starts to “feel cheap” after the first five or ten years, even sinking-fund depreciation would leave the inflation-adjusted cost of power from a new power plant declining over time.

It is interesting that municipal and cooperative utilities normally finance their capital investments using bond issues that contain compound amortization – fixed annual payments for principal and interest, just like a home mortgage, but private regulated utilities typically request and receive permission for front-loaded capital recovery.

There are two drawbacks to the use of sinking-fund depreciation. The first is that it is different from the “normal” method of depreciation used by the accounting profession, and this may raise audit flags. The second is that it creates greater financial risk for the utility (the gap between fair market value and depreciated book value grows more slowly), and this could translate into higher borrowing costs for the utility.

Sale and Leaseback / IPP Contracting

Another technique for levelizing the cost over time is for utilities to not own their high-cost power plants. Many utilities have built new power plants and later sold them to leasing companies, negotiating fixed-payment leases for the assets. This has the effect of flattening out the payment stream.

Other utilities negotiated long-term fixed-payment schedules with independent power producers (IPP’s) to flatten out the payment schedule. HECO is an example of this, in its contracts for the AES/BP and Kalaeloa power plants. The IPP’s absorb the difference in risk between front-loaded cost recovery that utilities typically receive and the flat recovery reflected in the contract. Arguably, however, the interest rates that the IPP’s must pay to finance their investments need to reflect this risk, and this cost is internalized into the contract price. The net effect is about the same as sinking-fund depreciation schedules.

Sharing the cost burden equitably over time provides significant benefits to consumers in the short run, will help protect economic vitality that might be adversely affected by high energy costs, and ensures that as loads grow over time, the costs are paid in part by the new customers for whom new resources are built.

Rate Making Test Year Conventions

A utility rate proceeding sets rates based on a sample 12-month period, known as the “test year.” One of the most contentious and time-consuming elements of the regulatory process in Hawaii is the use of the “future test year” approach to regulation. The utility forecasts its future loads and expenses for a year ahead, and then the DCA and the PUC question the assumptions that go into that forecast.

The assumptions are very important, because the utility has an incentive to overestimate expenses, and to underestimate loads, simply because in the end, rates are costs (\$\$) divided by loads (kWh). A very significant portion of the time of all parties is spent on accounting adjustments to estimate the costs and loads associated with a future year. The future test year approach was developed in the hyper-inflation era of the late 1970s and early 1980s, in order to have rates that anticipated inflation, so that the utility was not perpetually losing profitability.

The more common form of regulation in the United States uses a “historical” test year, in which an actual year recently passed is used as the basis for setting rates. The historical results are adjusted for “known and measurable” changes, such as increased loads, new power plant investments, and new labor agreements, but only changes that are known are used. For all parties, this is a much simpler process, but certainly not free from a need for analysis. The test year must be “normalized” to remove the effect of abnormal circumstances, such as weather, power plant over-performance or under-performance, and other conditions. The theory underlying a historical test year is that loads, revenues, and expenses should all grow at about the same rate. In a low-inflation era, where productivity improvements and the effect of straight-line capital recovery (with costs of the major resource additions that typically trigger rate case filings decreasing over time after rates are set) can offset inflation, the historic test period probably makes more sense.

Tools were also developed during the hyper-inflation era to allow historical test years to produce reasonable financial results for utilities. These include end-of-period rate base determination, attrition adjustments, and a few others. In theory, a historical test period plus adjustments for known factors should produce very similar results to a future test period. The principal difference is in the amount of time that the regulatory process must devote to achieve comparably reliable results. If a goal is to reduce the regulatory burden on all participants, eliminating the use of the future test year is a viable option.

Option: (PUC) Use Historical Rather than Future Test Year Period

Hawaii should consider converting from a future test year to historical test year as the basis for rate making. This option will reduce the effort required of the utility, the DCA, and the Commission. It must be done carefully to ensure that the utility does not wind up with inflation risk without an offsetting opportunity to retain the benefits of productivity savings.

EVALUATION AND SELECTION OF UTILITY RESOURCES - IRP

One emphasis of this report is the regulatory treatment of energy efficiency, renewable and distributed energy resources. Perhaps the most direct context in which decisions regarding these resources are examined is in the Integrated Resource Planning (IRP) process. IRP is a methodical and rigorous process to determine and select an appropriate mix of resources to meet future energy needs. Once determined, the approved utility IRP is supposed to govern all utility capital expenditures.

Although the IRP process is the most broad and prospective context in which utility resources are evaluated, the PUC evaluates utility resource selection decisions in several other contexts for particular purposes. The contexts in which resources are evaluated and selected are outlined briefly below:

- A determination is made regarding the types and general timing of utility resources in the context of the utility IRP process.
- The program implementation schedule of the utility IRP is (supposedly) updated annually. This schedule is supposed to identify the timing and approximate expenditures for all utility resources.
- Individual resources are also evaluated by the PUC prior to procurement:
 - Utility owned resources are examined in CIP dockets prior to expenditure of funds.
 - Power purchase contracts for power supplied by non-utility generators must be approved by the PUC prior to implementation by the utilities.
 - Energy efficiency programs are reviewed and must be approved prior to implementation.
- As a separate matter the PUC determines whether the costs of any of these resources are reasonable and should be included in rates in the context of a utility general rate case.

By far the most analytically rigorous and “policy-driven” of these venues is the integrated resource planning process. The PUC has adopted a progressive IRP Framework (Framework).⁷⁸ The existing Framework provides criteria and a process that **could** provide a level playing field for the consideration of energy efficiency, renewable and distributed energy resources. The implementation of the IRP process, however, has not successfully provided the intended fair consideration of all available resources. The PUC has not followed through with implementing the intent of the Framework and has not assertively directed the utilities to meet several crucial requirements specified in the Framework.

What is IRP?

Integrated Resource Planning (IRP) is a decision-making process used to determine how utilities will meet future demands. IRP and its older close cousin “least-cost planning” developed in the 1980’s and 1990’s on the mainland to address growing concerns with electric power plant siting and environmental concerns.

For several decades preceding the 1970’s utility planning and resource selection was conducted primarily within the confines of utility engineering and finance divisions. The predominant trend in resource development was increasing power plant sizes driven by economies of scale. The 1970’s brought fundamental changes to the landscape of energy economics and power plant development in the United States. With the birth of OPEC, oil prices increased drastically from a production cost basis to a cartel-managed supply and demand basis. The concurrent high rates of inflation and correspondingly high costs of capital increased the costs of financing new power plant construction. Environmental concerns posed increasing obstacles to power plant permitting and construction, particularly for nuclear and coal projects. The long construction lead times of large power plants further extended by permitting delays and compounded by high capital carrying costs posed unprecedented risks to the financial welfare of utilities with large construction programs. It

⁷⁸ Docket No. 6617, Decision and Order No. 11630, May 22, 1992, *A Framework for Integrated Resource Planning*

was clear that utilities needed to take a wider scope of concerns into account in planning to meet future energy needs.

At the same time, also propelled by these changes, energy efficiency gained acceptance, first as a means to mitigate growing demand for energy under constrained generating supplies, and later, in the context of IRP, as a utility resource to be considered on par with generation resources. Least-cost and integrated resource planning were embraced by many utilities and commissions as a way to incorporate efficiency options in utility planning and address wider concerns with generation resource development.

The term "integrated" in IRP refers to the incorporation of several components that were new to the traditional utility planning approach:

- IRP integrates conservation and efficiency programs into the scope of resources available to utilities to meet future energy demands. IRP attempts to "level the playing field" by putting programs to meet future energy needs by implementing efficiency measures on a par with construction of additional generation resources.
- IRP attempts to explicitly integrate environmental and other public concerns into the resource planning process. Resources are evaluated and selected based on attainment of a spectrum of objectives, including cost, reliability and environmental, cultural and economic impacts.
- IRP integrates public participation into the utility resource planning process. There is some opportunity for public participation in the utility planning process and an opportunity to intervene as a party in the proceedings before the PUC considering the utility application to approve the IRP.
- Although it is not an explicitly intended result, IRP also integrates the personnel within the utility. Since the various elements of the IRP process involve many divisions of the utility who otherwise do not work together extensively, IRP encourages internal utility communication (and sometimes friction) and affects utility reorganization.

IRP examines energy efficiency measures from a perspective different than prior tradition. Utility programs to encourage customers to implement energy efficiency measures are considered utility resources on a par with generation resources. Because the improvements are made on the customer side of the utility meter, these are referred to as "demand-side management" measures, or more collectively simply as "DSM".

Including DSM measures as utility resources requires several changes to the resource planning process:

- Direct comparison of efficiency (DSM) programs with generation resources requires a substantial level of analytical rigor. DSM resources have several characteristics that are fundamentally different than generation resources.
- DSM resource costs are primarily capital expenditures that occur at the time the measures are installed. DSM benefits are primarily costs that are avoided over a stream of many years after installation. Resource analyses must properly account for the differences in the values of these cost and benefit streams.
- DSM resources can reduce utility system peak demand thereby allowing deferrals in the construction of new generation resources. The extent of the resulting "avoided capacity costs" is dependent upon the coincidence of DSM measure load reduction impacts with the utility system peak loads. In order to properly account for the timing of these system impacts, resource impacts must be characterized and analyses performed on an hourly basis.

- DSM resources are financed differently than generation resources. A substantial portion of the cost of DSM measures is borne by participating customers. Analyses must account for customer-paid costs as well as utility costs of DSM programs.
- The utility portion of DSM costs is financed differently than generation resources. Even though the benefits of DSM programs are long-lived the costs are usually "expensed" rather than "ratebased".
- DSM resources meet energy needs at the customer's location. Energy savings include not only the reductions in what is read at the customer's meter, but include avoided transmission and distribution losses. These losses must be accounted for in the resource planning analyses.

Hawaii's IRP Framework

In 1990, the PUC opened an investigative docket to consider IRP for Hawaii's energy utilities. Twenty-three parties were admitted as participating parties including the energy utilities, several state agencies, large customers and public interest groups. At the suggestion of the parties, a collaborative was formed with most parties actively participating. The collaborative and subgroups of the collaborative held an extensive series of facilitated meetings and work sessions. The collaborative unanimously adopted seventeen collaborative principles which were forwarded to the PUC to provide the foundation for an IRP process for Hawaii. After a contested case hearing the PUC adopted its IRP Framework incorporating the collaborative's principles.

Several steps in the PUC IRP Framework are outlined below:

- Objectives and measures of attainment are identified. These are the attributes that will be used to evaluate the merits of candidate resource plans. These are typically measures of reliability, cost, environmental or economic impacts, risk and uncertainty and other factors.
- A detailed energy demand forecast is prepared for a planning period of at least twenty years. The forecast predicts how much energy will be consumed by residential, commercial and industrial users and what proportions of energy use will be used for specific "end-uses" such as water heating, lighting, cooking, refrigeration, etc.
- Various supply resources are identified. Ideally, all possible resources are considered. For the electric utilities, these typically include different types of oil, coal and biomass-fired generation, wind, solar, geothermal, and hydroelectric resources. For gas utilities, various fuels and methods of supply and distribution are considered.
- Demand-side options are identified. These refer to actions that are taken on the customer (demand) side of the utility meter. These include conservation and energy efficiency programs, load management measures and other methods of meeting energy needs by reducing the demand for energy.
- Demand and supply resources are screened and evaluated to determine an optimum mix of resources using the objectives and measurements of attainment as criteria. The optimum plan is selected as the utility resource plan.
- Action plans are developed to determine the timing of specific actions and resources necessary to implement the selected utility resource plan.
- The selected resource plan, along with documentation of the IRP process is submitted to the PUC for approval. The IRP is reviewed as a contested case proceeding.
- The approved IRP is used as the basis to govern capital improvements and resource acquisitions by the utility.

What Is Right with Hawaii's IRP Process

Hawaii's IRP framework has successfully provided for the implementation of DSM programs by Hawaii's energy utilities. The IRP process provides the analytical basis for evaluating DSM programs on the merits of their value as utility resources. The DSM financing provisions of the IRP Framework have allowed Hawaii's energy utilities to recover the costs of the DSM programs from ratepayers incorporating mechanisms for the recovery of lost margins and shareholder incentives.

The IRP process has increased the level of public access to resource planning information. The advisory group process has given some members of the public and participating agencies the opportunity to comment and advise the utility in the IRP process.

The IRP process has made the utilities' long-range plans and the criteria and information supporting the plans more explicit and more accessible to the public.

Improving Hawaii's IRP Process

Action: (PUC) Determine Whether IRP Is to Be Implemented as a Regulatory Instrument

Hawaii has a progressive IRP Framework that incorporates public policy in utility resource evaluation and selection. The IRP process could work effectively if implemented diligently.

Recently, however, the IRP process is not being implemented diligently or effectively. Existing IRP applications are not being processed by the PUC. Several crucial components of the IRP process are not being implemented according to the IRP Framework. The PUC is not rigorously reviewing and enforcing the IRP Framework as a decision making or regulatory instrument.

The PUC should promptly determine whether it intends to implement and enforce the IRP Framework. If not, IRP should be reduced or abandoned and the extensive resources now expended on this process should be conserved. If the PUC does intend to continue the IRP process, some priority needs to be assigned to the review, improvement and enforcement of the provisions of the IRP Framework. This will require some commitment of resources by the PUC.

As noted previously in this report, the PUC currently has limited staff resources which presently may make a substantial commitment of personnel to policy matters difficult. Until the PUC can obtain sufficient staff and resources to address policy effectively, some of the options identified below may not be practical for immediate implementation. Nevertheless, the PUC should take a long term view regarding this long term planning framework and make a substantial eventual commitment of its own resources to diligently implement IRP, if it chooses to continue the process. Forming a policy group with several dedicated staff within the PUC as suggested earlier in this report would facilitate the implementation of the IRP process.

Alternative: (PUC) Eliminate or Reduce IRP to a Simple Filing If it Is Not to Be Applied Effectively

IRP is expensive and time consuming. If the IRP applications are not going to be reviewed or used in any effective way as a regulatory instrument, the IRP Framework and process should be eliminated or replaced with a simpler informational filing format.

Alternative: (PUC) Implement, Improve and Enforce the IRP Framework

The IRP process has real potential as a vehicle to implement public policy if the process is diligently prioritized by the Commission. Several options for achieving this objective are identified below, organized in the following categories:

- enforce and implement the existing provisions of the IRP Framework
- improve implementation of the IRP process.
- use evaluation methods and criteria that fairly evaluate all resource types.
- legislative options

Enforce and Implement Existing Provisions of the IRP Framework

The PUC has not been rigorous about its review of the utility IRP applications. Several important aspects of the implementation of the IRP process are ineffective because the PUC has not followed through with diligent application of the terms or intent of the IRP Framework. Recent IRP plan applications have not been reviewed by the PUC at all.

Because the IRP process, including the public advisory group process, is controlled entirely by the utilities, it is only in the process of review by the PUC that other parties have an opportunity to express any exceptions they may have with the utility plans. Without active and diligent oversight by the PUC the IRP process has become largely a utility exercise.

Option: (PUC) Take Action on Outstanding IRP Applications

Several IRP applications have been filed, but no action has been take to put the review of these applications on the PUC agenda.

Option: (PUC, DCA) Review IRP Applications Rigorously

Recent reviews of utility IRP's by the PUC have not been rigorous. The IRP's have been treated more like information filings by the utilities than a venue to **regulate** the selection of utility resource selection. If the IRP process is to be effective at implementing policy the PUC needs to be rigorous and assertive in its review of IRP applications. The options below identify several aspects of the IRP process that should be implemented more consistently with the letter and intent of the IRP Framework.

The DCA should play and active and assertive role in the review of utility IRP applications.

Option: (PUC) Consider All Available Resources in the IRP Process

The IRP Framework requires that utilities consider and evaluate all resources that will be reasonably available in the twenty-year IRP planning horizon. Despite the objections by several participants in the IRP process, the utilities have limited the scope of resources considered in IRP in several important respects. Several important types of resources are presently excluded from evaluation:

- transmission and distribution system improvements
- DSM measures other than rebate programs
- customer generation and implementation of renewable resources
- new non-utility generation of any kind
- fuel substitution options
- utility owned renewable resources

Several Hawaii utilities have categorically stated that they will not implement renewable resources and will therefore not include them in the "preferred" plans submitted to the PUC for approval. In conjunction with the utilities' exclusion of non-utility generation in preferred resource plans, this essentially prevents renewable resources from being included in the utility resource plans

submitted to the PUC for approval.⁷⁹ This is not consistent with the objectives of IRP and is not consistent with the literal requirements of the IRP Framework.

The PUC could require utilities to abide by the existing requirements of the IRP Framework regarding the consideration of all reasonably available resource options.

Option: (PUC) Incorporate Meaningful Assessment of Externalities in Resource Selection

One of the important precepts of the PUC's IRP Framework is that external costs and benefits are to be considered in determining the utility resource plan. External costs and benefits (externalities) are real, but non-monetary or indirect impacts of utility resources. It is widely recognized and formally prescribed by the IRP Framework that it is essential to consider more than just direct dollar costs in making important utility resource planning decisions. Externalities are an important component in the societal cost test identified as an important perspective in the IRP Framework.

Despite some good initial approaches, the Hawaii utilities have retreated from any transparent treatment of externalities as explicit decision making criteria. Reasonable methods are available and essential for meaningful assessment of the diverse types of resources that are supposed to be evaluated taking a wide variety of criteria into account.

