

January 25, 1990

Memorandum

TO: Geothermal Roundtable Participants

FR: Dee Dee Letts

RE: Group Memory and Future Roundtables

I am anxious to get this in the mail to you as session has started and most of the information requested has come in and is attached. I am still waiting for two things which I will forward as soon as I have them. One is the location of the private spigots in the Puna area and the second is the response to PCC on its request to the Governor to enlarge the discussions taking place at the Roundtable. Until we have an answer to the latter I will not proceed with setting meeting dates and agendas for any future meetings. Feel free to call if there is anything in this packet that needs further explanation.

I will be in touch soon.

DBED/PCC ROUNDTABLE
1/9/90

The Roundtable was called to order at 9:30 AM with the following persons in attendance:

Clint Churchill, Campbell Estate
Rod Moss, True/Mid-Pacific
Bill Paty, Department of Land and Natural Resources
John Richardson, Hawaiian Electric Company
Bill Moore, County of Hawaii Planning Department
Denver Leaman, Greenpeace
Lynn Maunakea, County of Hawaii Research and
Development
Nelson Ho, PCC
Maurice Kaya, DBED
Les Matsubara, DBED
Jerry Lesperance, DBED
Ron Phillips, PCC
Steve Phillips, PCC
Andrea Gill, DBED, Energy Extension
Senator Andy Levin (arr. 11:30 AM)

The meeting began with a presentation by Campbell Estate and True/Mid-Pacific Geothermal. When the presentation ended, the following discussion took place.

- Q: Where are the private water spigots that your trucks are using as a source of water? Outside of Kea'au, there was a truck filling water this morning: is that a private or public spigot?
- A: Not sure. I do not know where the private ones are; I will find out.
- Q: Site lighting pollution - violating terms of permit. It's supposed to be shielded below the horizontal plane.
- A: Working with the County to correct. Problems in meeting the horizontal plane elements of the ordinance due to safety concerns on-site.
- C: Light is extremely noticeable.
- Q: Have you started the pig control program yet?
- A: Not yet. Need to work with landowner, possible liability concern with allowing hunters access.
- Q: I received a report that you had started trapping pigs.
- A: No.
- Q: Will you be applying to DLNR for other variances? Permits that need a public hearing should not be changed administratively which subverts and changes expectations set at the public hearing. Water permit is example. Person in Honolulu can grant variance without understanding effects on local community.
- A: Don't anticipate at the moment any more variances to permit. We assume variance with broader impact would need wider view than just developer and DLNR. If major change (exceeds 100mw) - must go back through process. Hope that as variances come up, they will be minor or emergency.

- Q: Does DLNR have objections to the legislature prohibiting the issuance of variances without going back through the original process?
- A: Willing to ask and solicit community reaction to any requests for variances in the future. Realize that an unforeseen impact was a problem and will consult with the community in the future. Would prefer not to legislate as it takes away emergency flexibility.
- C: Current procedure could lead to issuing variance on action which would have been opposed at permit hearing. Is one person in DLNR making the decision?
- A: We will get open discussion on variances before approval when possible.
- Q: One of variances - extension of flow (venting) period - from 8 hours to 45 days. Why? At the same time another variance has cut the number of air quality monitoring stations.
- A: Abated vs. unabated venting: were some restrictions mixed up from unabated to abated venting periods? Unabated venting restricted to 8 hours/day (if drilling with mud. Maybe not if drilling with air). Not 8 hours continuous; it's 4 hours each on 2 days. Always have requested and maintained that we need 30-45 days flow test. It will be abated. We feel the original permit mixed terms so this variance was to rectify that.
- Well-drilling project does not qualify for EPA "prevention of significant deterioration" (PSD) rules. You qualify if you emit 100 tons/year of listed pollutants (about 28 pollutants are on the list). If the pollutant is not on the list and H₂S is not then you must emit 250 tons/year to qualify for PSD regulation.
- Need to monitor maximum impact areas which over the long-term will be power plants, not wells.
- When building power plant, then we will need to demonstrate to DOH where monitoring stations should be. There are only 4 stations at Geysers and monitoring is working well. As we put more power plants online, monitoring stations may merge, or may not. Case-by-case basis: go to DLNR with a report of where monitoring stations should be.
- C: This variance negated 5 years of testimony. BLNR required 5 monitoring stations, including residential areas. Plan dismantled by variance - unwise. Can't guarantee wells won't become permanent source of pollution (accident, etc.). Must monitor if pollution does occur.
- A: Based on geology, don't expect landslide. Geysers had one - poor geologic study, improper location. We could have rupture to well bore but have the technology to intercept and close off. Geysers well not causing problem and is meeting California standards. Putting monitoring station in residential areas doesn't tell anything. Baseline data of H₂S in rift zone well documented.
- C: Your geologist said of the public hearings:
- 1) if eruption were to bury wells, they could be dug later. Original sites are now under lava.
 - 2) project site was chosen on the basis that it would not to be overrun once in 100 years - now it is under lava.

- A: We can go dig up buried wells, probably would not dig if under 300 feet of lava.
- Q: If ruptured?
- A: Can go in even if ruptured, under lava.
- C: Geysers is problem - wild bore major H₂S emission source - all other wells had to tighten emissions to 5 lbs/megawatt hour or 2 lbs/megawatt hour to compensate.
- C: Not the information I have. 5 lbs. standard fairly recent. Never heard this well responsible for changes. Will go back to source and verify (see Group Memory addendum).
- C: Information from Bob Reynolds, Lake County geothermal supervisor.
- Q: When will you hit the geothermal reservoir?
- A: Perhaps next 30 days - rate of drilling varies. Now at 3,000 feet.
- Q: You did comment to the Judge that you wouldn't hit the resource before the air quality standards were in place? Find out what your company agreed to in court as you may hit reservoir before hearings and standards?
- Q: Where is your market for energy? How to get energy to market?
- A: Still not confirmed best transmission route. Hoped to share ORMAT right-of-way; didn't work; find different route. Once confirm resource and market, enter contract with utility company. Work on transmission then.
- Q: HELCO says no plan to buy geothermal electricity beyond 25 mgw from PGV? Where is the market?
- A: If there is no market, we can shut wells in and wait until the market is there.
- Q: Is that in True's financial interest?
- A: We expect a market. If no market, it's a loss. Total risk is company's.
- C: Looking at the market on O'ahu. Mid-1995, HECO will buy maximum 250 mgw.

HPOWER =	40 mgw
<u>Coal =</u>	<u>180 mgw</u>
	220 mgw

online 1993, 1994
- Is this 250 mgw in addition to the planned 220 mgw (see addendum)?
- C: Entire baseload on Oahu approximately 500 mgw.
- A: Beginning 1995, over 7-8 years, some geothermal can be absorbed, up to 500 mgw.
- C: Looks soft: now coal facility is for sure; may change HECO's needs.
- A: Power demand may change, come later. We will look at the best information each step of the process and assess risk.
- Q: How much money is True-Mid willing to spend if soft market?
- A: Based on projections we've seen, there will be a need for geothermal energy. Proceed, anticipating a market. Even just on the Big Island.
- C: Utility industry burns residual. Won't save one drop of oil. Imports consumed for jet fuel, gasoline. Remainder is residual; utility burns this (see addendum). Newspaper - no energy crisis projected in the next 10-15 years. Where does True-Mid expect to get return? No market 10-15 years, if ever. Seems State guarantees you get return regardless.
- A: Business venture, our risk.

