

HSWAC Comments Regarding HES 2007¹

Written Comments and Responses

- Will we be able to see all written comments?
- Will we be able to see all responses to these comments?

Stakeholder Review

- Will stakeholder review comments (throughout the project) be included in the final report?

RMI Will Test Strategic Pathways vs. Three Scenarios

- In your presentation you discussed three fuel price scenarios (see slide 10). You claimed that they were equally likely scenarios.
- Is this really the case?
- I have written an article (Attachment A - "Will the Price of Oil Ever Come Down? - Don't Bet on It.") about future oil prices that strongly suggests that the "Constrained World: High Fuel Prices and Climate Change Regulation" scenario is the more likely scenario.
- What leads you to believe that the other two scenarios (especially the "Adequate Supplies: Moderate Long Run Prices" [i.e., \$45/bbl]) are equally likely, or likely at all?
- Even if the first scenario is even remotely possible, doesn't it make sense for Hawaii to wean itself off fossil fuels and to aggressively pursue energy efficiency and renewable energy technologies? If so, why waste a lot of time and effort on less likely scenarios?

Classification and Treatment of Seawater Air Conditioning in This Study

- How will renewable energy electricity displacement technologies such as seawater air conditioning (SWAC) and solar thermal (including solar water heating) be treated in this study?
- Will they be classified and treated as renewable energy technologies (which they are) or as energy efficiency technologies?
- SWAC is clearly a renewable energy technology (see Attachment B).
- What criteria will you use to make this determination?

¹ These comments regarding HES 2007 were submitted to the Rocky Mountain Institute (RMI) by Honolulu Seawater Air Conditioning LLC (HSWAC) on July 11 and 14, 2006. For additional information please contact: David Rezachek, Ph.D., P.E., Associate Development Director, Honolulu Seawater Air Conditioning, LLC, 7 Waterfront Plaza, Suite 400, 500 Ala Moana Blvd., Honolulu, HI 96813, Cell Phone: (808) 282-5594, Telephone: (808) 543-2024, Fax: (808) 543-6043, Email: rezachekd001@hawaii.rr.com

Quantitative Risk Assessment and Risk-Adjusted Discount Rates

- On slide 5, you state that RMI uses quantitative risk analysis (define the underlying volatility of fossil fuels and evaluate the value of renewables and efficiency hedges).
- Please describe the quantitative risk analysis process/methodology that RMI intends to use.
- How will RMI determine the “value” of renewables and efficiency hedges?
- How will this added value be used in the development of an implementation plan?
- One of the major problems associated with Hawaii’s current IRP process is a lack of any thorough analysis and quantification of the risks associated with continued use of imported fossil fuels.
- For example, under the current regulatory system, utilities are allowed to pass the costs of fossil fuels directly to customers. Utilities pass any changes in the costs of oil directly along to its customers. Utilities, are thus shielded from most of the risk of oil price increases. Customers assume most of the risk of higher fuel prices. A large increase in fuel prices and the related electricity charge may result in a much smaller decrease in use and, as a consequence, a slight reduction in utility sales. Thus, utility risk due to oil price increases is significantly less than is the customers’ risk.”
- Furthermore, by failing to take these risks into account, utilities undervalue the benefits of energy savings (i.e., reductions in the use of imported fossil fuels) provided by renewable energy, energy efficiency, and DSM technologies.
- Utilities use their weighted-average cost of capital (WACC) -- the weighted-average cost of their equity and debt -- as a discount rate for both capital and energy expenditures. The utility’s present value factor is equal to its after-tax cost of capital. The use of the WACC as a discount rate is inappropriate, at least with respect to energy costs.”
- Discount rates affect the revenue requirements for a particular DSM measure. Using an inappropriate discount rate, which is too high, biases the results against renewables (such as solar water heating), and in favor of low-capital, fuel-intensive technologies with high variable costs (e.g., fossil-fueled power plants and, particularly oil-fired power plants).
- According to the Hawaii Solar Energy Association’s (HSEA) final position statement in Hawaii PUC Docket No. 00-0209, Shimon Auwerbuch stated that “[t]he widespread use of the WACC as the discount rate ... is inconsistent with textbook finance, and leads to distorted results and sub-optimal decisions.” He further stated that “[t]he WACC-based approach ignores financial risk and hence leads to unreliable results’ and ‘WACC-based results ... tend to understate the riskiness of future fossil fuel outlays.”
- Auwerbuch goes on to say “[o]perating outflows, however, especially those for fuel, are riskier. Oil prices in the post-embargo environment move counter-cyclically ... suggesting that oil-based generation may be considerably riskier than generating with capital-intensive technologies.”

