ALTERNATIVE APPROACHES TO THE LEGAL, INSTITUTIONAL AND FINANCIAL ASPECTS OF DEVELOPING AN INTER-ISLAND ELECTRICAL TRANSMISSION CABLE SYSTEM

EXECUTIVE SUMMARY

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FOREWORD

Electrical energy self-sufficiency is a major goal of our state. This goal can be attained if we fully develop Hawaii's abundant and indigenous alternate energy resources. Because these energy resources are not always located near the centers of demand, we must consider an inter-island electrical grid system.

In 1981, the Hawaii Deep Water Electrical Transmission Cable program was initiated to address the issues which must be resolved before an inter-island transmission cable can be installed. This report, published by the Department of Planning and Economic Development, presents alternative approaches to the legal, institutional, and financial aspects of such a system. It is intended to assist in developing basic policy decisions on the financial, organizational, and regulatory considerations involved in the construction of a cable system.

A deep water electric cable system could cost $400 million. The magnitude of this project and its economic and social impact on the future of our islands cannot be understated. As such, I urge your thoughtful review and consideration of this report.

George R. Ariyoshi

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PREFACE

The Hawaii Deep Water Electrical Transmission Cable Program was initiated to review the technical, scientific, legal and economic issues relating to a future electric cable transmitting energy between the Islands, principally between Hawaii and Oahu. This new study now presents different possible approaches to the legal, institutional, and financial arrangements which could be used to establish a cable system. We hope this report will stimulate further interest in and discussion of the subject.

The study was carried out by Gerald A. Sumida with the assistance of Patricia E. Lee, Stanley D. Suyat and Robert P. Takushi of the Honolulu law firm Carlsmith, Wichman, Case, Mukai and Ichiki, and by Alan L. Hills of First Interstate Cogeneration Capital Associates. This study follows a preliminary analysis of the same issues prepared by the same principal authors for our Department and published in April 1984. The views and opinions offered here are those of the consultants, and not necessarily those of the Department of Planning and Economic Development or other agencies of the State of Hawaii.

We are grateful for the financial support of others. Since 1982 the U.S. Department of Energy has funded a research, development and demonstration program to establish the technical and economic feasibility of a deep water cable system suitable for Hawaii. The State Legislature has also authorized funding to address site-specific issues and problems, including those in this report. We deeply appreciate the support of our partners in this program.

Kent M. Keith
State Energy Resources Coordinator
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EXECUTIVE SUMMARY

A. Introduction

The Hawaii Deep Water Cable Program (HDWC Program) was initiated in October, 1981, by the State and Federal Governments as a research and development program to explore the technical, environmental and financial dimensions of a deep water electric energy transmission cable system which would deliver electric energy from the abundant renewable alternate energy resources (especially the geothermal resources in the Puna district) on the Island of Hawaii to Oahu, where the State's largest electric energy demand exists. Such a cable system could, if developed, result in the decreased usage of oil-fired electric energy generating units, thereby reducing the amounts of high-cost imported fuel oil presently used to produce electric energy and power.

Much of the work accomplished to date by the HDWC Program has centered on the scientific, technological and engineering aspects of a deep water cable. But there has also been a continuing recognition of the critical importance of the legal, institutional and financing aspects of a cable system. The Department of Planning and Economic Development of the State of Hawaii (DPED) thus commissioned a Preliminary Analysis: Legal, Institutional and Financial Aspects of an Inter-Island Electrical Transmission Cable (April 1984), which reviewed the numerous and diverse international, Federal, State and County laws and regulations that would actually or potentially apply to an inter-island cable system; delineated ten different institutional arrangements for a cable system; surveyed several potential approaches to financing the system; and set forth certain conclusions and recommendations. This Preliminary Analysis was reviewed on July 16, 1984, by a working group comprised primarily of the HDWC Program participants, which in large measure accepted the study's conclusions and recommendations and suggested that certain aspects of the preliminary analysis be further developed.

Based upon the conclusions and recommendations of the Preliminary Analysis, as modified by the working group and DPED, this study (i) delineates three comprehensive alternative scenarios for the development, financing, construction, ownership, regulation and operation of an inter-island electric energy transmission cable system, which are: a private venture to undertake all of these functions; a public cable system authority to undertake all of these functons; and a public cable system authority to oversee the development, construction and operation of the cable system, with one or more phases of the actual development, construction and operation to be done by private parties under contract, and with financing to be provided by a combination of

public and private sources; (ii) an outline of a fast-track permitting system for the development, construction and operation of a cable system and for the coordinated development of Hawaii's alternate energy (especially geothermal) resources; and (iii) the formulation of an approach to the coordinated development of a cable system and Hawaii's alternate energy (especially geothermal) resources.