- C: Refineries can change mix of product. Do import some. HECO's downtown power plant, bad location, may have to close.
- C: Why have stationary power generation source 250 miles from point of use - question reliability of transmission system. If your wells have to vent, who is responsible for effects of H₂S?
- A: Can't conceive of any way all 500 mgw would vent unabated. Backup is to shut well in, if had to.
- Q: Willing to shut in?
- A: Case by case. Abate emissions if offline. If offline is anticipated to last a long time would be more economical to shut everything in.
- C: Expensive. Figure real costs to taxpayer. Haven't seen what True/Mid-Pacific proposing on costs of power plant construction, plus satisfying standards.
- A: There's a lot we don't know yet.
- Q: How much of this planning have you been doing? State has been doing nothing.
- A: Project not really started; drilling first well. Based on understanding of State policy of support for Geothermal energy.
- C: Not against geothermal; want safe, sound development. In True we are dealing with a company with no experience in geothermal drilling or power plants? We don't want you practicing in Hawaii.
- A: Consultants, experts will build power plants, meet standards. When get to stage of design of power plant, will get experts. Developer who builds hotel, hires experts to construct.
- C: Not convinced that True/Mid-Pacific has this expertise.
- A: Not at that point yet. Hire experienced drillers, loggers now.
- Q: Concerned. HGPA impacted property values, health - the State got the royalties. Never put any money into long-term health studies. Why isn't Consumer advocate here? Who would protect the resident from total cost? I've paid with lower property values, risk to health. Example: nuclear, cost of decommissioning not calculated in. Tutto (Consumer Advocate) said: No one in the State will look at whole cost; those impacted will "pay" more. How can we calculate whole cost?
- A: Tutto has never been invited. DBED/PCC can invite if want.
- A: 1985 - HECO started paying 6.17 cents per kilowatt-hour for electricity purchased from HGPA. State has never collected royalties on HGP-A. Royalties were waived because in the case of HGP-A it would be the State paying the State. State owns HGP-A; didn't charge itself royalties. HELCO payments on HGP-A - this money was spent on operations and maintenance, no profits. Plus capital improvement money. State never put a penny in their pocket from HGP-A.
- Q: Will there be any effort to look at cradle-to-grave costs?
- A: Some information is available now: jurisdictions spread over several agencies (e.g. roles of PUC and Consumer Advocate on prices to consumer). Consumer Advocate has sent representative to group as observer. DBED interested in

"cradle-to-grave" costs for all energy technology to create a "level playing field", to determine options. Example: geothermal vs. oil - some subsidies now. Taxpayers to ensure supply of oil (military in Mediterranean) also avoid environmental impacts (Exxon Valdez). Geothermal - not have those costs, but in a cradle-to-grave these costs would be factored into oil costs. DBED will try to determine social and environmental costs; our intention is to evaluate energy sources by a "cradle-to-grave" assessment. U.S. Department of Energy has done some initial work - emissions for coal, nuclear, oil. Expect U.S. Department of Energy will publish some of this data in 1990. Data on national costs DBED can use, and update locally. Willing to commit Energy Division funds to this type of analysis.

- C: In talking to the Public Utilities Commission and the Consumer Advocate, this type of assessment is falling through the cracks.
- C: Public Utilities Commission produced the Integrated Resource Planning document and they are now looking at the next step: alternate generation, demand-side management. Appropriate to include social/environmental costs. PUC committed to that approach - integrated resource plan. DBED role is to research and support.
- Q: Last June energy conference - when will the report be out?
- A: Final draft is on DBED Energy Division desk. Group chairs have confirmed content reflects comments at conference. Goal: release during legislative session.
- C: Concluded after talks with Consumer Advocate, Federal government encouraged product responsibility. Lawsuits on knowledge of problems with product. Will affect electric utility and geothermal industry: if not produced in safest way, will be liable for class action suit.
- Q: Campbell, True/Mid-Pacific discussing with HECO or consortia?
- A: Not since final submission of proposals to HECO. Talked with various individuals, and companies.
- C: You should halt drilling until the landswap lawsuit is decided in court. Such action would be good community relations.
- A: Not difficult to bring lawsuit. Injunctive relief or a restraining order would have been granted by court if the evidence were sufficient. Will follow judicial system and adhere to outcome of litigation. If a project stopped whenever a lawsuit was filed, society would come to halt.

RECAP:

- Locate private water spigots
- True looking at management program, pigs and weeds
- DLNR: variances in future will be aired with affected parties
- Question on wild well at Geysers - affect on air standards, costs
- Question on True/Mid-Pacific court agreement in court, reach resource before or after air quality hearings.
- Question on HECO's commitment to geothermal to 1995
- Dependability, liability of transmission line.

- "Cradle-to-grave" " - who assesses? Include all technologies
- Integrated energy study at PUC is appropriate vehicle for cradle-to-grave assessments
- DBED energy conference proceedings out in February

LEGISLATION SUGGESTIONS:

Senator Levin next gave the group a rundown on bills he is introducing on geothermal and those he has been requested to introduce.

5 Bills:

- 1) Entitle person wanting compensation to start a proceeding. Distance from geothermal to be determined. (G0214-1)
- 2) By request - referendum on geothermal.
- 3) Force state to acquire property of impacted people value not less than a 100% of tax assessed value and not less than 100% of value price to the start of geothermal (date to be determined) (G0090).
- 4) Hire neutral geothermal/energy. Place in Department of Commerce and Consumer Affairs. Appoint by DCCA after public hearing with all consultants available for questions. Consultant look at permits, compliance, take court action. (G0157-2)
- 5) Geotherma; Siting Authority, based on Massachusetts statute - siting of hazardous waste facilities. Facility site safety council under Budget and Finance: (G0081-1)
 - Members:
 - DOH
 - OSP
 - OHA
 - DBED
 - PUC
 - 4 residents - HI County
 - 3 residents-at-large
 - Environmental Council
 - Power of Facility Site Safety Council:
 - Dispense money
 - Review proposals
 - Compensate, even areas not directly affected
 - Facilitate negotiations
 - Decide scope of social and economic impact analysis
 - Hire/fire executive secretary
 - Also formed: Local Assessment Committee in any community with facility (host community) each has Local Assessment Committee
 - Negotiate with would-be developer over compensation for negative impacts. If project can't offer compensation, wouldn't go forward.

- Sign siting agreement (in Massachusetts - municipalities have legal standing; not so in Hawaii) - bind parties to negotiate (need to determine how).
- Four Ex officio:
 - Mayor
 - Civil Defense
 - Planning
 - Fire Department
- 7 Residents, appointed by Governor from lists submitted by districts elected officials: Representatives, Senate, Council
- Developer - letter of intent submitted
- Facility Site Safety Council - review, public meeting, consider alternate sites
- Developer prepare impact report
- Negotiations - can voluntarily submit to arbitration
- No facility could be built if no site agreement: developer, committee, Mayor, County Council would have to agree on siting.

Intend to introduce all these bills in the next day or two, based on input today.

Q: Geothermal Siting Authority bill to be retroactive?

A: Intent is yes - retroactive. No grandfather current activities.

One more bill:

- Right to be compensated if you want to move, would have to change existing statute Ch. 111 to make people eligible for relocation assistance to people displaced due to government actions.

Geothermal 157-2: Geothermal Consultant Bill - where will it go and how would we follow it?