- "Under current practice, risky fuel expenses are discounted too heavily (using the WACC), which masks their importance and overstates their desirability relative to less risky capital outlays. ... Properly analyzed, risky fuel outlays should reduce the project's discount rate ... Capital market theory therefore suggests that fuel outlays be discounted at lower rates."
- Auwerbuch provides the following example. "Consumers usually prefer 'safe' predictable outlays over risky ones. In the home-mortgage market, for example, most consumers willingly pay the premium for a fixed rate in order to avoid the risk associated with adjustable-rate mortgages, thus in essence discounting the 'safer' outflows at a higher rate. Presumably, consumers would prefer relatively fixed (or at least known) future electric rates to those that fluctuate dramatically due to fuel, all else being equal. Given an equal stream of predictable capital charges as compared to fuel prices, most consumers would rather be obligated to pay the former. Yet this is not the result obtained with the WACC -- it equalizes the two streams contrary to consumer preference."
- "Finally, the DSM cost analyses, whether risk-adjusted or WACC-based, are based on the implicit assumption that the projected oil and electric price stream are an unbiased estimate of future expectations. But oil-price forecasts have been wildly inaccurate in the past, so that consumers may view the thirty-year [or twenty-year] oil price forecast presented to them as unreliable."
- Use of solar water heating, [seawater air conditioning], and other DSM measures, helps consumers to stabilize their effective electric rates or costs.
- Auwerbuch has recommended a proxy [discount] rate of 0.0% for oil/gas and 5.0% for coal.
- HSWAC proposes that RMI use risk-adjusted discount rates to determine the true value of energy savings.

Near-Term, Mid-Term, and Long-Term Plans

- Reb Bellinger, Makai Ocean Engineering, stated that the subject study needs to develop Near-Term (0 - 5 years), Mid-Term (5 - 10 years), and Long-Term (10 - 20+ years) Plans. Honolulu Seawater Air Conditioning LLC strongly agrees with this suggestion.
- The world, in general, and Hawaii, in particular, is faced with significant energy problems. Hawaii is dependent on imported fossil fuels for more than 90% of its energy needs, and the vast majority is oil. Since 2002, the price of oil has risen from less than \$20 per barrel to more than \$70. Some (e.g., http://money.cnn.com/2006/07/14/news/economy/oil_lookahead/index.htm) are predicting that this could increase to ("\$80 to \$85 a barrel over the next couple of months barring any new major events, and \$90 to \$100 if things escalate.").
- Furthermore, Oahu is faced with a severe reserve electricity generation capacity deficit. The next power plant won't be completed until 2009, at the earliest. And, opposition to any new fossil fuel power plants and permitting issues could delay this.
- Hawaii (and especially Oahu) needs to do something immediately!

- There are a number of technologies that could immediately help to alleviate these problems, if they are aggressively pursued. This includes seawater air conditioning and solar thermal (solar water heating). Intermittent renewable energy technologies, such as wind, will also help. These technologies represent cost-effective, near-term solutions. Net-metered PV can also contribute, but current costs would likely prohibit utility-scale, grid-connected systems.
- Other renewable energy technologies are in earlier stages of development and/or need improvements in cost effectiveness. These technologies should be pursued in the mid-term. One such technology is ocean thermal energy conversion (OTEC). Biomass is also an important contributor, but it will take several years to develop dedicated biomass plantations.
- Long-term solutions may include hydrogen (an energy carrier - not an energy source), but only if this hydrogen can be produced from renewables.
- With limited funding available to fund renewable energy and energy efficiency development, there needs to be some planning and prioritization to assure that Hawaii gets the biggest bang for the buck throughout all stages of the proposed plans.