A GOOD INITIAL APPROACH

In the first round of IRP applications, HECO, MECO and HELCO incorporated a multi-attribute "matrix" analysis that could potentially serve as a reasonable method for considering externalities in the resource selection process. This method identified several "attributes" of each of the candidate plans⁸⁰ in a matrix allowing each attribute to be assigned a "weight" associated with its relative importance.⁸¹ The weights assigned to each attribute were different according to each of several "perspectives". For example, a utility perspective might assign greater weight to the attribute of reducing revenue requirements. An environmental perspective might assign greater weight to reducing pollutants.

MECO's IRP included an analyses using sets of weights selected by each of its advisory group members. Resource plans were evaluated and ranked according to how robustly they fared with respect to the spectrum of perspectives characterized by the sets of weights assigned by the various advisory group members.

There were several problems with details of the utility matrix method identified in testimony to the PUC, but all witnesses testifying regarding this matter agreed that the matrix approach, if applied with some improvements, is a sound approach. The selection of weights used is subjective, but explicitly documents the policies and assumptions used in resource evaluation. The method can

⁷⁹ A significant exception is MECO's most recent IRP application which includes wind resources in the preferred utility plan even though MECO has no intention of procuring these as utility-owned resources. MECO is currently negotiating with an IPP to provide these resources.

⁸⁰ In preparing the IRP's the utilities identified a portfolio of possible resource "plans" optimized to meet future system demands. A spectrum of plans was developed to meet a spectrum of objectives. These were examined and winnowed down to a set of "candidate plans" from which "final candidate plans" were selected. From these final candidate plans a "preferred plan" was selected as the utility integrated resource plan.

⁸¹ The attributes were the quantified results of the resource integration analyses. The attributes correspond to the measures of attainment of the IRP objectives to be optimized by the planning process. These include for each plan, for example, the net present value of utility revenue requirements, total resource costs, utility capital requirements, tons of various environmental pollutants, percentage implementation of DSM, renewable and oil resources.

be extended to include several attributes that are otherwise only discussed in qualitative terms in the utility IRP analyses. In short, the multi-attribute method, if extended and improved, is a promising and effective means to explicitly incorporate a broad spectrum of factors in resource evaluation and selection.

A FAILED ATTEMPT AT MONETIZATION

In reviewing the first round of IRP applications the PUC found the HECO companies' multi-attribute approach to be reasonable but reaffirmed its position that the utilities should monetize externalities.⁸² The PUC directed HECO to proceed with the company's proposed program to determine monetized externality values for use in Hawaii IRP analysis.

HECO retained a consultant and proceeded, with the assistance of an Externalities Advisory Group (EAG), to prepare an Externalities Workbook (Workbook). The Workbook identifies the results of HECO's investigation and documents the methods and assumptions used in the process. GASCO (now The Gas Company) and Kauai Electric Company (now the Kauai Island Utility Cooperative) participated as members of the EAG.

The results of HECO's externalities investigation were quite disappointing. The investigation was very expensive and provided little that will significantly improve Hawaii's IRP process.

- Very few of the identified external impacts were monetized. There is no monetization of carbon emission impacts.
- There is no information regarding what proportion of external impacts are quantified by the monetized values.
- There is very little quantification of non-monetized impacts.
- No methods are identified for incorporating non-monetized impacts quantitatively in IRP analysis or for making qualitative assessment of externalities.

In short, the Workbook fails to monetize or quantify a sufficient spectrum of external costs and benefits to be useful in the IRP process. The Workbook fails to provide any methods to utilize non-monetized externalities (which comprise the vast majority of externalities) or to improve or extend the scope of the identified values.

There are several reasons that the externalities investigation was not productive.

- HECO selected and retained a consultant known for promoting arguments against the use of externalities in regulatory resource decisions (on behalf of the electric industry).
- HECO did not follow the procedures or intent of HECO's proposal (approved by the PUC) for conducting the externalities investigation.
 - HECO did not determine how or whether the externality values would be used prior to embarking on its monetization efforts.
 - HECO never allowed the advisory group to play any part in determining which impacts would be quantified or monetized.

⁸² The multi-attribute matrix approach does not explicitly monetize externalities. However, as demonstrated in testimony regarding this method, the multi-attribute method **does** implicitly infer dollar values to each attribute by way of equating dollar cost attributes with other attributes using the assigned weights as coefficients.

- HECO allowed the consultant to use a screening process that precluded the monetization of almost all externalities.⁸³
 - First HECO and the consultant agreed to limit the investigation to rely solely on existing data.
 - Then the consultant determined categorically on academic grounds that only damage-based estimates would be used for monetization (even though there was no existing data to support damaged based estimates).⁸⁴
 - Based on these determinations the consultant concluded that, with only certain exceptions, Hawaii externalities would not be monetized by the investigation.
 - The consultant insisted on academic grounds that economic impacts were not externalities and would not be addressed (even though these were explicitly identified by the Hawaii PUC as external impacts).
 - The consultant insisted on academic grounds that carbon dioxide emissions are not Hawaii-specific and therefore should not be addressed.
 - The consultant determined that site-specific impacts were outside its scope of work.
 - The consultant determined that only “normal” emissions would be addressed. Expected but abnormal emissions (such as hydrogen sulphide geothermal emissions) were not addressed.

The HECO externalities investigation was an extensive and expensive but ultimately non-productive undertaking. Aside from the lack of useful information provided by the investigation, HECO entirely disclaims the results of the Workbook, leaving significant question regarding its merits or ultimate use.⁸⁵

A RETREAT FROM METHODOLOGICAL QUANTIFICATION

HECO’s second round of IRP retreated from any progress towards monetization or methodical quantification towards a more qualitative and subjective approach. Externalities are characterized and discussed but not quantitatively ranked or evaluated. The latest IRP does not document as explicitly as the earlier IRP’s what assumptions or policies were used in determination of the selected resource plan.⁸⁶

⁸³ The consultant had a contractual obligation to rigorously determine monetized values for any external impact that the consultant determined could be monetized. The consultant was allowed to make its own determination that almost all external impacts could not be monetized, even though this allowed the consultant to drastically reduce its own workload.

⁸⁴ Although there may be legitimate argument in the academic community whether damaged based or any of several other methods of estimating external impacts is most correct, the objectives of the externalities investigation was not academic. The purpose was practical: to derive values that could be used to improve the IRP process. Many mainland jurisdictions use any of several other methods to derive monetized values where these cannot be determined by damage estimates.

⁸⁵ The Workbook begins with a Preface that clarifies that the Workbook was prepared in order to comply with a PUC order, that the views and conclusions are those of the consultants and not HECO, and disclaims any implications that HECO stands by the accuracy, completeness, method or process described in the Workbook. HECO states that the Workbook is copyrighted and prohibits any duplication without both the consultants’ and HECO’s permission.

⁸⁶ MECO’s second IRP includes some of the better methods developed in its first IRP.

RECOMMENDATIONS

The PUC could be assertive and require more meaningful consideration of external costs and benefits consistent with the existing provisions of the IRP Framework. Reasonable methods exist. The multi-attribute matrix methods used in the first round of IRP would be a good place for the utilities to start. Improvements and design of the methods could and should be done with the participation of the utility advisory groups.

As the caption introducing this option suggests, the objective should be to *incorporate a meaningful assessment of externalities*. It is more important that methods be credible and meaningful to the stakeholders than it is for the methods to be absolutely correct by academic standards. Although the PUC required and HECO attempted an effort at rigorous monetization, this approach proved expensive yet fruitless and should not be pursued further in that format. Fortunately, a credible and meaningful analysis is probably a more attainable objective than one that is absolutely and academically correct.

The PUC should acknowledge the limitations of a rigorous monetization approach. The utilities need to relax their exclusive control over this aspect of the IRP process and let stakeholder and advisory group input play a more important role. If the objective is to attain a meaningful assessment of externalities, this meaning can be most directly derived by allowing substantial contributions by the stakeholders to whom the results must ultimately be meaningful.

Option: (PUC) Establish PUC Objectives in IRP - A Recipe for a Renewable Portfolio Standard

In its IRP Framework the PUC reserves for itself the option of identifying objectives for utilities to meet in preparing the IRP's.⁸⁷ The example cited in the Framework is that the PUC could specify that, as an IRP objective to be optimized by the utility, the amount of fossil fuel used by the utility would be reduced to specified amounts by specified times. This approach has never been exercised by the PUC but it remains a viable part of the IRP Framework. This would be a means to effectively implement portfolio standards and examine the costs and benefits in the rigorous context of the IRP process prior to implementation.

Improve the Implementation of the IRP Process

Option: (PUC) Provide Interim Review of Utility IRP's

The current procedures of preparation and review of utility IRP's provide the PUC with limited options to provide guidance to the utility or require modifications to the utility plans without considerable wasted effort.

A utility IRP cycle begins with an order by the PUC opening a docket and directing the utility to prepare its IRP plan. The PUC usually takes no action on the matter, except for allowing several requests for extension of time, until the utility files its IRP. After the utility files the IRP (assuming that the PUC proceeds with review of the IRP) a schedule of proceedings is determined, usually by agreement between the parties and tacit approval by the PUC in the form of a prehearing order. The PUC then usually takes no further action on the IRP until the parties have completed a discovery process, have submitted direct and rebuttal testimonies and proceed to a hearing on the merits of the application.

By the time the PUC examines an IRP application the process has been extensively implemented and the positions of the parties are firmly cast. The IRP is an integrated plan that is difficult to

⁸⁷ IRP Framework IV.B.2, p.20.

modify without time consuming “reintegration”. It is very difficult for the PUC to reject some part of the utility IRP without extensive redoubled effort by the utility and participating parties. It is also difficult for intervening parties to efficiently or effectively obtain remedy from the PUC in matters where the utility proceeds with preparing its IRP without taking the interests or positions of intervening parties into consideration.

It would be possible for the PUC to provide some interim review of the utility IRP prior to the utility selection of its preferred resource plan. This would allow some guidance from the PUC regarding the scope, evaluation or details of candidate plans prior to the time that final decisions are made by the utility. At the time of an interim review, the positions and suggestions of intervening parties could be considered and the reasonableness of the utility course of analysis could be assessed before extensive resources are committed to the completion of an application and the formal discovery and testimony of a contested case proceeding.

One possibility would be to hold one or more public hearings during the course of the IRP process. Advisory group members could voice support or concerns to the Commissioners at the public hearing. The Commissioners could ask questions and provide comments. Comments by the PUC could be verbal and informal during the public meeting or could be provided as an order clarifying policy and procedural issues after the public hearing. This option could be implemented simply by identifying this process as a step in a Schedule of Proceedings at the opening of the IRP docket.

Option: (PUC) Direct Participation by Commissioners in the IRP Process

Except for administrative actions, the PUC has not participated in the review of IRP applications prior to the filing of the completed utility IRP application and after submission of testimony by the parties. It would be possible for the PUC commissioners or staff to participate more directly in the IRP process. This would familiarize the PUC with the issues and subject matter of the process prior to the contested case hearings.

The PUC has previously cited concerns about ex parte communication in the context of a contested proceeding as a reason not to participate in the IRP advisory group process. This position seems overly cautious, however, since the IRP process is open to intervention by any affected party from the date the docket is opened until a period after the IRP application is filed and noticed by the utility.⁸⁸ The advisory group process, although not public, is open to all participants and, to date, has included all parties to the IRP dockets. All statements or filings made to or by the PUC in the advisory group process would be open to all parties and advisory group participants. In other jurisdictions regulatory commission staff have played an active role in the development of utility resource plans.

Participation could take several forms:

- The PUC could require documents submitted to the IRP advisory groups to be filed with the PUC for review. The PUC could file information requests as the process progressed.
- The parties and/or advisory group participants could make regular progress reports to the PUC in open session and hear feedback and comments from the PUC as the IRP process goes forward.
- The PUC policy staff can be involved on a more intimate basis in the development of the IRP itself, more directly representing the Commission.

⁸⁸ This is an exception to the PUC’s standard practices regarding time allowed to petition to intervene in a contested case proceeding.

- The PUC could attend or actively participate in some or all of the utility advisory group meetings.
- The utility could be required to hold public meetings attended by or presented before the PUC at one or more stages of the IRP preparation process. The utility could present its work to date and allow advisory group participants an opportunity to present comments or alternative analyses.

Option: (PUC) Provide Recognition or Standing to IRP Advisory Group Members

The IRP Framework provides for advisory groups with participation by individuals and organizations who are stakeholders in the utility’s activities. The advisory group members are appointed by the utility with a utility representative as the chairperson. The advisory groups are strictly advisory and have no authority except to provide comments and advice to the utility.

Advisory group members, just as any other members of the general public, can petition the PUC to intervene in the IRP process. If admitted as intervenors parties can participate in the contested case proceeding reviewing the IRP application and have standing for judicial appeal of the final decision of the PUC in the IRP docket. Without intervenor funding, discussed above, participation as an intervenor may be a hardship for public interest organizations.

The utilities are more concerned about the “advice” received from advisory group members who are likely to become intervenors than from members who do not have the resources to participate as formal parties. The PUC could empower the advisory group members generally if some form of standing or recognition by the PUC were provided to advisory group members. This could take the form of an opportunity to present testimony to the PUC during the contested case proceeding, could be recognized *a priori* as a finding that the member has an interest in the outcome of the proceeding for purposes of a later petition to intervene, or could be recognized *a priori* as standing to participate as an intervenor in the contested case.

Use Evaluation Methods and Criteria Fair to Renewable Resources

This section identifies several aspects of IRP analysis that must be properly implemented in order to give fair consideration to energy efficiency, renewable and distributed energy resources. IRP incorporates rigorous accounting of utility resource costs. In order to evaluate the diverse characteristics of different resource types the analyses must be detailed and comprehensive in order to produce meaningful results.

Resource analysis methods have evolved primarily from techniques applied historically, primarily to conventional utility resource technologies. Although the integrated analytical tools designed and used for IRP analysis deliberately attempt to incorporate methods to provide a fair and “level playing field” for consideration of all resource types, the assumptions and perspectives used in these analyses need to be appropriately applied. The integrity of the evaluation methods, criteria and assumptions used in IRP analysis must be appropriate to address the scope of resource types addressed.

Several aspects of resource analysis are of particular importance to the fair consideration of non-conventional generation resources. The consideration of externality impacts is of primary importance. Consideration of externality impacts is addressed as a separate option described earlier in this report. This section addresses the treatment of quantifiable, monetary resource impacts.

Option: (PUC) Use Appropriate Life Cycle Costing in Resource Evaluation

The PUC should require discount rates to be used in Hawaii utility IRP analyses that are appropriate to evaluate the various required analysis perspectives. This issue is discussed in detail below.

Appropriate life cycle costing is essential in utility resource evaluation. Utility resources have long life spans that must be considered over a long study period. Differing types of utility resources have different types of costs, different proportions of capital and operating costs and different distributions of costs over the life of the facilities. Some resources have low capital costs and high operating costs. Some resources have high capital costs and lower operating costs. Some resources require large expenditures at the time of installation and low costs later. Other resources have low initial costs but increasing later costs. In order to properly evaluate and compare these disparate types of resources in economic analyses, appropriate life cycle costing is essential.

There are several necessary components to life cycle costing in utility resource evaluation:

- The Time Value of Money
- Cost Perspectives
- End-effects

The Time Value of Money.

Several aspects of the value of money over time must be accounted for, including the effects of inflation, real cost escalation and financial discounting. These factors must be characterized using appropriate assumptions, accounting methods and forms of expression of results.

Inflation is the reduction in the value of the dollar over time. If the value of a dollar increases, this is referred to as deflation. One dollar today is usually worth less than one dollar next year. The effects of inflation are usually accounted for historically using a price index. The most common price index used in Hawaii is the “Consumer Price Index for Honolulu (Urban)” published by the U.S. Bureau of Labor Statistics. The effects of inflation are accounted for in the future by price inflation projections. These can be derived by several means. Several projections of inflation are published for the Hawaii economy.

Real cost escalation represents increases in the costs of a commodity after the affects of inflation are accounted for. The price of fuel, for example, is usually projected to increase faster than the rate of inflation.

Discounted costs represent the time value of money taking financial factors into consideration. The discount rate applied to future costs or benefits represents the difference in value of having the use of a dollar now versus having use of the dollar at some future time. There is more value in receiving a dollar now than receiving it next year (over and above the effects of inflation) because you have the use of the dollar for the year. The two most common components of discount rates are the investment value of money (its “opportunity cost”) and financial risk.

There are several naming conventions that apply to the expression of dollars in terms that either do or do not include the effects of inflation.