- Senator Levin will give Dee Dee bill numbers as introduced
- Will go to committees: (guess)
 - Senator Matsuura's
 - Consumer: Russell Blair
 - Ways and Means
 - Senator Chang's
- Representative Mark Andrews
- House Finance
- Hope bills assigned by opening day
- Not looking for consensus? DBED, HECO and the County have established protocols for reviewing legislation. They assured the Roundtable that they would introduce all these bills into their respective processes and let Dee Dee know the results.

The group then took a caucus/lunch break to look at the bills and prepare for the afternoon discussion. First to be discussed after lunch was the siting bill.

Siting Authority Bill:

Q: How would it interface with Act 301 - another step to go through

A: Haven't addressed this. Work out in legislature.

Q: 301 doesn't take away agency permitting authority. Would this bill retain permitting authority?

A: Yes, would retain. Make permitting easier if agree.

Q: Possible to substitute this for 301?

A: Best to handle separately; will be tough enough as is to get this through the legislature.

C: 301's intent better covered by this bill.

No consensus that this bill should replace 301.

C: Put language in - retroactive, no grandfathering current projects.

C: Problem opening everything up again - applying to projects already permitted.

C: What has been permitted is a reason for community concern. Two wrongs don't make a right.

C: Three wrongs don't make a right. Equity issue and taking issues may be involved in making this bill retroactive.

C: No project can operate without agreement; according to language in bill - take affect upon approval. No further retroactive language needed.

C: As example, True/Mid-Pacific brought rig in, wouldn't be fair to go back and reconsider. Expense.

C: Community has also spent hundreds of thousands of dollars and labor, consider equity for community.

C: Need to look at "taking" issue - possible compensation could be triggered if bill made retroactive.

Q: "Facility" definition includes research?

A: It includes exploration and predevelopment activities

Q: Transmission line to service Big Island included?

A: Yes

C: Have existing permit structure. Not comprehensive - State, County each have some. This requires additional approval. Like taking chicken and goose and trying to make a duck. Look at structure. County planning department may be in difficult position - advocating of siting and staffing decision making body (Planning Commission). May be better to create different authority, instead of keep adding to permit structure.

C: Goal is additional public input.

C: This mechanism may just confuse situation. Who do you go to?

C: Should check with Massachusetts to see what laws repealed as result of this one, if anything has been sited under bill - has it been amended?

C: Cable project is one of very few situations with overlapping jurisdictions. One island community taking impacts while another gaining benefits. Local power plant no overlap.

Not same as Massachusetts; no adjacent municipalities here. Careful when lift laws - make sure apply to our situations.

C: Input needed - raise problems, propose solutions.

C: Not sure cable is only project to impact Big Island with no benefit to Big Island, e.g. spaceport. Also, County may not always be the only local government on this island.

Q: How are committees selected?

A: Members appointed by Governor.

Geothermal 214: allow landowner/resident living within a certain distance of geothermal to bring action for compensation within 2 years of development dealing with lost value.

- Decrease in value of property, or ability to use land.

- Person would still own property, not sell to state. If property was worth \$10,000 before geothermal, and the worth dropped to \$5,000, after development owner would be eligible for \$5,000 from the State.

Q: Would this bill force the County to subsequently drop the tax assessment to the true value?

A: Different bill could mandate County drop taxed value should fall on County to do. County Council should instruct Tax Department to do this. Person can appeal tax bill now. To force on geothermal would be difficult. Court determined value should help with this.

Q: Burden of proof on who?

A: Landowner.

C: Problem caused by private enterprise. Should developer contribute to fund? Developer, county, State making money. Developer should bear some burden - purpose behind condition 51 (of PGV permit). Problem: entire burden on taxpayer, none on developer. Subsidy. Raises real cost of energy development - part of "cradle-to-grave" argument.

C: Should be able to sue the county as well as the state too.

Q: "Geothermal Development Activities" include transmission lines, cables, industries using power.

A: Lines and cable - yes.

Industries - no.

C: Everyone on island pays. Higher taxes, higher electricity rates - be fair to everyone. People living in Kona disagree that it's fair.

C: If the entire State is benefitting by not importing oil, then entire State should help support those bearing the impacts.

C: Whether money comes from State or County or developer, it all comes from our people.

C: That's argument for not waiving royalties and using royalties in compensation issues - comes off top of developer pocket, not tax money. Don't subsidize developer of obnoxious operation.

C: Can't ask few to subsidize the many.

C: If you want to make the developer accountable, don't go through State or County - money comes from taxpayer.

C: All payments should come from royalties.

C: If the payments come from State and County, they constitute a hidden subsidy to geothermal.

C: Under present law, if one private party injures another,

- At option of resident, ask State for relocation benefits. If must be relocated.

Q: Radius on distance from project?

A: Distance to be filled in by Legislature. Testify - come in with suggestions.

RECAP:

- DBED, HECO, County, PCC - processes to review legislation. Will send copies. Will review these bills. Any proposed changes, support or not support, feedback to Dee Dee for Roundtable information.
- C: Specific feedback is the most useful.

STATUS UPDATES:

- Attorney General on PGV's ATC
 - Turned down request for DOH to hold contested case on permit
 - Hearing officer report not in - no DOH decision on ATC yet
- DOH still on track - air quality standards. Expecting hearings to happen in February
- DLNR - water/trucking problems resolved. 24 hour was for 3 days only.
- Evidentiary hearing on Pohoiki Transmission Line.
 - 2/7/90 on the Big Island
- Kapoho residents petition submitted to remove land from the subzone
- Discussion on Governor's meetings - expand discussion to energy in general answer from Governor pending.

Legislation to form a State Energy Commission.

- Proposed by Mark Andrews
- Draft is not out of LRB yet
- Establishes County Energy Boards
 - 7 members: selected by Governor, confirmed by County Councils
 - 2 members from each County board (Hawaii, Maui, Kauai)
 - 3 members from Oahu county board
 - Take on all issues regarding energy consolidate them out of other agencies:
 - DBED
 - DOT
 - PUC
 - DLNR
 - OSP
 - Focus would be energy policies and consistency

Q: What kind of staffing for commission?

A: Each County Board determines needs per County, each County's resources.

- Policy-making body - commit funds, authority to develop recommendations. DBED's Energy Division staff would transfer to commission as would other energy staffs.

- Q: Impact on PUC
A: PUC remains as regulator, but not produce reports or studies.
C: Should be careful how you react to all these bills. Difficult to comment on bills out of context because they affect each other; needs to be looked at comprehensively as a package.
Q: Are there other conversations with Governor Waihee on expanding dialogue?
A: Governor Waihee is still looking at it.
Q: Roundtable future? More and more adversarial actions. Reason to meet? What should be discussed? Agenda?
C: Don't meet with same groundrules: "How" and "If" geothermal. State left hole in energy policy. Look at full range of policy options.
C: Roundtables continue for geothermal, find another forum for other policies.
C: Continue in present format, not necessarily productive. Need to broaden the scope. Hope Governor Waihee's response is soon.
C: Agree to broaden to all energy policy, this or another group.

No more Roundtables until response from Governor Waihee. Will send notes for this meeting, legislation and answers to this morning's questions as soon as possible.

GEOTHERMAL GROUP MEMORY ADDENDUM

This document addresses answers to questions raised at the January 9th Geothermal Roundtable that various parties were going to check on.

