ENERGY

A few thoughts . . . . . .

If for some reason the people of Ak. decide to remove the capital out of Juneau (reaffirm previous vote) then is this phase II still needed or is that determinable?

STATEMENT BY NORANDA MINING INC. BEFORE

THE ALASKA STATE LEGISLATURE, HOUSE COMMITTEE ON RESOURCES

CONCERNING BILLS NO. SB 25, 26

MARCH 30, 1981

Mr. Chairman, Members of the Committee:

Noranda Mining Inc., operators of the Greens Creek Project, presents the following statement in support of the purposes of Bills SB 25 and 26 to help provide needed additional power markets.

The Noranda Greens Creek Project is located on Admiralty Island, about seven miles east of the mouth of Greens Creek in Hawk Inlet and about 18 miles southwest of Juneau. Since 1973 discovery, Noranda has undertaken extensive diamond drilling, in part from an underground adit, to delineate the ore body, consisting of silver, gold, lead and zinc. To date, all activities have been entirely helicopter supported. The project is located partially within the boundaries of the Admiralty Island National Monument but outside the wilderness designation and is managed by the Forest Service. Special consideration was given in the Alaska National Interest Lands Conservation Act (ANILCA) so the project can go forward.

Present power requirements for the project are supplied by two diesel generators located at the adit campsite. These two generators have 130 kw capacity each and use 600 gallons of fuel per day, all of which is flown in by helicopter from Hawk Inlet.

The 1981 field season planned activities include excavating a cross-cut tunnel for ore sampling, water sampling, and examination of possible sites for tailings disposal. Noranda, with consultants, will develop conceptual plans. An environmental assessment report is being prepared for submission by early 1982.

All this work is preliminary to mine and mill feasibility. Should these studies prove positive, actual mineral production would begin in 1985 or 1986, and is expected to employ 250 workers who would likely commute from Juneau. Ore production will be 800 tons per day, and the mine life will be between 10-15 years, and possibly longer, depending on results of further diamond drilling. Energy requirements for the mine and milling operation are expected to be about five megawatts, requiring 1.5 million gallons of diesel fuel per year.

Noranda is extremely interested in hydroelectrical power being supplied to the project as part of power transmission planned for the Hoonah area. Benefits would include:

- Conservation of fossil fuel.
- Noranda usage would help lower the unit cost to Hoonah and other potential users.
- Conserve ambiant air quality in Hawk Inlet - Greens Creek area.
- Compared to the cost of diesel generated power, hydroelectric would be more economical and contribute to the feasibility of the project.

I would be glad to respond to any questions.

Douglas S. Smith
Public Relations Coordinator
Noranda Mining Inc.
Post Office Box 1268
Juneau, Alaska 99802
(907) 789-4171

Testimony: Regional Energy Authorities

HB 289 "An Act Relating to Regional Energy Authorities..."

Mark Siegars
Energy Director/Economic Planner
Bristol Bay Native Association

Dillingham, AK 99576

842-5257

Since the Fall of 1979, the Bristol Bay Native Association has been working towards the formation of a Bristol Bay Regional Energy Authority. In November of 1979 , at an energy seminar in Dillingham representatives from the thirty villages of the region met to discuss the energy future and options available. Representatives from the Alaska Power Authority, the Division of Energy and Power Development, the Army Corps of Engineers, AVEC, the Alaska Power Administration, Rural CAP, Southwest Regional Schools, Nushagak Electrical Cooperative, Naknek Electrical Association, and Dave Gray of Representative Nels Anderson's office attended as discussants providing technical and descriptive information on the Region's energy potential. Several reccommendations were formulated at this seminar, one of which was the formation of a regional energy authority.

An important realization made by the seminar participants was the low electrical energy needs of the region in relationship to the total energy resources needed. Additionally, due to institutional, economic, and political barriers, the development of appropriate local alternate electrical generating capabilities necessitates a regional approach. This was the impetus for seeking the creation of a regional energy authority.

The single most important issue influencing the participants decision to include the formation of a regional energy authority in the seminar's reccommendations was impending problems with transportation. Transportation is not only important for inta-regional infrastructure but is also a key energy component in the transfer of goods and services between the region's primary goods suppliers through out the state and outside. Because the local fishery is fossil fuel based there is also concern that the region's livelyhood may be at stake.

Additional discussions focused on home heating requirements, communication needs, and the interface of energy and our subsistance needs. Fossil fuels have come to play a major role in the way we meet these needs and the opportunities that avail themselves. By way of an example, there was some discussion of the development of local individual and community gardens. These gardens could make a valuable contribution towards decreasing the community's and region's dependency upon imported fossil fuels. Community gardens can also contribute to the actualization of an equilibrium between the cash economy, self sufficency, and subsistance.

We as most other western regions of the state are net energy importers. We import shelter in the form of heating energy, construction energy, electrical energy, and human energy, we import food in the form of agricultural energy, we import transportation energy in the form of transportation fuels, we import economic development in the form of employment energy, education energy, and health energy, and finally we import a higher standard of living in the form of convenience energy. We have made a conscious choice to partake of all these goods and services; we would like to have the opportunity to make some choices about where we will develop some of the energy feedstocks to be sure that we can continue to have all these goods and services.

Sub-regional dissimilarities with regard to pricing of goods and services, resource availability , development potentials, accessibility, cultural needs, land status, consumption patterns, and resource conflicts makes it imperative that a cooperative development and management strategy be put forth to insure our survival as well as stabilized lower prices. Bristol Bay is no different than any other region of the state, our lively-hood and economy is heavily dependent upon proper resource management and the mitigation of resource conflicts for both natural eco-systems and end-users.

We have spent considerable time and effort contacting people to begin the process of organizing a Bristol Bay Regional Energy Authority. This contact has been at both the state level and the local level. However, during the course of these interviews the State Attorney General's office issued an opinion that suggested a statutory change would be needed in order to see the realization of our regional energy authority.Since that time, all our efforts have been geared at getting the necessary legislative changes.

The state Administration, the Alaska Public Utilities Commission, and several of the other regional non-profits have indicated that the idea of regional energy authorities is a positive step towards providing local input into the comprehensive solution of our energy woes. Regional Energy Authorities may provide a positive structural change in our energy delivery services that would provide greater grassroots involvement.

We must remember that energy is an organic issue. There are a lot of comlex relationships that support our economy and form of civilization. If we unknowingly patch up the wrong problem we may aggrevate our current situation. Only through careful planning and analysis will we be able to effectuate a strong and demonstrable effort to rebalance the energy scales in our favor. Regional Energy Authorities may provide us with the vehicle to achieve this goal.

In discussions with representatives from the other regional non-profits a budget figure of $150,000 per year for three years would be quite adequate to satisfy organizational costs and planning efforts for regional energy authorities. Approximately, seven regions expressed an interest in forming a regional energy authority. Not all the regions would do this ijmediately because they have placed the allocation of regional planning funds at a higher level of priority.. (if regions were to have to achieve a specific task, they would prefer to do the planning activities before getting into the service delivery aspect of energy)

BRISTOL BAY NATIVE ASSOCIATION
P.O. Box 189
Dillingham, Alaska 99576
by Full Board of Directors

Resolution No. 81-06

ENTITLED: Regional Energy Authority

WHEREAS, The Full Board of Directors on the 30th day of November, 1979 approved and endorsed the recommendations of the Bristol Bay Energy Seminar, in Resolution 80-6, and

WHEREAS, Those recommendations contained the formations of a Regional Energy Authority, and

WHEREAS, Preliminary feasibility studies and reconnaissance studies recommended regional consensus on energy developments.

NOW THEREFORE BE IT REOLVED by the Full Board of Directors of the Bristol Bay Native Association that the Alaska Power Authority coordinate their efforts and decisions with the Bristol Bay Native Association Energy Department and the Regional Energy Authority.

SIGNED _____
President

CERTIFICATION:

I, the undersigned secretary of said Association, do hereby certify that the Full Board of Directors is composed of 31 members, of whom 24 were present at a meeting this 17th day of October, 1980, and that the foregoing resolution was adopted by the affirmative vote of 24 members.

_____
Secretary

December 13, 1980
Date

STATE OF ALASKA

JAY S. HAMMOND, GOVERNOR

DEPARTMENT OF LAW

OFFICE OF THE ATTORNEY GENERAL

POUCH K–STATE CAPITOL
JUNEAU, ALASKA 99811

November 17, 1980
465-3690

Mr. Mark Siegars
Development Specialist
Bristol Bay Native Association
P.O. Box 189
Dillingham, Alaska 99576

Re: Regional Electrical Authorities AS 18.57

Dear Mr. Siegars,

Commissioner Knowles of the Alaska Public Utilities Commission has referred to our office your questions regarding interpretation of AS 18.57. I am sorry to state that our office can give its legal opinion only to officers or agencies of the state. I am attaching a copy of the response which I have written to Commissioner Knowles.

It may be that development of alternative energy sources is necessary and desirable in your area (we offer no opinion on that point); we suggest that you approach the legislature if you believe that it is. We would also highly recommend that you contact Clarissa Quinlan at the Division of Energy and Power Development, (address listed below) if you are interested in pursuing the question of expansion into energy development. That division is in the final stages of developing a master plan for energy development in the state. Any entity which does enter the field of general energy development will undoubtedly be required to coordinate its efforts with that division. Also, it would probably be a good idea to consult the expertise of the division regarding energy needs and problems before approaching the legislature.

Sincerely,

WILSON L. CONDON
ATTORNEY GENERAL
By: Sarah T. Kavasharov
Sarah T. Kavasharov
Assistant Attorney General

STK/jb
cc: Clarissa Quinlan, Director
Division of Energy and
Power Development
338 Denali Street
Anchorage, Alaska 99501

Susan M. Knowles, Commissioner
Alaska Public Utilities Commission

03-C6LH

MEMORANDUM State of Alaska

TO: Susan M. Knowles, Commissioner
Alaska Public Utilities Commission

DATE: November 17, 1980

FILE NO: J-66-349-81

TELEPHONE NO: 465-3690

FROM: WILSON L. CONDON
ATTORNEY GENERAL

SUBJECT: Inquiries of Bristol Bay Native Association

By:
Sarah T. Kavasharov
Assistant Attorney General

This is in answer to the questions posed by your correspondence with Mr. Siegars of the Bristol Bay Native Association.

AS 18.57 does not authorize the organization of an "energy" authority. The statute makes specific reference throughout to electrical energy only. Even the Alaska Power Authority is specifically limited in regard to the types of energy development which it is authorized to undertake. AS 44.56.070; 44.56.230(4)

It is our opinion that a change in the statute would be required to authorize expansion of a regional electrical authority into other areas of energy development. AS 18.57.040(11) does not expand a regional authority's powers beyond those necessary and/or convenient to enable it to carry out its specific purpose, which is to provide electrical energy.

In answer to your other questions, a regional electrical authority may provide electrical space heating or other forms of electrical energy as well as generating the power to provide it. AS 18.57.040(10) allows a regional authority to own any kind of real or personal property or any interest in property, including mineral and water rights.

I hope this response is helpful to you. I am sending a copy of this memorandum to Mr. Siegars as well.

STK/jb
cc: Mark Siegars
Clarissa Quinlan

Rural Alaska Community Action Program, Inc.

CPC RESOLUTION #81-10

ENTITLED: "Urging Full Support of House Bill 289, Entitled, 'An Act Relating to Regional Energy Authorities,' with an Amendment to Designate the 14 Member Non-Profit Organizations of the Alaska Regional Energy Association as the Authorized Designees

WHEREAS, AS 18.57 creates Regional Electrical Authorities limited to the production of electrical energy, and

WHEREAS, the electrical generation represents only a small part of the energy requirements for rural Alaskans, and

WHEREAS, there is a need for regional coordination to achieve local planning and development, and

WHEREAS, there is an urgent need for appropriate alternative energy approaches; now, therefore, be it

RESOLVED: That the Alaska Regional Energy Association urges speedy passage by the Alaska State Legislature and and the approval by the Governor of House Bill 289, an Act relating to Regional Energy Authorities.

Adopted by the Delegates to the Citizens Participation Conference, March 19, 1981, in Juneau, Alaska.

Gordon Jackson

Gordon Jackson, President
RurAL CAP Board of Directors

Philip J. Smith, Executive Director
RurAL CAP

Rural Alaska Community Action Program, Inc.

CPC RESOLUTION #81-17

ENTITLED: "Representation by Rural Residents on Boards, Commissions and Other Decision-Making Bodies"

WHEREAS, Village residents are not represented on the various energy boards, commissions, and other decision-making bodies, and

WHEREAS, village residents' views are not asked for or represented on these boards, commissions and decision-making bodies, and

WHEREAS, the rural energy delegates of the Citizens' Participation Conference recognize this deficiency in the policy-making bodies as their number one priority, and

WHEREAS, House Bill 20 includes the appointment of a board that does not now include village resident representation, and

WHEREAS, Senate Bill 25 includes the appointment of an Authority that does not now include village resident representation; now, therefore be it

RESOLVED: That the village energy delegates of the 1981 Citizens' Participation Conference request that the Governor and the Legislature of the State of Alaska be urged to select rural village residents for representation on energy-related boards, commissions and other decision-making bodies.

Adopted by the Delegates to the Citizens Participation Conference, March 19, 1981, in Juneau, Alaska.

Gordon Jackson, President
RurAL CAP Board of Directors

Philip J. Smith, Executive Director
RurAL CAP

Rural Alaska Community Action Program, Inc.

CPC RESOLUTION #81- 16

ENTITLED: "Provision for Support Services and Training for Energy-related Projects in Rural Alaska"

WHEREAS, Most energy-related projects in rural Alaska are planned and built by federal and State agencies and maintained by agency personnel at great expense to the villages, and

WHEREAS, Village residents are capable of performing construction, maintenance and operating functions with the proper training, and

WHEREAS, Such functions would create additional jobs in villages for local residents, and

WHEREAS, Village residents wish to have more control over services and capital improvements in their villages; now, therefore be it

RESOLVED, That the Village Energy Delegates of the 1981 Citizens Participation Conference urge the Legislature and State and Federal agencies to require, as a matter of policy and appropriation, the provision of support services and training for local village residents whenever there are major energy projects conducted at the village and regional level.

Adopted by the Delegates to the Citizens Participation Conference, March 19, 1981 in Juneau, Alaska.

Gordon Jackson

Gordon Jackson, President
RurAL CAP Board of Directors

Philip J. Smith, Executive Director
RurAL CAP

Rural Alaska Community Action Program, Inc.

CPC RESOLUTION #81-18

ENTITLED: Energy Curriculum Development in Schools

WHEREAS, Energy conservation is critical to the continued existence of rural Alaskans, and

WHEREAS, the price of homeheating fuel has become so exorbitant that rural Alaskans are not able to pay for it, and

WHEREAS, it is important for students to learn the necessity of energy resources and how to take care of them; now, therefore be it

RESOLVED: That the village energy delegates of the 1981 Citizens Participation Conference recommend that curriculum be developed in Junior and Senior high schools that helps young adults learn about energy conservation, alternative energy sources, and general concepts.

Adopted by the Delegates to the Citizens Participation Conference, March 19, 1981, in Juneau, Alaska.