This study seeks to enable the principal decision-makers to explore three generic approaches to or models of developing, constructing, financing, owning, operating and regulating a cable system and ultimately to select the preferred approach or model. It is therefore not intended to propose a detailed plan of action to accomplish a pre-selected course of action. This would be the subsequent logical step once one of the three approaches, or a modified version of any one, is selected as the preferred course of action.

While this study explores the implications for the development of a cable system of the fundamental interrelationship between the cable system and the Island of Hawaii's geothermal resources, it generally assumes that the development of the renewable alternate energy resources (particularly the geothermal resources) and power plants will coincide with the development and commencement of operation of a cable system such that electric energy will be available for transmission through the cable once it has been installed and is ready for operation. To the extent that this assumption is not fulfilled, there may be important implications and additional complexities for the financability of a cable system.

B. General Overview of a Cable System and Its Costs and Economics

The cable design that is currently being evaluated centers on a ±300 kVdc submarine power cable that could be installed in and across the Alenuihaha Channel between Hawaii and Maui; the Auau Channel between Maui and Molokai, on one side, and Kahoolawe and Lanai, on the other side; and the Kaiwi Channel between Molokai and Oahu. The cable system would be capable of transmitting some 500 MW of electric energy. The significance of this route is two-fold: First, the cable would be installed and must be capable of operating in depths of up to 7,200 feet (2,195 meters) in the Alehuihaha Channel, which is far deeper than any previously installed submarine power cable. Second, the total cable length would be some 158 miles (254 km), which is much longer than any existing submarine power cable.

The cable system would consist of three cables, viz., two operating cables and one spare cable to be available should one of the operating cables fail and need to be repaired, together with a sea

return. The cable currently being evaluated is a self-contained oil-filled (SCOF) cable, and will require an intermediate oil repressurization facility on Maui.

The cost of a cable system itself has tentatively been projected to be some $375 to $400 million (1986 dollars). While a firm estimate of the total cost of a cable system must still be determined, the study uses a working estimate of $400 million, which must be provided by the financing approach to be adopted. In addition, the annual costs of operating, maintaining and repairing a cable system as well as the amortization of its total development costs would generally be funded through the cable system's operating revenue income. This will require the cable system to charge a fee for the transmission of the electric energy from the Island of Hawaii to Oahu.

Furthermore, since the purpose of a cable system is to transmit from the Island of Hawaii to Oahu the electric energy generated from primarily geothermal resources, the cost of developing those resources becomes relevant in any survey of the cable system's economics. There are no comprehensive and definitive estimates that are publicy available for the cost of the commercial development of 500 MW of geothermal power on the Island of Hawaii. However, several estimates are that the total commercial development costs of 500 MW of geothermal power could amount to some $600 million to $1 billion. How this amount would be financed and how this development process could be successfully and expeditiously carried out are issues that are generally beyond the scope of this study. But it seems reasonably clear at this time that the financing of the development of up to 500 MW of geothermal power sources would in large measure necessarily be repaid out of the sale of this geothermally-generated electric energy to HECO. This means that both the economic and financial feasibility of the development of the geothermal resources will depend on the same ultimate source for payment as that of the cable system. That source would be initially HECO but ultimately the ratepayers on Oahu who would receive, consume and pay for that cable-transmitted electric energy. Assuming, very tentatively, a low estimate of $600 million for the geothermal power development costs and an estimate of $400 million for the development of the cable system, this results in an approximate $1 billion total cost.

C. Regulatory Considerations for the Cable Transmission of Electric Energy

There are Federal as well as State public policies and laws that are actually or potentially applicable to the development and operation of a cable system, the cable system entity and the pricing of the electric energy to be transmitted by the cable system. The Federal and

State governments each deem the production, transmission and sale of electric energy to involve vital public interests and hence generally regulate those activities as public utilities under Part II of the Federal Power Act (FPA) and the Hawaii public utilities law.