HECO

- How much geothermal are you prepared to accept?
 - 230 MW of baseload capacity by 1995 from geothermal Chapter 5 of the RFP for the Geothermal/Interisland Transmission Project is attached and nothing has changed. This need is in addition to what is anticipated from other sources.
- Transmission reliability
 - Geothermal must be consistent with HECO's maximum loss of generation criteria of 125-146 MW. In other words, failure of any component of the generation system or transmission system of the Project must not cause generators connected to HECO's system to have to pick up more than 125-146 MW in an emergency to prevent dropping any customers.
- Residual Fuel Oil Importation
 - Approximately 70-80% of HECO's fuel needs are supplied by the local refineries, the other 30-20% is imported.

TRUE MID PACIFIC GEOTHERMAL

- Court Action
 - True/Mid is not aware of anything in the Court's decision that prohibits them from hitting the reservoir prior to the adoption of air quality standards. For anyone interested in looking at the record it is Civil No. 89-358, 3rd Circuit, Judge Kimura.
- Geysers
 - Concerning the question of the impact of the well blow out at geysers. According to PG&E and UNOCAL drilling began in the area around 1956 - this particular well was drilled and blew out in 1957 - it was not until 1973/74 that the first public hearings were held on limiting H₂S emissions - at this time there were 11 power plants on line contributing to the background H₂S as well as this particular well - in their opinion standards were needed due to the proliferation of geothermal energy not due to this well - the first standard was set at 1,000 ppm off gas limitation per

power plant and these standards have been tightening and changing as more production comes on line to increase background levels.

Listed below are the Senate Bill numbers, committee referrals, Chairs and phone numbers for the Geothermal Bills introduced by Senator Levin. I have noted the LRB numbers as they appear on the drafts previously sent below the bill numbers. An * denotes that drafting changes took place after the draft you have and prior to introduction. Current drafts of these bills should be available from Senator Levin's office 548-6357. The one bill listed that has no LRB number is the one dealing with relocation rights that was discussed but no draft was ever circulated.

NUMBERS	COMMITTEE	CHAIRPERSON
SB 2555* LRB GO214-1	ENERGY WAYS & MEANS	RICHARD MATSUURA 548-6291 MAMORU YAMASAKI 548-6512
SB 2553 LRB GO157-2	ENERGY WAYS & MEANS	SAME SAME
SB 2552* LRB GO090	ENERGY	SAME
SB 2572 LRB GO081-1	ENERGY WAYS & MEANS	SAME SAME
SB 2557	ENERGY WAYS & MEANS	SAME SAME

Ms. Dee Dee Letts
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I was also asked to provide information with regard to the percent of fuel consumed by HECO and its subsidiaries that is imported as product. Approximately 70-80 percent of our fuel is obtained from local refineries, the other 30-20 percent is imported.

Comments relative to proposed legislation will have to be sent to you later. However, we will be in contact with Senator Matsuura relative to their content.

I hope the above is adequate and satisfactory for your needs. If you need additional information, I can be reached at 543-4420.

Very truly yours,


J. F. Richardson, Jr.
Executive Staff Engineer

JFR, JR:ajr
Attach.



CHAPTER 5: POWER DELIVERY AND SCHEDULE

The delivery of Project power to HECO will be determined by its need for power and the rate of development of the geothermal resource. This Chapter describes HECO's forecasted power requirements and the scheduling information to be included in the Proposal.

The Project can provide HECO with both capacity and energy. HECO will require additional baseload and cyclable capacity after 1994. The amount of baseload capacity that HECO could accept is determined by the minimum load on the system and that portion of this minimum load reserved for generation on Oahu. The amount of deliverable capacity in excess of this minimum is dependent upon the DEVELOPER's ability to cycle the Project. Depending on the time of day, HECO could agree to accept up to the full 500 MW Project capacity.

HECO will accept the energy represented by the PPA capacity. The amount of additional energy that HECO could absorb depends on the system load. The PROPOSER has the option of varying the Project's design and development to maximize the sale of capacity and energy to HECO.

5.1 CAPACITY

HECO's present (spring, 1989) system capacity is 1277 MW. The system's peak load is growing by about 2.2 percent per year. Purchases from Independent Power Producers are expected to accommodate this growth through 1994. HECO has to begin planning additional capacity by the end of 1990 to accommodate the post-1994 growth. Hence the timing for this RFP.

HECO's capacity requirements beyond 1994 are dependent on the amount of installed generation, load growth, unit retirement and level of acceptable risk. Risk, as defined by HECO, is a probabilistic index which indicates the probability of having insufficient capacity to meet the peak demand for the day. HECO uses a minimum acceptable risk index of 4.5 years per day, which may be restated as having insufficient capacity to meet the peak demand for one day out of every 4.5 years.

The estimated capacity requirements are shown on Figure 5.1A as a step function based on 25 MW increments of generation addition. This estimate has been prepared for only the ten year period of 1995 to 2005, during which HECO plans to add approximately 500 MW.

Superimposed on the HECO capacity requirements is a hypothetical Project power supply capability curve, shown as a smooth curve for clarity although it most likely would be a step function. As can be seen, this hypothetical uniform development of the Project results in an excess of Project capacity in the years up to 2001, after which a shortfall exists until the full 500 MW capability is on line.

The PROPOSER has other options. Referring to Figure 5.2A, the Project could install 230 MW of baseload capacity by 1995. With respect to baseload capacity demand after 1995, the Project could then add baseload capacity only if HECO experiences an increase in minimum load beyond that which is currently anticipated. However, if any portion of the Project power can be cycled, additional cycling capacity (beyond additional baseload) can be added up to the full 500 MW Project development. The reliability of delivery must be consistent with HECO's maximum loss of generation criteria of about 125 MW, see Chapter 4.

5.2 ENERGY

Forecasted peak and minimum HECO annual loads are shown on Figure 5.2A. The beginning point for PPA negotiations for power delivery will be the curves presented in this section.

5.2.1 PEAK LOAD

Peak loads for HECO are expected to increase from the present level of 1080 MW to about 1660 MW in 2008, assuming a steady growth rate of 2.2% per year. There should be no constraint on sale of Project power at peak load levels, as can be seen in Figure 5.2A.

The PROPOSER may assume that any amount of Project power in excess of the level absorbed by HECO at minimum load (see Section 5.2.2) will be purchased by HECO as peaking power when such power is delivered during on-peak periods. On-peak hours are presently 7:00 am to 9:00 pm.

5.2.2 MINIMUM LOAD

Minimum load growth on Oahu is estimated to continue at a rate of 1.6% per year. This is shown on Figure 5.2A, along with another curve that is offset by 230 MW. This 230 MW is HECO's judgment as to the minimum generation that must be maintained on Oahu, accounting for contractual commitments and HECO's generation needed to stabilize the system. This assumes that HECO's reheat units will be modified to maximize their cycling capability by 1995.

This lower curve of Figure 5.2A represents the amount of Project power that HECO could absorb during minimum load conditions. It could be considered the potential baseload for the Project. Also shown on Figure 5.2A is the same hypothetical Project power supply

capability used on Figure 5.1A. As can be seen, HECO could absorb more than the hypothetical Project capability from the initiation of power delivery through the year 2000. In fact, at minimum load HECO could absorb approximately 230 MW in 1995, rising to about 250 MW in the year 2000. HECO cannot absorb all the potentially available Project power at minimum load from approximately the year 2001 through the year 2020.

The PROPOSER should strongly consider and describe methods of reducing Project power flow to HECO during light load periods and other possible situations when HECO will require less power than would be available from the Project. Refer to Section 7.1.2 for further discussion on this subject.