Gordon Jackson, President
RurAL CAP Board of Directors

Philip J. Smith, Executive Director
RurAL CAP

Rural Alaska Community Action Program, Inc.

CPC RESOLUTION #81-14

ENTITLED: "Delivery of Energy Related State Programs to Villages"

WHEREAS, There is a need for more local government assistance personnel in the villages and rural areas, and

WHEREAS, There is a need for administrative expertise and grant writing skills at the village and regional levels, and

WHEREAS, There is a need for more information on agencies and processes for development of energy programs to village residents; now, therefore be it

RESOLVED, That the Village Energy Delegates of the 1981 Citizens Participation Conference request that the State of Alaska provide personnel, technical assistance and expertise to local village residents through the establishment of more offices and personnel at the regional levels, especially for the Department of Community and Regional Affairs and the Division of Energy and Power Development.

Adopted by the Delegates to the Citizens Participation Conference, March 19, 1981 in Juneau, Alaska.

Gordon Jackson

Gordon Jackson, President
RurAL CAP Board of Directors

Philip J. Smith, Executive Director
RurAL CAP

KODIAK AREA NATIVE ASSOCIATION
Post Office Box 172 - Kodiak, Alaska 99615 - Phone (907) 486 - 5725

JOB DESCRIPTION

REGIONAL ENERGY PLANNER

DUTIES:

Under the general direction of the President, the Regional Energy Planner will be responsible for the following:

1. Inventory existing and alternative energy resources for the region and villages.
2. Development of a comprehensable statistical data base illustrating energy production and use in the region and villages.
3. Assistance to the Regional Energy Council comprised of one representative from each village.
4. Coordination and assistance to all agencies conducting energy programs in the region and villages.
5. Performance Analysis of energy programs conducted in the region and villages.
6. Development of the Regional Energy Plan.
7. Development of Regional Energy strategies.
8. Assistance in the implementation of the strategies and plan for the region and villages.
9. Assistance to energy related education regional and village workshops.
10. Delegate to the Alaska Rural Energy Association.

QUALIFICATIONS

Preferably a college degree or at least two (2)years of practical experience in energy technology or business management related fields. Should be familiar with rural Alaska and its characteristics. Must be able to express himself/herself articulately in conversation and in writing.

WORK PLAN

KODIAK AREA NATIVE ASSOCIATION

REGIONAL ENERGY PLANNING PROGRAM

JUNE 1, 1981 TO JUNE 30, 1982

TASK I: REGIONAL ENERGY COUNCIL FORMATION AND ASSISTANCE

OBJECTIVE: Establish the Regional Energy Council and provide technical assistance.

WORK STEPS	RESULTS	TARGET DATES
1. Establish REC		
a) Composition	Formation of REC	July, 1981
1. One member representing each village.		
2. One member representing Kodiak proper.		
2. Establish REC as Standing Committee to the KANA Board of Directors	Standing Committee	July, 1981

TASK II: GRANT-IN-AID ASSISTANCE

OBJECTIVE: Provide Technical Assistance to KANA and villages.

WORK STEPS

1. Provide assistance in application for energy related funding projects and grants.	Completed applications.	As grants become available.

TASK III: INFORMATION AND REFERRAL

OBJECTIVE: To provide assistance to agencies conducting energy programs.

WORK STEPS	RESULTS	TARGET DATES
1. Make regular field trips to villages to retrieve information on energy resource, production, and use.	Information concerning Base data information gathered.	Quarterly
2. Research and develop statistical data base on regional energy.	Completed Base data information.	October, 1981, and May, 1982
3. Provide as liaison for the Region to Federal, State, and local agencies involved with energy programs.	Information exchange, strengthened program delivery.	On-going

TASK IV: ENERGY PROGRAM ASSISTANCE

OBJECTIVE: To provide assistance to agencies conducting energy programs.

WORK STEPS		
1. Provide coordination with agencies conducting energy programs within the region and villages.	Quality program delivery	As programs are initiated.
2. Provide assistance to agencies conducting energy programs within the region and villages.	Quality program delivery.	As programs are in progress.
3. Provide interaction between agencies conducting energy programs with the REC.	Quality program delivery	As programs are in progress.

TASK V: SERVICE DELIVERY TO REGION AND VILLAGES

OBJECTIVE: Assist REC in the development of Regional Energy strategies and plan.

WORK STEPS	
1. Develop energy strategies for each village.	Completed Energy planing strategies.

WORK STEPS	RESULTS	TARGET DATE
a. Akhiok		First quarter
b. Karluk		First quarter
c. Kodiak proper (with Borough planning assistance)		First quarter
d. Larsen Bay		Second quarter
e. Old Harbor		Second quarter
f. Ouzinkie		Third quarter
g. Port Lions		Third quarter
2. Assist the REC in preparation of the Regional Energy Plan	Completed plan.	May, 1981

TASK VI: PLAN IMPLEMENTATION

OBJECTIVE: Assist in implementing the Regional Energy Plan.

1. Assist the REC in implementing village energy plan programs.	Begin efforts for FY83	June, 81
2. Assist the Borough in implementing energy plan program.		June, 1981
3. Provide information to REC and Borough from energy related agencies in the implementation process.		June, 1981

TASK VII: ENERGY WORKSHOPS

OBJECTIVE: Provide educational workshops related to energy issues.

WORK STEPS

1. Provide workshop topics, agenda and materials	Two (2) workshops	August, 81; May, 82
2. Coordinate with agencies wishing to conduct further workshops.	More workshops	As assigned during workshops.
3. Address regional energy issues in workshops.	Qualitative workshops.	As assigned during workshops.
4. Provide followup on workshops.		Three weeks post workshops.

Suggested Changes to HB 289: " An Act Relating to Regional Energy Authorities..."

Sec. 2, lines 3-12, page 2.,
this section needs to be changed to include the 14 members of the Alaska Regional Energy Association, as well as exclude the Alaska Federation of Natives, which will prohibit the development of a state-wide parent organization.

Sec. 2, lines 20-27, page 2.,
This section should be deleted because there is no precedence for this call for specialists; there may not be adequate human resources to meet this requirement; deletion leaves the choices to the regions.

Sec. 5, line 20, page 4.,
this line needs to be deleted because it would allow the regions to have tax-exempt oil and gas companies.

A. There needs to be a provision for organizational and start-up money. This funding may also be needed for the first two years to allow for the development of a regional structure to make the authorities self-sufficent.

B. There may be a need to include explicit language that states that the creation or association with a regional energy authority is completely voluntary.

C. There should be a proviso that these Authorities be regulated by the Alaska Public Utilities Commission. This regulation will provide some state oversight, and accessibility to the financial management expertise of the Commission. This may also be the easiest way to give credibility to the Authorities and accountibility to the State.

Alternatives to Regional Energy Authorities:

Vehicle: Regional Non-Profits

Needs: Statutory change to allow direct access of non-profits to State money.

Programmatic:

allocation of money to the regions to conduct a small grants program similar that that of the State and the Department of Energy; this will regionalize the competition for funds.
an immediate effect would be the integration of local human resources into technology transfer and the determinations of long term solutions.

allocating money to the regional non-profits to do more work with the home energy assistance program, waste heat utilization, weatherization, energy audits (energy balancing) and retrofits, increased educational efforts, and the implementation of commercial and industrial conservation developments as well as residential efforts.

comprehensive state energy planning at both the state level and the regional and village level; allocate money to the regional non-profits to do the local effort.

maintain state energy agencies as core elements of energy programs, however break-out the money to regions for projects and funding of other activities

short term and immediate solutions must be part of the long range solutions

change energy management and strategies to mutiple use concept rather than focusing in on pricing and visibility, eg. large hydroelectric projects, large wind energy conversion systems.

ALASKA ENERGY CENTER FY82

PROPOSED BUDGET

During the past few months the Board following the wording of the enabling legislation, the Letter of Intent, and discussions with the Governor and his staff has established By Laws, Goals, and Program Objectives.

The Interim Executive Director has developed a series of specific projects and program approaches and strategies aimed at meeting the Center's goals. From this information tentative budgets have been prepared for FY81 and FY82.

In mid-March I was offered and accepted the job as the Executive Director and since that date have had an opportunity to review and discuss the proposed projects and programs. I have made certain changes which are included in this brief outline of the proposed budget, but which have not been presented to the Center's Board of Directors and therefore cannot be considered a formal presentation of the Center's budget. The Board will meet on April 4th to act on this budget request immediately after which we will prepare and submit through the Department of Administration our FY82 budget.

Gordon Zerbetz
Executive Director
March 25, 1981

ALASKA ENERGY CENTER FY82 PROPOSED BUDGET

1. HISTORY OF THE CENTER

The Center became functional in the Fall of 1980 with the appointment by the Governor of the Board of Directors. After a couple of organizational meetings the Board at the December meeting received and reviewed a proposed FY81 and 82 budget prepared and presented by the Interim Director. The board selected a few items for action and provided additional guidance. Further work was done by the Interim Director on focusing and detailing the programs and projects in the next couple of months in order to meet the Center's Goals and Objectives. At the same time the Board was making a concentrated effort to hire a permanent director. In February the selection of Mr. Gordon Zerbetz was made and he was employed in mid-March. It was felt that Mr. Zerbetz should have an opportunity to review and modify the FY82 budget before final submission to the Board and then to the Department of Administration. This review process is now complete and a proposed budget prepared.

2. METHOD OF ACCOMPLISHING GOALS

The Center will coordinate its energy programs with appropriate elements of the state and federal government in order to eliminate duplication and overlap. The hiring of a qualified and competent professional staff is essential to ensure a high quality program for maximum statewide benefit. However, the great majority of the programs and projects are planned to be carried out by contractors. The solving of energy problems and the ability of the private sector to replicate the solutions can have a very positive impact

in Alaska's economic development. The Center intends to insure that successes are immediately available to the public.

A parallel, but semi-independent activity of the Alaska Energy Center will be the creation and operation of an Alaskan innovation center. This activity will provide technical, business, and financial assistance to Alaskan inventors and entrepreneurs to develop new products and processes. In the later stages of the project development efforts the innovation center will work closely with the Alaskan Renewable Resources Corporation as a business is formed or expanded in order to fully commercialize the idea or invention.

The main office of the Center is in Fairbanks, and during the year it is planned to open small branch offices in Anchorage and Juneau.

The Center staffing through FY82 will be at the ten person level. In FY83 and the first half of FY84 this level will gradually expand to a maximum level of twenty-five to thirty persons, using a combination of operating and capital funds.

Attached is a copy of the Goals and of the Objectives of the Alaska Energy Center.

3. RELATIONSHIP OF THE FY81 AND FY82 BUDGETS

Because of the late start in FY81 in getting the Center fully operational, all of the FY81 Operating Budget will not be spent by July 1981. However, it is planned that to the maximum extent possible, the funds will be obligated to competitively selected contractors for programs and projects which are integrated into the Center's overall plan. As a result, a lot of the work of the

Center in FY82 will be in monitoring and directing contractor activities which are spending FY81 funds.

It is planned, then, in FY82 to have the Center's activities at the twelve to thirteen million dollar level by effectively combining both the FY81 and FY82 budgets. It is felt that this is a minimum level of annual funding the Center requires to advance the technologies and commercial energy products and concepts for benefit of Alaskans.

The major elements of the FY81 and FY82 budgets are given in the next two sections. Also attached to this are brief descriptions of each program title listed in the proposed budget brief.

4. FY81 BUDGET

Operation of Center through Fiscal Year	$ 560K
Innovation Center	1,
Integrated Farm Alcohol Study	
Home Design Competition	220
University of Alaska	585
Southeast Electric Car	200
Seward Hydroelectric	500
Skagway Windelectric	390
Integrated Village/Community Energy Utilization	600
Improved Utility Pole Test	200
Improved Home Furnace	350
Design Wood-Alcohol Plant	325
Design Ore Processing Plant	150
Interior Alaska Solar Panel Testing	125
Geothermal Village Heating	280
New Initiatives and Small Projects	225
	$6,400K

All except the first item will involve contractor work and carry forward into FY82.

5. FY82 BUDGET

Operation of Center for FY82	
Salary, rent, travel, etc.	$1,225K
Programs begun in FY81 which will require FY82 funds to complete first phase work:	
Home Design Competition	120
Improved Home Furnace	350
Monitor performance of Skagway Windelectric	25
Monitor performance of Seward Hydroelectric	25
Monitor performance of Geothermal Village Heating	20
Complete Wood-Alcohol Plant design	100
Complete Ore Processor Plant design	150
Advanced Air to Air Heat Exchanger	200
Gasifier Car	175
Coal-Diesel Operations	450
Innovative Insulation/Construction Competition	150
New Initiatives and Small Projects	325
Reserved for follow-on work from:	3,090
Integrated Village/Community Energy Utilization (continued)	
AEC Projects from DEPD	
AEC Projects from DOT	
	$6,405K

The selection of the follow-on work will be made as soon as sufficient information is available from the on-going and planned work. The AEC is closely following the work of DEPD and DOT.

The Center recognizes that a portion of the FY82 budget is not detailed at this time. This is required during the start-up year of the Center. However, it is planned that in future years project specific information will be provided. It is expected that the greater portion of the FY83 budget will be detailed and that both an operating and capital budget will be requested.

ALASKA ENERGY CENTER

CONCEPTUAL FRAMEWORK GOALS

The following goals for the Alaska Energy Center were established by the Board of Directors at the November 13/14, 1980 meeting:

"The Center will be a recognized leader in the research and development that will accompany future changes in energy production, conservation, and consumption patterns.

The Center will assess various new and emerging technologies, with preference for energy related technologies, and will aid in developing a public understanding of broad social, economic, and environmental implications of those energy technologies.

Through research and development and related activities the Center will aid in creating new industries and employment in the state based on locally available energy resources and the technologies associated with them.

The Center will become economically independent in its operating budget within ten years.

The Center will provide a service to Alaskans through an Innovation Center to assist Alaskan inventors and entrepreneurs, with preference for energy related activities."

The objective of the Center shall be to achieve all of the Goals listed.

ALASKA ENERGY CENTER

PROGRAM OBJECTIVES

In keeping with the Legislative intent, the Goals of the Alaska Energy Center (as adopted on November 13/14, 1980), and the perceived needs of Alaska residents, the following Program Objectives were adopted by the Board of Directors at the December 18/20, 1980 meeting:

1. To design, develop, and implement intregrated and appropriate energy systems for Alaska's villages, towns, cities, and other settlements, with emphasis on the term "appropriate" as it applies to a locality's particular social, cultural, economic, and resource characteristic;

2. To develop Alaskan energy resources for commercial utilization in markets in Alaska and out-of-State;

3. To accomplish the first two objectives, the Center will explore and develop energy technologies appropriate to Alaska;

4. To establish an Innovation Center which will provide technical, financial, and business support to Alaskan inventors and entrepreneurs to develop and market new processes and products.

SPECIFIC PROGRAM DESCRIPTION

Integrated Farm Alcohol Study

The Kenai Peninsula Community College will coordinate a program involving the construction of a small semi-portable barley to ethanol plant, a manure methane biogas digester, and feeding trials of dairy and beef cattle using the barley protein by-product and the digester effluents.