Environmental/Regulatory Trends

- One of the Inputs for RMI's Approach for Defining Hawaii's Energy Strategy is Environmental/Regulatory Trends.
- This study should look at how possible trends (e.g., greenhouse gas fees or penalties; "no new fossil fuel power plants" policies; etc.) affect the choice of energy sources in the future.
- This study should also make recommendations on possible implementation of these policies to help achieve energy development goals.
- How would RMI approach this?
- Will RMI consider the impacts of such policies in its analysis?
- How would RMI address the issue of externalities? To date, Hawaii has not really considered externalities in its planning processes (other than some minimal qualitative assessments). RMI needs to attempt to quantify externalities costs and incorporate such costs into their analyses.

Renewable Potential

- There wasn't a lot of detail presented on how RMI would determine renewable potential.
- What renewable energy technologies is RMI planning to evaluate?
- Does this include electricity generating renewable energy technologies, or will electricity displacement renewable energy technologies such as seawater air conditioning and solar thermal also be included?
- How will this determination be made?
- Who is conducting this analysis?

- Have they been/will they be contacting renewable energy developers such as Honolulu Seawater Air Conditioning LLC?
- If so, when can we expect to hear from them?
- The Neighbor Islands should easily be able to meet (and exceed) the 20% (true) renewables requirement by the year 2020. It will be significantly more difficult for Oahu. However, HSWAC believes that it is possible for Oahu to meet the 20% in 2020 requirement with true renewables and that Oahu should not have to depend on excess production from the Neighbor Islands to meet this requirement.
- We have prepared a scenario (Attachment C -) where Oahu can meet this 20% by 2020 with real (not energy efficiency or fossil fuel) renewable energy.
- The summary below identifies a number of renewable energy technologies that should be pursued on Oahu. There are likely to be more. RMI needs to consider the widest variety and applications of such renewables (electricity, mechanical power, thermal uses). We would be happy to discuss this with you.

Biofuels Potential

- Again, not much detail was provided about how RMI plans to assess biofuels potential.
- What approach does RMI plan to take with biofuels?
- Some important factors to consider are land use, water use, fertilizer use, air and water pollution, and net energy.

Fossil Fuel Dynamics

- What is Fossil Fuel Dynamics?

Energy Systems Models / Energy 2020

- Please provide more information about proposed Energy Systems Models.
- How will these models be integrated into Energy 2020?
- There was some concern about the use of Energy 2020 to make too many important planning decisions. We share this concern.
- We would like to see the results of the model calibration using historical data. If the Energy 2020 model is not able to accurately predict what happened using historical data, what confidence should anyone have that it will be able to predict future events and interactions?
- There were previous attempts to use the Energy 2020 model to predict the impacts of short term impacts (e.g., oil price spikes of < 1 year duration). It is my understanding that this model uses a one-year time step. Therefore, the model cannot predict the impact of events of less than duration, it can only use the one year averaged value of whatever parameter is being investigated. Is this assessment correct? Does RMI plan to test any short term impact scenarios? If so, how will this be done given the limitations of the model?

Stakeholder Review & Comment

- The box in RMI's Approach for Defining Hawaii's Energy Strategy shows stakeholder review and comment for the models, strategic pathways, and policy options.
- Shouldn't there be some stakeholder participation during the Input process? If not, why not? Or, was this done at the July 6, 2006 meeting and subsequent one-week comment period?
- Will stakeholders be able to review and comment on Inputs? If so, how and when?

Senior Stakeholder Review/Decision

- Who (and what) are the Senior Stakeholders?
- How does one achieve this lofty status?
- Does that make everyone else Junior Stakeholders?

The Hawaii Energy Strategy Timeline

- Inputs
 - It appears that the input process has been completed without the benefit of stakeholder input. Is this true? If so, why? HSWAC has not been contacted to provide inputs regarding the SWAC technology and SWAC project currently under development and proposed. When will RMI be contacting HSWAC and other renewable energy developers?
- RMI Analysis & Integration with SSI
 - See above comments. Again, this process appears to be 2/3 complete without the benefit of stakeholder inputs.
- Policy Development
 - What does this consist of? Is it the development of various scenarios to evaluate? Or, have policies already been developed before modeling and analysis has been done?
- Stakeholder Inputs
 - Shouldn't stakeholders have been consulted earlier on in the process?