5.2.3 DAILY AND YEARLY VARIATIONS

The previous RFP sections present only the instantaneous peak and minimum demand on the systems. The amount of power that can be cycled is determined by the daily and yearly variations. Figure 5.2B presents HECO daily variations for four conditions, February and August weekdays and weekends. Information on HECO yearly variations can be determined from Tables 5.2A, B and C.

5.3 PROPOSED SCHEDULE

Sections 5.1 and 5.2 present HECO's best assessment of its capability to accept power from the Project using the assumptions for Project development stated and HECO's present forecast for load growth, new generation units on order, unit retirement schedule and modification of reheat units for cycling duty. The PROPOSER should consider this information in the preparation of the Proposal. However, if the information with its assumptions adversely affects or influences the economic feasibility of the Project (c.f. Section 7.1.6), the PROPOSER should identify the problems and propose an alternate schedule. The PROPOSER is

strongly urged to use HECO's capacity and energy requirements shown on Figures 5.1A and 5.2A if at all possible.

Several times throughout the RFP reference is made to a first phase of Project power of about 125 MW. This is only an assumption for purposes of describing the first phase. The PROPOSER is free to select a different value. The PROPOSER should complete Exhibit 5.3A for whatever power delivery schedule is used in the Proposal, for the first phase and the complete Project. These values of Exhibit 5.3A should also be used for all other Proposal submittals.

HECO requires schedule-related information to validate commitments made by the PROPOSER. This should be in the form of a milestone or summary schedule. HECO is not specifying the exact form this schedule should take, as it will vary with PROPOSER'S scheduling software computer program and the exact mix of Project equipment proposed. However, the timeline should include, as a minimum, the information on the sample Exhibit 5.3B included in the RFP. One Exhibit 5.3B should be included for the first phase of power shown on PROPOSER'S Exhibit 5.3A, and one for the complete Project. The amount of detail shown on the Project exhibit can be less than that shown for the first phase exhibit.

This milestone schedule should include all steps necessary to obtain access to and permission to use the geothermal resource, acquire the necessary surface rights and rights of way and secure permits for the major elements of the project. Specification preparation, procurement, fabrication and installation should be specifically included for at least the major items, as shown on the sample Exhibit 5.3B. PROPOSERS may include more items, if desired. Major civil and structural construction activities should also be shown, as well as testing and start-up.

The PROPOSER is encouraged to present a qualitative/quantitative defense of PROPOSER'S Exhibits 5.3B on Exhibit 5.3C.

MORNING

HAWAIIAN ELECTRIC CO., INC., RECORDED INSTANTANEOUS PEAK MEGAWATT DEMAND BY MONTHS - AM

	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>1987</u>	<u>1988</u>	<u>1989</u>	<u>19</u>
JAN	813	818	818	822	862	833	876	897	947		
FEB	821	840	835	844	861	851	875	879	944		
MAR	804	812	804	855	868	825	895	894	947		
APR	801	817	808	838	846	842	888	890	941		
MAY	835	827	834	840	856	844	894*	942*	969		
JUN	848	855*	865*	860*	873*	889*	915*	973*	990*		
JUL	852	866*	893*	865*	868*	918*	957*	992*	992*		
AUG	855	881	886*	891*	880*	924*	976*	987*	1031*		
SEP	872	884	894	881	887	912	963*	1006	1031		
OCT	869	861	868	872	900	907	951	994	1014		
NOV	853	850	869	878	883	906	938	989	1011		
DEC	864	844	876	865	846	901	927	955	1000		

* AM PEAK EXCEEDS PM PEAK

TABLE 5.2A
YEARLY MORNING
PEAK DEMAND

HAWAIIAN ELECTRIC CO., INC., RECORDED INSTANTANEOUS PEAK MEGAWATT DEMAND BY MONTHS - PM

	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>1987</u>	<u>1988</u>
JAN	883	914	919	903	889	898	927	891	923	963	993
FEB	873	890	901	906	890	906	925	908	918	937	995
MAR	887	884	883	875	857	895	901	865	920	930	981
APR	869	877	863	860	847	868	875	864	896	914	945
MAY	858	877	867	848	857	866	862	846	882*	904*	971
JUN	840	855	858	849*	863*	845*	853*	862*	886*	940*	962*
JUL	867	867	874	863*	872*	859*	852*	906*	927*	955*	963*
AUG	887	907	869	885	879*	887*	852*	902*	929*	975*	997*
SEP	900	910	931	905	916	914	891	921	956*	1016	1035
OCT	911	953	935	903	928	925	935	938	971	1018	1035
NOV	917	928	938	920	932	939	925	940	986	1030	1065
DEC	903	939	926	918	915	944	908	943	968	1014	1068