However, certain aspects of the generation and sale of electric energy have been exempted from such government regulation. On the Federal level, the Public Utility Regulatory Policies Act of 1978 (PURPA) seeks to encourage the development of the nation's alternate energy resources by, in part, exempting qualifying small power producers and cogenerators generating electric energy from renewable energy resources from certain requirements of traditional utility regulation. On the State level, the Hawaii public utilities law exempts from public utility regulation any person who controls, operates, or manages plants or facilities for production, transmission, or furnishing of power primarily or entirely from non-fossil fuel sources, and provides, sells or transmits all of such power, except such power as is used in its own internal operations, directly to a public utility for resale to the public. However, the cable system does not appear to fall within this Federal exemption but does appear to fall within the State exemption.

The Federal Power Act (FPA), which is administered by the Federal Energy Regulatory Commission (FERC), regulates the transmission and sale of electric energy at wholesale in interstate commerce, but does not apply to purely intrastate sales of electric energy or to any state or any state agency. Given the FPA's definition of when such transmission is deemed to be in "interstate commerce", the FPA would in all likelihood not apply to a cable system and its operation.

PURPA, however, which in part amends the FPA, will directly and indirectly affect the cable system, particularly with respect to the pricing of electric energy to be transmitted through the cable system, the pricing of transmission charges for such energy, and transmission and wheeling considerations. Under FERC's rules adopted pursuant to PURPA, electric utilities must (i) offer to sell electric energy to qualifying cogeneration and small power production facilities (qualifying facilities or QFs) and (ii) purchase electric energy from QFs. The rate for purchase of electric energy by a utility from a QF must be "just and reasonable" to the utility's consumers and in the public interest, must not discriminate against QFs and may not exceed the utility's "incremental cost" of alternate electric energy. This "incremental cost" is referred to as "avoided cost."

While the geothermal power plants may qualify as qualifying small power production facilities (QFs) if they meet certain stated criteria, PURPA's avoided cost approach would not apply to the cable system, since it would only transmit the energy generated by the

geothermal power plants to HECO and could not otherwise qualify as a QF.

In addition, FERC may, upon proper application, require the physical connection of any cogeneration, small power production or the transmission facilities with an electric utility's facilities as well as the provision of energy transmission services. FERC's regulations prescribe the electric utility's interconnection obligations to a QF; obligate a QF to pay for the interconnection costs which the state regulatory authority may assess against the QF on a nondiscriminatory basis; and delegate to such state authority the determination of the manner of payment.

The FPA's transmission or wheeling provisions would be limited to electric utilities and geothermal power producers, and the applicant for wheeling, whether an electric utility or geothermal power producer, must assume the transmission and rate of return costs. The cable system itself, however, may not be subject to a wheeling order.

The Hawaii public utilities law, which is administered by the Public Utilities Commission (PUC), generally regulates every person who owns, controls, operates or manages any plant or equipment, directly or indirectly for public use, for the production, conveyance, transmission, delivery or furnishing of power.

It also provides two exemptions from PUC regulation that are relevant to the cable system. First, it exempts any person who (i) controls, operates or manages plants or facilities for production, transmission or furnishing of power primarily or entirely from non-fossil fuel sources, and (ii) provides, sells or transmits all of such power, except power used in its own internal operations, directly to a public utility for transmission to the public. Second, it exempts producers of geothermal steam or electric energy generated from geothermal steam. It also authorizes the PUC to direct those public utilities supplying energy to the public to arrange for and acquire electric energy generated from non-fossil fuel sources in order to reduce the use of fossil fuels in the generation of such electric energy, and also prescribes that the rate for purchase paid by the utility to the alternate energy producer shall be as agreed between them and approved by the PUC. Should they be unable to agree, the PUC shall establish the purchase rate. The rate shall be just and reasonable and shall be not less than 100% of the cost avoided by the utility when the utility purchases the electrical energy rather than producing the electrical energy.

Both the geothermal energy producers and the cable system appear to be exempt from PUC regulation under the Hawaii public utilities law. However, while the cable system does not appear to be a

public utility subject to PUC regulation, the PUC may nonetheless possess the statutory authority to require the transmission of geothermally-generated electric energy from the Island of Hawaii to Oahu through the cable system.

The PUC also has jurisdiction over the agreement between the public utility and the producer of non-fossil fuel generated electric energy, and, if the geothermal energy development, transmission and interconnection costs are to be passed on to HECO, must review and approve the power purchase contract between the geothermal energy producer and HECO.