Home Design Competition

A statewide competition open to all comers for the design of a variety of home styles and climatic conditions covering Alaska, emphasing minimum energy use. This is a three-phased program in which the Center pays for the designs and provides limited construction support funding to monitor home energy consumption.

University of Alaska

Five specific energy related research projects conducted by the Fairbanks campus faculty in: small scale hydroelectric icing problems, heat storage in zeolite, Prudhoe Bay trapped methane, groundheat pump system, and resource assessment and coordination.

Southeast Electric Car

The University of Alaska, Juneau, will coordinate a program for retrofiting and a one-year user test of up to ten electric cars. The initial work will be centered around the support services available in the Juneau area, but the program can be expanded to other Southeastern communities.

Seward Hydroelectric

This is a joint project of the Center and the Seward Hospital

Skagway Windelectric

The installation and monitoring of a multi-element wind-electric generator farm in the Skagway area using commercially available wind generators to test and evaluate a combined wind/diesel community utility operation at a sufficiently large scale to uncover all potential problem areas.

Integrated Village/Community Energy Utilization

This is a key element of the Center's plan. Many of the other programs have a short term focus of developing and perfecting energy specific technologies. The ultimate objective is to be able to collect and integrate a group of technologies approved by the local populace that will reduce their overall energy cost. In this FY81 program up to six Alaskan villages and communities energy use and needs will be evaluated and an integrated plan for future development will be prepared for local evaluation and approval. These plans will be used to identify site specific projects for the Alaska Energy Center's joint program involvement in FY82 and future years. This will be an on-going activity with new communities/villages being added each year, and with specific capital budget request being included in the FY83 and future year budgets.

Improved Utility Pole Test

Evaluate various utility pole designs and construction techniques and install poles using an improved designed for various soil and climatic conditions, with the objective of demonstrating reduced life time costs.

Improved Home Furnace

The design, manufacture, and testing of more efficient and

safe home furnaces suitable for weatherized Alaskan homes/small buildings using gas, liquid, and/or solid fuels will be supported with special focus on providing Alaskan jobs through manufacturer and assembly operations.

Design Wood Alcohol Plant

This is the first phase of a program, which if the economics appear favorable, the Center will request FY83 capital funds for the construction and operation of a semi-portable wood to ethanol (or possibly methanol) plant suitable for converting the farm clearing wood waste and Southeast beach logs into a usable liquid fuel.

Design Ore Processing Plant

This is the first phase of a program, which if the economics appear favorable, the Center will request FY83 capital funds for the construction and operation of a transportable "knock-down" precious metal ore processing plant, emphasizing energy efficient and use of local energy sources. Such a plant should make many small mining operations profitable by eliminating the high transportation cost of the unconcentrated ores.

Interior Alaska Solar Panel Testing

In conjunction with the North Star Borough, the Center will construct and operate a solar panel heating system and performance/test evaluation stand for solar panels.

Geothermal Village Heating

The Division of Energy and Power Development has various aquifer and geothermal heating projects currently under study and evaluation. The economically viable projects will be supported with determination being made as soon as sufficient

information is available.

Advanced Air to Air Heat Exchanger

A proven and efficient small scale air to air heat exchanger would be of great benefit to homes in Alaska. This is the first phase of such a program which will ultimately lead to the Alaskan manufacture, installation, and servicing of air to air heat exchangers suitable for the various Alaskan climatic conditions.

Gasifier Car

This is an initial study, evaluation, design, and manufacture of a small advanced solid to gas conversion unit suitable for automobile installation adapted to Alaskan fuels and climatic conditions.

Coal-Diesel Operations

Diesel engines were initially fueled by coal. The widespread state use of diesels for ship propulsion and electric power generation, coupled with the abundant and relatively inexpensive coal resource, make the statewide use and potential for coal, coal-water, or coal-oil fuel diesels a desirable option. This will be an initial technical feasibility study and experiment of the various options.

Innovative Insulation/Construction Competition

This program will support the development of new energy efficient building materials and techniques, and the demonstration of existing and new knowledge to the building industry in Alaska.

Alaska State Legislature

House of Representatives

Committee on Resources

Terry Gardiner, Co-Chairman
Fred F. Zharoff, Co-Chairman
465-3715

Pouch V
State Capitol
Juneau, Alaska 99811

MEMO: March 26, 1981

TO: Rep. Terry Gardiner
Rep. Fred Zharoff
co-chairmen
Members of the House Resources Committee

FROM: Bob Speed, A.A.

RE: Most recent estimated cost figures for different elements of the House energy financing and development plan

Power project financing: reconnaissance, feasibility, construction of projects		(Not yet avail. Ak. Power Auth. to testify Mon. to provide these figures: est. $170 million
Alaska Energy Center:		12,000,000
(Alaska Energy Center estimates their FY 82 needs at only about $6 million, based on their ability to use and administer funds at this stage of their development)		
Energy Conservation and Alternative Energy:	breakdown	14,200,000
Audits: $32,000 x $75 cost per audit:	$2,400,000	
Grants: $32,000 x $300	9,600,000	
Technical advisory program	2,200,000	
Alternative energy/energy cons loan prog.	50,000,000	
Northern Technology grants program	1,600,000	
Renewable energy business loans	10,000,000	
Rural energy program:		
Village Energy Reconnaissance & Conservation (VERC)		15,000,000
Governor's Fuel Emergency Fund:		250,000
Bulk fuel storage facilities grant fund:		2,400,000
Bulk fuel revolving loan fund (no new funds needed, but		0
Power Production Cost Assistanceextend lapse date to 1985)		4,800,000
Power project/energy reconnaissance, construction, etc. (should be considered as part of the APA and AEC budgets)		
Energy planning and education:		1,500,000
**ESTIMATED PRELIMINARY TOTAL:		$220,150,000

Alaska State Legislature

House of Representatives

Committee on Resources

Terry Gardiner, Co-Chairman
Fred F. Zharoff, Co-Chairman
465-3715

Pouch V
State Capitol
Juneau, Alaska 99811

MEMO: March 25, 1981

TO: All Legislators

FROM: Rep. Terry Gardiner

RE: National Conference of State Legislatures energy policy reports

Attached you will find four reports provided to us recently by the National Conference of State Legislatures (NCSL) energy program, having to do with development of a comprehensive state renewable energy policy.

One of the reports, that having to do with Small-scale hydro and geothermal policy, was developed as the second phase of a project NCSL did for the Alaska Legislature under a federal Department of Energy grant during the past two years. This report, and the legislation which will result from it, conclude the federally funded portion of the NCSL project. Previous results from this federally funded program included some of the provisions of the final version of 1980's Senate Bill 438 (HCS SB438 (Finance) am H), now Chapter 83, SLA 1980; and the final version of 1980's HB 779 (CS SSHB 779), now Chapter 173, SLA 1980. The latter represents a comprehensive policy by statute for development of geothermal resources, model legislation providing a modern and efficient framework for future development of these resources.

The other three documents are reports commissioned by the Legislature itself, through the Speaker's Office and the House Research Division. All developed out of the first year's work as a framework developed which indicated the need and desire for a comprehensive effort at state energy planning, and more specifically, a stated policy to develop Alaska's renewable energy base. One of the first observations in developing a state energy planning process was that there are a multitude of state agencies involved in Alaska's energy service delivery system, with little coordination and great lack of direction at key levels. This resulted in the commission for the study on State Energy Agency Organization, the report most recently received.

Of the two remaining reports, the one titled Renewable Energy Development: Solar Heating, Wind Power and Biomass is the document intended to complete the renewable energy policy package along with the previously described document on small-scale hydro and geothermal. Finally, the document Energy Emergency Preparedness is one we commissioned to fill out the state's effort to develop a comprehensive state energy plan.

-more-

Legislation will be introduced shortly incorporating those options which we felt were most worthy of consideration, having to do with small-scale hydro (specifically, the permit application and review process), geothermal amendments, and solar/renewable energy and related issues.

NCSL staff will be in Juneau to work with the House Resources Committee and other interested legislators on this work on the dates of April 2 and 3, and hearings will be held on those dates at 3 p.m. Probabl location of the hearings will be the House Resources Committee Room, unless it is felt that larger quarters are necessary. All legislators are invited to attend.

The committee will also start discussion of the general issue of state energy agency organization, which many legislators have come to feel is cumbersome and lacking direction.

In regard to NCSL's work on energy agency organization, it should be pointed out that this research was done with the cooperation of Gov. Jay Hammond, who also recognized the inefficiencies of the administrative structure in dealing with this important issue. The Governor's Office has been conducting its own organization study through the Division of Policy Development and Planning.

...ents. 1) Renewable Energy Development/Geothermal and Small Scale Hydro
2) Renewable Energy Development/Solar Heating, Windpower, and Biomass
3) State Energy Organization
4) Energy Emergency Preparedness

APPROPRIATIONS FOR GOVERNOR'S
ENERGY FINANCING PROPOSAL

APPROPRIATION	AMOUNT
Power Production Equity Fund [PPEF]	$200,000,000
Debt Assistance Loan [DAL]	50,000,000
Power Project Completion Loan Fund [PPCLF]	100,000,000
Power Project Equity Fund (non-utility) [PPEF(2)]	2,000,000
Alternative Energy Loan Fund [AELF]	5,000,000
Residential Energy Conservation [REC]	13,116,000
Low Income Weatherization [LIW]	13,160,000
Alaska Power Authority [APA]	1,000,000
TOTAL	$384,276,000

HB 382

Rural Energy Existing Programs Appropriations:

Governor's fuel emergency fund: contingency fund; extend lapse date to 1985.	$ 250,000
Bulk fuel storage facilities grant fund: C&RA Governor's budget is $1,260,000 FY 82; increase	2,400,000
Bulk Fuel Revolving Loan Fund: Commerce, contracting to RurALCAP; no additional monies, but extend lapse date to 1985	
Power Production Cost Assistance: CSSB 174 (Fin): supplemental of $1.05 million CSSB 26: FY 82 appropriation of $4.8 million	4,800,000
	$ 7,450,000

Federal programs being cut can be picked up by incorporating them into new state programs

New Programs:

Village Energy Reconnaissance and Conservation Program	15,000,000
(HB 173: $735,000 for rural energy audits and energy conservation improvements is a supplemental)	
Power projects reconnaissance, feasibility, construction, and demonstration projects	30,000,000 ?

From Rep. Brian [illegible]

FY '82 Proposed Funding for Energy Conservation Programs

Audits (32,000 x ₱75.00)	2,400.0
Grants (32,000 x ₱300.00)	9,600.0
Technical Advisory Program (advanced audits)	2,200.0
Alternative Energy/Energy Cons. Loans	50,000.0
Northern Technology Grants	1,600.0
AT Business Loans	10,000.0
R+D Energy Center	12,000.0
VERC Program	15,000.0

from: Dob Lohr, KurAL CAP

Village Energy Reconnaissance and Conservation Program

Proposed Budget

FY 1982

Program Element	Personnel Resources	Budget (000)
Regional Energy Contracts	Performed Under Contract	$2,225.0
Energy Audits	Performed by Local Residents	2,800.0
Weatherization/ Conservation	100% Local Hire for Implementation	7,241.7
Reconnaissance Studies	Performed Under Contract by Private Engineering Firms	1,400.0
Community Participation & Training	Training in Regional Centers and Villages	1,333.3
		$15,000.0

FY 1983

Program Element	Personnel Resources	Budget (000)
Regional Energy Contracts		$2,225.0
Energy Audits		2,800.0
Weatherization/ Conservation		20,575.0
Reconnaissance Studies		1,800.0
Community Participation & Training		1,492.6
		$28,892.6

Note:
FY 1984 & FY 1985 Budget Figures are Identical to FY 1983.

Total Budget FY 1982-85 $101,677.8

TO: Rep. Terry Gardiner, chairman
House Resources Committee
VIA: Bob Speed, administrative assistant
FROM: Rep. Brian Rogers
RE: Fairbanks-area energy projects

Current energy legislation being considered by the House and Senate contains little for the Interior region other than participation in statewide energy conservation programs. The following projects have been developed by the local governments as part of their "Program for Progress"; these projects are generally ready to go this summer and would contribute to solution of some Interior energy problems.

FAIRBANKS NORTH STAR BOROUGH:

-20 year aybacks	1. Energy Management Program - modify borough buildings to reduce heat loss; solid waste incinerator heat recovery program; tie-in borough buildings to district heat program	$ 12,152,077
6-yr payback	2. Solar Collector Retrofit Borough Buildings - solar installations on three borough pool buildings	1,211,760
	3. Waste Heat Greenhouse - four greenhouses using heat from North Pole Refinery; greenhouses to be used to expand greenhouse industry in Interior Alaska	1,260,642

CITY OF FAIRBANKS:

1. District Heating Demonstration Project phase 2 - extend district heat project to Schools complex, Hospital, more homes	2,500,000
2. Power Plant Expansion for District Heating - increase production of heat from power plants. This is a 4-year project with FY 82 funding covering design, down-payment on boiler and initial site preparation.	FY82=4,000,000 TOTAL=19,400,000
3. Sewer Plant Energy Conservation and Management study	20,000
4. Power Plant energy conservation and safety improvements- insulate roof, siding and pipes. ($1\frac{1}{2}$-yr payback!)	165,000
5. Public Safety building energy conservation project - insulating windows, doors, thicker roof insulation	295,000

In addition to these projects, I would recommend several additional Interior projects and/or studies to include:

1. Alaska Power Authority - preliminary engineering and design of extended district heating project to tie in Airport Road, Fairbanks International Airport, and University of Alaska power plant into system.	400,000
2. University of Alaska - energy conservation improvements planning at Fairbanks campus and organized research	350,000
3. Division of Energy and Power Development - grant for planning and testing of a block-by-block Urban Energy Retrofit & Conservation project modelled after VERC	?
4. Department of Transportation - transportation energy conservation study for Interior Alaska	?

Note: details on the borough and city projects, including detailed design are available from my office or the "programs for progress" booklet.

March 27, 1981

The Honorable Terry Gardiner
The Honorable Fred Zharoff
Co-Chairman
Alaska State House Resources Committee
Pouch "V", State Capitol Building
Juneau, Alaska 99811

RE: CSSB 26

Dear Co-Chairman:

Sealaska Corporation supports CSSB 26 in its present form except for an additional appropriation which is explained below and urges your support in passage of this bill.

CSSB 26 provides for a number of power project developments throughout the state and establishes a program to meet the growing need for power as our state develops. At the present time, both rural and urban communities are in need of power supplies at a cost that will enable them to ensure sound economic and social growth. The appropriations to the power project development fund and the Alaska Power Authority for feasibility studies for proposed power project sites is a major positive step in the future of Alaska.

Sealaska Corporation urges your consideration of an additional project of constructing a Juneau-Hoonah transmission line using Snettisham Power between Douglas Island to Hawk Inlet to Hoonah. An Alcat Engineering Inc. study, commissioned by the Alaska Power Administration, has indicated that such a transmission line is technically and financially feasible at a cost of $996,000 for a complete system engineering and design. The cost of transmission could be accomplished for as little as four cents a kilowatt, added to the cost of power from Snettisham, would provide a kilowatt at five and a half cents to ten cents which would be less than half of the current cost of power to the residents of Hoonah who presently pay approximately one hundred eight dollars per household per month. In addition, such a development would be compatible with the Noranda mining development and would do much to encourage the development of the mine.