* AM PEAK EXCEEDED PM

TABLE 5.2B
YEARLY AFTERNOON
PEAK DEMAND

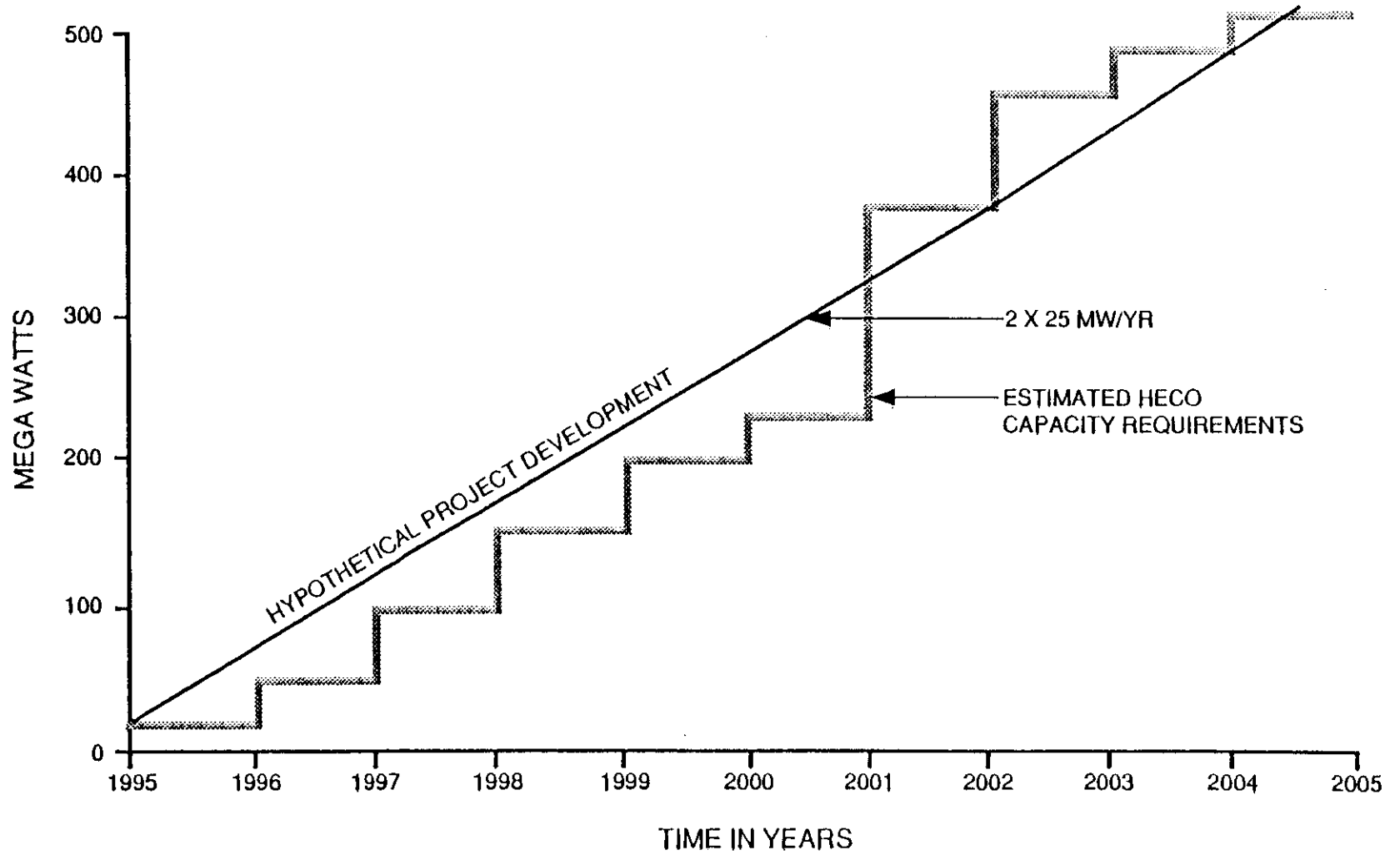
HECO

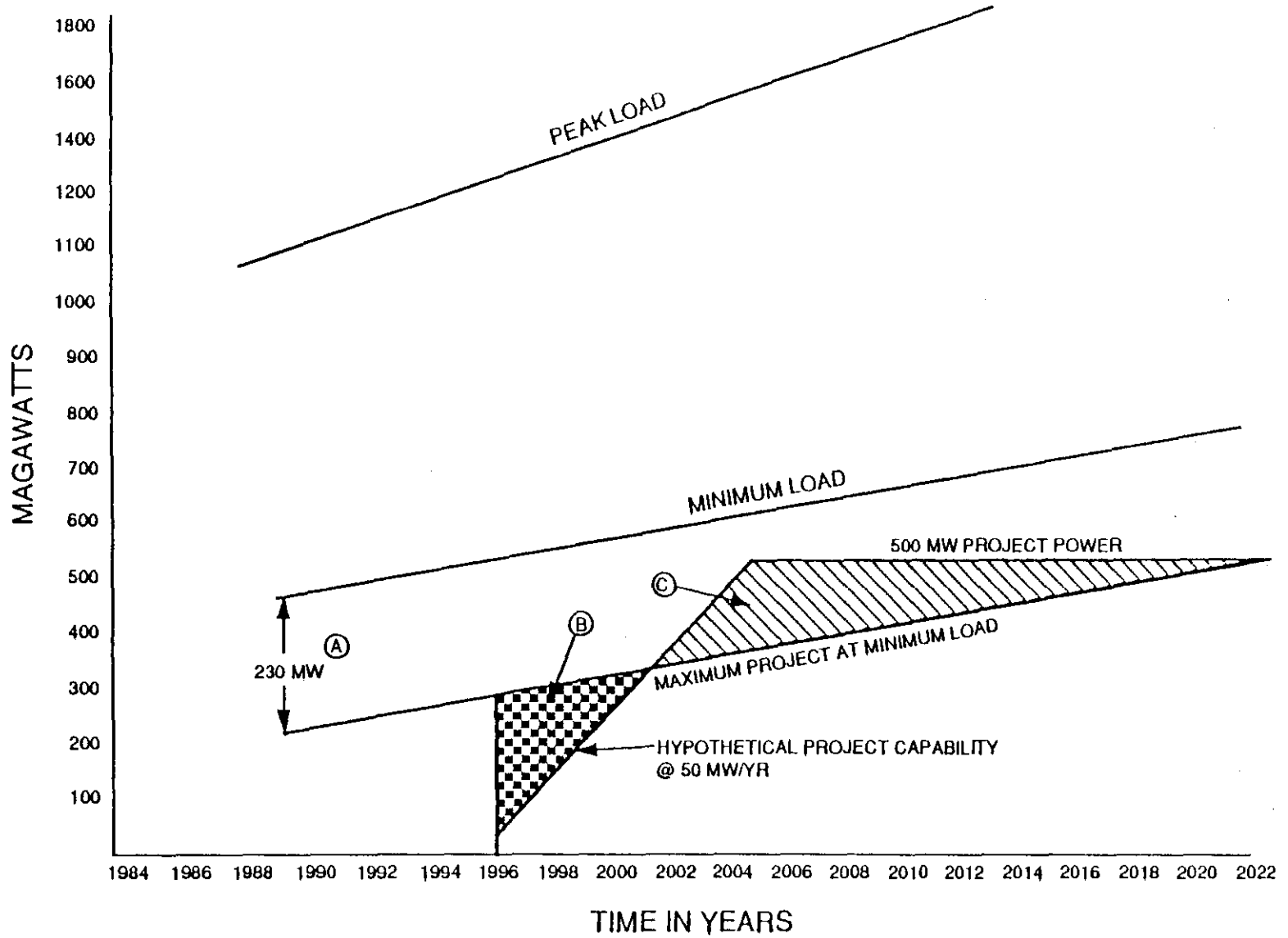
RECORDED INSTANTANEOUS MINIMUM MEGAWATT DEMAND BY MONTHS

JAN	377	407	419	434
FEB	378	401	421	449
MAR	394	416	419	456
APR	390	409	416	454
MAY	388	429	417	470
JUN	406	422	457	489
JUL	429	461	477	506
AUG	432	462	493	503
SEP	438	466	493	500
OCT	431	451	483	494
NOV	404	431	459	503
DEC	401	422	451	458