D. Alternative Comprehensive Scenarios for the Development of a Cable System

This study presents three alternative scenarios for the development, construction, financing, operation, ownership and regulation of a cable system. Each scenario is intended to be self-contained and encompasses the institutional, financing and regulatory aspects of a cable system. The fundamental distinction among these scenarios rests in the institutional arrangement or entity form which would undertake the cable system's development, since each of these forms has specific implications with respect to regulatory controls and financing approaches. These three basic institutional arrangements are: (i) a private entity, (ii) a public entity, and (iii) a public entity, which would contract with other parties for the development, construction and operation of the cable system (public entity/private contracting).

The Private Entity Scenario

Under this scenario, a private entity would develop, construct, finance, operate and own the cable system. The private entity and the cable system would be subject to all international, Federal and State regulatory regimes (excluding, however, the State public utilities law) that are applicable to private entities. The cable system entity could assume any one of several forms of business organization available to private parties desiring to undertake a joint commercial enterprise, although the most likely forms include a corporation, a general partnership or a joint venture.

A private entity would acquire and own all of its real property; contract for the performance by other parties of any of the functions of the cable system; meet all requirements of international, Federal, State and County laws and regulations applicable to the private entity and ordinarily have no special legal powers or capabilities to fulfill the requirements of, obtain any exemptions from, or expedite any processing of permits and approvals mandated by those requirements;

finance, or arrange for the financing of, the development, construction and, to the extent desired or necessary, the operation of the cable system through a combination of (i) equity investment for corporate stock or a partnership interest, (ii) taxable interest rate loans, (iii) tax-exempt interest rate bonds, and/or (iv) public grants-in-aid of construction and/or operation; and enter into all necessary contracts with (i) the geothermal energy producers for the electric energy to be transmitted through the cable system from the Island of Hawaii to Oahu as well as (ii) HECO which would receive that energy on Oahu and in turn distribute and sell that energy through its own electric grid system.

Once the cable system becomes operational, the private entity would require sufficient revenues from the operation of the cable system to amortize the debt financing incurred to develop and construct the cable system's facilities, to meet ongoing operating expenses and to give the private entity's equity investors (i.e., owners) an adequate return on their investment.

It is important to note, however, that there could be important indirect limitations on the contracts that the private entity could enter into with HECO. The PUC could limit (i) the amount that HECO would be permitted to pay to the private entity for the costs of transmitting such electric energy through the cable system to HECO and/or (ii) the amount that HECO would be permitted to pay to the geothermal energy producers to purchase such electric energy. This could as a result limit the charge that the private entity would be able to impose for transmitting such energy through the cable system on either the geothermal energy producers and/or HECO. This, of course, would directly affect the private entity's operating income revenue stream, the rate at which the private entity could amortize its debt financing, and ultimately the rate of return that the private entity's equity investors could anticipate and would actually receive. These potential limitations could have profound implications for the overall economic viability of the entire relationship involving the alternate energy producers on Hawaii, the cable system and HECO.

The general financing approach used by a private entity to finance the development and construction of a cable system would involve a combination of (i) an investment by the private entity itself, (ii) long-term debt in the form of taxable interest rate loans obtained from institutional lenders (e.g., commercial banks, insurance companies and major pension funds); (iii) long-term debt in the form of tax-exempt interest rate bonds; and/or (iv) public grants-in-aid of construction and/or operation. This financing approach would be in the form of a project financing which is generally used for projects of this magnitude, complexity and risk.

In a project financing approach, a private entity would generally be required to provide as its investment in the project an amount equal to approximately twenty percent to forty percent of the construction costs of the cable system. The actual percentage that would be required for the equity investment would ultimately be determined by the projected net operating revenues of the cable system, the relative amounts of debt service coverage margins and the expected rate of return on equity required by the investors. This equity investment could be provided by direct capital contributions and by leveraged lease financing, under which the user of an asset (here, for example, the cable system's facilities) leases the asset from a lessor rather than owning the asset and financing its development and acquisition through direct borrowings.