The additional Juneau-Hoonah transmission line should be incorporated in CSSB 26 by amending Section 4, Item 10 to include

Hoonah the additional cost for the project. I urge you consideration of this project and feel strongly that it could have a positive impact within the foreseeable future that would benefit both the public and industry.

Sincerely,

SEALASKA CORPORATION

Byron I. Mallott
Chairman of the Board

Alaska MUNICIPAL League

TELEPHONES
(907) 586-1325
586-6526

204 N. FRANKLIN ST.
JUNEAU, ALASKA 99801

March 27, 1981

To: Terry Gardiner, Co-Chairman, House Resources Committee
Fred Zharoff, Co-Chairman, House Resources Committee
and all members of the committee

From: Ginny Chitwood, Executive Director, Alaska Municipal League

Re: Energy Legislation

The Alaska Municipal League is a strong proponent of hydro-electric development and has included the subject as one of its ten top priorities. Delegates at the AML Local Government Conference last November adopted six planks dealing with this issue:

"The League supports legislation which would favor the investment of a percentage of the permanent fund into the development of energy resources and potable water supplies." (Part I.G.1., page 3)

"The League supports uninterrupted continuance of loan funds from the state for feasible hydroelectric projects within the state, and further supports long-term, low-interest loans at three percent for these projects with funding appropriated from non-renewable resource revenues such as those presently being generated by oil and gas receipts." (Part I.I.1., page 3)

"The League supports expeditious funding which would make available to the various municipal utilities and cooperatives in the State of Alaska direct grants and/or low interest loans in order that they may immediately be brought into adequate service for the people and that the Alaska Power Authority be adequately funded to meet the needs of the municipalities for water and power source development and distribution." (Part VI.A.1., page 11)

"The League supports the concept of direct grants and low interest loans from state funds for the construction of conventional and alternative energy sources in funding fossil, hydroelectric, geothermal, wind and other means in order that rates paid by the Alaska consumer may be kept as low as possible." (Part VI.A.4., page 12)

(over)

"The League supports loans for the financing of construction of power projects in amounts approved by law, at an interest rate not to exceed three percent (3%) and a term consistent with the useful life of a project but not to exceed 100 years and with principal and interest payments commencing on the project power-on-line date". (Part VI.A.6., page 12)

"The League requests the Legislature and the Administration to adopt, by statute and/or regulation, the policy that hydro-electric energy is one of the most advantageous and acceptable methods of generating renewable energy for use by the many citizens of Alaska." (Part IX.B.4., page 16)

Renewable Energy in Alaska's Future

a report from the

RAINBOW ENERGY RETREAT

prepared by the

Alternative Energy Resource Center

March 1980

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Alternative Energy Resource Center

March 1980

This project was funded by a grant from Western SUN with the aid of the Alaska Division of Energy and Power Development.

Renewable Energy in Alaska's Future

Table of Contents Page

Prepared by

Steve Smiley and Nancy Lee

Alternative Energy Resource Center
1069 W 6th Avenue
Anchorage, Alaska 99501
274-3621

INTRODUCTION

Alaska faces the unique challenge of using its tremendous oil revenues to develop a renewable energy based economy. Public interest has fostered a rapid expansion of activity in the field, generating new programs and an increase in renewable energy applications. The state must consider the role of renewable energy in formulating its power development plan and statewide energy policy.

In rural Alaska, renewable energy holds the key to ending reliance on continually escalating fossil fuels. Housing insulation retrofit, wind power, photovoltaics, alcohol, methane, small scale hydro and other alternative technologies can enhance local self sufficiency through the provision of reasonably priced, fixed cost energy for local economic development and the maintenance of a comfortable standard of living.

Less obvious is the role of renewables in an urban setting. While large scale hydro or coal fired electrical generating facilities may have a role in supplying energy to urban centers, there is a danger in perceiving that such development will meet all of the energy needs of the people it serves. The severity of the arctic and sub-arctic climates dictate caution against providing all of our heat, lighting, cooking, transportation and commercial energy needs from one power source. Maximizing the use of a broad range of renewable energy technologies such as co-generation, waste heat recovery, wind farms and super insulated residences matched to appropriate end use will better protect citizens in the event of supply interruptions from natural, military or technical causes. Any balance of supply needs could be met by mid- and large-scale facilities.

THE MEETING

For alternative energy efforts to be effective, a well-rounded assessment of current alternative energy activities and needs must be made. To this end, the AERC sponsored a meeting of 30 of Alaska's alternative energy leaders to discuss needs, strategies, priorities and accomplishments for the development of renewable energy in Alaska. The meeting was held on November 21-23, 1980 at Rainbow Valley, south of Anchorage.

Information on alternative energy is as diffused and broad ranging as the geographic and climatic dimensions of Alaska. Since the field is embrionic, yet growing at a fantastic rate, much of the awareness of the needs and potentials for renewable energy lie within the minds of those working in the field. Daily contact with design, program management and client/constituent needs form a working base of knowledge. The efforts of these individuals to develop renewable energy systems clearly defines for them where data and information gaps lie, what priorities exist for research and development and the local resources and skills available for implementation. Therefore this group is uniquely capable of looking at the long-range requriements for the development of renewable energy systems in Alaska. Moreover, the bringing together of technical professionals, program managers, legislative and state representatives, community leaders and renewable energy policy advocates for two days served as an invaluable forum to inform each sector of the needs and priorities of the others.

CONSENSUS PROCESS

The workshop employed a "limited consensus process" in reaching decisions. Thus, one or two dissenting voices would not prevent an objective

from being accepted providing that there was strong overall support for the measure. This report must, therefore, not be perceived as implying full support of each item by each participant. It is, however, representative of the priorities of the renewable energy community at large.

GUIDING PRINCIPLES

Initially, four guiding principles were defined by the group as a basis upon which specific long term goals for renewable energy development could be formed.

These guiding principles were:

1. A free and healthy society and environment.
2. Maximizing of self-sufficiency and sustenance.
3. Public understanding of energy and energy choices.
4. Minimal government and maximum individual and local responsibility and control.

Using these principles as reference, ten major goals were defined for the process of achieving a renewable energy base for Alaska:

1. Establish a wide understanding of energy choices, in part through formal education.
2. Invest nonrenewable revenues in sustainable energy systems.
3. Develop a comprehensive, accessible standardized data base for energy resources.
4. Maximize end-use efficiency.
5. Develop regional and local energy plans.
6. Commercialize renewable energy technologies with an aim toward sustained job creation.
7. Establish a decision making process that incorporates all of the internal and external costs of energy.

8. Provide equal access to energy capital while working toward the elimination of subsidies.
9. Develop renewable agricultural systems.
10. Implement full resource recovery.

Each of these goals is discussed below with specific recommendations for implementation. An effort has been made within the narrative to point out how the goals interrelate to one another. There is no priority implied in the numbering of goals. All are considered to be of equal weight.

GOAL ONE: ESTABLISH WIDE PUBLIC UNDERSTANDING OF ENERGY CHOICES IN PART THROUGH FORMAL EDUCATION

All too often the American public simply does not believe an energy crisis exists. Nor does it seem to understand the role that renewable energy can play in response to that crisis. Yet the social upheaval that could occur if an unaware populus is caught unprepared for supply shortages, rationing, etc., is reason enough to begin a public education campaign on the potential for renewables. The workshop participants have thus defined public education as the first priority for action this year.

There are three thrusts to this educational effort: first, to provide basic public education in renewable energy issues and technologies. These can be accomplished through multi-media productions, traveling energy shows and energy coordinators who can provide Alaska-specific information upon request. Second, technical information should be provided to individuals and professionals to develop a core of skilled technicians capable of design and installation of renewable energy systems in Alaska. Finally, the education of financial and administrative officials will establish a basis for informed public decision making.

Objectives:

A. Conservation and renewable energy seminars for builders, architects, planners, engineers, appraisers, bankers and public officials. These seminars should be keyed particularly to the needs of each professional group including such areas as energy economics and state of the art technologies.

B. Establish energy coordinators in each region or major community who will provide information on energy and serve as a regional liason in community energy planning processes.

C. Establish a two year community college and a four year university alternative energy curricula.

D. Integrate renewable energy into primary and secondary school curricula, including library and A-V collection development.

E. Increase private sector renewable energy seminars including the use of community education courses in the community schools.

F. Coordinate the workshop efforts of public and private organizations.

G. Develop high profile energy efficiency demonstration projects that show the integration of energy, food production and waste management, such as the integral urban and rural arks of the Farallones and the New Alchemy Institutes.

H. Make energy information available at the local level.

I. Provide state support for the Energy Extension Service and expand its program.

GOAL TWO: INVEST ALASKA'S NONRENEWABLE REVENUES IN SUSTAINABLE ENERGY SYSTEMS

According to Roger W. Sant, author of *The Least-Cost Energy Strategy*, a "well focused R and D program including commercialization of new energy technologies may be a relatively more cost-effective program for the taxpayer." He adds, "the most useful policy would be one that encourages the maximum number of competing elements."

The investment of fossil fuel revenues in renewables can have several impacts by encouraging state investments in improving the efficiency of our existing energy systems, upgrading our housing stock and assisting in the commercialization of small energy conservation and renewable energy firms. In addition, relief could be provided to rural Alaska while establishing a successful track record for renewable energy systems. More importantly, the infant renewable energy industry would have working capital to become established while the educational process is raising consumers awareness and additional technicians are acquiring the skills necessary to accomplish the work.

Objectives:

A. The state should make a major investment in appropriately scaled renewable energy production and conservation programs.

B. Subsidize the start up costs of renewable energy project to enhance their long term cost-effectiveness. The state can make major investments in rural-energy systems thus reducing the burden in trageted bush communities by reducing or eliminating the need for fossil fuels. While addressing one of the most pressing needs in the state, rural energy, the program will funnel capital through the young renewable energy industry.

C. Invest in upgrading the building stock to cut energy use by 50%.

A large home retro-fit program is required to satisfy this task. On a -10 degree day, the average Anchorage home is sufficiently insulated to maintain a liveable temperature for approximately three hours if the heat should be turned off. This is a poor standard from both an energy and public safety perspective. Raising the R-value of the wall to superinsulated levels* would increase that margin to one to two days depending on the user patterns of the residents. Heat exchangers may be included when needed to preserve air quality. Fuel requirements when the heating plant is in operation would be cut to a fraction. Alaskans now have the opportunity to move from the era of temporary quarters that has dominated our building style to one in which we recognize that the quality of our housing stock is an investment in the state's future.

D. Upgrade present electrical generation facilities and distribution systems.

E. Provide state funding for the low-income weatherization program and assess benefits and liabilities of a complete state take-over.

F. Create an energy efficient housing loan program under the alternative technology loan fund and capitalize it with $25 million.

G. Improve the energy small business loan process and increase funding to $5 million.

H. Assess current energy programs for unused funds to identify whether funds allocated by the state legislature for renewable energy purposes are being fully utilized. Any sums not being utilized by state agencies might be contracted out to accomplish the purpose of the allocation.

---

*R-40 walls and R-50 ceilings are suggested by some solar experts as an appropriate insulation level for Anchorage. These levels are used here for illustrative purposes and are not intended to imply an optimum level.

GOAL THREE: DEVELOP A COMPREHENSIVE, ACCESSIBLE, STANDARD DATA BASE FOR ENERGY RESOURCES

Renewable energy technologies are by their nature site-specific. Application in arctic and sub-arctic climates has been limited. Before the implementation of renewable energy technologies can occur on a wide-spread basis, a thorough assessment of renewable energy resources must be made. In addition thorough testing of equipment or systems suitable for this climate range must be accomplished. To be useful, this data must be in standardized form and readily available to the public, most efficiently through a network of computer terminals.

Objectives:

A. Examine existing information on resource potential and the appropriate technology state of the art.

B. Identify data needed to be gathered, and the appropriate sites.

1. Solar
    a. BTU/sq ft on horizontal, verticle and latitudinal tilt surfaces in 17 locations statewide with three pyronometers each.
    b. Photovoltaic accummulators in the same locations.
2. Wind-statewide installation of several hundred anemoters.
3. Energy conservation technologies building performance monitoring.
4. Hydro and tidal power.
5. Geothermal well log data acquisition .
6. Biomass resource assessment.

C. Develop an equipment testing facility to assess the relative merits of energy and conservation technology available to Alaskans.

D. Gather data on existing power generating facilities.

E. Increase state funds for new data collection.

F. Publish an atlas of all of Alaska's energy resources.

G. Make energy information available at local levels.

H. Develop a renewable energy site evaluation package to include a handbook and testing hardware.

GOAL FOUR: MAXIMIZE END-USE EFFICIENCY

Some energy forms can perform certain tasks more efficiently and appropriately than others. Large energy savings can be achieved by utilizing our energy supplies according to the most efficient end-use.

Many processes currently utilizing electricity could use energy supplied in its appropriate form from a renewable resource, for example, space or industrial process heat from solar or geothermal or mechanical energy from wind and hydro. Electricity is appropriate for lighting and the operation of motors. Hydro, wind or photoelectric cells can supply that electricity in lieu of combustion of gas or oil.

Transportation as an energy sector can be viewed in the same end-use perspective as electrical supply. By looking at what is being transported, where, and for what purpose, we can often determine a much more efficient means of getting the job done. In transportation, the trade off may be a choice of local rather than imported commodities, more sophisticated and widely available communications systems or development and utilization of comprehensive mass transit systems.

Transportation issues covering a broad spectrum are listed under this goal. The disproportionate amount of energy use in this sector suggests that there are significant gains to be made through conservation and appropriate end-use.

Objectives:

A. Establish a methodology to access of energy end-use efficiency.

B. Create incentives for energy efficiency:

   1. Redesign of electric rate and structures, i.e., peak load pricing.

   2. Consumer education of appliance efficiency.

3. Advertising program discouraging electric resistance heating, where appropriate.

C. Define building thermal efficiency standards for Alaska regions.

D. Complete a comprehensive analysis of transportation by nature and end-use.

E. Increase use of communication systems instead of transportation. Expand access to and integration of state communication systems.

F. Assess new transport technologies, for example, lighter-than-airships, Hovercraft, and bargetrains.

G. Investigate the feasibility of a South-East, South Central Alaska Ferry system.

H. Purchase of the Alaska Railroad by the State of Alaska.

I. Integrate Alaska railroad to connect with Alaska waterways and the Canadian railways.

J. Develop comprehensive mass transit systems in Anchorage, Fairbanks and Juneau.

K. Provide transit services in other communities as needed. These could include "paratransit" systems utilizing school buses, for example, to take workers to pulp mills, canneries, etc.

GOAL FIVE: DEVELOP REGIONAL AND LOCAL ENERGY PLANS

Community energy planning plays a key role in tying together data gathering and planning processes with public education.