- When costs are expressed as the actual number of dollars at the date they are incurred they are referred to as nominal costs, nominal dollars, current costs or current dollars.
- When costs are expressed taking into account the effects of inflation as the number of dollars valued at a specific reference date, they are referred to as real costs, real dollars,

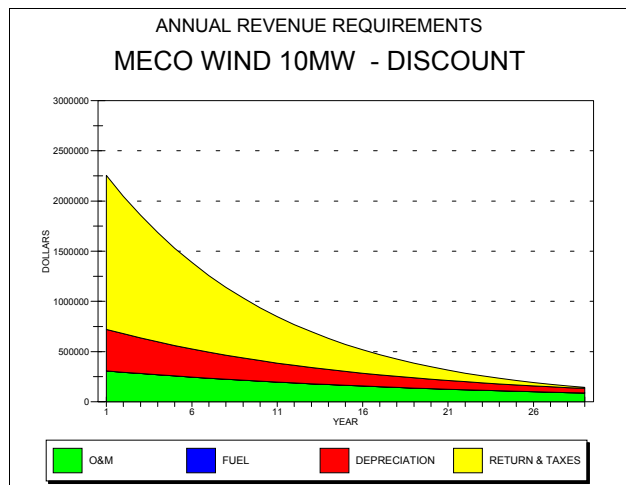
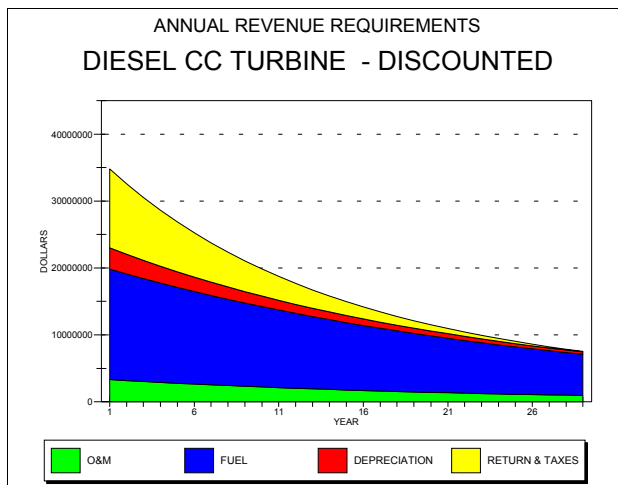
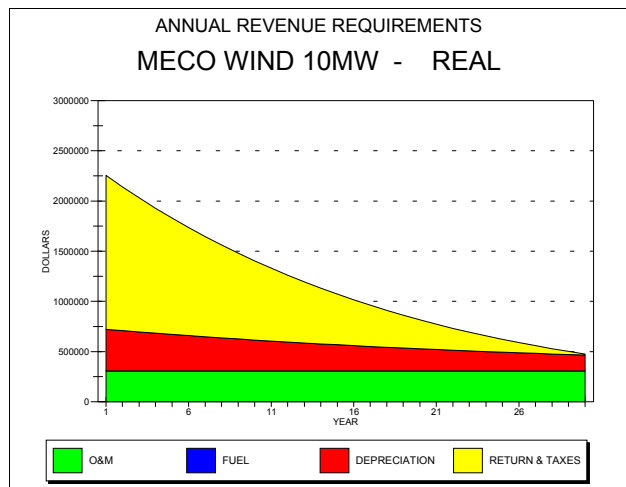
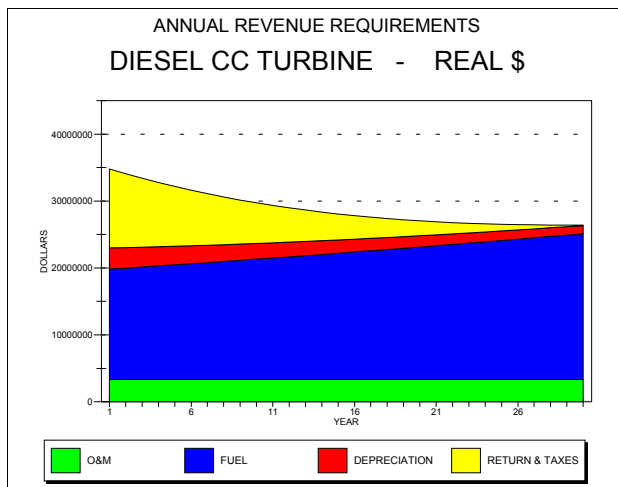
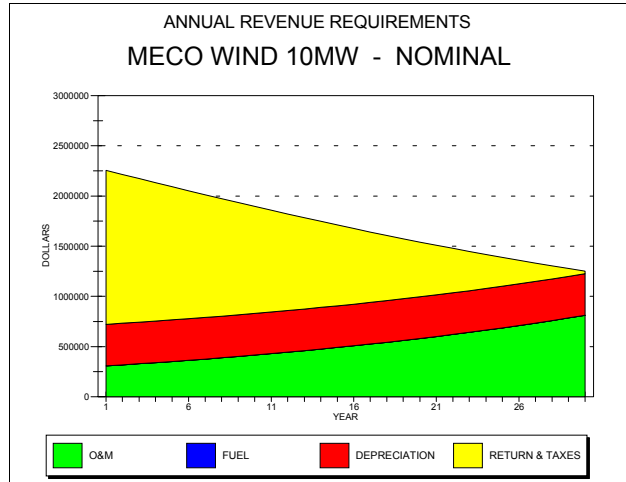
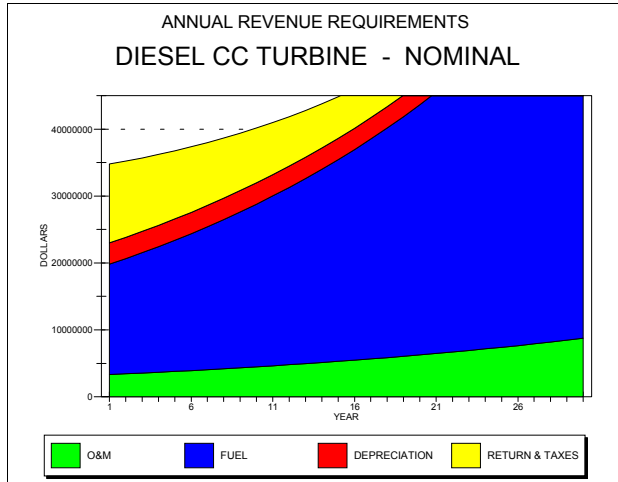
constant costs or constant dollars. All of these are expressed associated with a specific date, such as 2003 dollars or \$2003.

- When costs are discounted according to a discount rate they are referred to as discounted or present value dollars. These costs are also expressed associated with a specific date and either implicitly or explicitly represent an assumed discount rate.

Assumptions regarding all three of these aspects of the time value of money are important in utility resource evaluation. Different types of resources have different types of costs. Some resources, such as energy efficiency and renewable resources have predominantly capital costs that are incurred at the time the resource is initially implemented. The benefits of these resources can be long lived, up to thirty or more years. Fuel intensive resources, by comparison, have significant operating costs that vastly exceed the nominal and real costs of capital costs over the life of the resource. Assumptions regarding the real cost escalation of fuel and other operating costs can significantly affect economic comparisons of the life cycle costs. Similarly, assumptions regarding the discounting of these cost streams have significant impacts upon comparisons of resources that are capital intensive versus resources that are operating cost intensive. These principles can be seen on the charts on the following page.

The charts on the following page show thirty-year cost streams for utility-owned combined cycle combustion turbines and utility-owned wind resources.⁸⁹ Costs are shown for nominal dollars (top charts), real dollars (middle charts) and discounted dollars (bottom charts).

⁸⁹ Costs are expressed in terms of utility revenue requirements and include operation & maintenance (O&M), fuel, depreciation, and return on debt and equity with taxes.



Cost Perspectives

Discount rates are important assumptions used in utility resource planning. The values assigned to discount rates, for example, can appreciably affect the evaluation and selection of renewable and efficiency resources (capital intensive resources) compared to fuel intensive resources.

Discount rates in utility resource planning represent opportunity cost and risk components of financial decisions. These factors can be very different to different stakeholders. Utilities may view the time value of money differently than customers or government. Discount rates can and should be applied differently to the different customer perspectives considered in the IRP analyses.

The costs and benefits of utility resources are usually examined from several different cost perspectives. These are formally recognized by several (typically five) standard industry “cost test perspectives”. Several of these perspectives are explicitly defined in the PUC IRP Framework. The cost perspectives were originally developed to facilitate meaningful economic assessment of DSM programs, but are used more broadly as perspectives for evaluation of all resources in IRP analyses.

- The **utility cost** perspective⁹⁰ represents costs from the perspective of the utility and in all important respects represents utility revenue requirements as usually expressed in a general rate case. These costs include return and taxes incurred against ratebase, and operating expenses including depreciation. Utility costs include the costs to the utility of implementing DSM programs, including any rebates to the customer, but do not include the customers expenses in implementing DSM resources.
- The **total resource cost** perspective expands the scope of costs considered to include the customer costs of DSM resources. When a customer invests in an energy efficiency improvement that is part of a utility DSM program the customer’s portion of the costs are included in the total resource cost.
- The **societal cost** perspective expands the total resource cost to include external costs and benefits. External costs and benefits are costs not incurred directly by the utility or its customers, including environmental, economic and cultural impacts.
- The **participant cost** perspective looks at the costs and benefits of a measure or program from the perspective of a customer who elects to participate. This perspective looks at the costs, on the margin, of participating versus not participating in the program or measure.
- The **customer cost** perspective looks at the rate impacts of a measure, program or resource plan⁹¹.

The Hawaii utility IRP’s typically apply the same discount rate to all of the analyses performed from all of the cost perspectives identified above⁹². The utilities use their after tax cost of capital as the

⁹⁰ This is more recently sometimes called the Program Administrator cost in recognition of frameworks used in several states where DSM programs are implemented by non-utility organizations or agencies.

⁹¹ There are various versions of this cost test with varying definitions. The definition here is the one used without rigorous definition in the Hawaii PUC IRP Framework. Other implementations of this perspective are referred to as the “ratepayer impact measure” and the “non-participant cost” perspective.

⁹² In response to earlier expression of these concerns, several sensitivity analyses have been performed in Hawaii utility IRP analyses to examine the impacts of different discount rates on resource selection. For specific reasons these sensitivity analyses did yield different, but not drastically different results with moderate changes in discount rates. The plans to which the sensitivity analyses were applied, however, had most differences between resource plans only in the later years of the study period. The computer simulation model used was limited in its

resource evaluation discount rate. This discount rate is about eight or nine percent in nominal terms. This discount rate varies from IRP to IRP depending upon long term projections of inflation and utility cost of capital.

Although there is little argument that the after-tax cost of capital is appropriate for the company's own view of the utility cost test, it has been argued by many that this discount rate significantly over-discounts future costs when applied to the perspective of customers, government or society in general. It is one thing to look at long-term resource costs from the perspective of the utility executive board room. It is another thing to value long term cost projections from the perspective of public policy.

One important policy issue regarding the discount rate assumptions is inter-generational equity. Utility resource decisions made now affect costs to consumers many years from now. To future generations of customers, the opportunity cost of money to utility stockholders now is irrelevant to the fairness of the rates they pay for the services they receive. Highly discounted projections can extremely diminish the apparent costs of future resource operation costs. Inter-generational fairness to customers, however, requires that we consider the cost impacts to future customers with some parity with the priority given to today's customers. Just because investment capital has a high value to the utility in terms of present opportunity costs does not necessarily justify using utility after tax cost of capital for purposes of analysis purporting to represent a public policy perspective.

This issue, of course, is not unique to Hawaii. Other jurisdictions have used a wide spectrum of discount rates for representing company, government, general public and even environmental perspectives.

The PUC should require discount rates to be used in Hawaii utility IRP analyses that are appropriate to evaluate the various required analysis perspectives. Several suggestions have been made for reasonable discount rate assumptions for Hawaii utility IRP analyses.⁹³ To represent the perspective of the utility company the after-tax cost of capital is a reasonable discount rate. For the total resource cost perspective, intended to include the concerns of future as well as existing customers, a discount rate with a small real component, perhaps 1% to 3% (real discount rate) would be reasonable. For the societal cost test the discount rate should be close to 0% real (equivalent to the rate of inflation in nominal terms).

Option: (PUC) Incorporate Measurable Risk in Resource Selection

Different resources have different types of risk. There is financial risk, which is highest for capital-intensive resources. There is technological risk, that is the risk that a technology will become economically obsolete before it is physically obsolete. There is the risk of non-performance, that a unit might not operate after it is built. There is fuel cost risk, particularly applicable to oil-fired generating resources.

Tools to incorporate risk analysis in utility resource decision making have been developed throughout the era of Integrated Resource Planning, and have taken many forms.

The matrix below compares some of the risk-related characteristics of different generating resources.

ability to assess low discount rates due to the methods used in determining end-effects.

⁹³ In response to several comments to the draft version of this report, suggested discount rates are provided.

	Coal Plant	Oil or Gas	Wind	Geothermal	Efficiency
Unit size (larger is riskier)	Large	Large	Small	Medium	Very Small
Fuel Cost Risk	Low	High	Zero	Very Low	Zero
Reliability over Years	High	High	Medium	Medium	High
Reliability Hour to Hour	High	High	Low	High	Very High
Environmental Impact	High	Medium-high	Low	Low	Very Low
Technological Risk	Medium	Medium	Medium	Medium	Low
Capital Intensive	High	Medium	Very High	High	High

Figure 18 Comparison of Resource Type and Risk

The IRP Framework requires that the utility analyze its resource plans using sensitivity analyses and that risks and uncertainties need to be addressed.⁹⁴

Incorporating these risk characteristics into the IRP process can be done using sophisticated modeling tools, that calculate the “expected cost” of a resource mix over time, taking into account the probability of fuel cost volatility, failure or technological risk. This approach was proposed to the PUC in the docket considering the adoption of the IRP Framework and was not specifically required or rejected by the PUC.

The results of risk analyses can be used effectively in a multi-attribute analysis method of resource evaluation. This method is discussed earlier in this report. Alternatively, scoring techniques can be used to evaluate resources or resource plans.

In general, portfolio theory favors a diversity of resources, so that no individual risk is excessive. While there is no logical correlation between oil prices and wind velocity, a system using both oil and wind resources is likely to have greater total reliability and more stable costs than one relying exclusively on one or the other. Analyses that assess risks can quantify the value of portfolio diversity.

Generally, an analytical process that accounts for the benefits of reducing risk and of portfolio diversification would more fully recognize the merits that energy efficiency, renewable resources and distributed generation can offer to the optimization of the utility resource mix

Option: (PUC) Use Utility Capacity Expansion Criteria Sensitive to Contribution of As-available Resources

Some renewable resources are intermittent, meaning that they are not available at all times due to the intermittent availability of the energy source. Wind and solar resources, for example, are available only when the wind is blowing or the sun is shining. Despite this characteristic, these renewable resources contribute measurably to utility system reliability because they do regularly

⁹⁴ IRP Framework IV.F and IV.J

provide power to the utility system. The contribution of intermittent resources to utility reliability has been demonstrated rigorously in testimony submitted to the PUC.⁹⁵

Electric utilities use specific generation expansion criteria to determine the timing of the need for additional generation resources. These criteria are designed to determine the need for generation resources in order to maintain the reliability of the generation system as loads grow or as generation units are retired. The existing expansion criteria used by Hawaii's electric utilities, however, are not sensitive to the contribution of intermittent resources.

The contribution of intermittent renewable resources can be measured and could effectively defer the need for additional generation resources on a utility system if sensitive measurements of system reliability were used as capacity expansion criteria. The modern computer simulation models now used by Hawaii's utilities for resource planning and determination of production costs can be used to measure intermittent renewable resource reliability contributions. Generation expansion criteria based directly on sensitive measurements of system reliability would recognize the ability of intermittent resources to defer the need for additional generation capacity while maintaining equivalent levels of system reliability.

Legislative Options

Option: (Legislature) Require General or Specific Actions Regarding IRP

Several actions and options to improve the implementation of the IRP process are identified above. All of these could be implemented by the PUC without action by the Legislature. To the extent that sufficient actions are not taken regarding the IRP process, the Legislature could require general or specific actions to be taken by the PUC.

Option: (Legislature) Direct the PUC to Implement Renewable Portfolio Standards.

The Hawaii 2002 Legislature created voluntary Renewable Portfolio Standards(RPS). The legislature originally considered mandatory standards. Whether because of technical obstacles or political or other considerations, the Legislature demurred and adopted an RPS bill that was not mandatory and consequently is not likely to have much impact.

Setting the threshold levels for RPS and determining a viable system for enforcement is not a simple matter. For example, the thresholds identified in the RPS need to be set a proper levels in order for the standards to be effective. If the required levels of renewable resources are set as low as the level of renewable resources that would develop in any case, the standards would have no real effect. If the required levels are set too high, the implementation of the standards could be economically impractical.

The implementation of RPS requires a substantial amount of technical examination and fact-finding. The PUC is arguably a more qualified venue than the legislature for some of the technical aspects necessary for RPS effective implementation, both from the standpoint of technical requirements and from the standpoint in ongoing policy and implementation oversight.

As explained in an earlier section of this report, the PUC already has the necessary authority to implement several versions of a Renewable Portfolio Standard framework. In its original Decision and Order on its Integrated Resource Planning Framework the PUC reserved for itself the option of identifying objectives for utilities to meet in preparing the IRP's. The example used by the PUC was that it could specify, for example, that in the utility IRP the amount of fossil fuel used by the

⁹⁵ Rigorous analyses and testimony were submitted in several dockets including Docket No. 7310 and Docket No. 00-0135.

utility would be reduced to specified amounts by specified times. This approach has never been exercised by the PUC but it remains a viable part of the IRP Framework. This would be a means to initially identify portfolio standards and examine the costs and benefits in the rigorous context of the IRP process prior to implementation. It is not certain, of course, that the PUC would ever avail itself of this provision in its IRP Framework. It is very possible, given the turnover of personnel that the PUC is not even aware of this IRP Framework provision.

The legislature could decide that there will be an RPS or some similar framework for requiring minimum levels of renewable penetration, but delegate all or some portion of the determination of the framework to the PUC. The legislature could direct the PUC to consider and adopt an RPS framework either in conjunction with its IRP Framework or independently. The Legislature could decide what standards should be used in determining reasonable levels of required renewable penetration or could let the PUC decide what standards should be used. It could be required that a framework be adopted by rule making or by a generic contested case docket.