Review and Evaluation of Existing Incentives for Renewable Energy and Energy Efficiency Technologies

- There are a large number and variety of incentives provided to renewable energy and energy efficiency technologies at the federal, State and local levels. To our knowledge, there haven't been any evaluations or comparative analyses of costs and benefits of these incentives.
- Does RMI plan to do such an analysis for this study? If so, how will this analysis be conducted? What types of measures of merit will be used (e.g., cost per barrel of oil saved, cost per kWh saved, etc.)

- If not, why not? It is likely that some types of incentives may be proposed to stimulate development of renewable energy and energy efficiency technologies. How will it be possible to determine which technologies should receive such incentives and how much, if such impact and benefit/cost analyses have not been conducted?
- With limited funding, isn't it important to know which technologies should be supported in the near-term, in the mid-term, and in the long-term? And, whether some of the existing incentives should be increased, decreased, eliminated, or transferred to other technologies based on the benefits obtained for the costs incurred?

Slide 9 - ... future energy system ...

- On slide 9, RMI shows a block for Renewable Power with an arrow to Power and then an arrow to Commercial Industrial Process and Buildings DG/PV.
- These seems to indicate that RMI is considering only renewable energy electricity generation but not mechanical and thermal applications of renewable energy. Is this correct?
- If not, shouldn't RMI have a block for Non-Power Renewable, with arrows that go directly to Commercial Industrial Process and Buildings DG/PV? For example, seawater air conditioning uses thermal energy from cold, deep seawater to directly cool buildings (and the return water could also serve as a heat sink for commercial industrial processes, or for cooling the inlet air for a gas turbine power plant). Solar thermal energy can also provide hot water and process heat to such end users.
- Thermal and mechanical applications of renewable energy must be considered if RMI intends this to be a comprehensive study.

Policies and Regulations

- In Phase 1: RMI proposes to "identify the legislative or policy proposal that did not pass the last session that merit reconsideration."
- Does RMI plan to consider all energy-related legislation that did not pass? HSWAC, and others introduced a number of bills that did not pass. If not, what criteria will be used to select those to be considered? How will RMI determine which "merit reconsideration?" What criteria will RMI use? Will there be an opportunity for stakeholder input into this process? If not, why not?

RMI Expert Pool

- Who are in the RMI Expert Pool?

Technology Data Sheets / Technology Cost and Performance Information

- Does RMI have any form (e.g., a Technology Data Sheet) that it uses to describe the operational and cost information for a given technology such as SWAC?
- What format does RMI propose for submitting technology cost and performance information?
- By what date does RMI have to have such information?

Cost Effective - Definition and Determination

- How does RMI define cost effective for the purposes of this study?
- What cost components will be used to determine cost effectiveness?
- Does this evaluation include externalities costs and benefits?

Interviews With Renewable Energy and Energy System Developers

- Does RMI plan to conduct any interviews with renewable energy and energy efficiency system developers to identify issues (other than financing) that affect project development?
- For example, HSWAC has identified permitting as a significant issue. How does RMI propose to address these types of development issues?

Coordination With PUC Act 95 Activities, Forum Project, and IRP + Energy Efficiency/DSM Docket

- The 2006 legislature appropriated \$200,000 to the Forum to continue their work. The PUC has conducted at least two workshops on Act 95 (RPS) and their work is not yet complete. The on-going IRP + energy efficiency/DSM docket is also addressing a number of these issues.
- How will HES 2007 be coordinated with these efforts?
- How will RMI avoid duplication of efforts?
- How much is the HES 2007 effort going to cost?
- What differences in deliverables are anticipated from each of these efforts?

Utility Load Curves

- RMI has requested utility load curves.
- HSWAC would also like copies of these curves (on a monthly and annual basis) and associated data (hourly load values used to develop the curves).
- Will we be able to have access to this information?

Legislative Testimony / Drafting Legislation & Policy

- Will stakeholders have any input into this important aspect of this project?
- Since much of the proposed legislation is intended to stimulate and assist developers of renewable energy and energy efficiency systems, wouldn't it be prudent to determine what types of legislation would be most beneficial to developers?
- How does RMI intend to solicit and incorporate this important feedback?