Energy will prove to be a key factor of contemporary life in the next decade. Individuals will be forced by skyrocketing costs to make changes in their lives. Yet thepublic does not understand the complexity of energy issues. An effective planning process like that used in the Franklin County (Mass.) Energy Study could, for example, show Anchoragites how a major portion of the estimated $350 million that they export from their community each year for energy could be diverted back into the local economy. Such a planning process would assess energy consumption in a fine grained approach by sector and end use; followed by an analysis of renewable resource potential. An assessment of the full environmental, social and cultural impacts of this broad spectrum renewable energy development would be made for comparison with other conventional energy supply scenarios. If effectively implemented, this study would serve not only as a data gathering and planning process but would also educate Alaskans about the energy choices available to them and their communities.

Objectives:

A. Develop and define an appropriate decentralized energy planning process for rural communities.

B. Conduct community energy planning seminars for urban and regional planners in local energy planning.

C. Establish regional energy coordinators as primary outreach agents to coordinate with planners.

D. Expand and complete comprehensive energy plans for each community in the state.

E. Provide funds for community energy planning processes in each community.

GOAL SIX: COMMERCIALIZE RENEWABLE ENERGY TECHNOLOGY WITH AN AIM TOWARD SUSTAINED JOB CREATION

A transition to renewable energy based economy will create jobs. Studies have shown that the renewable energy/conservation industry's labor intensive activities create four to seven times the jobs of capital intensive industries.[1] Moreover the jobs created by a shift to renewable energy use are local jobs that feed money back into the local economy.

The success of commercialization of renewables and therefore the creation of jobs depends largely on efforts in the educational and financial spheres. Technicians and professionals must be trained to evaluate, design and install equipment. Financial officers and assessors must have an understanding of renewable energy systems and displaced fuel costs to provide responsible financing for these systems. Property assessors must also share in the same kind of educational process. The capital necessary to support this industry must be made available. Finally, technologies appropriate to Alaska's climate must be designed, tested and marketed through competent Alaska based businesses. The role of the Alaska Energy Center in bringing new technologies to commercial viability is critical.

Objectives:

A. Provide state funding for high visibility alternative energy projects.

B. Establish an "Innovation Center."

C. Provide state assistance in marketing alternative energy technologies.

D. Modify the existing Alternative Energy Revolving loan fund to take into consideration improved energy conservation in buildings, simplify its process and remove it from the Office of Business Loans.

GOAL SEVEN: ESTABLISH A STATE ENERGY DECISION-MAKING PROCESS WHICH INCORPORATES ALL INTERNAL AND EXTERNAL COSTS AND BENEFITS IN ENERGY CHOICES

In order for the transition to renewable energy to be effectively implemented, it is imperative that the decisions relative to all energy production and utilization be made by persons aware of the potential and application of renewable energy.

Life cycle costing in buildings will determine on a competitive basis the savings possible through conservation or solar.

The impact of market imperfections on renewable energy decisions is critical. When all the external costs and benefits are weighed and comparisons are made on a replacement* cost basis renewable energy systems become much more cost effective. Comparison should be made between fossil fuel application and renewables that considers the true environmental and social impacts of each, the hidden and actual subsidies and the replacement costs rather than average cost of present fossil fuel energy production.

Decision makers must be educated to the implications of this information. Legislative and administrative action to rectify these imperfections in the decision-making process should be a high priority.

Objectives:

A. Enforce life-cycle costing on public building construction and

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*To avoid confusion the term "replacement cost" has been substituted for marginal cost. With respect to economic analysis we do not propose extending traditional micro-economic short-run marginal cost analysis to long-run total cost investment decision-making. When comparing energy alternatives emphasis must be put on the replacement costs of current technology rather than current energy costs which may reflect historically low roll-in prices. Public policy makers must be alert to market imperfections and how these impace their analysis.

state financed loans and land disposal programs.

B. Increase state funding for research into external costs of energy development and initiate ways to mitigate these costs.

C. Enforce provisions of SB438 of 1980, particularly as it relates to financial institutions and standards.

D. Amend SB438 to more effectively respond to rural needs.

E. Produce a replacement cost pricing economic analysis for energy development and require use of this methodology for energy decision-making. Establish an energy review process for such decisions at two levels such as Office of Budget and Management and perhpas the Alaska Power Authority and Department of Transportation and Public Facilities as is appropriate.

F. Conduct renewable energy seminars for legislators, administrators, mayors and housing authorities.

GOAL EIGHT: PROVIDE EQUAL ACCESS TO ENERGY CAPITAL WHILE WORKING TOWARD THE ELIMINATION OF SUBSIDIES

Renewable energy systems can provide appropriate solutions for rural energy needs. Once in place they drastically displace or eliminate costly imported petroleum fuels. However, the development of the new industry to accomplish this task will take several years for data collection, systems testing, technical training and local planning activities to be accomplished. Meanwhile subsidies have been provided to moderate some of the exhorbitant costs to rural residents.

The subsidy question has two other dimensions. One is the hidden subsidies within petroleum fuel pricing which skew the cost effectiveness of renewables. Another is the hidden subsidies to urban Alaskans, particularly Anchorage residents who benefit from the rolled in costs of 20 year old natural gas lease agreements.

In many cases rural residents do not qualify on a defacto basis for loans, audits, etc. because they are difficult to reach or lack collatoral. A systematic assessment of energy programs to enable participation by rural residents is necessary.

The comprehensive deployment of renewable energy technology could serve ultimately to eliminate the need for energy subsidies. For renewables to be deemed cost effective in comparison to non-renewables we must first determine what subsidies are available to fossil fuels that renewables are not afforded. Then the subsidies must be equalized with the aim of solving the supply problem through implementation of rewewables and thus eliminating their need.

Objectives:

A. Identify existing state and federal subsidies.

B. Consider scenarios for equalization of subsidies.

C. Consider elimination of subsidies.

GOAL NINE: DEVELOP RENEWABLE AGRICULTURAL PROCESSES

Fifty percent of Alaska's energy usage is in the transportation sector, much of that used in importing goods from outside the state. World energy economics will most certainly drive the costs of transportation of food and energy to exhorbitant levels for Alaskans. The umbilical cord with which Seattle supplies our basic needs will draw tight indeed. Regional and local Alaska food production coupled with renewable energy technologies can go far toward reducing transportation costs for these commodities. Sweden has already demonstrated that a subarctic country can be largely food self-sufficient.

Application of renewable energy technologies for grain drying, the raising of soil temperatures, compost and fuel production can radically change the economics of small and large scale farms. Renewable energy can greatly increase the quality and varieties of crops that can be grown in Alaska. Fertilizer resulting from methane digestion of fish waste and other distillation processes offers a supply of locally produced organic nutrients. Geothermal energy also has major developmental implications in areas where its heat can be used for greenhouses and raising of soil temperatures.

Striving for food self sufficiency in Alaska does not mean abandoning the world market. Crops can be encouraged that provide for Alaska's needs as well as being valuable on the world market. This approach does not preclude the availability of such specialty items as avocados or pineapples. It can, however, reduce the cost of basic food stuffs to a level that will allow families to maintain a reasonable comfortable standard of living.

Rapidly rising fuel costs make it necessary for Alaska to establish in 20 years an agricultural infrastructure that took 100 years to accomplish in the lower 48. The state's surplus revenues make such a possibility

tenable.

Objectives:

A. Support in-state, renewable agriculture projects that do not depend on fossil fuels.

B. Completely classify all type II and III soils by mid 1982 and designate such soils as agricultural land.

C. Provide state support for community subsistence agriculture including:

1. Village/community gardens and animal husbandry.

2. Community canneries, food processing and storage facilities.

D. Capitalize and develop in-state agricultural processing.

E. Promote agriculture waste recovery.

F. Develop marketing cooperatives.

G. Evaluate the agricultural rights program.

H. Increase funding for a vigorous research program in northern climate agriculture.

I. Investigate problems in reindeer husbandry.

GOAL TEN: FULL RESOURCE RECOVERY

The processes of material extraction, transportation of raw materials, industrial processing, fabrication, labeling, shipping, marketing and delivery are so energy intensive that reuse and recycling of materials is fundamental to wise resource management. The Anchorage Recycling Center and Anchorage Chamber of Commerce recycling project have proven the success of urban recycling efforts in Alaska.

Objectives:

A. Establish recycling stations in communities throughout the state.

B. Develop a demonstration project in site source separation collection by municipal sanitation.

C. Provide low interest capitalization loans for recycling projects.

D. Legislate a Bottle Bill.

E. Enforce state government agency recycling requirements.

F. Establish a market use for waste oil, including setting up a refining plant.

G. Change back-haul regulations to permit trucking firms to allow reduced rates to recycling firms.

H. Set up a shredding plant so that sensitive or classified material can be recycled after being destroyed.

I. Study ways to reuse materials not able to pay their way in shipping to Seattle, i.e., glasphalt, cardboard to prest logs.

J. Monitor waste associated with the proposed natural gas line, consider back hauling and reuse of waste if possible.

SUMMARY

The Rainbow Retreat proved to be extremely valuable in defining a frame of reference for renewable energy development. The group plans to meet again in April 1981 to expand the objectives outlined in this report into well-defined programs. It will also serve as a forum to define the roles of state agencies and other actors in the field.

Though limited by time, an effort was made at the Rainbow Retreat to define the appropriate state agency to implement various objectives. Opinions were conflicting, pointing up the confusion that exists over the jurisdiction of various state energy agencies. Even when the legislative or administrative mandate of a particular agency is clear, subsequent legislative action frequently does not follow suit. It is imperative for the effective development of renewable energy, that this confusion be addressed.

The Alternative Energy Resource Center is pleased to have had an opportunity to sponsor the Rainbow Retreat. Thanks are extended to Western Sun and the Solar Advisory Group for the necessary financial support they provided. Thanks are also expressed to the participants for their enthusiasm and hard work. Finally, we would like to express our appreciation to John Pursley for the generous offer of the use of his home for the retreat.

This report represents an ongoing process. Any comments, criticisms or suggestions are welcomed and should be forwarded to Nancy Lee, Alternative Energy Resource Center, 1069 West 6th Avenue, Anchorage, Alaska 99501.

PARTICIPANTS IN THE RAINBOW ENERGY RETREAT

Robert Balivet, American Institute of Architects

James Barkshire, Alaska Renewable Energy Associates

Mimi Burbage, Superinsulated Homes, Inc.

Geoff Feiler, Heat Loss Analysis

Bob Gibson, Kuskokwin Community College

Bob Grove, Fairbanks Town and Village Association

Quin Hart, Utility Officer, Elmendorf AFB

John LeMay, Alaska Society of Energy Auditors, Inc.

Nancy Lee, Alternative Energy Resource Center

Bill Leighty, Western Sun Solar Advisory Group

Don Markle, Division of Energy and Power Development

Sherry Modrow, Alaskans for Alternative Energy

Robert Moen, Alaska Power Authority

Eric Myers, Alaska Public Interest Research Group

Mark Newell, Wind Systems Engineering, Inc.

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Peter Poray, Municipality of Anchorage Energy Coordinator

John Pursley, Alaska Energy Center

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Bob Roggasch, Roggasch and Associates

Representative Brian Rogers, Alaska State House of Representatives

Skip Roy, Alternative Energy Technical Assistance Program

Rich Seifert, Water REsources Institute, University of Alaska

Bob Shipley, Western Sun

Sam Skaggs, Sun-till Systems

Steve Smiley, Alaskans for Alternative Energy

Bob Speed, Legislative Aide to Representative Terry Gardiner

Jack Spratt, Alaska Energy Extension Service

Natalie Stevens, Alternative Energy Resource Center

Senator Terry Stimpson, Alaska State Senate

Sherry Valentine, Formerly with RurALCAP

Logan Wakefield, Anchorage Community College

Jeff Weltzen, Fairbanks Environmental Center

Mark Wittow, Legislative Aide to Representative Hugh Malone

REFERENCES

[1]Ken Bossong: Solar Energy and Jobs. Citizens' Energy Project Report Series Number 49, Washington, D.C. 1980.

Richard Grossman and Gail Daneker: Energy Jobs and the Economy. Alyson Publications, Boston 1979.

Council on Economic Priorities: Jobs and Energy: The Employment and Economic Impacts of Nuclear Power, Conservation and Other Energy Options. Washington, D.C. 1980.

Energy Conservation and Alternative Energy

This proposal includes a revised version of the current Energy Audit Program, plus reccomendations for a Technical Advisor Program to be run by the Alaska Energy Center to provide technical advice to financial institutions on Alternative Energy/Energy Conservation Loans as a combined state program.

1. Energy Audit- Program is simplified and cost of an audit is reduced. State reimburses contracted certified auditor @ $75 per audit. Auditor can charge customer at whatever rate the market will bear. Auditor reccomends steps to be taken under refund/grant program, and services of technical advisor where necessary o where an alternative Energy/Energy conservation Loan is desired. 32,000 audits should be completed in FY82 as part of a three year program. millions $2.400

2. Refund/Grant Program for Energy Conservation- For improvements reccomended in Energy Audit.
   32,000 grants @ $300+COLA 9.600

3. Technical Advisor Program- Alaska Energy Center contracts with Energy Experts from a variety of fields to provide technical assessment of Alternative Energy/Energy Conservation Loans. State pays Technical Advisors at rates set by the Energy Center by regulation.
   13,000 Technical advisor visits @ average $200. 2.600

4. Alternative Energy/Energy Conservation Loan Combined Program
   Loans are available through Financial Institutions with State funds available as a secondary market. Interest rate remains at 5%, loan limited to $20,000. for individuals and $50,000 for businesses. (money is also made available under this program for Alternative Energy Business development)
   Individual Loans 5000 Loans @ av. $10,000 50.000
   Business Loans 10.000

5. R&D through Alaska Energy Center- This is an important componant of any proposal to insure that the technology to accomplishh broad based energy conservation and use of Alternative Energies remains current. millions
   Recommendation $12.000

6. Demonstration Grants combined Northern Technology and DOE Small Grants Program(Federal, discontinued)
   400 grants @ average $4000. 1.600

Projected Power Cost Comparison

(¢/KWH)

	1st Year of Operation			1991		
	State Funded (CS SB 25)	3% State Loan (SB 25)	Financing w/o Legislation	State Funded (CS SB 25)	3% State Loan (SB 25)	Financing w/o Legislation
Bradley Lake	0.7	3.8	9.1	1.4	4.4	9.8
Green Lake	1.3	7.3	13.0	2.3	6.7	10.9
Port Lions	4.9	12.6	18.0	9.7	17.5	23.0
Solomon Gulch	1.8	9.3	14.8	3.7	9.4	14.4
Chester Lake	1.4	5.4	7.9	2.8	6.8	9.4
Terror Lake	1.0	5.6	13.7	1.5	5.0	11.3
Tyee Lake	2.9	11.6	30.8	3.4	8.1	22.0
Swan Lake	2.8	13.8	28.2	2.8	9.1	23.0

Original sponsors: Kerttula, Ziegler, Ferguson, et al

Offered: 3/5/81
Referred: Rules

Funding Information

General Fund	$512,500,000
Other Funds	-0-
	$512,500,000

IN THE SENATE BY THE FINANCE COMMITTEE

CS FOR SENATE BILL NO. 26 (Finance)

IN THE LEGISLATURE OF THE STATE OF ALASKA

TWELFTH LEGISLATURE - FIRST SESSION

A BILL

For an Act entitled: "An Act making special appropriations to the Alaska Power Authority for energy projects and for the power production cost assistance program; and providing for an effective date."