PROCUREMENT OF ENERGY RESOURCES

This section addresses the procurement of supply and DSM utility resources to meet future energy demands. This section applies to the electric utilities. Hawaii's gas utility currently has surplus capacity and is not expected to acquire DSM or new supply resources in the foreseeable future.

Description of the Evaluation and Procurement Procedure

Hawaii's electric utilities provide energy services using generation resources owned by the utilities, independent power producers (IPP's) and by utility implementation of DSM resources.

INTEGRATED RESOURCE PLANNING

In principle, the procurement of utility resources is to be "governed" by the approved utility IRP. With regards to DSM resources, this is effectively the case. Utility applications for DSM programs have been consistent with the programs approved in the IRP. Regarding supply resources, however, the IRP process and approved IRP's have not been utilized in any effective way to govern resource procurement.

SUPPLY RESOURCE PROCUREMENT

Utilities plan for the acquisition of new supply resources in the context of the IRP process. The utilities also plan for resource procurement internally based upon corporate strategic and financial considerations. Utilities make decisions about the types of resources to be developed and whether resources should be procured as utility-owned or non-utility-owned resources outside the context of the IRP process.

The decision to proceed with a utility owned versus an IPP owned resource is a product of several factors.

- The utility may or may not want to build its own supply resource depending upon whether the resulting addition to the utility ratebase is consistent with company strategic and financial objectives.
- Some of Hawaii's electric utilities have decided as a matter of policy not to acquire wind and other renewable resources as utility-owned resources.
- Utilities are in some cases required to purchase power generated by IPP resources meeting the definition of "qualifying facilities" (QF's) according to PURPA and corresponding state rules.

UTILITY RESOURCE PROCUREMENT

A utility can build and own its own resources.

A utility must obtain approval from the PUC prior to expenditure of more than \$500,000 for any capital project. Essentially all generation resource additions far exceed this threshold.

This “CIP” approval is distinct, both in purpose and effect, from any approval to include the costs of a new resource in rates charged to utility customers. The CIP approval process occurs prior to utility expenditure. A utility is allowed to include the costs of a new resource in its rates only after the resource is in operation (“used and useful”) and only after the PUC finds the investment to have been “prudently incurred” and approves the inclusion of the costs of the resource in the utility ratebase in a general rate case.

The utility is responsible for the planning, engineering, financing, permitting and construction of its own resources. The time it takes from a decision to build a generation resource to bringing the resource on line is affected by several factors, but can be as much as five to seven years, despite construction times of only two to three years.

Utility owned resources are financed by issuing bonds and corporate equity (in approximately equal proportions) and are repaid from revenues collected through rates approved by the Commission.

NON-UTILITY RESOURCE PROCUREMENT

Independent Power Producers’s (IPP’s) can provide electricity to utilities by contract or according to tariff.

Small as-available resources (100 KW or less) can receive energy payments from a utility according to a tariff, referred to in Hawaii as a “Schedule Q” tariff. The form of the tariff is reviewed and approved in each general rate case and is adjusted quarterly base upon utility fuel prices.

Large resources and any resources that receive payments for capacity are governed by a Power Purchase Agreement (PPA). The PPA is a detailed contract between the utility and the power producer. PPA’s typically specify a formidable list of terms and conditions and can be several hundred pages in length.

Prior to implementing the terms of a PPA a utility must obtain the approval of the Commission.

The process for negotiation of a PPA and approval by the PUC can be protracted. The length of time for an IPP to complete a PPA with a utility is a major issue regarding the implementation of renewable resources. In part, the length of time to complete the negotiations is a function of the complexity of the issues. In some cases, where the utility is not motivated or is disinclined to execute a PPA, the process can be extremely arduous and frustrating for IPP’s attempting to proceed with construction of resource projects.

DSM RESOURCE PROCUREMENT

To date, all utility sponsored DSM programs have been administered by the sponsoring utility. It would be possible for utilities to procure DSM programs or services by contracting with independent entities. This is discussed elsewhere in this report as an option for DSM implementation.

DSM programs are justified on the basis of their value as utility resources. The value of these programs is assessed in measuring the ability of the programs to displace the need for the operation and construction of utility generation resources. This determination has been made in the context of the rigorous analyses conducted in the IRP process.

In accordance with the PUC IRP Framework, DSM resources must be analyzed in the utility IRP and included in the approved IRP program implementation schedule. The program must also be considered and approved in a DSM program application proceeding before the Commission.

The PUC has not standardized the DSM program application process, so each DSM program application is considered independently. Standardization of the process to review and approve DSM program applications would be a potential improvement in Hawaii's regulatory process. Standardization could substantially reduce the amount of paper-work in the program review discovery process and increase the accountability and speed of the review process.

Hawaii's DSM programs have been implemented primarily as rebate programs. In these programs the utilities provide a financial incentive, usually in the form of a direct rebate, to customers that install energy-efficient devices. The objective of the program is to reduce utility energy and resource needs by increasing the efficiency of customer energy use. The rebate mechanism is intended to overcome customers' reluctance to invest in cost-saving efficiency improvements.

Problems with Resource Procurement.

It is clear that there are problems with the existing resource procurement process. Many of these problems are specific to the process of IPP resource procurement but some are applicable also to utility resource procurement. Consider the following symptoms:

- Siting, permitting and construction of new resources is expensive and problematic.
- There are several renewable energy developments proposed by IPP's that have been bogged down in negotiations with utilities for many years.
- IPP's are vocally frustrated with the expense and delays caused by contract negotiations.
- The utilities seem to feel that they are hostage to laws requiring them to negotiate with IPP QF's on terms they do not favor.
- The legislature considers bills in each session that recognize and attempt to address resource procurement problems.
- There is widespread disappointment that renewable energy resources are not being implemented to a sufficient extent.

Underlying these symptoms are several identifiable problems with current procedures for utility energy resource procurement:

- There is no effective methodical resource procurement process to implement supply resources identified in the utility IRP
- The avoided cost analyses used in negotiations with potential non-utility power producers are not standardized and result in confused, arbitrary and sub-optimal resource acquisition decisions.
- There is currently no efficient and effective way to determine which of several non-utility projects is the least-cost option for the utility and its ratepayers.
- IPP's do not have access to a functional complaint process. Complaints filed with the PUC have been expensive, time-consuming and have provided no effective remedies.
- The utilities clearly have the upper hand in all aspects of the contract negotiation process.
- The PUC has not required utilities to publish avoided cost information sufficient to determine utility avoided capacity or energy costs.

- There is no mechanism to finance renewable IPP resources above avoided costs even if these resources would be approved in a utility resource plan as utility resources considering non-cost resource benefits.
- There is no mechanism for providing savings to utility customers by projects that are available below the utility's avoided cost.

Mitigating Actions Now Available to the Commission

Several of the problems with IPP resource procurement could be resolved by the PUC by following through and implementing existing conventions and proposals. There are several important outstanding dockets that have received little or no attention by the PUC (see below). There are also several outstanding complaint dockets in which the PUC could provide more explicit and prompt guidance and decisions.

The PUC could also adopt new conventions or processes to address resource procurement issues. Although it has expressed an intent to do so, the PUC has not considered competitive bidding or any explicit methodical procedure for resource procurement. Requiring utility RFP's or Standard offer contracts are also options available to the Commission. None of these options would require any new enabling legislation.

Level the Playing Field Between Utilities and Independent Power Producers

Option: (PUC) Resolve PUC Docket No. 7310

Docket No. 7310 is a generic docket opened by the PUC in 1992 to consider replacing the archaic "proxy" method that is still used to determine the avoided costs paid to as-available resources in accordance with the Schedule Q tariff. Despite the fact that this docket was extensively analyzed and negotiated by the participating parties resulting in a stipulated agreement that resolved most of the outstanding issues, the PUC has not taken action to resolve the docket.

This docket, now more than ten years old, is still open and unresolved. Even though all parties to the docket agreed that the proxy method (now almost twenty years old) was outdated and should be replaced, the method is still used to calculate avoided cost payments to as-available renewable resources.

BACKGROUND

In 1984 in Docket No. 4569, the PUC examined methods of determining avoided costs for HECO, MECO and HELCO. At that time the proprietary computer simulation model used by these utilities to calculate avoided costs was producing results that were counter-intuitive and difficult to defend. The PUC adopted a "proxy" method of determining avoided costs that was proposed by the utilities. The proxy method determines avoided energy costs for on and off-peak periods⁹⁶. Generally, the proxy method equates on-peak avoided energy costs with a calculation of the average fuel costs of the utility's intermediate and peaking generating units. Off-peak avoided energy costs are based on the fuel costs of the utility's baseload generating units. The parties to Docket No. 4569 generally agreed that, with respect to the utility system conditions in 1984, using the on and off-peak average costs of generation was a simple and reasonable "proxy" for marginal or avoided costs.

The proxy method is still used to calculate avoided energy cost tariffs and Schedule Q tariffs. These tariffs are updated quarterly based on contemporary fuel prices and utility generation fuel

⁹⁶ Utility energy demand varies substantially on a daily basis. For each utility, each day is divided into several periods representing typical levels of generation.

mix. The Schedule Q tariff specifies the amount that the utility will pay for as-available energy provided to the utility by small IPP's. Several large IPP contracts have been indexed on the quarterly avoided energy cost filings.

The proxy method is simple, but is now recognized by all parties (including the utilities) as archaic and inaccurate. For many years the proxy method has generally resulted in avoided cost estimates lower than actual incremental or marginal avoided costs determined by modern production costing methods⁹⁷.

In HELCO's 1990 general rate case⁹⁸ the proxy method used to calculate the Schedule Q tariff and the energy payments in several existing HELCO PPA's was contested. The PUC opened Docket No. 7310 as a generic investigation to resolve the methods used to determine energy payments for as-available energy providers for HELCO and all other electric utilities in Hawaii.

The issues considered by the parties in the docket included:

- whether and how the proxy method for determining avoided costs should be replaced or revised
- what method should be used to determine avoided energy costs and the Schedule Q rates
- what factors in addition to fuel costs should be accounted in avoided energy costs
- what, if any, capacity costs are avoided by purchase of power from as-available resources
- what computer model(s) and modeling assumptions should be used in determining avoided energy costs and on what terms should the model(s) be made available to interested parties.

In a Docket No. 6742 the PUC stated that it wanted issues regarding monetized externalities explored in a generic docket on avoided cost⁹⁹. This issue was consequently addressed (but not resolved) by the parties in Docket No. 7310.

After extensive testimony, analysis and negotiations, the parties in Docket No. 7310 agreed on many of the issues considered in the docket. In 1994 the parties filed a Stipulation to Resolve Proceeding which identified the parties agreement and positions regarding the issues in the docket. The parties agreed that:

- The proxy method should be discarded with the exception of application to the small Molokai and Lanai utilities.
- The convention of weighted on and off-peak pricing should be continued.
- Avoided fuel costs should be determined using a computer production simulation model using a "QF-in/QF-out" method¹⁰⁰.

⁹⁷ As the efficiencies of the utility generation systems improve and the mix of generation fuels tends towards diesel rather than industrial fuels the proxy method will soon (if not already) result in higher avoided costs than those determined by more accurate methods.

⁹⁸ Docket No. 6432.

⁹⁹ Decision & Order #12118

¹⁰⁰ This method runs a production cost simulation of the operation of the utility system twice. The fuel costs of the utility's resource system are simulated without the QF resources included and these costs are compared to the costs of operating the system with the QF resources included (at zero cost). The difference in the fuel costs is the fuel cost avoided by the QF's.

- Avoided operation and maintenance costs should be based on the price of avoided consumables and amortization of diesel and turbine overhaul costs.
- Conventions identified in the stipulation should be used to account for avoided working cash, avoided fuel inventory, and transmission and transformation losses.

There was not agreement regarding which computer model would be used or how payments for the model or analyses performed on the model would be resolved. There was no agreement regarding the application of monetized externality adders or whether capacity payments should be made for as-available energy providers¹⁰¹.

One very important factor that would be resolved by the PUC's approval of the stipulation offered by the parties is access to avoided cost information. Federal law and corresponding FERC rules require state commissions to require utilities to provide sufficient information for IPP's to determine the utilities avoided costs. The PUC adopted rules pursuant to the federal requirements requiring filings stating each affected utility's avoided costs¹⁰². These rules, however, are substantially out of date. The information required by the PUC and provided by the utilities is not sufficient to determine the utility avoided costs. HECO, MECO and HELCO have published a method for determining utility avoided costs according to a differential revenue requirements analysis. This method requires substantial amounts of information that is not provided in the avoided cost filings and is not available from the utility. At this time sufficient information to determine utility avoided costs is not available to the public.

The utility requirement for a rigorous method of determining avoided costs in conjunction with a lack of necessary information presents a substantial impediment to the ability of IPP's to negotiate with the utility. Approval of the stipulation offered by the parties in Docket No. 7310 or some other resolution of this matter by the PUC would assist IPP's, including renewable generation providers, to negotiate more effectively with the utility.

Docket No. 7310 does not appear to be on the PUC's radar screen, despite references by parties in several more recent dockets. The PUC's inaction on this docket remains a disincentive and an impediment to renewable energy development. Resolution of the docket as suggested by the participating parties would provide more reasonable published avoided energy costs for as-available generation, would mitigate some of the existing problems faced by parties attempting to negotiate PPA's with Hawaii utilities and would provide public access to avoided cost information more in line with the requirements of federal law.

Option: (PUC) Provide Standard Offer Contracts

The development of standard offer contracts (SOC's) has been proposed as a method to mitigate the dilemma faced by independent power producers frustrated in their attempts to negotiate timely contracts with the electric utilities (primarily HECO and subsidiaries). Requiring the utilities to acquire generation resources in accordance with Standard Offer Contracts is perceived as a method to expedite the problems and delays several IPP's have been experiencing in their attempts to complete PPA's.

A primary purpose for developing standard offer contracts is to shorten the time required to complete negotiations for renewable resources with the utility. The utilities are perceived as unwilling parties using the contract negotiation process to delay or derail the implementation of IPP

¹⁰¹ The DCA provided testimony and analyses asserting that there was capacity value provided to the utility system by as-available energy providers and proposed a pricing formula.

¹⁰² KIUC is not subject to these requirements since it is below the size threshold identified in existing rules. The affected utilities are HECO, MECO and HELCO.

resources. SOC's are believed to be a way to reduce the amount of "wobble-room" available to the utilities and hence corner them into faster finalization of a contract.

Something does need to be done to mitigate the burdensome existing contract negotiation process. Presently the utilities clearly have the upper hand. Utilities have superior resources, control the access to necessary data, operate the proprietary simulation models they require for analysis, and can use delay to their advantage in negotiations. IPP's are not able to negotiate effectively with the utilities in the existing utility dominated venue.

SOC's may help to level the playing field somewhat but are not likely, by themselves, to be as effective as some parties seem now to hope. Several aspects of providing SOC's that could delay rather than speed up the process of negotiating PPA's with utilities should be considered:

First, the time spent on drafting, deliberating and approving standardized contracts is justified if they ultimately serve as the basis for several contracts with some net reduction in redundant deliberations and negotiations. It is not clear, however, that there are a large number of potential projects that would use the standard offer contracts once adopted.

Second, the process for drafting SOC's could be protracted and would certainly involve review and approval by the Commission. Whether used as a tactic or because of taxing the utilities' staff resources, the process of drafting, reviewing and approval of SOC's could delay the finalization of contracts now being negotiated with the utilities.

Third, it is not clear that SOC's can be implemented for Hawaii's small utility systems without provisions for exceptions based on substantial, justifiable issues. Hawaii's utilities are quite small by industry standards. Intermittent resources can impact the operation of the utility in several ways that need to be considered. What is possible in one contract may not be possible again for an essentially identical resource that follows on its heels. A utility may be able to accommodate one wind farm but not be able to accommodate a second identical wind farm. For this reason, standardized contracts may have to include provisions for handling these exceptional circumstances by a case by case negotiation process... which puts IPP's right back where they are now in terms of being subject to the upper hand of the utilities in the contract negotiation process.

Provided the right context, standard offer contracts could be used effectively. As discussed elsewhere in this report, one viable solution, though one which has no certainty of implementation, would be a competitive bidding process, perhaps implemented in conjunction with a decisively administered IRP process.

Option: (PUC) Provide an Expedited Process for Resolving Formal Complaints

One remedy available to an IPP aggrieved by the process of negotiating a PPA with a utility is to file a formal complaint with the Commission. The PUC is charged with the duty of implementing and enforcing its rules, including the rules it has adopted in accordance with PURPA. Several IPP's have filed complaints with the PUC asking for actions to speed up negotiations with utilities. These complaints have been time consuming, costly and ineffective. One important factor is the PUC's unwillingness to be decisive and prompt in its adjudication of the complaints. In most IPP negotiations time is of the essence. In fact, speeding up the process is the most frequently sought remedy in IPP complaints. The PUC has not been quick or decisive in these matters, depending on the parties to work things out in good faith (even where lack of mutual good faith was the reason for the complaint). Clearly one way that the PUC could mitigate the problems with resource procurement would be to act decisively, promptly and consistently in response to formal complaints. If necessary the PUC should conduct rulemaking or a generic investigation docket to consider ways to expedite the process by which PPA's are negotiated and adjudicated.

One option that could be considered is binding arbitration to resolve differences between parties with a settlement master appointed by the Commission. This would require that if IPP's and utilities could not reach agreement in a reasonable period of time, either party could request that the PUC appoint an arbitrator or settlement master. This process could move more quickly than a contested case complaint docket before the PUC and would not tax or be delayed by limited PUC resources.