The remainder of the funds needed to construct the cable system (approximately sixty percent to eighty percent) would be obtained through taxable interest rate loans or tax exempt interest rate bonds or a combination of the two. Taxable interest rate loan financing is generally obtained from major institutional lenders such as banks, insurance companies and major pension plans. Tax-exempt interest rate bond financings would involve the issuance of State or municipal (i.e., County) bonds, including special purpose revenue bonds (SPRBs). Under Section 103(a) of the Internal Revenue Code of 1954, as amended (IRC), the interest earned by a purchaser of bonds issued by a state or municipality will be tax-exempt, provided that the bond issue complies with the requirements of that provision. There are, however, strict restrictions on the use of SPRBs that may limit the use of such financing, but it appears that the cable system may be able to qualify for the use of SPRB financing.

In addition to private equity investments and the issuance of debt, a portion of the costs of development, construction and/or on-going operations of the cable system could possibly be funded by any available grants from either the State Legislature or the Federal government pursuant to authorization by Congress and by foreign governmental export credits, if available, also for major items of equipment and/or other goods and services provided by non-U.S. manufacturers and vendors, depending upon the extent, if any, to which foreign-manufactured equipment is utilized.

The extent of the legal and regulatory controls imposed on the structure and the operation of a private entity would be generally less than those imposed on a public entity. However, the private entity would be potentially subject to international, Federal and State laws as discussed in the study.

The implementation of the private entity scenario will generally require certain legislative and administrative policy decisions and actions. The most critical include an appropriate form and degree of public oversight of the private entity's development, operation and ownership of the cable system and perhaps of the private entity itself; the desirability of enacting separate SPRB enabling legislation specifically tailored to providing SPRB financing for the development of the cable system; the establishment and operation of a special fast-track permitting system and procedure will be required to coordinate, consolidate and expedite all permitting and approval requirements for the construction and operation of the cable system's facilities.

Public Entity Scenario

Under this scenario, a public entity would develop, construct, finance, operate and own the cable system. The public entity would be a special purpose public corporation created by State legislation (incorporation act) to perform these functions. It would obtain the required financing through State appropriations, State general obligation and/or revenue bonds, and possibly also from certain non-governmental capital sources. Although the public entity may be specifically exempted from certain State and County laws otherwise applicable to public entities, it will still be subject to Federal and State regulation.

The public entity would acquire the equipment comprising the cable system's facilities, all real and personal property, and other necessary rights, privileges and interests, all of which would be owned by the public entity; enter into contracts for and/or in connection with the construction and possibly the financing of the cable system; be granted special exemptions from State and County laws and regulations that would otherwise be applicable to State public agencies and corporations; obtain and/or arrange for the financing of the cable system's development, construction and operation through a combination of (i) State appropriations and direct grants-in-aid, (ii) State general obligation and/or revenue bonds, and (iii) possible financing from certain non-governmental sources, such as export credits.

In general, the public entity financing approach would rely more heavily upon long-term debt to finance construction of the cable system than would the private entity financing approach. This is largely because the public entity would not be subject to Federal and State income taxation and could not, therefore, use any of the income tax deductions or credits that would otherwise be available to private equity investors in the cable system. The investment by the public entity in the cable system would be made through direct State appropriations that would accompany the enactment of the incorporation act.

These appropriations would most effectively be used to fund the required pre-construction development activities. The cable system's actual construction costs would then be funded through the proceeds from the issuance of general obligation bonds, revenue bonds and SPRBs, which are the available State public sources of financing to fund the construction costs of the cable system.

The extent of the international and Federal regulatory and legal controls imposed on the structure and the operation of a public entity would be substantially the same as under private entity scenario, but would generally be considerably be more under State law. Because of these State legal constraints, a public entity would probably have much less operational flexibility than a private entity in determining the method and scope of, and in actually carrying out, the management and operational functions of a cable system unless the incorporation act exempts the entity from at least certain State laws.

The implementation of the public entity scenario will require considerably greater and more complex legislative and administrative policy decisions and actions than would be required for a private entity, including issues relating to the protection of the public interest.

Public Entity with Private Development, Construction and Operation by Contract Scenario

Under the public entity/private contracting scenario, a public entity would be responsible for the development, construction, financing and operation of the cable system and would own that system. The public entity would be a special purpose public corporation created by legislation (incorporation act) to perform these functions. However, instead of itself undertaking the development, construction and operation of the cable system, the public entity would enter into contracts with private third parties which would in turn perform those services for the public entity.