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF ALASKA:

* Section 1. The sum of $354,900,000 is appropriated from the general fund to the power project development fund of the Alaska Power Authority (AS 44.83.400 - 44.83.480), to be expended by the authority in the amounts specified for the following listed power projects:

(1)	Bradley Lake	$40,000,000
(2)	Chester Lake	6,000,000
(3)	Green Lake	46,000,000
(4)	Port Lions	1,400,000
(5)	Snettisham	20,000,000
(6)	Solomon Gulch	62,000,000
(7)	Swan Lake	53,000,000
(8)	Terror Lake	81,500,000
(9)	Tyee Lake	45,000,000

* Sec. 2. The sum of $40,000,000 is appropriated from the general fund to the power project development fund of the Alaska Power Authority (AS 44.-83.400 - 44.83.480) to be allocated by the authority to the following areas for development and construction of power projects under AS 44.83.187:

(1) $10,000,000 for projects in senate district M

(2) $10,000,000 for projects in senate district N

(3) $10,000,000 for projects in senate district P

(4) $10,000,000 for projects in other areas of the state.

* Sec. 3. The sum of $85,000,000 is appropriated from the general fund to the Alaska Power Authority for acquisition of a right-of-way for and design and construction of a high voltage electrical transmission system connecting Anchorage and Fairbanks.

* Sec. 4. The sum of $27,800,000 is appropriated from the general fund to the Alaska Power Authority for feasibility studies under AS 44.83.181, to be allocated to the following proposed power project sites:

(1)	Black Bear Lake	$ 1,400,000
(2)	Grant Lake	1,000,000
(3)	Kisaralik	1,000,000
(4)	Kotzebue	850,000
(5)	Power Creek	700,000
(6)	Scammon Bay	200,000
(7)	Susitna	15,000,000
(8)	Takatz Lake	50,000
(9)	Tazimina Lake	2,000,000
(10)	Rural community studies: Akhiok, Ambler, Angoon, Atka, Chignik, Chignik Lagoon, Chignik Lake, Cold Bay, Elim, False Pass, Goodnews Bay, Grayling, Gustavus, Ivanoff Bay, Kaltag, Karluk, Kiana, King Cove, Larsen Bay, Nikolski, Old Harbor, Ouzinkie, Perryville, Shungnak, Tenakee Springs, Togiak, Unalaska	5,600,000

* Sec. 5. The sum of $4,800,000 is appropriated from the general fund to the Alaska Power Authority for the power production cost assistance fund

(AS 44.83.162).

* Sec. 6. Sections 1 and 2 of this Act take effect on the effective date of an Act entitled "An Act establishing a power project development fund in the Alaska Power Authority and amending the Alaska Power Authority Act; and providing for an effective date."

* Sec. 7. Sections 3 - 5 of this Act take effect immediately in accordance with AS 01.10.070(c).

MEMORANDUM State of Alaska

TO: Governor Jay S. Hammond

DATE: March 18, 1981

FILE NO:

TELEPHONE NO: 465-3573

FROM: Frances A. Ulmer, Director
Division of Policy Development
and Planning

-and-

Ron Lehr, Director
Division of Budget and Management

SUBJECT: Alternative Energy Systems, Cogeneration and Conservation Financing Proposal.

-SUMMARY-

You have instructed your staff to develop alternatives and recommendations for State financial assistance for energy development. In making this request, you specifically instructed that individuals or small power producers receive equitable treatment with respect to any subsidies or other incentives which may be offered to utilities. Such equitable treatment not only insures fairness in the distribution of public funds for energy development, but also will tend to minimize distortion of economic choices in this rapidly developing sector of the State's economy.

I ALTERNATIVE ENERGY SYSTEMS

A. Introduction - Alternative energy systems (AES) produce electric power using renewable sources of energy and/or unconventional but commercially proven technologies. AES can also produce non-electric energy such as space heat, and can conserve energy. Project size is usually small-scale. Common examples of AES include wind turbine generators, low head or micro hydro, biomass, solar, geothermal, etc.

B. Purpose - To provide comparable and equitable State financial assistance to sponsors of residential or small business alternative energy systems. In recognition of the potential impact AES development may have on utility systems, research was conducted on federal and State opportunities for minimizing negative impacts. Mechanisms are available for insuring equitable and orderly development.

C. Financing Options For AES

1. Power Project Equity Fund

a. Recommendation - Non-utility sponsored alternative energy systems should be eligible for per capita equity grants, but only when the system produces electric power.

b. Eligibility -

i. produces electric power from renewable energy source;

ii. based on commercially available technology;

iii. conforms to regulations and standards covering utility interconnection; and

iv. sponsored by households, groups of households.

c. Mechanism - Administered by APA in conjunction with utility program. Grant amount limited to number of individual users of project if individuals not already counted for grant for different project.

d. Funding - Lump sum $2,000.0 appropriation to be allocated by APA.

e. Pro's/Con's; Other Options - See full proposal.

2. Alternative Energy Loan Fund

a. Recommendation - Amend the existing Alternative Technology and Power Resource Revolving Loan Fund to provide debt financing and debt restructure for alternative energy systems.

b. Eligibility -

i. produces energy using renewable resources or unconventional technology or conserves energy;

ii. based on commercially available technology;

iii. conforms to regulations and standards covering utility interconnection; and

iv. sponsored by households, groups of households, or small businesses.

c. Mechanism - Major amendment to existing loan program to provide Energy Center assistance to Division of Business Loans, contracting for private sector loan administration, increased interest rates, and debt restructure.

d. Funding - FY82 budget request for existing program is $1,200.0 Given proposed increased scope and uncertain demand, $5,000.0 is recommended.

e. Pro's/Con's; Other Options - See full proposal.

II INDUSTRIAL COGENERATION

A. Introduction - Industrial cogeneration is defined as the use of fuel to generate both uesful thermal energy and electricity in a sequential process. Industries generating process steam or creating waste heat may have cogeneration potential. Examples include oil refineries, oil pipeline pump stations, saw mills, pulp mills, and seafood processing facilities.

B. Purpose - To provide compatable and equitable financial assistance to sponsors of industrial cogeneration projects. Mechanisms exist to govern the interaction between cogenerators and utility systems when interconnected.

C. Financing Options

1. Power Project Equity Fund

a. Recommendation - Utility sponsored industrial cogeneration projects should be eligible for per capita equity grants. Waste heat recovery and district heating projects should also be included.

b. Elgibility -

i. sponsored by a utility;

ii. conforms to regulations and standards covering utility interconnection; and

iii. financed with revenue bonds.

c. Mechanism - Administered by APA in conjunction with utility program. Grant for cogeneration deducted from total available to utility. Grant proceeds applicable only to electric power portion of project.

d. Funding - No additional funding necessary.

e. Pro's/Con's; Other Options - See full proposal.

2. Debt Assistance Loans

a. Recommendation - Industrial cogeneration projects should be eligible for debt assistance loans if revenue bonds are used for project financing.

b. Eligibility - same as above except utility sponsorship not required.

c. Mechanism - Administered by APA in conjunction with utility program. Loans may cover only costs associated with electric power.

d. Funding - No additional funding necessary.

e. Pro's/Con's; Other Options - See full proposal.

III RESIDENTIAL ENERGY CONSERVATION

A. Introduction - The State established a residential energy conservation program in 1980 providing energy audits, grants, and loans from the Residential Energy Conservation Fund. The federal government has provided a low-income weatherization program, but due to budget cutting this program may not receive federal funding in FY82. Results from both of these programs indicate

residential energy conservation is efficient and cost effective. Energy conservation improvements include insulation, weather stripping, and storm windows.

B. Purpose - To address the most critical short-term energy problem faced by most Alaskans, the cost of space heating. Recommended financial assistance for residential energy conservation includes grants, rebates, and loans and State funding of the low income weatherization grant program.

C. Financing Options

1. Residential Energy Conservation Fund

a. Recommendation - Provide funding level which allows completion of program within five years. This would cover 25,873 homes in FY82. A five year program would cover approximately 129,400 homes.

b. Eligibility -

i. all occupied residential buildings in Alaska; and

ii. building receiving weatherization funds ineligible for grants under this program.

c. Mechanism - Administered by the Division of Energy and Power Development using subcontractors.

d. Funding - FY82 funding of $13,116.0. Five year program would require about $79,565.4.

e. Pro's/Con's: Other Options - See full proposal.

2. Low-income Weatherization Grants

a. Recommendation - Provide State financial participation in the low-income weatherization program, in conjunction with administration of the Residential Energy Conservation Fund for operating efficienies. Consider coordination with statewide energy planning and local or regional reconnaisance studies. About

5,080 homes would receive weatherization in FY82. A five year program would weatherize 25,400 homes.

b. Elgibility - Low income households based on state-determined low-income.

c. Mechanism - Administered by the Division of Energy and Power Development using subcontractors.

d. Funding - FY82 funding of $13,160.0. Five year program would require about $80,344.2

e. Pro's/Con's: Other Options - See full proposal.

Attachment

STATE of ALASKA

MEMORANDUM

TO: Ronald D. Lehr, Director
Division of Budget & Management

Fran Ulmer, Director
Division of Policy Planning & Development

DATE: March 24, 1981

FILE NO:

TELEPHONE NO:

FROM: George Matz, Program Analyst
Division of Budget & Management

Tom Singer, Policy Analyst
Division of Policy Planning & Development

SUBJECT: Energy Development Financing

The Governor has requested that we develop a plan for financing non-utility energy projects as a complement to the power project financing plan which has now been introduced (HB 310) to the Legislature. The intent of this plan is to provide all types of energy generation and conservation systems with nearly equal financial incentive from the State in order to minimize economic distortion of the project selection process. Following is a report which provides details as to the options which can be used to achieve this intent. The options are listed under three categories which include: 1) alternative energy systems, 2) industrial cogeneration and 3) energy conservation.

I. ALTERNATIVE ENERGY SYSTEMS

Purpose - The purpose of this addition to the Governor's Energy Financing Proposal is to provide a means whereby residential or small business alternative energy systems may receive state financial assistance which is comparable to the financial assistance available to utility power projects from the Power Project Equity Fund, Debt Assistance Loans, and the Power Completion Fund. Because of the size of the subsidy for utility power projects, non-utility alternative energy systems which can produce or substitute for electricity would seldom be economic to the end-user unless comparable financial assistance is provided. This would be true even if the actual costs of the system are considerably less than the actual costs of power from a utility.

Financial assistance being proposed for residential alternative energy systems includes grants from the Power Project Equity Fund for small power projects and loans from the Alternative Energy Loan Fund for energy systems which utilize a renewable source of energy. Financial assistance for small businesses includes only loans from the Alternative Energy Loan Fund. The intent of the financial assistance is to provide funding for alternative energy systems which are based on commercially available equipment but not to fund research, development or demonstration projects.

Utility vs Non-Utility - The impact on utilities from non-utility power systems deserves special attention. Two situations are:

1. Non-utility power systems which are connected to a utility grid in order to sell surplus power to the utility and to purchase power when needed.

2. Utility customers who develop their own power system becoming totally self-reliant in meeting their power needs.

Regarding the first situation, the federal Public Utility Regulatory Policies Act of 1978 (PURPA) removes the institutional barriers which have prevented the non-utility or "small power producer" (and cogeneration facility) from competing with a utility. PURPA requires an electric utility to purchase from and sell electric energy to qualified small power production facilities that are not owned by utilities. The "rates for such purchase:

1. shall be just and reasonable to the electric consumers of the electric utility and in the public interest, and

2. shall not discriminate against qualifying cogeneration or qualifying small power producers" and

3. require the qualifying cogeneration or qualifying small power producer to produce electric energy at a rate which is less than the "incremental cost to the electric utility of alternative electric energy" (the buyers avoidance cost)

The Act interprets "just and reasonable to the electric consumers of the utility" in a manner which looks to protecting the interest of the electric consumer in receiving electric energy at equitable rates.

The Federal Energy Regulatory Commission (FERC) has promulgated some rather complex regulations regarding the criteria for qualification that are to be used by state public utility commissions. However, the State of Mississippi has successfully challenged PURPA in District Court claiming that the Act is unconstitutional as an infringement of the perogitive of the state. FERC's response to this is to continue the program but at the discretion of the state. To FERC's knowledge, only the State of Mississippi does not intend to comply with PURPA.

State financial assistance to the small power producer adds to the incentive created by PURPA.

The second situation (self-reliant systems) is not directly affected by PURPA but compliance with relevant APUC regulations (which may be promulgated this spring) could be used as a condition to a grant from the Power Project Equity Fund.

The combination of the two situations could result in a wide range of economic impacts which are described below.

1. A substantial number of utility customers become mostly self-reliant in electrical energy generation, thereby reducing the utilities average energy load and generating efficiency. However, they remain hooked-up for standby power, thereby maintaining or increasing the potential peak load and the reserve capacity that the utility must maintain. This could result in higher rates to remaining customers.

2. A substantial number of utility customers become entirely self-reliant in electrical energy generation and opt-out of the utility system. This reduces both the average energy demand and the peak demand, but leaves the utility with the cost of unused generating capacity. This may be a temporary problem to a utility which is experiencing rapid growth or a long term problem to a utility with little or no growth. Either way, fixed costs would be spread over fewer customers and with fossil fueled generators, operating efficiencies may be less and fuel surcharges greater.

3. The utility may be planning an increase in its generating capacity. The development of self-reliant alternative energy systems may be more cost-effective to the user and the utility than conventional generating systems. Rate increases required to finance conventional generating systems could be avoided.

4. Development of non-utility alternative electrical energy systems may reduce utility peak loads which could reduce fuel surcharges and capital expenditures for reserve capacity.

5. Development of non-utility power systems could delay or eliminate the need for additional utility generating capacity and reduce peak load, resulting in more cost-effective power and more stable costs.

Because every situation is unique, it is impossible to generalize about impact scenarios. Impacts would have to be determined on a case by case basis.

Negative impacts to the utility consumer from connected non-utility power producer should be prevented by:

1. PURPA/APUC regulations which prohibit the hookup of non-utility power systems which are not in the public interest.

2. PURPA/APUC regulations which permit hookup of the non-utility power producer but prohibit double dipping (i.e., a system receives the benefit of a direct grant plus the service area grant.)

3. If APUC decides not to promulgate PURPA regulations, the utility could decide what action best meets their interest and presumably the public interest.

Preventing negative impacts (i.e. demand reduction) from self-reliant customers who opt-out of the utility system is a more ambiguous situation. Options include:

1. AS 42.05.701 defines a public utility as any group of 10 or more customers who purchase a service thereby requiring an APUC certification of convenience and necessity. The APUC could prevent uneconomic competition with an existing utility by enforcing certification requirements where applicable.

2. "Double dipping" could be prevented by requiring a higher hook-up charge if an opt-out customer decides, at some later time, to once again hook into the utility.

3. The entire problem can be prevented by making non-utility power producers ineligible for equity grants if the system is located within a utility service area. However, almost 99% of the States' population lives in communities which have public electric utilities. Not providing equity grants to non-utility power systems would contradict the goal of providing comparable state financial assistance to all power producers.