Action: (PUC) Require Utilities to Provide Avoided Cost Data

Federal law and corresponding FERC rules require state commissions to require utilities to provide sufficient information for IPP's to determine the utilities' avoided costs. The PUC adopted rules pursuant to the federal requirements requiring biannual filings stating avoided capacity costs and quarterly filings stating avoided energy costs for each affected utility. These rules, however, are substantially out of date. The information required by the PUC and provided periodically by the utilities is not sufficient to determine utility avoided costs. HECO, MECO and HELCO have published a method for determining utility avoided costs according to a differential revenue requirements analysis. This method requires substantial amounts of information that is not provided in the quarterly avoided cost filings and is not available from the utility. The PUC clearly has the authority and apparently also has a federal mandate to require the utilities to provide this information. At this time, however, this information is not available to the public.

The inability to determine the avoided costs of Hawaii's utilities is an impediment to the fair and timely negotiation of PPA's for renewable energy IPP's. Whether in the context of Docket No. 7310 or as a separate matter, the PUC should require, or the legislature should require the PUC to require sufficient avoided cost data. The minimum standard for providing the data should be to comply with the letter and intent of federal law (PURPA).

Establish a Formal Utility Resource Procurement Process

As explained above Hawaii does not currently have an effective methodical resource procurement process to implement utility resources. A framework for IRP has been adopted by the PUC to evaluate and determine the timing and types of utility resources. The issues of resource siting, ownership and procurement generally, however, are not governed by any clear or effective procedures.

Option: (PUC) Establish a Competitive Bidding Process for New Wholesale Generation

The PUC has determined in several previous dockets that it would consider competitive bidding procedures for utility acquisition of new generation resources. Competitive bidding is probably the most realistic presently available option identified in the PUC's docket considering electric industry restructuring and competition.

There are many issues to be resolved in establishing a competitive bidding process. A generic docket or rulemaking proceeding would be appropriate venues for this purpose. Using rulemaking proceedings in conjunction with a collaborative process with direct participation by the PUC would allow the greatest possible opportunity for broad public input and discussion.

There are several variations of competition options for new wholesale generation that are distinguished by several characteristics. All include some form of competitive procurement process for new generation resources. These are outlined briefly below:

- The relationship of the utility planning process to the competitive procurement process; several alternatives:
 - the utility IRP dictates the timing and nature of a competitive RFP

- a preliminary RFP solicits options assessed in the utility IRP resulting in a formally defined competitive RFP
- the utility IRP forecast dictates an RFP evaluated in the utility IRP process
- Whether the utility or utility affiliates are allowed to bid for new generation resources.
- The specificity and scope of the bidding process; several alternatives:
 - RFP specifies specific size/fuel/technology
 - RFP specifies resource type by operational function (baseload, cycling, peaking, emergency, spinning reserve, as-available)
 - RFP specifies need for a specifically defined block of power
 - RFP open to supply sources only or to all sources (including DSM)
 - separate RFP's for supply and DSM resources
- Who drafts and/or approves the RFP prior to the bidding process:
 - utility
 - independent contractor
 - with or without PUC review of RFP prior to issue
- Who evaluates and selects the winning bidder(s):
 - utility with PUC review
 - independent contractor with PUC review
 - a new agency, board, or commission

- Whether an RFP effectively includes enough detail to serve as an executable PPA:
 - signed immediately upon selection of bid pending PUC approval
 - negotiation of PPA after selection of winning bid
- Form of the fuel cost terms specified in the RFP and/or used as criteria to evaluate bids:
 - based upon straight pass through of fuel costs
 - based upon formula requiring bidder to guarantee a heat rate with pass through of fuel price variations
 - based upon price per KWH escalated by non-fuel price index
 - based upon price per KWH schedule not indexed
 - no specific form of terms required in RFP
- Form of maintenance cost terms specified in the RFP and/or used as criteria to evaluate bids:
 - straight pass through of maintenance costs
 - escrow account with joint management
 - indexed price per KWH or KW-YR.
 - levelized fixed price
- Form of non-price terms specified in the RFP and/or used as criteria to evaluate bids:
 - amount of control of dispatch of resource by utility
 - performance standards and penalties
 - coordination and amount of utility control of maintenance scheduling
 - regulatory "out" provisions prior to and/or after PUC approval of PPA

A Suggested Example for a Competitive Bidding Process

Any competitive bidding process should be established only after all affected stakeholders have an opportunity to participate in an appropriate docket or rulemaking proceeding for this purpose.¹⁰³ The process identified below is provided only as an example.

The timing, sizing and types of resource technologies would be determined for each utility in the context of the IRP process. In the IRP process a wide spectrum of factors would be considered including direct and external costs and benefits. Utility program implementation schedules in the IRP would identify the timetable for a competitive bidding process for resources identified in the IRP. The utility, with the participation of interested parties, would be directed to draft an RFP which would include a draft SOC or PPA and criteria for evaluating responding proposals. The RFP (or several draft RFP's if parties do not agree or if several types of resources are specified) would be submitted to the PUC for review and determination. The PUC would approve one or more RFP for the utility to issue. Responses to the RFP would be evaluated according the proscribed criteria by an objective entity. This entity could be a team with representatives of the utility, PUC and other parties or could be a consultant managed and selected by the PUC and paid by the utility. The selected proposal would be reviewed before the PUC with participation by interested parties.

This procedure would provide several advantages over the existing situation.

Identifying specific resource types that will go to bid would prevent less beneficial types of generation from being forced upon the utility as QF's under PURPA. This would alleviate some of the utilities' current concerns regarding allowing externality considerations from including more expensive resources in the selected utility plan. The utilities now have a concern that if resources are included in the twenty year plan approved in the IRP that cost more than the least-dollar-cost fossil fuel units but are preferred because they provide environmental or other external benefits, then a fossil-fuel unit QF could force the utility to contract for generation at the higher avoided cost without actually providing the benefits to the utility and its customers that would be provided by the higher-priced preferred resource.

This process would allow preferred resources to command contract prices higher than the avoided costs of the least-dollar-cost resources to the extent determined reasonable in the utility IRP. It would also provide a competitive mechanism for obtaining the preferred resource types at less than avoided cost. FERC has accepted competitive bidding as a means to determine fair costs consistent with the avoided costs as interpreted under PURPA.

PROVIDE FOR THE NEEDS OF SPECIFIC RESOURCES

Several options are identified that address issues associated with specific resources, including energy efficiency, wind generation and distributed generation resources.

Energy Efficiency and Load Management Resources

Hawaii's existing utility sponsored DSM programs may soon end unless some action is taken to resurrect or replace them. The PUC has ordered that several mechanisms that provide cost recovery and incentives for these DSM programs will soon end.

Currently each electric utility implements its own demand side management (DSM) programs, using utility staff and ratepayer funds. The economic justification and financial cost recovery

¹⁰³ The authors recommend a rulemaking proceeding for this purpose.

mechanisms for the utility DSM programs were established in the PUC IRP Framework, the utility IRP application dockets and DSM program application dockets. The PUC determined that the approved DSM programs are beneficial utility resources and that the associated program costs, lost margins and shareholder incentives can be recovered from the utility ratepayers.

However, in the last months of 2001 the PUC issued several orders that will terminate the lost margins and shareholder incentives recovery for DSM programs for HECO, HELCO and MECO.¹⁰⁴ These orders allow the existing DSM programs and DSM financial mechanisms to continue until the date interim rate relief is provided in HECO's next rate case which is to be filed using a 2003 or 2004 test year.¹⁰⁵ The orders were based on stipulated agreements by the parties in the DSM dockets. The orders and stipulated agreements for HELCO and MECO are both contingent upon the terms agreed in HECO's next rate case. According to the stipulated agreements the utilities agree that they will not seek continuation of lost margin recovery or shareholder incentives in HECO's next rate case or thereafter.

The PUC expressed concern in its orders that, despite the utilities' agreement to discontinue existing lost margins and shareholder incentives recovery, it expects the utilities to maintain the same level of commitment to its DSM programs. Clearly, however, without full compensation for DSM program impacts and some financial incentives, the utilities are not likely to maintain comparable levels of commitment to these programs. Unless the PUC is prepared to use a stick in place of the disappearing carrots, it can be expected that utility enthusiasm for utility run DSM programs will wane considerably.

Although the PUC's orders have not received much notice, they are a significant shift in Hawaii's energy policies. The DSM programs and the associated financial recovery mechanism were the result of several previous PUC dockets¹⁰⁶ including an extensive collaborative process in the docket leading to the adoption of the IRP Framework¹⁰⁷ and the efforts of a DSM cost recovery work group.¹⁰⁸ Despite the amount of collaboration and deliberation that went in to establishing the DSM financial mechanisms, they are disappearing with very little public notice and a scant public record explaining the basis for this significant change in Hawaii energy policy. This is a case of significant state energy policy being made in the regulatory "infield" without any involvement of the "outfield".

If Hawaii intends to continue the implementation of energy efficiency and load management programs some assertive actions will have to be taken. Unless the PUC is prepared to strictly enforce utility implementation of these programs, the future of the existing programs should be

¹⁰⁴ KIUC's DSM programs are not affected by these orders and will continue. TGC currently has no DSM efficiency programs.

¹⁰⁵ See Decision & Order No. 19020, November 15, 2001 and Amended Order No. 19094, December 11, 2001.

¹⁰⁶ These include the initial generic IRP docket (Docket No. 6617), the dockets for each of the energy utilities (Docket Nos. 7257, 7258, 7259, 7260, 7261) and the individual DSM program application dockets.

¹⁰⁷ The general provisions for DSM program cost recovery, lost margins and shareholder incentives were part of the Collaborative Agreement by the parties in Docket No. 6617 that were explicitly incorporated by the PUC in its Framework for Integrated Resource Planning in that docket.

¹⁰⁸ A working group including the DCA, electric utilities, DBEDT and the Natural Resources Defense Council deliberated regarding the DSM financial mechanisms reaching agreement on most of the terms of the mechanisms. The resulting specific provisions for cost recovery, lost margins and shareholder incentives mechanisms were first approved by the PUC in HECO's first DSM program application and then applied to utilities' DSM programs.

considered in jeopardy and the achievement of significant cost-effective savings for consumers may be lost.

Several options to maintain aggressive DSM implementation are offered below. The PUC could initiate proceedings to consider the future of DSM implementation generally or any of the following options specifically.

Option: (PUC) Establish New Utility DSM Finance and Incentive Mechanisms

In its recent orders ending the DSM financial mechanisms for HECO, MECO and HELCO the PUC explicitly reserved for itself the right to reopen the proceedings to consider, among other things, whether the stipulations adopted by the orders are consistent with the IRP Framework. The PUC could, on its own initiative or based on testimony filed in HECO's next general rate case, reconsider the fate of the DSM financial mechanisms.

HECO has agreed in the stipulations not to seek continuation of the lost margins or shareholder incentives mechanisms, but this does not preclude other parties or the PUC from asserting these or other improved mechanisms. The PUC could, with or without the agreement of the parties, re-establish the existing DSM financial mechanisms or establish new financial mechanisms.

Option: (PUC, Legislature) Establish an Independent DSM Implementation Entity

In several mainland jurisdictions DSM services are provided by independent implementing entities. There are several examples that could serve as models for Hawaii.

The Vermont Public Service Board (Vermont's public utilities commission) created a "DSM utility" by order. Efficiency Vermont is a non-government non-profit "energy efficiency utility" that receives funds from each electric utility in the state and uses these funds to implement energy efficiency programs. Efficiency Vermont is a public utility, and as such, reports to the Public Service Board just like other public utilities.

The New York Energy Research and Development Authority (NYSERDA) is a public benefit corporation created by the New York Legislature in 1975. It is a research organization that funds research into various energy development technologies and activities. Since 1998 NYSERDA has been the implementing agency for New York's "Energy \$martSM" program" under the direction of the New York Public Service Commission. The Energy \$martSM program provides energy efficiency services, including programs directed at low income consumers, using funds collected by a charge on the electricity provided by New York's investor-owned energy utilities.

Both of these organizations operate energy efficiency programs with funds provided by public utility ratepayers, essentially the same source of funds used now by Hawaii's electric utilities. The programs are implemented independently of the generation utilities. This eliminates conflicts between inherent electric utility incentives to maintain sales and the objectives of the energy efficiency programs to reduce consumption.

Either of these models could be used for an independent DSM program implementation entity in Hawaii. The PUC could initiate rulemaking proceedings to consider the implementation of this option.¹⁰⁹

¹⁰⁹ It is not certain that an energy utility similar to that created by Vermont's commission by order could be implemented by the Hawaii PUC without enabling legislation. Action by the Legislature could implement either model.

Option: (PUC) Consider Competitive Bidding for DSM Services

The PUC could consider alternate methods of DSM implementation and program selection that allow for competition in the provision of DSM services. DSM programs identified in the utility IRP could be put out to bid by issuing an RFP. In many mainland jurisdictions DSM services are provided by non-utility service providers. Funding for these services is provided by a surcharge on utility rates referred to as a “system benefit charge” or “public benefits charge”. This is essentially the same mechanism currently used to finance Hawaii utility DSM programs.

Competitive DSM resource procurement could potentially result in lower DSM measure costs, lower DSM program administration costs, lower program evaluation costs, and could reduce the extent that shareholder incentives are necessary. In conjunction with a wider spectrum of program designs than currently offered by Hawaii’s utilities, this could extend the availability of DSM program benefits to renters, low income consumers and could potentially shift the burden of DSM expenses away from ratepayers generally to DSM program participants, thus reducing the rate impacts of DSM programs.

This approach would be consistent with the Energy Policy Act of 1992, Section 115, subsection (c) Small Business Impacts, which provides, in part, that in implementing IRP and DSM programs, state commissions should consider the impacts upon non-utility DSM service providers and assure that utilities do not have unfair competitive advantages.

The PUC could initiate rulemaking proceedings to consider the implementation of this option.

Option: (Counties) Utility Permit Fees to Fund Energy Code Enforcement

Energy efficiency building codes are established, implemented and enforced by the county governments. Although some energy efficiency codes have been established there is generally insufficient funding to fully implement or enforce the codes. The counties could establish fees for permits for gas and electric fixtures that would provide sufficient revenue to fund energy code implementation and enforcement.¹¹⁰

In addition to providing revenue for energy code enforcement, the fees could be structured as an incentive to encourage the installation of efficient appliances and fixtures. Fees could be reduced or waived for installation of efficient measures. Fees could be increased for wasteful installations.

Wind Generation Resources

Wind turbine generators are a promising renewable energy resource for Hawaii. In conjunction with existing incentives wind generation is currently cost-effective at the avoided energy costs of Hawaii’s utilities.

There are limits to the extent that wind resources can be implemented in Hawaii, including limitations on the amount of wind generation that can be incorporated on each island utility electrical system and the extent of available sites that have sufficient wind regimes and public acceptance.

Several options are identified below that address issues of particular importance for the implementation of wind resources.

¹¹⁰ This approach could also be applied to water consumption efficiency and could be implemented and enforced as part of the same program by the same agency staff.

Option: (Utilities, PUC, DCA) Provide Studies of Wind Resource Carrying Capacity

The electrical generation provided by wind resources varies from moment to moment with fluctuations in wind speed. Integration of wind resources with utility generation requires the utility to “follow” the variations in wind generation with compensating variation of utility generation. This is similar to the need for the utility to follow variations in customer demand fluctuations, but is generally an additional component of variation that must be accommodated by utility resources.

The need to follow variations in wind generation output limits the amount of wind generation that can be accommodated by each utility generation system. Some additional “operating margins” can be maintained by utilities using existing equipment, possibly at some cost in utility system generation efficiency.¹¹¹

The ability and associated costs of accommodating wind resources is a function of the mix of generation resources on the utility system and the capabilities of the utility controls on generation unit dispatch. Both the existing and future mix of generation resources on each utility system is an important component of the extent to which wind resources can be implemented in Hawaii. Generally, this should be a matter addressed in the utility IRP analyses because it is crucial to determining the utility’s optimum resource mix. The analytical “optimization” tools currently used in Hawaii utility IRP’s, however, do not address or resolve these issues. Specific studies are necessary for this purpose.

Wind resources have been determined to be one of the most promising and economical existing and near-term renewable resources in Hawaii. Studies should be performed, either as part of the utility IRP process or independently, to determine the carrying capacity of each of Hawaii’s electric utility systems and how wind resources can be most effectively implemented and considered in utility resource selection and procurement.

Option: (Legislature) Establish Wind Resource Development Zones

Siting and permitting are important considerations in the implementation of wind generation resources in Hawaii. There currently is no methodical or prospective process to determine the extent, permitability, or optimum location of wind generation sites or to coordinate or expedite permitting reviews.

A process could be established to identify and approve geographic zones on each island that are appropriate for wind resource developments.¹¹² This would involve conducting studies to determine which areas of the islands have sufficient wind regimes and are acceptable regarding visual and environmental impacts. As appropriate, the designation of wind resource development zones could constitute a determination that certain permitting requirements are met or reduced within the zone. This process could be similar to the establishment of geothermal resource subzones provided for in HRS 205-5.1 and 205-5.2.

In some states the study and establishment of geographic zones for siting specific types of energy generation facilities are implemented by an Energy Facility Siting Council. This approach is discussed in a separate section of this report.

¹¹¹ The magnitude of additional operation margins and the system efficiency costs associated with providing additional margins depends on many factors, some which change from moment to moment, and are difficult to determine either generally or specifically.

¹¹² Wind speed maps have recently been prepared and published for the islands of Oahu and Maui.