This scenario is basically a variation of the public entity scenario, and the public entity under this scenario is thus virtually identical to that discussed under the public entity scenario. The only substantial difference lies in this public entity's contracting with private parties for the development, construction and operation of the cable system.

A Comparative Analysis of the Comprehensive Scenarios

Each of these three scenarios has certain advantages and disadvantages.

First, the establishment of the private entity is clearly easier than that of either public entity since the private entity can readily be established by the participants involved in conformance with the laws of the state in which it is formed. In contrast, the public entity in each of the two public entity scenarios will require specific action by the State Legislature to establish a public charter and entity, and the resulting legislation would be, of course, subject to all of the considerations inherent in the legislative process.

Second, one of the most important aspects of a cable system would be the extent and nature of the public oversight and regulation of its development and operations. Under Hawaii's existing public utilities law, the private entity would not be subject to direct public oversight and regulation by the PUC but would be exempted from PUC regulation. This would thus provide greater flexibility, to some degree, in the private entity's activities than in the public entity's activities. However, in light of the magnitude of the cable system project and the very substantial part that it would play in providing the basis for the development of the Island of Hawaii's geothermal power and in supplying a substantial amount of electric energy to Oahu, this lack of public oversight may be regarded as too significant to ignore. Moreover, the operations of the cable system would be subject to indirect PUC regulation through the PUC's mandate to approve the rates at which HECO would be allowed to purchase the electric energy transmitted through the cable system. If that rate must, from an economic standpoint, be sufficient to pay for the development and operations and maintenance costs of both the geothermal and the cable projects, then this indirect regulation may be extremely critical to the success of each of these projects.

The public entity under both public entity scenarios, in contrast, would, by virtue of being a legislatively established entity, be subject to public oversight. However, there could still be an issue as to whether it would be exempt from PUC regulation or be specifically subjected wholly or in part (e.g., regarding the setting of the transmission charge) to PUC regulation. The Hawaii public utilities law does not specifically address whether a State public entity engaging in the activities defined as constituting a "public utility" falls under that law. Hence, the same considerations mentioned above for a private entity are applicable here. However, the incorporation act establishing the private entity could specifically provide for PUC regulation of the public entity or at least of some of its activities.

Third, the private entity would have very substantial flexibility in its internal operating arrangements and procedures. These would be governed specifically by the private entity's constitutive documents and its governing body's decisions and generally by the

laws governing the type of organization selected for the private entity. The public entity similarly would be governed by its constitutive documents (i.e., its incorporation act and its bylaws) and its governing body's decisions. However, except to the extent specifically exempted or excepted in its incorporation act, it would be subject to all State laws applicable to State agencies and public corporations and instrumentalities. These may be quite extensive and could impose substantial strictures on the public entity's internal operations.

Fourth, the private entity would have no special exemptions from any permit requirements necessary to develop and operate the cable system, unless specific legislation were enacted providing such exemptions. The public entity similarly would have at best only minor advantages in the permitting process but would otherwise be subject certainly to most, if not all, of the more substantial permitting requirements. However, either the incorporation act or specially enacted ancillary legislation might provide some relief from such permitting requirements, especially because of the public purpose that the public entity embodies.

Fifth, with respect to implementation of the selected financing approach, the advantages and disadvantages of the private entity vis-a-vis the public entity under each public entity scenario are less clear, because the two types of entities can use different and distinct financing approaches. The private entity could use a combination of equity investment, commercial loans, tax-exempt interest rate bonds and/or public grants-in-aid as principal sources of capital. The public entity could use full faith and credit general obligation bonds as well as revenue bonds and SPRBs. In essence, the issue in large measure devolves to which financing route is more desirable in terms of the cost of capital, the repayment risks and the ease of obtaining such funds through these two approaches. Finally, a remaining policy issue is whether the State desires to own the cable system; if it does, then this will have a pivotal impact upon which financing approach to select and would also influence the availability of certain types of financing.

D. An Approach to the Coordinated Development of a Cable System and the Island of Hawaii's Geothermal Energy Resources

It is very clear that the possible development of a commercial cable system cannot be examined in isolation, particularly because the costs involved and the possible financing approaches to fund those costs depend upon ensuring that a cable system will be able adequately to assure the generation of sufficient revenues to satisfy the requirements of the financing and provide a reasonably reliable supply of electric energy to Oahu.