POWER PROJECT EQUITY FUND

Recommendation - Amend HB 310 to provide a means whereby a non-utility power project can receive a grant from the Power Project Equity Fund.

Eligibility - A non-utility power project, located in Alaska, can qualify for a grant from the Power Project Equity Fund if:

1. The power project is predominantly dependent on the use of a renewable source of energy.

2. The power project is based on commercially available technology.

3. The power project, if connected to a regulated utility, complies with APUC regulations regarding PURPA.

4. The power project, if connected to an unregulated utility, complies with APA grant stipulations regarding PURPA.

Mechanism - Grant applications, including design and cost details, will be submitted to the APA. The APA will determine the technical viability of the project and the amount of grant for which the project is eligible. The amount of the grant will be determined by the number of residents who are committed to using power from the project providing that the per capita subsidy for this service area has not been previously committed either to a utility via a financial plan for a power development project or to other non-utility projects for the same residents. The amount of the grant cannot exceed the cost of purchasing, constructing and installing the project nor be applied to operating, maintenance or fuel costs. The APA will withhold payment of 25% of the grant until it receives notification that the project has been completed.

Funding - An appropriation must be made from the Power Project Equity Fund before grants can be awarded. Since it would not be practical to appropriate the grant for each non-utility project, $2,000,000 will be appropriated in FY 82 to non-utility projects to be allocated by the APA. This appropriation will be continuing.

Pros:

1. Provides comprehensive and equitable access to Power Project Equity Fund grants. Not providing grants to non-utility power projects could preclude as many as 71 communities (total population of 5,500) which do not have centralized power systems, from receiving

grants.

2. A non-utility power project may be more cost-effective than utility power, but without comparable State financial assistance it might not be competitive.

3. Grants to non-utility power projects can enhance the development of alternative technology in Alaska and provide an incentive to utilities to improve generating efficiencies.

Cons:

1. Utilities may not favor non-utilitiy projects having access to the Power Project Equity Fund since this could reduce the size of their grant and may add an element of uncertainty to financial planning.

2. Non-utility projects may be more difficult to assess and audit than utility projects.

3. Although there are means to mitigate problems that could arise when a non-utility project is developed within a utility service area (see PURPA section for discussion) some problems are inevitable. An absolute solution to the problem would be to not allow grants from the Power Project Equity Fund to uncertified utilities.

4. Non-utility power projects could receive a grant plus the benefits of the utilities grant unless prevented from doing so by hook-up charges.

Other Options:

1. Uncertified utilities are not eligible for Power Project Equity Fund grants.

2. Only individuals who do not reside in a utility service area (about 5,500 people) are eligible for Power Project Equity grants.

ALTERNATIVE ENERGY LOAN FUND

Introduction - The Alternative Technology and Power Resource Revolving Loan Fund was established during the 1980 Legislative session. The program provides loans for the purchase, construction and installation of alternative energy systems which are more efficient, less costly, and less energy intensive than conventional energy systems. Alternative energy systems can be used for a wide variety of energy end-uses, such as electricity, heat or transportation. The program terminates June 30, 1984. Loans may not exceed $10,000 or have a term longer than 20 years. The interest rate is set at 5% (until Jan 1, 1984) and principal and interest payments are returned to the fund.

Recommendation - Amend the Alternative Technology and Power Resource Revolving Loan Fund to 1) improve the technical assessment of loan applications 2) revoke the loan limits 3) increase the interest rates and 4) reduce administrative costs.

Eligibility - The only clear eligibility requirements given by the present statute is that loans be used "to develop means of energy production utilizing energy sources other than fossil or nuclear fuel." The Eligibility criteria should require that alternative energy systems be economically feasible and based on commercially available technology. Also, if the alternative energy system will generate enough surplus electricity to sell to a regulated utility, it should be in compliance with PURPA regulations. Only projects for residential buildings and small businesses are eligible for loans.

Mechanism - The Alternative Technology and Power Resource Revolving Loan Fund is renamed the Alternative Energy Loan Fund and has no termination date. Principal repayments and interest payments shall return to the general fund rather than revolve.

The Division of Business Loans will contract with the Alaska Energy Center for a technical and economic assessment of each loan, and contract with commercial lending institutions or title companies for the commercial credit search, loan closing and loan servicing.

The current loan limit of $10,000 is revoked. Principal and interest payments may be deferred or graduated providing that the present value of the principal is not reduced. This provision is comparable to debt assistance loans for bonded projects. The principal of the loan shall not exceed 90% of the value of the collateral. The term will not exceed 75% of the useful life of the system. The interest rate shall be the same as the most recent APA revenue bond interest rates.

Funding - FY 81 funding was $600,000 and the FY 82 budget request is $1,200,000. The demand for alternative energy loans is unknown but sufficient funds should be provided to meet the expanded purpose. An increase to $5,000,000 has been proposed.

Pros:

1. For small-scale energy projects which can't be financed with bond proceeds, the Alternative Energy Fund provides a source of debt capital with repayment assistance comparable to the Debt Assistance Loans Available to utilities.

2. Amendments to the loan conditions are more consistent with the Governor's policies.

3. Technical and economic assesment by Alaska Energy Center can improve the effectiveness of the loan program.

4. Contracting with the private sector for the credit search, loan closing, and servicing of the loan should reduce administrative costs, particularly with small and geographically dispersed loans.

5. Removing loan limit should allow for a greater variety of eligible energy systems.

Cons:

1. Increasing the interest rate will reduce the attractiveness of the loan program.

2. The loan program will need a yearly appropriation and not have the security of a revolving fund.

Other Options

1. Transfer entire loan program to Alaska Energy Center.

2. Transfer entire loan program to APA.

3. Do not contract out technical and economic assessments or credit search, loan closing and loan servicing but change the terms.

4. Do not make any changes to loan program.

5. Technical assessment done by the Division of Energy & Power Development (DEPD). See attached letter.

II. INDUSTRIAL COGENERATION

Introduction - Industrial cogeneration is defined as the use of fuel to generate both useful thermal energy and electricity in a sequential process. When an industry uses process steam, the waste heat can either be disposed of, often resulting in thermal pollution, or beneficially used to generate electricity. Usually, the waste heat amounts to a substantial percentage of the BTU's consumed by the facility. Until recently, if the conversion of waste heat to electricity resulted in surplus power for the industrial facility it was unlikely that a utility would be interested in purchasing it. However, because of the federal Public Utilities Regulatory Policies Act of 1978 (PURPA), utilities are now required to purchase and sell power to qualified cogeneration facilities. The purchase of power is required only at a price which is less than the buyers avoidance cost. On a national scale industrial cogeneration is expected to make a substantial contribution to the amount of new generating capacity that will be developed. Although Alaska is not considered to be heavily industrialized, its oil refineries, oil pipeline pump stations, sawmills, pulp mills and fish processing plants provide significant opportunity for the development of industrial cogeneration. Converting waste heat into electricity could be cost-effective and benefit both the industry and the consumer.

Purpose - The purpose of this addition to the Governors Energy Financing Proposal is to provide State financial assistance for qualified industrial cogeneration facilities which is comparable to the State financial assistance that a utility power project can receive. Without equitable treatment the project selection process would be distorted by the substantial subsidy that the utility power project receives. If this occurs, industrial cogeneration, even if it were more cost-effective, would seldom be a financially attractive option. The recommended State financial assistance for industrial cogeneration consists of grants from the Power Project Equity Fund under certain conditions and Debt Assistance Loans.

POWER PROJECT EQUITY FUND

Recommendation - Amend HB 310 to allow grants from the Power Project Equity Fund to industrial cogeneration facilities which are sponsored by a utility (Also amend HB 310 to allow utilities to use grants from Power Project Equity Fund for waste heat and district heating projects.)

Eligibility - To receive a grant, an industrial cogeneration facility must comply with PURPA regulations and, to meet a public purpose, must be sponsored by the public electric utility which serves the facility.

Mechanism - Identical to the Power Project Equity Fund. A grant to a cogeneration facility will be deducted from the total grant available to that service area. The amount of the grant cannot exceed that portion of the capital costs which is equavalent to that portion of the energy which is to be sold to the utility.

Funding - No additional funding is needed.

Pros:
1. Reduces the distortion that a substantial subsidy for utility power projects could have on the project selection process.

2. Provides an incentive for cost-effective cogeneration at no extra cost to the State.

3. Utilization of waste heat should increase power generation efficiencies and reduce actual costs as well as external costs (i.e. pollution).

Cons:
1. Power from industrial cogeneration could increase the financial difficulties being experienced by proposed hydro projects which have excess capacity.

2. Unless the industrial facility operated 24 hours a day, industrial cogeneration could not be considered as base load.

3. The life cycle of industrial cogeneration may not be as long as conventional power generation systems.

Other Options
1. Industrial cogeneration is not eligible for grants from Power Project Equity Fund.

DEBT ASSISTANCE LOANS

Recommendation - Amend HB 310 to allow industrial cogeneration facilities to qualify for a Debt Assistance Loan.

Eligibility - Industrial cogeneration facilities which comply with PURPA regulations and are financed by revenue bonds are eligible for a Debt Assistance Loan. Utility sponsorship is not required.

Mechanism - A financial plan for the industrial cogeneration facility must be submitted to the APA which then treats this request in the same manner as a utility loan. The amount of the loan can not exceed that portion of the capital costs which is used to generate power for the public utility.

Funding - No additional funding required for FY 82.

Pros:

1. Reduces the distortion that a substantial subsidy for utility power projects could have on the project selection process.

2. State loan would mostly be an investment and increase revenues in future years when oil revenues would be declining.

3. Utilization of waste heat should increase power generation efficiencies and reduce actual costs as well as external costs (i.e. pollution).

Cons:

1 - 3 are the same as the Cons for the Power Project Equity Fund.

4. The Debt Assistance Loans do not return to the State 100% of the present value of the principal.

Other Options

1. Provide loans via AIDA

2. Provides no loans for industrial cogeneration.

III. ENERGY CONSERVATION

Purpose - The purpose of this addition to the Governors Energy Financing Program is to address the most critical short-term energy problem faced by most Alaskans; the cost of space heating. A recent report ("The Impact of Rising Energy Costs for Rural Alaska") by ISER states that 77% of the energy costs of residents in rural Alaska is spent on space heating, which indicates the magnitude of the problem.

Financial assistance proposed for energy conservation includes acceleration of the Residential Energy Conservation program and State participation in the low income Weatherization program. A residence could only receive financial assistance from one program.

RESIDENTIAL ENERGY CONSERVATION FUND

Introduction - The Residential Energy Conservation Fund was established during the 1980 Legislative Session. It provides residential buildings with 1) an energy audit for which the resident pays no more than $10, 2) a grant of up to $300 for single-family dwellings or $200 for multi-unit dwellings to pay for the conservation improvements as determined by the energy audit and 3) 5% loan (until January 1, 1984) of up to $5,000 for residential energy conservation improvements. The grants are based on a

7 year payback and the loans require a 10 year payback. The program requires the development of audit standards as well as the training and certification of auditors. FY 81 funding includes $1,484,400 for energy audits and $3,258,700 for refunds and grants. The audits and grants became available in December 1980 and meet with substantial response throughout Alaska. Funds for the program are now depleted, but a supplemental for $5,[illegible]8,600 has passed the House. The program has trained about 236 certified auditors who have conducted approximately 7,700 audits. The average cost has been $175 per residence. The average grant has been $275 per residence.

Recommendation - Provide funding which allows completion of the Residential Energy Conservation Program within five years.

Eligibility - All occupied residential buildings in Alaska would be eligible for an energy conservation audit and grant except those which have received benefits from a State sponsored weatherization program. All occupied residential buildings would be eligible for the loan program.

Mechanism - DEPD will continue to manage the program. The allowable cost for the grant is updated by the most relevant Consumer Price Index. To encourage the cost-effectiveness of energy audits, the State will rebate up to 90% of the cost of the energy audit. The remainder of the costs are to be paid by the resident.

Funding - FY 82 funding for this option includes:

Energy Auditor Training	$150,000
Energy Audit Contracts	4,012,000
Refunds/Grants	7,762,000
Other costs	1,192,000
TOTAL	$13,116,000

Approximately 25,873 homes would receive energy conservation audits and grants with this level of funding.

A five year program would require funding at approximately $79,565,400 which includes an inflation factor of 10%.

Pros:

1. Provides equitable relief to an energy conservation problem that impacts virtually all Alaskans.

2. Provides a significant number of jobs, particularly in the housing industry, throughout the State. Small vendors, rather than large contractors, receive most of the economic benefits.

3. The private sector will perform most of the effort, thereby minimizing increases in direct State employees.

4. Provides a long-term improvement by reducing the cost of heating to Alaskans.

Cons:

1. Program requires a signficant outlay of State funds with no financial returns.

2. Home owners receive the benefits of capital improvements when selling the home but not home renters.

3. The program will require good management to avoid abuses.

WEATHERIZATION

Introduction - The State of Alaska has operated a federally funded weatherization program since 1977. The purpose of the program is to reduce heat loss and the cost of space heating in homes occupied by low income persons. The program provides energy conservation improvements, such as insulation, weatherstripping, and storm windows, at no cost to the residents. Most of the recipients of this program live in rural Alaska.

The future of the US Department of Energy (DOE) sponsored weatherization program is uncertain. The budget cuts proposed by President Reagan eliminates any direct funding for the program in FFY 82. Weatherization grants may be included in FFY 82 block grants but probably at a much reduced level of funding. Also, CETA workers, who provide the bulk of the weatherization labor force, will no longer be available to the program. Although federal funding for Alaska's program for this summer will not be affected by these cuts, the cost of the program will be increased without CETA labor.

The U.S. Department of Housing and Urban Development recently announced that it will spend about $32 million to improve inadequate native housing it had built in rural Alaska. Many homes are to be totally rebuilt or replaced. Despite the amount of money to be spent, only 347 homes will be affected by the program which is a small percentage of homes eilgible for weatherization improvement.

Present Program

Eligibility - Only low-income persons, as determined by federal poverty guidelines, are eligible for weatherization grants. The program's low income guidelines for Alaska, which includes a 25% cost-of-living adjustment, are given below.

Size of Family Unit	Non-Farm Family	Farm Family
1	$5,950	$5,113
2	7,850	6,713
3	9,750	8,313
4	11,650	9,913
5	13,550	11,513
6	15,450	13,113

Operation - The weatherization program was initially sponsored by the federal Community Services Administration (CSA) and managed, in Alaska, by the Department of Community and Regional Affairs. When DOE began administering the program, management was transferred to DEPD by administrative order. The attached 4A provides budgetary details on the present program.

The thrust of the weatherization program, that being energy audits followed by purchase and installation of conservation measures, is accomplished by subcontractors or local governments. Regional non-profit organizations such as RurALCAP or the Fairbanks Town and Village Association are typical subcontractors. DEPD provides administration, monitoring of and technical assistance to the subgrantees. Each of these activities are controlled by DOE regulations.

Three problems have been encountered in administering the weatherization program.