Option: (PUC) Provide Capacity Payments for Wind Resources as Appropriate

Wind resources are considered “as-available” because their generation output is only available when the source of energy (the wind) is available. Despite the fact that the output of as-available resources are not available all of the time, they contribute to the reliability of utility resource systems in proportion to the percentage of time that they are available. This has been rigorously demonstrated in several analyses presented to the PUC. In this specific respect, as-available resources are different than conventional resources only in degree, not in absolute terms. Conventional resources are also not available when scheduled maintenance is being performed or during unplanned “forced” outages.

Hawaii’s utilities do not give credit to as-available resources for their contributions to utility system reliability. The primary reason is that the utilities have chosen a methodology which does not include the contribution of as-available resources in determining the timing of the need for new resource additions to the utility systems. Consequently, adding as-available resources to the utility system does not defer capital expenditures on new generation capacity and hence results in no calculated capital cost savings (or avoided capacity costs).

There are several benefits of wind and other renewable resources that are not fully taken into direct consideration in resource evaluation decisions. These “externalities” are a subject of discussion in the IRP process and elsewhere in this report. The extent to which wind resources can contribute to system reliability and could defer the need for new generation, however, is not an externality, but a real (but unaccounted) monetary system benefit. Hawaii’s electric utilities have insisted on considering incremental operation margin costs associated with wind resources as costs in determining the prices paid to wind developers. The utilities are unwilling, however, to consider the incremental capacity benefits that result to the utility system by providing both as-available generation and increased operating margins. The resulting system with wind and additional operating margins is more reliable in the same sense as the system would become more reliable by adding additional conventional generation capacity.

The utilities and PUC should consider all of the benefits of wind resources in evaluating and pricing these resources. This is especially important if the utilities are especially rigorous about quantifying all of the operational costs of wind resources in evaluation and pricing.

Distributed Generation Resources

Distributed energy generation resources and associated combined heat and power (CHP) applications are a quickly emerging market in Hawaii. Several vendors, including most of Hawaii’s electric utilities are actively engaged in securing a share of the CHP market. There are several ripe regulatory issues associated with the impending development of the CHP market. The PUC should take action to establish policies and standards to protect public utility interests and promote a fair and healthy business climate for non-utility stakeholders as appropriate.

Action: (PUC) Establish Clear Policies Regarding Distributed Generation

The PUC should determine clear policies regarding distributed energy resources located on the customer side of the utility meter. There are several policy issues:

- Should distributed energy resources be encouraged in Hawaii?

- Should preferences of fuel choice be dictated by policy or by public utilities, or be preserved as a customer option?¹¹³
- To what extent should the regulated electric utilities or affiliates be allowed to compete with non-regulated vendors or non-regulated utility affiliates in the CHP market?
- For utility-owned generation equipment on the customer side of the meter what appropriate treatment of standby tariffs should be established¹¹⁴
- For utility-owned generation equipment on the customer side of the meter what tariffs should apply to any provision of hot water to the utility customer? Is hot water a regulated public utility commodity because it is supplied by a public utility, or is hot water a non-public utility commodity because it is not offered to the general public in each case?
- Standby service tariffs need to be fair to compensate the utility for the costs of maintaining necessary standby capacity and to encourage distributed generation as appropriate.

Regulatory issues associated with distributed generation and combined heat and power installations are discussed in several previous sections of this report.¹¹⁵

ELECTRIC INDUSTRY RESTRUCTURING

In the past decade the structure of the electric power industry has changed drastically on the mainland. The Energy Policy Act of 1992 and FERC rules have opened up interstate transmission systems to wholesale competition. In several states the electric industry has been restructured to allow competition and deregulation. The regulated monopoly utility model that for decades was a uniform standard across the nation has been replaced in several jurisdictions by various types and degrees of competition and restructuring.

In Hawaii the issue of electric industry restructuring was taken up by the PUC in Docket No. 96-0493. A wide spectrum of parties were admitted as parties. The parties deliberated the issues in a collaborative process, but without success at reaching consensus on any significant issues. Extensive statements of position were submitted to the PUC by the parties. With the exception of filing a status report to the Legislature no further action has been taken by the PUC on this matter. There has not been an evidentiary hearing. There has been no decision or order from the PUC disposing of the issues or identifying further procedure with the docket.

There are several potential restructuring options that could be considered for implementation for Hawaii's electric industry. For each option identified below a brief explanation is provided, possible variants are identified, and the feasibility for application to Hawaii's electric industry is briefly discussed.

¹¹³ Assertive action may be necessary to ensure that fuel choice to customers will be preserved.

¹¹⁴ Existing standby tariffs pertain to customer operation of generation equipment on the customer side of the meter. It is not clear how the existing tariffs would apply to utility-owned generation on the customer side of the meter. Clearly, the standby tariffs should not be applied differentially in a manner that would provide inappropriate competitive advantage to the utility for distributed energy or CHP market share.

¹¹⁵ See section on Industry Trends: Distributed Generation (starting at page 16) and section on standby service tariffs (starting at page 65).

Option: Allow Bypass (Totally Independent of Existing Utility System).

An energy supplier could bypass the existing utility system by providing electrical power and all transmission and other necessary ancillary services to one or more customers. The existing utility generating and transmission systems would not be used as part of the transactions.

It appears that bypass is now possible and consistent with existing Hawaii law as long as power would be provided only on a contractual basis. If service is provided to the general public the energy supplier would, by statutory definition, become a public utility and would need to apply for and obtain a certificate of public need from the Commission.

Due to the inherent economic efficiency of using only one interconnected utility transmission and distribution grid, bypass would have beneficial application in Hawaii only in special circumstances. Bypass, therefore is not an option that could provide competitive services to a significant portion of Hawaii's energy consumers.

Option: Allow Bilateral Contracts (Using Utility Transmission System).

Bilateral contracts are contracts between one power supplier and one customer for the provision of electric power or electric power services. Bilateral contracts are distinguished from bypass (described above) in that the transfer of power would use the utility transmission and distribution system.

For many years some mainland utilities have provided wheeling services (according to tariff) for the transfer of electric power from other suppliers to individual retail customers. Recently federal law requires all utilities with interconnected transmission facilities to provide openly available wheeling services according to published tariff for wholesale transactions. Hawaii's utilities do not and are not required to provide wheeling services for retail or wholesale transaction.¹¹⁶

One option that has been suggested to open Hawaii's electricity market up to competition would be to allow and formalize the practice of individual non-utility energy suppliers providing electric power and power services to individual retail customers. This option is distinguished from full-retail competition only in that the existing price-regulated electric utility would continue to serve a predominant proportion customers. Taken to the extreme, allowing bilateral contracts to all customers could be considered a form of retail competition with the utility continuing to serve captive customers not served by other contracts.

Even in the simplest case, there are several complications that would arise by allowing bilateral contracts. For example, suppose that one large energy supplier would contract to provide power to one large customer with a tariff paid to the utility for power transmission. By nature of the fact that both the supplier and customer are connected to the utility transmission system, the ancillary services now provided by the utility (system stability, voltage regulation, spinning reserve, back-up generation, etc.) would be provided by the utility.¹¹⁷ Charges for these ancillary services could be assessed according to a wheeling tariff, but this would involve regulatory proceedings to "unbundle" utility ancillary costs to establish fair wheeling charges. It is also clear that the loss of a large customer from the utility revenue base could affect the cost of services to other utility customers. In the short-run, this could result in excess capacity and higher charges to other

¹¹⁶ By the definitions applied in federal rules there is no "transmission" of electrical power in Hawaii because there is no power exchanged between utilities and because all of Hawaii's distribution (and what is locally referred to as "transmission") is below the federally defined voltage threshold.

¹¹⁷ Even if some of these ancillary services were provided independently, they would be inextricably integrated with the utility provision of these services as a result of interconnection.

customers. This could be mitigated by some form of exit charges to customers that reduce services required by the utility, but this is also not simple and would have to be regulated.

It is clear that if a significant proportion of power in the utility service territory were provided by bilateral contracts, matters would be further complicated. Power suppliers would favor large customers (due to lower transaction costs), leaving smaller customers captive to increasingly expensive utility generation. The benefits of allowing bilateral contracts would not be equitably distributed to all utility customers. There are no mitigating measures to provide equitable benefits that are not cumbersome and convoluted. For these reasons, primarily related to equity of benefits and costs, allowing bilateral contracts may not be a desirable option for providing competitive electric services in Hawaii.

Option: Allow “No Sale” Wheeling Services (Using Utility Transmission System)

A special case of the preceding option would be the provision of power transmission services (wheeling) using utility-owned transmission facilities without any sale or resale of power. An example would be wheeling of power generated at a county-owned refuse plant or wind farm to a county-owned water pumping or treatment plant. There would be no sale or resale of power since the generation and destination facilities are owned by the same entity.

As explained in the previous example, wheeling services are commonly provided by mainland utilities for wholesale power transmission by tariff. Tariffs for wheeling services would have to compensate the utility for its costs, including the costs of the integral ancillary services provided by the utility resulting from connection to the utility system.

This option could be limited in scope in any of several ways. It could be limited to any transactions in which there is no sale of power (common ownership of generation and destination facilities). It could be limited to projects where the wheeled power is generated by renewable sources. It could be limited to government owned generation and destination facilities.

Without the availability of wheeling services, an entity wanting to generate its own power at a remote location has no alternative but to sell the power to the utility at the utility avoided cost and repurchase the power at the substantially higher retail electricity price. With wheeling services an entity would pay for the cost of wheeling directly by tariff rather than incur the difference between the utility avoided cost and utility retail price.

Option: Retail Competition - Customers Select Electric Service Providers.

There are various forms of retail competition options that are distinguished by several characteristics. These are outlined very briefly below:

- How the generation and transmission systems are operated:
 - regulated utility operates systems
 - independent system operator
- How the market for electric power services is operated:
 - exchange based upon market spot
 - individual customer-provider contracts or subscription
 - combination
- How ancillary services are provided:
 - as part of T&D (utility) function
 - competitive procurement by utility
 - unbundled and provided by market

- The extent to which the existing utilities are required to divest themselves of individual utility functions:
 - functional vs. complete divestiture
 - divestiture of generation function only
 - complete separation of generation, transmission and ancillary functions
- The extent to which continued regulation is necessary:
 - regulation only of T&D and ancillary functions
 - interim/transition price regulation for generation
 - permanent price-regulation for all functions
- Whether and how related societal services would be provided:
 - lifeline rates
 - DSM programs
 - renewable energy development programs
- How captive customers are served:
 - by regulated utility
 - by government
 - apportioned to all providers by regulation

Although there is a variety of potential retail competition options, all of the options rely fundamentally upon a free deregulated market to determine at least some component of electricity prices. The basic underlying premise supporting the institution of retail competition is that the competitive marketplace would function to encourage new less-expensive generation and force existing generators to control prices to compete with new sources. However, the nature of Hawaii's electric industry has not been demonstrated to be conducive to a sufficiently competitive market to effectively control electricity price without price regulation.¹¹⁸ Retail competition in Hawaii should not be counted upon to reduce electricity prices to a broad spectrum of Hawaii's electricity consumers. For this reason, retail competition should not be considered feasible at this time in Hawaii.

Option: Wholesale Market Competition - New and Existing Resources.

A competitive market for electric power supply could be established at the wholesale level. The existing utility would continue to provide transmission, distribution and ancillary services to its customers. Generation would be provided and priced in a formal coordinated competitive market. Competition could be based upon an hourly spot market, or longer-term power provision contracts. There are several variations of potential wholesale market competition options, including many of the same variables listed above for retail competition.

As with retail competition, wholesale market competition relies fundamentally upon an effective market to encourage efficient generation and control electricity prices. The nature of Hawaii's electric industry, however, has not been demonstrated to be conducive to an effective market. Wholesale competition in conjunction with price deregulation should not be counted upon to reduce electricity rates to electricity consumers.

¹¹⁸ In fact, based upon preliminary analyses, there are significant concerns regarding the price impacts of deregulating Hawaii's electric industry and relying upon a competitive market in the near term.

Option: Competition for Provision of New Wholesale Generation.

Competition for the provision of new generation at the wholesale level is one option that may be realistic for Hawaii's electric industry and could effectively lower long-range energy prices. The utility would continue to be regulated and would provide transmission, distribution and ancillary services to all customers. The existing utility would also maintain its existing generation system. New generation would be provided as needed based upon a competitive procurement process that would allow and encourage all potential electric power providers to compete on a level playing field. Impacts would be effective incrementally as new generation is required to meet new system load growth and to retire older existing or inefficient generation resources.

There are several variations of competition options for new wholesale generation that are distinguished by several characteristics. These are outlined in detail in a previous section of this report.

Option: Competitive Procurement for DSM Resources.

DSM resources are currently provided by each utility using utility staff and ratepayer funds. The fate of the existing DSM programs would certainly be subject to any form of retail competition restructuring options. Assuming, however, that retail competition will not be implemented in the near term in Hawaii, several options exist for a competitive procurement process open to providers other than the utility. There are several possible options:

- The utility or an independent entity could define programs and/or technologies based upon its IRP and could then issue an RFP for provision of the services.
- The utility or an independent entity could issue a broad DSM RFP and could then select offers based upon analysis of the offers in the utility IRP process.
- DSM resources could be evaluated competitively along with supply resources in an all-source RFP bidding process.

Option: Competition for Provision of Component and Ancillary Services.

Several services now provided by electric utilities could be provided by non-utility providers or by competitively procured contractual service to the existing utilities:

- metering and billing services
- emergency generation resources
- spinning reserve generation services
- generation, transmission and distribution maintenance

Metering and billing services and maintenance services have been competitively bid by mainland utilities and successfully implemented. We are skeptical whether competitive bidding for emergency or spinning reserve are practical in Hawaii.

Recommendations Regarding Competition and Restructuring for the Hawaii Electric Industry

The Commission, the Hawaii legislature (and the U.S. Congress) should move cautiously and without haste regarding the implementation of *retail* competition for the electric industry in Hawaii. Retail competition would be a major change to the electric utility industry that has significant risks that should be carefully considered prior to any commitment to implementation.

Hawaii has several unique characteristics that make deregulated retail competition more problematic than it is for most mainland jurisdictions.

- Hawaii's utilities are not interconnected with one another or with utility systems in other states. Each island utility system is an isolated market. Consequently:
 - EPACT wholesale generation and transmission provisions and subsequent FERC wholesale competition and transmission rules are functionally not applicable to Hawaii.
 - Capacity, reliability and stability are over-riding considerations in providing new generation and maintaining the existing utility systems. Bulk energy contracts have less value relative to mainland systems that have better means of firming capacity.
- Hawaii's utility systems are relatively small. Consequently:
 - At current economies of scale new resource acquisitions represent relatively large proportions of utility capacity. The number of potential competitors able to provide efficient generation is small relative to most mainland utility systems.
 - There is serious concern that there would not be a sufficient number of independent electricity providers to provide an effective competitive market without price regulation.
 - Because of the large proportion of generation owned by the existing utilities generation, assets would have to be divested in order to avoid undue market control in any deregulated competitive market.
- The powerful economic and political imperatives that may exist in some locations on the mainland probably do not exist in Hawaii.
 - On the mainland the **total** costs (capital and operating costs) of new, smaller, more efficient natural gas turbines recently has become less than the **marginal** costs of operating some older, larger existing generation units. This is a radical change in electricity generation economics. In Hawaii the total cost of new generation typically exceeds the total costs of embedded generation due to inflation, high construction costs in the state and the relatively small unit sizes dictated by the size of Hawaii's electric loads.¹¹⁹
 - Many mainland utilities are highly motivated to recover potentially stranded investments under the rubric of a shift to competition rather than face prudence reviews of existing generation facilities that have been rendered ineffective due to technical innovations and the drop in long-term natural gas prices. This situation probably does not exist in Hawaii.

Hawaii has the opportunity to proceed slowly with the consideration of implementation of retail competition. Hawaii lacks the economic and political urgencies that have pushed fast resolution of this matter on the mainland. Hawaii can learn by the experiences of mainland jurisdictions. It is still too early to tell whether the shift to retail competition being made in several mainland jurisdictions will prove to be prudent.

¹¹⁹ Possible future availability of LNG on Oahu could change the economics and relative costs of new versus embedded generation facilities. It does not appear, however, that this would result in total costs of new generation undercutting marginal costs of embedded generation.

Several significant and problematic issues need to be resolved prior to a commitment to implementing retail competition that will take some time and careful further examination to resolve. Some of these problematic issues are unique to Hawaii.

Without any restructuring of the electric industry there are existing competitive forces in Hawaii that will continue to play an important part of the utility economic and regulatory landscape. The PUC should monitor competitive forces as they develop in Hawaii's energy sector and enforce public utility policies that protect public utilities as appropriate and maintain a fair and healthy business climate for beneficial private enterprises. Of particular continuing and growing import are:

- inter-fuel competition
- non-utility generation provided to utilities on a wholesale basis
- distributed generation and CHP applications
- off-grid customer self-generation.

ENERGY UTILITY TAXATION

Taxes and tax structure provide powerful incentives to Hawaii's energy consumers, producers and utilities. Taxes are an important source of revenue for the state and a significant cost in providing energy services. This section looks at several aspects of Hawaii's existing tax structure and makes recommendations for alternatives.

UTILITY TAXES IN HAWAII

Utility taxes are complex and widely misunderstood. The principal taxes paid by a utility are federal and state income tax, state Public Utility (gross revenue) tax, and various employment-related taxes. The table below shows tax payments and revenues for HECO, the state's largest energy utility, for calendar year 2001.