This thus raises a basic dilemma: The development and installation of a commercial cable system would necessarily depend upon the development of the geothermal fields and power plants, and the development of the geothermal power plants would in turn depend upon the coordinated development and installation of a cable system. The developers of each project would be unwilling or unable to begin their respective projects without firm assurances from the other such that both projects would be completed on a sufficiently coordinated time schedule to avoid any delay in the transmission of energy to Oahu. This simultaneity requirement will be a primary consideration affecting the financing of both the geothermal and the cable projects.

The need for synchronizing the permitting, institutional development and financing of these two projects is essential. There should hence be formulated a master coordinated development plan for the geothermal energy and cable projects. This should be undertaken by a single State body designated as the State lead agency and empowered to accomplish this task, such as DPED. This body should: establish a specific consensus and commitment that all agencies will work cooperatively and in a mutually supportive way to facilitate the development of both projects in accordance with the master coordinated development plan and schedule to the greatest extent possible; create a master coordinated development schedule for both projects, incorporating accurate critical path schedules and carefully melding the development timelines and action items where needed or appropriate; create a master permitting process for both the geothermal energy and the cable projects; upon completion of the master coordinated development plan and schedule and the master permitting process, arrange for its thorough review by all parties (to the extent that they have been selected or are known) which will or might be involved in the actual development of each of these two projects; and identify specific actions that can be taken to eliminate or at least substantially mitigate problem areas in the permit process. Once the master coordinated development plan has been completed and formally adopted, its implementation can be commenced under the general direction of the State lead agency.

E. An Approach to Fast-Track Permitting for the Integrated Development of a Cable System and Hawaii's Geothermal Resources

The need for a coordinated development of the Island of Hawaii's alternate energy (and especially geothermal) resources and the cable system necessitates the formulation of an expedited or fast-track permitting system for the development, construction and operation of a cable system and for the coordinated development of Hawaii's geothermal resources.

Although the permit requirements for the geothermal energy and the cable projects differ in many respects, each will still face major permit hurdles that could present significant difficulties and delays. For example, approximately twenty-four different State and County permits or approvals would or might be required for a geothermal energy project, and there would also be certain inherent schedule constraints in obtaining the required permits.

The cable project may also require at least fifteen permits or approvals and would encounter similar inherent schedule constraints in obtaining all required permits.

Since a cable project will involve not only the Federal and State governments, but also at least two and possibly three Counties, the permitting process must be capable of effectively coordinating and orchestrating the review and approval processes for all government agencies involved. The efforts to date to improve and coordinate these procedures remain inadequate in light of the magnitude, complexity and importance of both the geothermal and cable developments. Thus, the study suggests an approach that would: establish a master application process to be used for each of the geothermal energy and the cable projects and which should be fully integrated into the master coordinated development plan outlined above; designate a lead agency which will have primary jurisdiction over the project and coordinate the review of the project by other agencies, including any required EIS process; carefully and thoroughly review the actual regulations and individual permit requirements to consolidate, streamline and otherwise remove internal inconsistencies and duplications; arrange for the major agencies, on all levels of goverment, which will obviously be involved in the permitting process for the project, to conduct a conceptual review of the project in order to resolve the major problems, if any, prior to the official submission of the application; undertake, once the master application is submitted to the lead agency, a "completeness determination" of the application; establish definite time limitations requiring that an agency perform its regulatory functions within certain time constraints; and provide as a general matter for joint hearings whenever more than one agency is required or chooses to hold a hearing.

F. Conclusions and Recommendations

Each of the three comprehensive alternative scenarios of how an interisland electrical transmission cable system could be developed, constructed, financed, operated and regulated represents the outlines of a model approach, but none presents an actual plan of action to be implemented. They are intended to provide the principal decision-makers with alternative approaches to developing this project, from which a particular approach could be selected as the optimum approach

for further refinement and analysis and the development of a detailed plan of action. The criteria for selecting this optimum alternative will depend on numerous factors deemed to be appropriate if not essential. Underlying these criteria are basic issues regarding, among other matters, whether the cable system ultimately should be owned by private parties or the public through the State government; whether the most feasible but also desirable financing approach would rest totally upon private financing or public funding or perhaps some combination of these; whether the fundamental requirements and exigencies underlying the development of the Island of Hawaii's geothermal resources--an integral part of any cable project--compel public ownership and financing; and whether the desired regulatory oversight can best be accomplished if the cable system were privately-owned or publicly-owned.