**TABLE 5.2C
YEARLY MINIMUM
DEMAND**

Figure 5.1A
CAPACITY CONSIDERATIONS

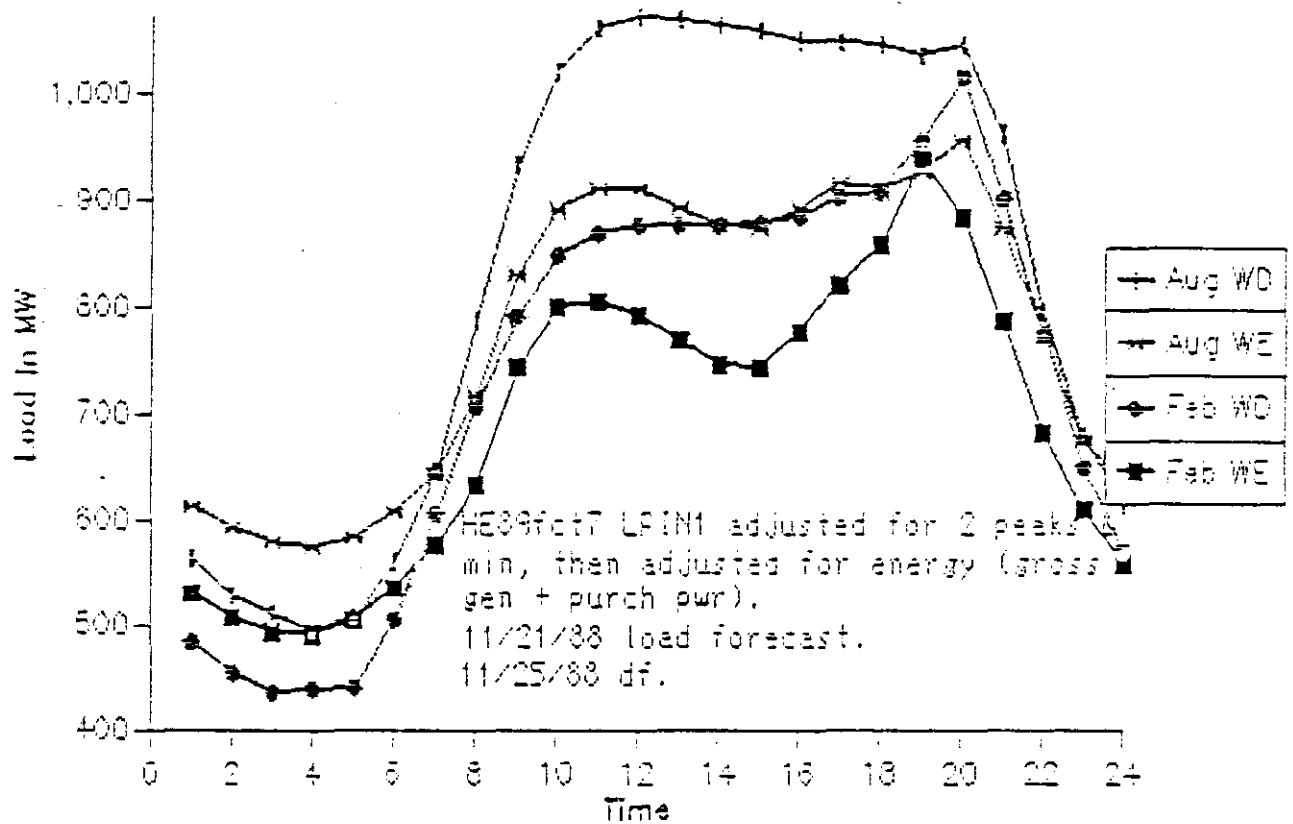




NOTES

- (A) 230 MW REPRESENTS MINIMUM HECO GENERATION AT MINIMUM LOAD
- (B) AREA REPRESENTS ADDITIONAL PROJECT POWER WHICH COULD BE ABSORBED BY HECO
- (C) AREA REPRESENTS EXCESS PROJECT POWER AT MINIMUM LOAD

HECO 1989 Adjusted Load Profile



**FIGURE 5.2B
DAILY LOAD VARIATION**

**OFFICE OF STATE PLANNING**

STATE CAPITOL, HONOLULU, HAWAII 96813

FROM: Norma WongTO: Susumu Ono Draft response Review/Comments FYI/~~Circulate~~

01/29/90

Energy Project Imperils a Rain Forest

By TIMOTHY EGAN

Special to The New York Times

PAHOA, Hawaii — Bulldozers and drill platforms have come here to the Wao Kele O Puna, the last big tropical rain forest in the United States, where a showdown over the fate of this jungle may ultimately determine the fate of modern Hawaii as well.

The roads that have been hacked through the humid forest form the rough beginnings of a plan to turn the east rift of the Kilauea Volcano into one of the world's largest geothermal power plants.

By tapping into the steam beneath the erupting volcano on the big island of Hawaii, political and business leaders hope to free themselves from a heavy dependence on foreign oil and to provide electricity for future development.

But critics say the plan to industrialize much of the forest would not only destroy an ecological treasure, but could also burden a generation of Hawaiians with unwanted real estate development and debt.

Pressures Pro and Con

"Why should America's last big tropical rain forest be sacrificed so all the new hotels can run their air-conditioners?" asked one opponent. Russell Ruderman, a biologist.

Gov. John D. Waihee 3d said the project had put tremendous political pressure on him. Environmental groups, led by the Rain Forest Action Network in San Francisco, are urging tourists to boycott the state to protest development in the rain forest.

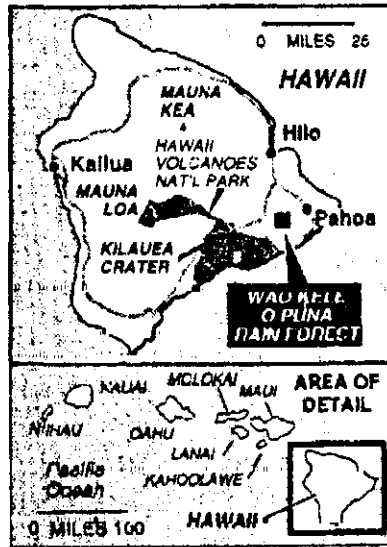
Tourism, an \$8 billion industry built around more than six million visitors to the islands every year, is the economic engine that runs Hawaii. Although Hawaiian government officials say they are not sure how much the boycott is hurting them, they are stung by the criticism.

"This is not Brazil or Peru," Governor Waihee said, responding to critics of tropical deforestation. He said he supported the development of geothermal plants as the key to Hawaii's energy future, but added, "That doesn't mean geothermal power has an absolute right to destroy a rain forest."

Small but 'Fascinating'

The forest is small by South American standards, with 27,000 acres much smaller than what is destroyed in South America each week. But the plan to cut roads, build power plants, and string electric transmission lines through Wao Kele O Puna (the name means "green forest of Puna") would tear up the ecological web that keeps it alive, critics say.

"We've got to be cautious with what is left here," said James Jacobi, a Fed-



Wao Kele O Puna is the nation's last big tropical rain forest.

'We've got to be cautious with what is left here.'

eral botanist with the Fish and Wildlife Service. "This place is so fascinating, so full of original species. But working here is frustrating because you virtually watch these species drop off the face of the earth. I fear these geothermal plants would accelerate that process."

Mr. Jacobi said half the Hawaiian Islands used to be covered by rain forest, and 95 percent of the plant and animal species found in those woodlands are exclusive to the state. Sugar plantations, logging and urban developments have leveled much of the forest.

Governor Waihee said that in order to meet this fast-growing state's energy needs, Hawaii will probably have to decide between increased imports of foreign oil — thereby risking a catastrophic spill in its pristine South Pacific waters — or cutting up parts of the rain forest on the lower slopes of an erupting volcano. He said the choice is further complicated because it

GEOTHERMAL ROUNDTABLE
TRANSMISSION LINES SUBCOMMITTEE
April 6, 1989

Dee Dee opened the meeting and had group members introduce themselves. She explained the groundrules and purpose of the committee and stated that one of the ways to begin to look at the subject would be to determine what the criteria should be for an acceptable corridor. Do we need one or two corridors, how wide must the corridors be run, all proposed and future lines, etc.?

C: There was concern expressed that the proposed legislation (S.B.430) introduced by Senator Matsuura has the potential to subvert the discussions taking place in good faith among those parties at the table. Everyone at the table is making an effort to come up with good criteria. Legislation subverts the purpose of these meetings.

Q: How subverts?

A: Initially the bill had DLNR as lead agency, then it was changed to DBED and now DOH. If the bill comes out this year, there is a major overlay on how corridors are selected, who selects, and criteria.

Q: How do we change the value of discussion?

A: The law now gives DOT the power to establish corridors. New law will/could change the agency but not the fact that some government agency has the final power to establish corridors. It was also pointed out that all four agencies are represented here today except DLNR who hopefully will be represented in the future.

C: Concern - whatever decisions we come up could be overridden by the bill.

C: If the agency is here at the discussions, it could influence their setting of criteria which could be meaningful. DOH here this afternoon. DBED and DOT here this morning. Dee Dee will make sure that word gets to them.

Q: As long as we have people running outside introducing legislation that is not in the community's interest, are discussions here taken seriously?

C: Discussion followed concerning what would make the group comfortable under the existing circumstances. There is a need for everyone to realize that everyone else at the table is here in good faith-that what we are engaged in is collaborative problem solving and advance notification to any member of the group about actions that may be taken by that group or any other group that may effect the table's discussion should be disclosed.