HECO (Oahu Only) Taxes Paid (2001)			
	Value	Percent of Total Revenues from Electricity Sales	Cost per KWh
Federal			
Income	\$ 21,077,330	2.4%	\$0.0029
Unemployment	\$ 80,878	0.0%	\$0.0000
FICA	\$ 6,774,930	0.8%	\$0.0009
Excise	\$ -	0.0%	\$0.0000
Federal Subtotal	\$ 27,933,138	3.1%	\$0.0038
State			
Income	\$ 2,131,538	0.2%	\$0.0003
Unemployment	\$ 172,685	0.0%	\$0.0000
Public Service Company	\$ 51,624,635	5.8%	\$0.0071
PUC Fee	\$ 4,386,120	0.5%	\$0.0006
Use and Excise	\$ 947,063	0.1%	\$0.0001
State Subtotal	\$ 59,262,041	6.6%	\$0.0081
County			
Franchise Fee	\$ 21,502,689	2.4%	\$0.0029
Total Taxes	\$ 108,697,868	12.2%	\$0.0149
Total Revenues	\$ 891,698,554	100.0%	\$0.1219

Figure 19 HECO Taxes and Revenues (2001)

The largest portion of this is the Public Service Company (gross revenue) tax levied by the State, followed by Federal Income Tax and County Franchise tax. Other taxes are relatively minor. Taxes for Hawaii's other utilities are approximately equally proportioned.

Not all of these are normally thought of as "taxes" in the traditional sense, or are substitutes for other types of taxes or fees generally imposed on other types of businesses. For example, the County Franchise Fee is paid in lieu of County real property tax. The state Public Service Company tax is levied in lieu of collecting General Excise Tax from the provision of public utility services.

Taxes comprise just over twelve percent of total utility revenue. This is approximately equal in magnitude to the utility's net income for shareholders and to its operating expenses (all labor and materials). It is dwarfed by the cost of producing electricity – fuel, purchased power, and the operating costs, interest, and profit associated with generating facilities.

Some analysts compare total utility taxes to the utility net income. This produces a very different picture, since the net income is only about 10% of the total revenue.¹²⁰ This perspective creates the impression that taxes are a huge part of the utility financial picture. Since other expenses are the lion's share of total utility costs in Hawaii, it is more appropriate to show taxes as a portion of the entire utility bill. The chart below depicts the breakdown of where the HECO utility dollar goes. The situation is similar on the neighbor islands.

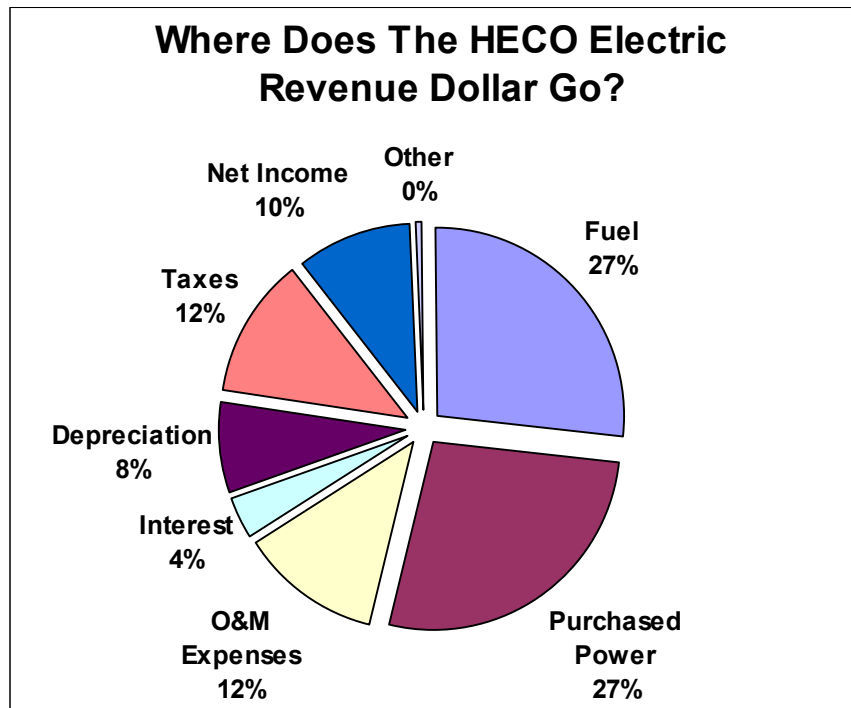


Figure 20 HECO Revenue Expenditures

Generation costs are by far the lion's share of electric utility costs in Hawaii. Generation costs are embedded in several of the categories shown in the chart above. A more explicit breakdown of costs by direct utility function is provided in the chart below. HECO is again used as the basis for comparison. Generation accounts for 80% of HECO's utility costs.

¹²⁰ It is sometimes quoted that utility taxes are over half of utility income. This is true if the meaning is that taxes are more than half of utility before-tax income. This statement is misleading to some people, however, because "income" is sometimes erroneously construed to mean "revenue".

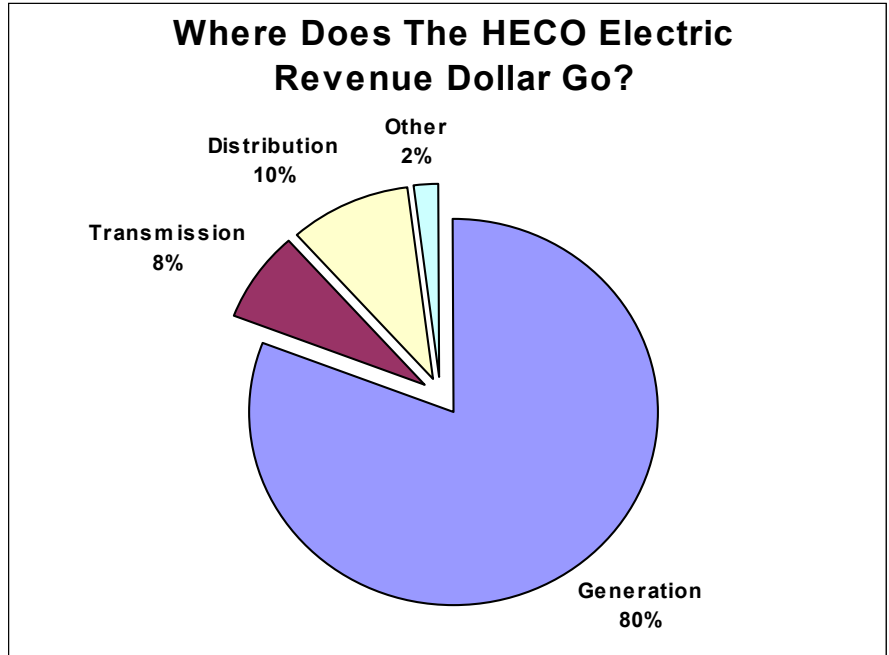


Figure 21 HECO Revenue by Function

Taxes on Hawaii's energy utilities comprise a minor portion of total state and county revenues. This is depicted on the charts below.

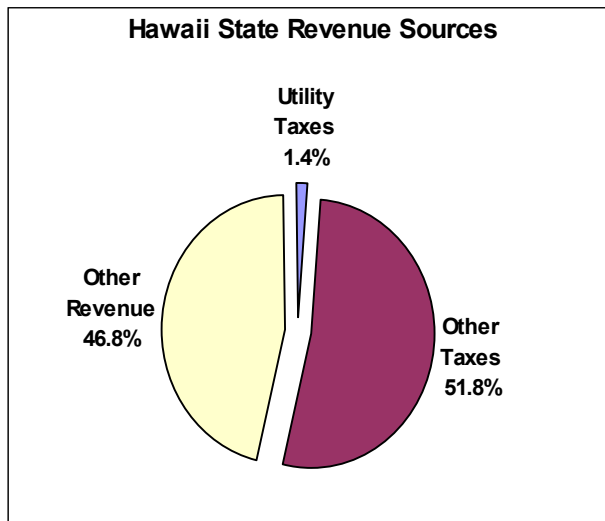


Figure 23 Hawaii State Revenues (2001)

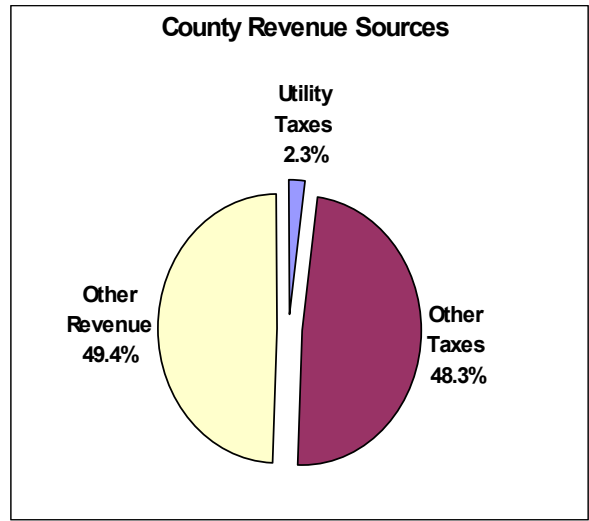


Figure 22 County Revenue Sources (2001)

ALTERNATIVE TAXATION APPROACHES

There are alternative approaches to taxing utilities that result in a different tax effect on consumers, or a different tax behavior by utilities. For business customers, all utility payments are deductible business expenses for state and federal income tax purposes, and it does not matter how the utility taxes are imposed or collected. For residential consumers, however, utility

payments are not deductible, and must be paid with after-tax income. For this group of customers, it would be possible to restructure utility taxes to reduce the effect of federal income taxes.

For example, for residential homeowners, property taxes are deductible in computing taxable income for federal income taxes. If the current tax burden on Hawaii utilities borne by residential customers for state income tax, state Public Utility Excise tax, and county Franchise tax were instead imposed and collected as part of property taxes, the cost would be deductible for income tax purposes, and the federal government would bear a proportion of the Hawaii tax burden in the form of lost federal income taxes. There are negative elements to this approach, notably in that the energy conservation benefit of higher electricity prices would be lost, as the roughly 10% of utility revenues now reflected in electric rates would be moved to property taxes. This would have the effect of reducing the residential share of these taxes by about 20%, (the average federal tax rate). Since residential revenues are about 25% of total utility revenues, and these taxes are about 10% of utility revenues, this would reduce the tax burden in Hawaii by $20\% \times 25\% \times 10\% \times \100 million, or about \$500,000. This approach has no value for the non-residential sector. Given the complexity of making the system fair, compared with the current system of taxing utility gross revenues, it is probably not worth implementing.

One positive aspect of Hawaii utility taxation is that utilities are not taxed on the value of their property. Since renewable energy resources (notably wind energy and geothermal energy) are capital-intensive compared with oil-fired power plants, a property tax would have the effect of imposing a higher level of tax on utility renewable resources than on oil-fired generation, where the majority of the cost is in fuel, not in the investment in the plant itself. Regarding utility-owned resources, Hawaii's existing system is more favorable to capital intensive resources than most jurisdictions in the United States.

However, this positive aspect does not apply to non-utility power generators who **are** subject to property taxes. IPP's are taxed in ways that utilities are not, first in property taxes, then by excise taxes. The energy produced by IPP's and sold to the utility is then taxed again by the Franchise fees (intended to be in lieu of property taxes) and again by the Public Service Company tax (intended to be in lieu of excise taxes).

If the State of Hawaii wanted to modify the tax system to provide a bias in favor of energy efficiency and renewable resources, it could tax the fuel input for electricity generation, rather than the utility gross revenues. This approach would cause the utility, in evaluating alternative resources, to have a more favorable view of efficiency and renewable resources.

RECOMMENDATIONS ON UTILITY TAXES

Assuming that the total revenue collection for Hawaii state and local government is to remain unchanged, the only modification to the form of taxation that we believe would produce a meaningful impact in the state would be to tax the hydrocarbon portion of electricity more heavily, and the non-hydrocarbon (distribution costs and renewable generating resources) less heavily. This could be designed in a manner that is initially revenue-neutral. This would contribute to a preference for non-fossil resources and energy efficiency in the utility resource evaluation process. If the utility responded to this incentive by increasing the non-carboniferous portion of its power supply, future tax receipts would be lower. However, as we discuss elsewhere, since both renewable energy resources and efficiency resources have a larger "local content" of labor and indigenous materials than conventional generation does, there would be offsetting tax revenues from the choice of alternative resources. This option is discussed below.

Option: (Legislature) Tax The Carbon, Not the Electricity

Hawaii's utility tax structure could be changed to provide incentives for non-fossil-fueled resources without changing the total amount of utility taxes.

Hawaii currently receives substantial revenue in the form of gross revenue taxes on electric utilities. For HECO alone, state and county taxes total about \$80 million per year, primarily in the form of the state Public Utility tax and the County Franchise tax. With generation of 7.7 billion kilowatt-hours per year, and sales (after line losses) of approximately 7.3 billion kilowatt-hours per year, this works out to an average tax of \$.011/kWh.

It would be possible to reconfigure this current tax revenue to influence future choices of electric generating technology. Instead of basing these taxes on electricity sales, the taxes could be based on the use of fossil fuels for electric generation. This would have the effect of providing a "preference" of about a penny per kWh for the use of energy efficiency or renewable generating resources.

Oahu's electricity generation from fossil fuels is approximately 80% from oil, and 20% from coal (the AES/BP unit at Barbers Point).¹²¹ The table below roughly estimates the carbon dioxide emissions from each of these sources:

Fuel	CO2 Tons/MWh	Energy MWh/Year	CO2 Million Tons
Oil	0.693	6,200,000	4.3
Coal	0.846	1,500,000	1.3
Total		7,700,000	5.6

Figure 24 Example Oahu Electric Generation Fossil Carbon Emissions

In order to generate \$80 million per year as a levy against 5.6 million tons of CO2 emissions, a levy rate of \$14/ton would be required. This is well within the range of typical estimates of the "cost" imposed by carbon dioxide emissions. The state of Oregon uses a range of \$10 - \$40/ton for measuring the cost of CO2 emissions. The Northwest Power Planning Council's Regional Technical Forum recently adopted a value of \$15/ton for CO2.

The prior HEPP report identified several such studies measuring the cost of carbon (not CO2) emissions, with estimated costs ranging from a low of \$10/ton (TGC, Low) to as high as \$186/ton (MIT Study, USA). These equate to \$30/ton to \$550/ton for CO2 emissions.¹²²

A carbon dioxide tax of \$15/ton (carbon tax of \$5/ton) would generate approximately the same level of total revenue as do the current Public Service Company and County Franchise taxes from HECO. This would have the automatic effect of producing a preference for renewable energy resources in the utility procurement process.

Since renewable resources contain a larger local labor content than fossil-fired generating resources and this local labor content produces a significant economic stimulus to the state

¹²¹ Some electrical generation on Oahu is provided by combustion of "refuse derived fuel" at the H-Power plant. Although this combustion results in carbon emissions, they are not from a fossil fuel source. These carbon emissions (and those resulting from biomass combustion) are not considered to be net additions of fossil carbon to the atmospheric carbon cycle and are thus exempted from the example provided.

¹²² Feinstein, Charles, *Environmental Requirements on Energy Producers*, February 2003

economy, it is likely that total state tax revenues would not be adversely affected by such a shift of priorities.

A more precise estimate of the CO2 tax needed to produce equivalent revenues can be performed as necessary. The conclusion of this analysis is that the level of tax needed to produce equivalent revenue is well within the range of estimates of the cost imposed by these carbon emissions.

Option: (Legislature) Take Advantage of the State's Tax-Exempt Bonding Authority

Making state tax-exempt revenue bond financing available to renewable resources could substantially reduce the costs of these resources.

The State of Hawaii can borrow at favorable interest rates due to its high AA bond rating, and the exemption from federal income tax on interest earned on state and local bonds. These factors combine to produce a 10-year bond rate currently less than 4%, and a 30-year bond rate of less than 5%. This compares favorably with the allowed rate of return to the utilities of more than 12% (including tax effects).

The impact of this difference in borrowing costs can dramatically affect the cost of capital-intensive energy resources. The table below compares the annual carrying cost of a solar water heater investment (10-year loan) and a wind farm investment (30-year loan) using 100% debt financing using state tax-exempt bond financing compared with utility taxable equity and debt financing. These examples are designed solely to illustrate the difference between financing options, and not as an indication of the actual cost of developing actual resources in actual locations in Hawaii.

By contrast, state bonding has substantially less relative impact on the cost of power from a conventional oil-fired power plant, because so much of the cost of that power is fuel-related, and there are no savings on fuel through the use of state bonding. Making state tax-exempt bond funding available for the development of renewable resources by entities other than the utilities would significantly reduce the cost of these resources, making them much more competitive with conventional generating resources. Because of the high local labor content of such resources, tax revenues to the state would probably increase with such substitution.

	Solar Water Heater	Wind Generator
Capital Cost	\$3,500 per house	\$1.5 million per MW
Annual Operating Cost	\$0	\$50,000 per MW
Life of Financing	15 years	30 years
Utility Cost of Capital (with income tax)	12.00%	12.00%
Municipal Bond Cost	4.50%	5.00%
Annual Fixed Cost - Utility Financing	\$514	\$186,215
Annual Cost - Municipal Financing	\$326	\$97,577
Total Cost - Utility Financing	\$514	\$236,215
Total Cost - Municipal Financing	\$326	\$147,577
Annual Energy kWh	3,500	3,000,000
Cost/kWh -- Utility Financing	\$0.147	\$0.062
Cost/kWh -- State Bond Financing	\$0.093	\$0.033

Figure 25 Financing Comparison

INCENTIVES FOR ETHANOL PRODUCTION FACILITIES

Ethanol can be produced from several biomass feedstocks available in Hawaii. A mixture of ninety percent gasoline and ten percent ethanol (E10) can be used interchangeably with ordinary gasoline for motor vehicles. Ethanol can displace petroleum use and reduce fossil carbon (greenhouse gas) emissions.