This study concludes that each of the three scenarios can be implemented, and that which is the preferred approach depends on which of the selection criteria articulated above are given greatest significance. In addition, this study concludes with the following recommendations for further action set forth below.

1. The total development costs of both the geothermal energy and the cable projects as well as the economics of both projects must be fully determined. The full cost data for each of these projects had not been fully developed at the time of this study, and the foregoing analysis thus had to rely on certain estimated costs. These estimates would not suffice for a comprehensive analysis of the most feasible financing approach that could be developed for the cable project.

Moreover, the financial feasibility of each project, considered both separately as well as collectively, will ultimately depend on the economics of each project, and those economics will be driven by each project's total development and operating and maintenance costs. In this respect, the significance of each of these interrelated projects for the State's economy must be considered to be of equal importance. The basic justifications for these projects are their collective ability to enable the State to reduce significantly (i) its costly dependency on imported oil for its electric energy needs, and (ii) conversely the State's vulnerability to severe disruptions in its oil supply as occurred during the 1973-74 and 1979 OPEC oil crises.

The more detailed and refined analysis of these economic impacts on the State's economy could provide substantial justification for developing both projects. Of course, there is one fundamental factor that pervades any such economic impact analysis--as well as the economic and financial feasibility of the two projects--and that is the price of oil. Should the price of the oil purchasable by HECO and

other electric utilities in Hawaii decrease below present (i.e., May 1986) levels and/or become stabilized for the indefinite future at low enough prices to make any geothermal resource development in Hawaii simply economically infeasible, then the future of both projects will clearly be in doubt. But predicting the intermediate and longterm future price of oil is notoriously difficult, if not impossible, under any circumstances, and this uncertainty should not be permitted to be the sole basis for determining that these two projects are financially infeasible.

In sum, without the determination of the total costs of both projects and a substantial analysis of the economic impacts of these projects on Hawaii's economy, it would be very difficult to fashion a workable approach and plan to finance the cable and the geothermal energy projects.

2. A preferred development scenario should be selected and a detailed plan be formulated to implement that scenario. From the three alternative scenarios elucidated in this study, one should be selected for further refinement. That scenario, after full review of its contents and implications, should then be modified as appropriate in light of whichever circumstances and additional considerations may be deemed to be important. That scenario, or any modified version, should then be the basis for the development of a detailed approach and plan of implementation. That plan would include an elaboration of the major elements of the nature, structure and form of the cable entity, the specific approach to and plan of financing to be used, the regulatory regime to govern at least certain aspects of its operations (especially the rate structure for the electric energy transmission services to be provided), and the legislative and administrative actions required to be taken as part of the plan's implementation. This would be in essence the comprehensive plan to develop, construct, finance, operate and regulate as appropriate the cable system. It would need to be, of course, closely interrelated with the development plan or plans of the geothermal developers for the geothermal energy project.

3. There should be undertaken an analysis of the optimum energy pricing structure to determine the price that should be paid for the cable-transmitted electric energy. The price to be paid for the cable-transmitted electric energy must generally be sufficient to pay for the development and operations and maintenance cost of each of the geothermal power plants and the cable system, and for the capital costs of each over whatever amortization period is required. This price will ultimately be paid by HECO's electric energy customers. What this price would be is uncertain at this time because the total costs, especially the development costs, of each project are not determined with any degree of certainty. However, depending upon what that price or price range is anticipated to be, it may be appropriate or necessary to

consider a different pricing approach and structure than that currently used for HECO to determine the rate that HECO's customers would pay for such energy.

4. There should be an analysis of the regulatory regime that would be appropriate for the cable system and its operations. A cable system would in all likelihood be exempt from PUC regulation under Hawaii's current public utilities law. Whether this exemption would be desirable depends in large measure upon the degree of direct public oversight and regulation that is deemed to be necessary for a project of this size and nature. This issue would be generally of lesser significance if one of the public entity scenarios were selected, since the incorporation act could provide its own regulatory provisions for the cable system.

However, the PUC would, under the current public utilities law, indirectly control the amount of the charge for the transmission of electric energy through the cable in its approval of what HECO would be permitted to pay for that service. In any event, this regulatory aspect would be an integral part of any plan of implementation as discussed above for the preferred scenario.