- C: As long as people have confidence that our work will result in something positive. We want to know what is going on. The Puna community has been lucky in that it has legislators that really work to keep them informed.
- C: Early dialogue. Bring information to the group first. Advance notice of bills to be introduced, lawsuits, etc. Evidence of good faith.
- C: CREDA believes the cable is not a foregone conclusion.
- C: Questions asked on cable and it's viability are valid. They should be put on the table this morning to be addressed. However, Dee Dee reminded the group that per the Governor letter to Pele Defense Fund the purpose of these meetings was not to discuss whether geothermal would be developed but when and how.
- C: Unfair discussing cable as foregone conclusion with the technology not proven.
- C: Let's get questions out and see how to answer. All that we've been doing is arguing semantics.
- Q: Economic feasibility of transmission to O'ahu. Dan Williamson doesn't know what cable will do to prices on O'ahu. There were questions raised as to the adequacy of previously collected data and reports--if they are going to continue to be used we must define what is ok for baseline and what needs to be redone.
- C: Previous documents will not be removed from use. Some of these documents do have problems, should be used for baseline, information should be supplemented and improved as the process continues.
- C: Several members of the roundtable have problems with some of the economic feasibility arguments mentioned in previous documents especially ROW acquisition costs for 240 miles at the rate of \$3,200 per mile.
- C: The value of right-of-way based on actual value. Not sure if the report had an average cost. Studies are based on information on hand, and are subject to additional refinement.
- C: DBED will revisit the assumptions behind this figure and let the group know.
- C: Clarify: acquisition of right-of-way may not be an outright purchase, but could just be utility cost. It may be acquired as perpetual easement. Owners may be able to use it still. Figure may not be unreasonable.
- Q: The Pele Defense fund offered its report done by NEA for the group to look at. DBED will run copies for the various participants at the table.

C: The group expressed concerns about the inherent inequities in being an isolated community trying to deal with a government agency. There is a perceived need for some type of funding to provide for copying, correspondence and information dissemination.

C: Getting back to the economic feasibility study, executive summary page 3. There is discomfort with the \$1.675 billion cost with no contingency. Proper engineering - 20% contingency up-front. Shaky engineering.

Q: In the study that is produced out of the current RFP - will there be another economic study?

A: Not in detail. Reports can always be criticized. Three experts may give three different costs. DBED is trying with HECO to get private sector to come up with hard numbers of their own. Can speculate for three hours, not improve document. Call it disagreement on methodology. Won't know cost till go out and get quotes. Bottom line feasibility - technical and economic elements, relate to cost comparison, geothermal versus alternative. Fair to look at the true costs of coal, oil, other future future energy sources. HECO says oil costs don't currently reflect the other environmental costs of oil.

C: EIS has to have section on economics.

Dee Dee suggested that the group take the next 10 to 15 minutes to outline an economic section.

C: Such a study is important so you'll know if will be saving money with this development, or if it will actually double or triple costs. Main point.

Transmission Economic Section:

- Real costs to everyone need to be addressed.
- The real costs of developing this energy technology or others (conservation, coal, fluidized bed, BACT) need to be compared against the real costs of continuing our current system and uses.
- Any financial, environmental impacts at well head (include hidden costs)
 - Contingency funds must be available for damaging impacts.
- Includes community or people whose health are impacted
- Who bears burden of proof on impacts
- Delays in permitting impacts on transmission costs.

- Risks on getting capital for developers (the Quinn speech implies that this risk is underestimated)
- Conservation keeps money in community as opposed to capital leaving the community.
- Insurance costs - what are they? and who pays?
- Education of public about alternatives and process; route and impact on other community.

In consideration of advance notice and good faith at the table CREDA let the participants know that it intended to open a dialogue with the Waimea community on geothermal transmissions.

- Infrastructure (roads, community, fire, police, medical, water)

Q: Should development pay for what people don't have now?

A: No, only what needs arise that are directly attributable to the development.

- What's in it for us?

Q: Is DBED only interested in 500 megawatts?

A: No, DBED is statewide and is concerned about geothermal development to meet the needs of Hawaii.

- Data on Resource is scarce - Local use should prove out before large scale use is developed.
- Realistic land acquisition cost:
 - Future should provide substantiation on any acquisition numbers.
 - How much purchased.
 - How much leased.
 - Look at costs by zones(urban, suburban, and agricultural)
- Look at construction costs whether you bury or go overhead; need specifics.
- What information, if any is there available to the community on potential routes?
- Health effects costs.
- Sequential rather than comprehensive testing of cable leaves questions of if the cable is laid and it doesn't work who bears the cost for removing it?
- Costs of repairs, etc.
- Impacts on Oahu, if cable fails after on-line.

- Cost of keeping Dahu reserve available if cable goes down.
- Reliability of ocean cable has to meet current criteria at least as reliable as oil.
- What is the timing on delivering to HECO the entire 500 megawatts.
- Details on subsidies if taxpayers have to subsidize.
- Environmental and sociological economic impacts as seen from affected communities and parties interested in protecting the environment.
- Methodology of corridor selection.
- Transmission boundary conditions; HELCO's seem to be fastest and cheapest.
- Where is the population to be avoided? Should be one of the criteria.
- Health impacts to people could change methodologies.
- Safety and liability within the chosen corridor:
 - Overhead versus underground.
 - Fire caused by arcing.
- Impact on property value.
- Weighting of factors (especially socioeconomic); community needs to be involved in weighting.
- PUC must begin evaluating actual costs to utility of producing energy and how it is passed on/fee structures.

Fee structure should build incentives for different options.
- Growth potential 10-15 years.
- Homework; when minutes get out, community markup copies with other comments and concerns and return.
- Draft EIS for the HELCO 69kv line should be available by 4/20/89
- Health impact to pacemakers linked.
- DLNR accepting agency for 69kv EIS. PUC has final say on construction if residences are impacted a public hearing is required.

BIN: Transmission Lines

- Ron will supply studies on PUC(mainland) pricing.

- Copies of S.B.430, H.D.1 will be supplied by DBED
- EPRI report on pacemakers.
- HELCO to provide copies of transmission line EIS.
- PUC technical order #6 will be supplied by DBED.
- DBED to copy Pele Defense Fund's NEA study.
- Dennis (HELCO) will send responses to comments on DEIS prior to publication of final EIS.
- Document distribution:
 - 1 - Pele Defense Fund
 - 1 - CREDAA
 - 1 - Environmental organizations - Greenpeace
 - 5 - FCC
 - 1 - each other group at table.

GEOTHERMAL ROUNDTABLE
Transmission Lines Subcommittee
April 6, 1989

Attendees:

<u>Name</u>	<u>Affiliation</u>
Andrea Beck	DBED/Hawaii Energy Extension
Maurice Kaya	DBED Energy Division
Gerald Lesperance	DBED Energy Division
Rodney Nakano	Hawaii County Planning
Francis Hirakami	Hawaiian Electric Company
Dennis Tanigawa	HELCO
Skippy Yasutake	PUC
Sherrie Moore	Puna Community Council
Dan Laine	PCC
Nelson Ho	PCC
Lynne Goldstein	Greenpeace Hawaii
Stuart Marks	CREDA/PC
James E. Moulds	PCC - Kalapana Community Org.
Ron Phillips	PCC
Howard Nakamura	R/D
Alvah T. Miyamoto	DOT (Highways)
Paul Takehiro	PDF
Dick Poirer	OSP

Gary Laperance

Environmental Review: 500 MW Geothermal Development