Hawaii offers several existing incentives to encourage construction of ethanol production facilities:

- **Investment tax credit.** Hawaii offers a substantial investment tax credit for construction of ethanol production facilities.¹²³ This tax credit is often referred to as a “production” credit, which it resembles. The amount of the tax credit is indexed on production capacity and is disbursed over a period of years. The tax credit is designed to approximate thirty cents per gallon of ethanol produced for the first eight to ten years of production.
- **Ethanol content requirement for gasoline.** Hawaii statutes require the Hawaii Petroleum Commissioner to adopt rules to require that some proportion of gasoline sold in Hawaii for use in motor vehicles must contain ten percent ethanol.¹²⁴ Rules requiring E10 fuels have not been adopted.
- **Excise tax exemption.** Retail sales of alcohol fuels are exempt from the 4% state excise tax.
- **Reduced highway fuel taxes.** Motor vehicle fuels containing at least 85% ethanol are subject to taxes equal to half the tax of diesel fuels.

There are several prospective ethanol production projects that are in various stages of implementation in Hawaii:

- A Maui project would produce 7.2 millions gallons of ethanol per year from molasses (byproduct from sugar cane refining operations). This project would use conventional technology.
- A Kauai project would initially produce 6 million gallons per year and perhaps be supplemented by an additional 6 million gallons per year capacity in later years. This project would use biomass to produce syngas for use in turbine/stationary power or conversion to ethanol fuel (or some combination). This project would use innovative technology.
- An Oahu project would produce up to 15 million gallons per year from molasses from Kauai and perhaps other islands. This project would use conventional technology.

Of these three projects the Maui project has progressed the furthest. This is the only project to register with DBEDT a notice of intent to construct ethanol production facilities. This is a necessary step for producers to be eligible for the state investment tax credit. This project is being delayed by inability to obtain assurances from the State of Hawaii regarding both the availability of the investment tax credit and the promulgation of rules requiring ethanol content in gasoline.

The investment tax credit is being delayed by the state administration. The magnitude of the tax credit is perceived as excessive because it can ultimately result in a producer recovering tax credits that are as much as or more than the original capital investment in the production

¹²³ HRS 235-110.3 Ethanol investment tax credit.

¹²⁴ HRS 486J-10 Ethanol content requirement. (L 1997; am L 2002).

facilities.¹²⁵ Viewed purely as an investment credit, this can easily be perceived as quite generous. Proponents of the tax credit tend to view it and describe it more as a “production” credit equal to thirty cents per gallon of ethanol produced. The tax credit has several attributes that resemble a production credit more than a typical investment tax credit.

- Since thirty cents per gallon of production capacity is less than thirty percent of the investment cost of ethanol production facilities, the amount of the credit is effectively indexed on the amount of production, not the amount of capital investment.
- The credit is disbursed over a period of years and is only available contingent upon continued production.
- The credit was originally conceived as a production credit to offset high operation costs of ethanol production and has been cast as an investment tax credit primarily for legal and administrative purposes.

In any case, it appears that the existing incentives provided in Hawaii statutes are sufficient to attract investment and promote construction of ethanol facilities in Hawaii. These incentives will only be effective, however, if they are implemented by the state administration. There are several projects actively progressing on the statutory promise of the investment tax credit and the expected promulgation of rules requiring ethanol in gasoline. Until these incentives are actually implemented, however, it is unlikely that any of these projects will be able to secure necessary equity financing and proceed further.

Several reports and documents addressing ethanol production facilities in Hawaii are provided in the CD Appendix to this report.

PUBLIC VERSUS PRIVATE UTILITY OWNERSHIP

There are several forms of ownership of energy utilities:

- An Investor Owned Utility (IOU) is a corporation owned by shareholders and overseen by a board of directors elected by shareholders. Until recently all of Hawaii's energy utilities were IOU's.
- A cooperative utility is a corporation owned by its customers and overseen by a board of directors elected by its customers. Recently the Kauai Electric Company was sold to the Kauai Island Utility Cooperative establishing Hawaii's first major cooperative utility.
- A municipal utility is a government agency overseen by an elected or appointed board. Most of Hawaii's major water utilities are county-owned municipal utilities.

There are several differences between IOU's and publicly owned utilities in how these utilities are financed and taxed. These differences generally offer financial advantages to public utilities.

¹²⁵ The amount of the tax credit is based on the lesser of thirty percent of the investment or thirty cents per gallon per day of production capacity. This amount is offered repeatedly each year for eight to ten years. Thirty cents per gallon per day of production capacity is very likely to be the lesser amount. This results ultimately in an accumulated nominal credit of \$2.40 to \$3.00 per gallon per day of production capacity. Current estimates of project facility capital costs are in this general range of magnitude.

- IOU's are financed with both debt and corporate equity. Public utilities are fully debt financed. In general, return on IOU corporate equity is more expensive than interest on debt.¹²⁶
- IOU's pay taxes on corporate earnings. Public utilities do not.
- Taxable bonds issued and backed by IOU's carry higher interest rates than tax exempt government bonds.¹²⁷

The differences in the financial structure of IOU's and public utilities can lead to different perspectives on resource acquisitions, particularly decisions to invest in utility-owned resources versus contracting for IPP-owned resources. IOU's look at capital expenditures on utility-owned resources as opportunities to maintain and expand corporate equity. Public utilities tend to be more indifferent to maintaining utility equity and may look more favorably on the levelized financial benefits that IPP contracts can offer.

There is an extensive body of literature comparing all aspects of public versus private ownership of utilities, based both in economic theory and empirical analysis. Many studies address the question of whether or not public ownership is more or less economically efficient than private ownership. Many studies examine the effectiveness utility regulation compared to competitive markets.

Most empirical analyses of mainland utilities have found that public utilities charge less to customers than privately owned utilities, but this simple comparison is not conclusive due to several complicating factors. For example, many public utilities have preferential access to relatively inexpensive power from federal hydroelectric power projects. In addition, municipal utility rates are sometimes politicized and subsidized by the governments of which they are a part. The findings of studies that correct for many complicating factors are mixed. In any case, the applicability of mainland statistical studies to Hawaii's utilities is questionable. As far as empirical analysis, in Hawaii, we will have to look to KIUC as our example of customer utility ownership.

¹²⁶ Corporate earnings, which are an important component of the "cost" of corporate equity are not a cost to public utilities. Since public utilities are "owned" by the public (or in the case of cooperatives, by the customers) payments against public utility equity are not necessary.

¹²⁷ This factor is less important in Hawaii than in some other jurisdictions. A large part of the debt financing of Hawaii IOU's is by state special purpose revenue bonds. Although these bonds are backed by the utilities, not the government, they are tax exempt and are less expensive to the utility than company issued bonds.

INSTRUMENTS TO PROMOTE RENEWABLE AND EFFICIENCY RESOURCES

The purpose of this section is to briefly enumerate several of the instruments that have been or could be considered to promote renewable resources in Hawaii. The general nature of impacts of the instruments on prices available for development of renewable and efficiency resources is also discussed.

There are four broad categories of instruments that could be implemented by government:

- financial incentives
- financial penalties
- mandates
- direct purchase or financing

Several instruments are identified in each of these categories below. In a strict sense, several of the instruments fall in between or in some combination of categories. Several instruments are presently functioning. Several have been identified in the text of this and other studies.

PRICE IMPACTS

For each category of instruments a brief explanation is provided regarding the nature of the impact upon the prices available for renewable and efficiency resource implementation. Currently utility avoided costs are the benchmark for determining renewable and efficiency resource cost-effectiveness. These include avoided capacity costs and avoided energy costs.

Avoided capacity costs are most dependent upon the types of generation facilities that will be built by the utilities in the future. Avoided capacity costs are estimated rigorously as the impacts of deferral of utility-financed capital costs of planned generation units. Several simpler methods of estimating these costs are commonly used.

For “as-available” resources, avoided energy costs are of most significance. As a rough rule of thumb, avoided energy costs will increase approximately at the rate of petroleum prices. Long term petroleum prices have been forecasted to escalate at a rate of 0% to 2% per year in real terms (above the rate of inflation).

Liquid Natural Gas facilities in Hawaii, now being discussed in a strategic planning context, could reduce avoided energy costs.

Future hydrocarbon taxes or emission fees could increase avoided energy prices.

Financial Incentive Instruments

Financial incentive instruments are designed to provide differential advantage to renewable or efficiency resources by subsidizing these resources.

These instruments tend to reduce the costs of implementing renewable or efficiency resources but would not otherwise directly affect the applicable price available to pay for the resources.

Tax Credits

Hawaii has existing tax credits for installation of solar water heaters, wind energy systems and photovoltaic energy systems. Tax credits are a direct subsidy by the state and result in lower tax revenues.

Special Purpose Revenue Bonds

Hawaii can issue tax exempt special purpose revenue bonds (SPRB's) for certain purposes. SPRB's could be issued for renewable energy projects or as a source of funding for loan programs.

In order to use SPRB's for energy efficiency measures there would have to be a statutory finding that these measures served a public benefit. A state energy finance authority could be set up for this purpose. The State of Washington Legislature adopted statutes that allow municipal utilities to use state tax-exempt bonds for energy efficiency programs and determines that this is a public benefit.

Revolving Loan Programs

A state or county agency or publicly funded non-profit entity could administer a loan program for renewable or efficiency resources. Under certain conditions (see above) a loan program could be funded by SPRB's.

Financial Penalty Instruments

Financial incentive instruments are designed to provide differential advantage to renewable or efficiency resources by penalizing conventional resources.

These instruments tend to increase the available price to renewable and efficiency resources by increasing the costs of conventional resources.

Emission Fees

Fees could be assessed against environmental emissions. This would have the effect of penalizing fossil fueled resources and could provide a source of revenue for financing alternative resources. Emission fees could be assessed on specific pollutants or on carbon emissions.

Hookup Fees

The state or county could assess fees for construction permits or electrical permits. Fees could be assessed based upon electrical demand or on an evaluation of energy efficiency (credits or waivers could be provided for efficiency measures). Fees could be used by the counties to fund energy code compliance enforcement.

Taxation

Utilities in Hawaii are presently taxed primarily on the basis of revenues. As explained above in this report, taxes could be levied on fuel consumption or on carbon emissions. This could be implemented to be initially revenue neutral. This would provide a differential incentive to renewable and efficiency resources.

It is possible, and according to some sources likely, that some sort of carbon tax may be imposed on fossil fuel emissions within the next decade or decades.

It would also be possible to levy a tax on "cheap" wasteful energy-consuming appliances. Hawaii could put a tax on incandescent light bulbs or resistance electric water heaters. These resources

are purchased frequently because the initial purchase price is much less than alternatives that are more economical on a full cost life-cycle basis.

Mandate Instruments

Mandate instruments are mechanisms to require some level of implementation of particular resources. The prices available for implementation of these resources would be at the cost or bid clearing price of the resources (with competitive pricing) or at the utility-financed and taxed cost of the resources (if determined at avoided cost).

Energy Codes or Standards

Energy codes are an effective way to require the installation of energy efficient appliances and energy efficient building practices. A present obstacle to implementing energy codes is the cost of plan review and enforcement by the counties. As noted above, hookup fees could be used by the counties to provide funding for review and enforcement of energy codes.

Integrated Resource Planning

IRP is listed here as a mandate instrument. This is consistent with a rigorous interpretation of the Hawaii PUC's IRP Framework. IRP has not, however, been implemented as a mandatory framework for determining what types of resources will be implemented in Hawaii.

Renewable Set Asides

Some states have identified specific percentages of electrical demand that will be met by particular resources. In assessing the need for conventional resources the demand "set aside" for the specified resources is not considered.

Renewable Portfolio Standards

Renewable portfolio standards have been adopted by some states that mandate the implementation of specified amounts of particular types of resources by specific dates. In some cases the standards are accompanied by a system of credits and/or penalties that serve as economic incentives to enforce the implementation of the standards.

The Hawaii Legislature has considered mandatory renewable portfolio standards but has adopted only a voluntary version of this instrument. It is widely agreed that Hawaii's voluntary statute will not be effective.

As noted earlier in this report, the PUC has a provision in its existing IRP Framework to effectively implement a version of portfolio standards by identifying utility objectives to be considered in each utility's IRP application. This would allow the costs and other attributes of the utility resource mix to be carefully assessed in determining the appropriate levels for each utility portfolio.

Direct Financing Instruments

One way government can promote the implementation of renewable and efficiency projects is by direct investment or by providing funds for purchase of these resources. These instruments would not directly affect the prices available for implementation of the resources. Prices would be at the cost or bid clearing price of the resources (with competitive pricing)

Government Renewable and Efficiency Projects

Hawaii already has statutes requiring state agencies to comply with efficiency guidelines in HRS Chapter 196. The advantage of direct investment in cost-effective energy efficiency resources is that these resources save the government money in the long term.

Hawaii could, in principle, invest directly in the financing, purchase or construction of renewable energy generation projects.¹²⁸

System Benefit Charges

System benefit charges are used in many mainland jurisdictions to fund energy efficiency and public benefit programs that are otherwise displaced by the implementation of energy restructuring, competition and/or deregulation. As applied in Hawaii, system benefit charges refer to charges made to utility customers as part of electric bills. In this sense, the existing utility DSM programs as well as the special fund that finances the PUC and DCA are presently funded by system benefit charges.

As suggested in the text above, system benefit charges could be used as they are in other states to finance the implementation of DSM programs or other beneficial programs by non-utility entities. Examples cited in the text of this report are Efficiency Vermont (a non-profit energy efficiency utility) and the New York State Energy Research and Development Agency (a non-profit non-utility energy efficiency services provider).

Green Pricing

Green pricing is a means to allow utility customers to choose to pay extra on their utility bills to fund preferred, but more expensive utility resources. The extra funds collected from customers are used to purchase or pay the difference in costs to purchase “green” (renewable or preferred) resources. Hawaii has a program that allows the customer to donate money for solar photovoltaic installations at Hawaii’s schools. Although this program has benefits, it does not function and is not perceived as a green pricing program.

¹²⁸ Government-owned generation projects would be more cost-effective if wheeling services were available to allow transfer of power generated by government resources to government facilities on existing utility transmission lines without purchase and resale by the electric utility.

CROSS-REFERENCE TO ACTIONS AND OPTIONS

The Table of Contents provides a reference to locate Actions and Options according to the general topics and organization of the report. This cross-reference section is provided as a supplemental guide to facilitate the use of this report as a reference. Actions and Options are listed below according to immediacy, sorted by implementing agency.

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<u>Action: (PUC) Open Generic Dockets or Use Rulemaking to Address Policy Matters</u>	33
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<u>Option: (PUC, Legislature) Create a System for Intervenor Compensation</u>	55
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<u>Option: (Governor, Legislature, DBEDT) Assign the ERC Duties to Advocate Energy Policy in Matters Before the PUC</u>	48
<u>Option: (Counties) Utility Permit Fees to Fund Energy Code Enforcement</u>	113
<u>Option: (Utilities, PUC, DCA) Provide Studies of Wind Resource Carrying Capacity</u>	114

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Options Requiring Legislative Action

The actions and options listed in the previous sections above could be implemented in whole or in part by the agencies identified without action by the Legislature. Legislation could be considered to encourage or mandate implementation. The options listed below would require some action by the Legislature prior to implementation by state agencies.

Options Requiring Action by the Hawaii Legislature

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<u>Alternative: (Legislature) Rename and redefine the DCA case audit and litigation staff as a neutral case audit and litigation staff and create a separate smaller agency with a pure consumer advocacy and public information duty.</u>	45
<u>Alternative: (Legislature) Transfer the PUC to the DCCA and consolidate and augment the staff as appropriate.</u>	45
<u>Option: (Legislature) Reassign the ERC to Be the Administrator of an Energy Division</u>	48
<u>Option: (Legislature) Update Legislative Findings Regarding Energy Policies</u>	49
<u>Option: (Legislature) Clarify Priorities in Hawaii's Energy Policies</u>	49
<u>Option: (Legislature) Direct the PUC to Implement Renewable Portfolio Standards.</u>	100
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Options Requiring Substantial Further Investigation Before Implementation by the Legislature

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CD APPENDIX

An Appendix to this report is provided in compact disc (CD) format. An outline of the directory structure of the CD Appendix is provided below.

CD Appendix

- 1 Report and PowerPoint
- 2 Appendices by Topic
 - Competition _ Restructuring
 - DSM Programs
 - E-Filing
 - Ethanol Production
 - Externalities
 - Fuel Adjustment Mechanism
 - Glossary
 - Incentives In Regulation
 - Instruments to Promote Renewables
 - Net Metering
 - Renewable Portfolio Standards
 - System Benefit Charge
 - Intervenor Funding
 - IRP
 - Levelization
 - Siting Energy Facilities
 - Staff Levels
 - Standby Tariffs
 - Taxation
 - Time of Use Rates
 - Wind Resources
- 3 Statutes and Rules
 - HRS Hawaii Revised Statutes
 - PUC Administrative Rules
- 4 PUC Management Audits
 - 1975 Audit Vol_1
 - 1975 Audit Vol_2
 - 1989 Audit
- 5 PUC Website Documents
- 6 HEPP Website Documents
- 7 Hawaii State Information

To obtain a copy of the CD Appendix and Report contact: Carl Freedman at energy@flex.com

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