1. DOE regulations allow no more than 10% of the states allocation to be spent on state and subcontractor overhead. With smaller contracts, there is not enough overhead to meet minimal costs and some subcontractors have decided to no longer participate.

2. DOE regulations restrict certain repairs and improvements which could substantially reduce heat loss.

3. The income guidelines are disproportionately low for Alaska, particularly for rural Alaska.

Accomplishments - The following chart provides details on accomplishments of the weatherization program.

Year	Homes Weatherized	Individuals Assisted	BTU's Saved
1977	435	1817	231.3×10^9
1978	528	2115	269.2×10^9
1979	559	2055	261.6×10^9
1980	1306	3975	506.0×10^9
TOTAL	2828	9962	$1{,}268.1 \times 10^9$

Based on the type of structure and location, the cost of labor and materials for weatherization is limited to $1,000 - 1,800 per home. The average cost per home in Alaska has been $1,550.

Post-weatherization audits of several homes in the Anchorage area indicate that these conservation measures reduce heat loss by about 1/3, which amounts to a savings of about $1,000 a year for an oil heated home. For rural areas, it is estimated that the heat loss is reduced by at least 1/3 and as much as 2/3. Since the price of oil is higher in the rural areas, the fuel savings is greater than that experienced in Anchorage.

Based on federal poverty guidelines and the preliminary 1980 census, DEPD estimates that 25,400 homes in Alaska qualify for weatherization. About 2/3 of these homes are in rural areas.

Funding - Federal funding for Alaska's weatherization program has been as follows:

Date Awarded	Amount of Grant
11/77	$318,000
3/78	516,400
9/79	1,247,200
3/80	1,102,810

As of January 1, 1980, carry over and new funds amount to $2,465,329 which should be sufficient to continue the program during this years construction season.

Future Program

Options - The State has three options for continuing the weatherization program. These are:

1. DOE program without State funding. The federal program will not continue beyond FFY 81.
2. State funding as provided by DEPD
3. State funding as proposed by Alaska Regional Energy Assoc. (AREA)

The DEPD option is recommended. Comparative features of each option are provided below. Costs are for the entire program.

Feature	DOE	DEPD	AREA
Program Years	1	5	4
Income Eligibility (family of 4)	$11,650	$15,273	None
Area Covered	Statewide	Statewide	Rural
Homes Improved	750	25,400	40,218
$ Limit per Home	$1,800	$2,200	optimal investment
Admin. Costs	**$500,000	*$7,304,000	$920,000
Energy Audits	----	*$4,309,500	$7,720,000
Program Costs	**$2,000,000	*$68,230,700	$80,440,000
Total Funding	**$2,500,000	$80,344,200	$89,080,000
Funding Source	Fed Grants	GF	GF
Other Comments	Possibly no funding for FFY 82. Does not account for CETA cut-backs	Part of Res. Energy Cons. Fund. Accounts for CETA cut-backs.	Proposal also includes energy plans and recon studies. Does not seem to include State agency admin. costs or account for CETA cutbacks.

*includes a 10% inflation factor
**approximate funding to be expended 1981 construction season

DEPD Program - The intent is to include State participation in the weatherization program as part of the ongoing Residential Energy Conservation Fund. This would allow logistical coordination between the low-income weatherization audits and grants and the energy conservation audits and grants available to all homes in the State. FY 82 funding for this option, which benefits 5,080 houses is:

Energy audits	$ 788,000
Weatherization	11,176,000
Administration	1,196,000
TOTAL	$13,160,000

AREA Program - AREA is an umbrella organization comprised of regional non-profit Native organizations. Their proposal is to use state agencies to combine the energy audits, weatherization improvements, community energy assesments for the long term energy plan, and APA reconnaissance studies into one effort in order to improve program coordination and cost effectiveness (particularly with transportation of materials). Regional teams would conduct the effort on a village by village basis, selecting the most needy villages first. Residents living in the Anchorage, Mat-Su, Kenai, Fairbanks North Star and Juneau Boroughs would not be eligible for this program. The total cost of this program is estimated to be $101,530,000. However, these cost estimates were made before the CETA cutback which amounts to about a 16% reduction in the number of homes that can be weatherized for this level of funding. Because of the CETA cutbacks, AREA may provide labor for only the disabled or aged recipients. Other recipients would have to provide their own labor but with AREA supervision to ensure proper workmanship. FY 82 funding for this option is not broken out.

DOE Options

Pros:
1. Requires no State funding
2. Provides weatherization improvements to rural and urban residents
3. Detailed regulations regarding weatherization practices reduces the potential for abuse
4. Has provided, through CETA, substantial seasonal employment opportunities throughout Alaska

Cons:
1. Federal funding will probably not continue beyond FFY 81.
2. Regulations have been too rigid and not well suited for Alaska, particularly the rural areas
3. Although the program has been effective, its pace has not been commensurate with the number of eligible recipients.

DEPD Options

Pros:
1. Expedites program so that all eligible recipients receive relief within the next few years. It would be apparent that the State is playing an active role in solving energy problems.

2. State participation can improve logistical coordination and cost-effectiveness, particluarly with other programs.
3. The State can promulgate regulations better suited to Alaskan conditions (i.e., income guidelines) than present federal regulations.
4. Benefits low-income residents in both urban and rural areas.
5. Provides an opportunity to demonstrate nationally how the State of Alaska is using its oil wealth in a responsible manner.

Cons:
1. State investment in weatherization would be expensive and with no financial returns.
2. Low-income residents would be receiving greater assistance than residents who receive Residential Energy Conservation grants.
3. Good program management and timely response will be needed to insure effectiveness and no abuse which may be difficult for state agencies.

AREA Options

Pros:
1. Provides more comprehensive coordination by including the long term energy plan and reconnaissance studies.
2. Program would be very visible and assure rural residents that State is attempting to solve its energy problems.
3. Establishes regional program managers to assure better program direction.
4. Provides priority to most needy villages.

Cons:
1. Does not include urban residents.
2. Regional program managers may lead to another layer of bureaucracy.
3. Does not distinguish between low-income and other residents
4. State would not receive a financial return on this investment.
5. Does not appear to include all costs, particularly state agency administrative costs.

RESIDENTIAL ENERGY CONSERVATION PROGRAM

5 YEAR PLAN

PROJECT	FY 82	FY 83	FY 84	FY 85	FY 86	TOTALS
Energy Auditor Training	150.0	150.0	150.0	-	-	450.0
Energy Audit Contracts	4,800.0 (30,953 audits)	5,280.0 (30,953 audits)	5,808.0 (30,953 audits)	6,388.8 (30,953 audits)	7,027.7 (30,953 audits)	29,304.5 (154,765 audits)
Refunds/Grants	7,761.9	8,538.1	9,391.9	10,331.1	11,364.2	47,387.2
Low-Income Weatherization	11,176.0 (5,080 homes)	12,293.6 (5,080 homes)	13,523.0 (5,080 homes)	14,875.3 (5,080 homes)	16,362.8 (5,080 homes)	68,230.7 (25,400 homes
Subtotal	23,887.9	26,261.7	28,872.9	31,595.2	34,754.7	145,372.4
10% State Admin. Costs	2,388.7	2,626.2	2,887.3	3,159.5	3,475.5	14,537.2
Total Budget	26,276.6	28,887.9	31,760.2	34,754.7	38,230.2	159,909.6
Total Households Assisted	30,953	30,953	30,953	30,953	30,953	154,765

Assumption: 1. A 10% inflation factor has been added to FY 83-86.
2. The program is budgeted to meet 100% of estimated need.

Note: Low interest loans have not been addressed in this Plan. However, the moderate income household in Alaska should be considered when developing any residential energy conservation program, especially since a major portion of funds will be expended in grants to low-income persons.

Benefits: Aside from the obvious benefits to the residents of cost savings and the conservation of fuel, this program will provide considerable benefits to Alaskans in other ways. The private business sector will benefit by (1) receiving audit contracts; (2) performing weatherization work on homes; and (3) increased demand for materials. Local contractors and suppliers will be used whenever possible. Local governments and non-profi organizations will participate, thereby, creating local expertise which would otherwise not be available.

CATEGORY: DEVELOPMENT
AGENCY: DEPARTMENT OF COMMERCE & ECONOMIC DEVELOPMENT
PROGRAM: ENERGY & POWER DEVELOP
SUB-PROGRAM: WEATHERIZATION

EXPENDITURES & FUNDING	(01) 80 AUTH	(02) 80 FINAL	(03) 80 ACT	(04) 81 AUTH	(05) 81 SUPL	(06) 81 RP	(07) 82 CONT.	(08) 82 ADD.	(09) REQUEST	(10) GOVERNOR	(11) HOUSE	LE
01 PERS. SERV.				144.4			105.5	5.0	110.5	110.5		
02 TRAVEL			5.8	30.0			30.0		30.0	30.0		
03 CONTRACTUAL			13.4	52.3			56.5		56.5	43.1		
04 COMMODITIES			1.4	1.5			2.6		2.6	2.6		
05 EQUIPMENT			3.5	.3			.7		.7	.7		
06 LANDS/BLDGS												
07 GRANTS, CLMS			1132.9	2259.5			2000.0		2000.0	2000.0		
08 MISC.												
** TOTAL EXPEND			1157.0	2488.0			2195.3	5.0	2200.3	2186.9		
09 I-A TRANSFER												
10 FED. RECEIPT			1157.0	2488.0			2195.3	5.0	2200.3	2186.9		
11 G. F. MATCH												
12 GENERAL FUND												
13 PGM RECEIPTS												
14 OTHER FUNDS												
15 FULL-TIME			4.0	3.0			3.0		3.0	3.0		
16 PART-TIME												
17 TEMPORARY												
18 STAFF MONTHS			48.0	36.0			36.0		36.0	36.0		

00496

MEMORANDUM State of Alaska

TO: George Matz
Program Analyst
Division of Budget and
Management
Office of the Governor

DATE: March 19, 1981

FILE NO:

TELEPHONE NO:

FROM: Clarissa Quinlan, Director
Division of Energy and
Power Development
Department of Commerce and
Economic Development

SUBJECT: Potential Changes in Administration of Alternative Technology and Energy Loan Funds

It has come to my attention that a couple of options relating to changing the technical and economic assessment of the Alternative Technology and Energy Loan Funds are under consideration.

One of these would have the Division of Business Loans contract the work out to another agency with the needed technical expertise. The Alaska Energy Center and the Division of Energy and Power Development have both been mentioned.

As part of the division's public information program and its administration of energy conservation and alternative energy projects, individuals are currently on-staff with in-depth knowledge in a variety of subject areas ranging from solar to wind to energy efficient construction and design. Were adequate funding made available to the division to critique the technical and economic merits of specific applications, existing in-house staff could be used. This availability of a portion of these individuals' time relates to the likelihood of a major reduction or termination of the federal funding upon which they now rely. It is anticipated that this vacuum will be filled by other State funding.

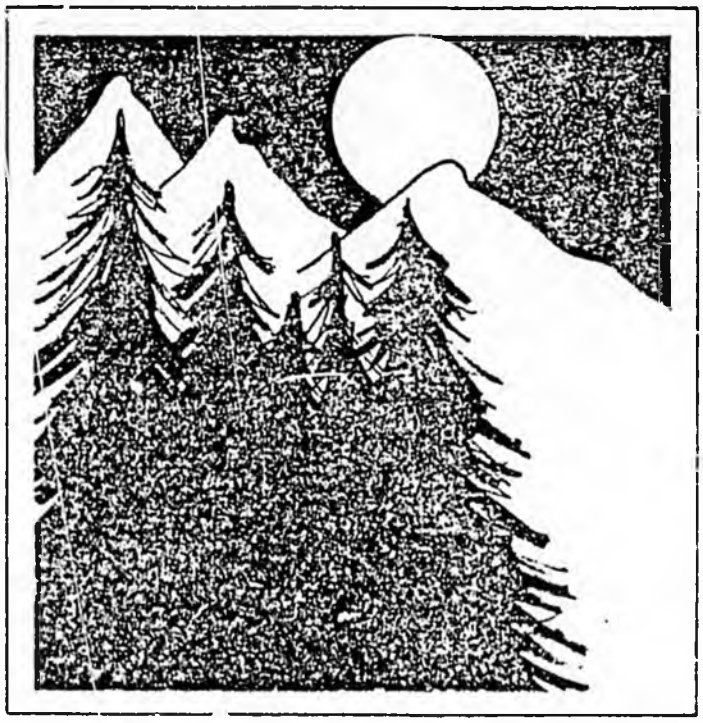
Because of the division's existing capability to carry such reviews, it is requested that serious attention be given to this option. It must also be remembered that the Alaska Energy Center is still in a start-up phase, has just recently hired an executive director and has not yet determined its mode of operation.

CQ/jar3/6

November, 1980

RENEWABLE ENERGY DEVELOPMENT SOLAR HEATING, WIND POWER AND BIOMASS

PROFILE



ALASKA ENERGY PROJECT

NCSL ENERGY PROGRAM

NOTE TO FILE:
For complete copy of this report see:
Legislature Reference Library Document no. 8000520

National Conference
of State Legislatures

STATE ENERGY ORGANIZATION

Alaska Energy Project

NCSL Energy Program

National Conference of State Legislatures

November, 1980

RENEWABLE ENERGY DEVELOPMENT GEOTHERMAL AND SMALL-SCALE HYDRO

SUPPLEMENT

NCSL ENERGY PROGRAM:
ALASKA

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National Conference
of State Legislatures

8000420

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Legislative Reference Library document no. 8000420

November, 1980

ENERGY EMERGENCY PREPAREDNESS

ALASKA ENERGY PROJECT

NCSL Energy Program

National Conference of State Legislatures

NOTE REGARDING THE FOLLOWING 2 FRAME ON MICROFILM:

COMPLETE DOCUMENT IS AVAILABLE IN ORIGINAL FILES IN ALASKA STATE ARCHIVES. TITLE PAGE ONLY HAS BEEN FILMED.

THE WIND BLOWS, WATER FLOWS, SUN SHINES:

ENERGY FOR AN ALASKAN LIFESTYLE

1ST ALASKA ALTERNATIVE ENERGY CONFERENCE

NOVEMBER 9 - 11

REGISTRATION AT UAA- CUDDY CENTER

SPONSORED BY THE ALASKA CENTER FOR THE ENVIRONMENT

A Proceedings of the First Alaska Alternative Energy Conference

November 9-11, 1979

Anchorage Community College

sponsored by:

The Alaska Center for the Environment

Proceedings are partially funded by a grant from the Alaska Renewable Resources Corporation

AUDITORS TRAINED AS OF JANUARY, 1982

CITY	CURRENTLY CERTIFIED	CERTIFIED/ NOT UPDATED	CURRENTLY CERTIFIED NOT ELIGIBLE TO CONTRACT	TOTAL
Anchorage	92	22	12	126
Auke Bay	1	4		5
Barrow	7	2		9
Bethel	5	1		6
Chugiak	2	1		3
College	8	1		9
Copper Center	1			1
Cordova	3	2		5
Delta Junction	1	1		2
Dillingham	1	3		4
Douglas	4			4
Eagle River	4	2		6
Ester	1			1
Fairbanks	73	35	4	112
Fort Wainwright		1		1
Haines	1			1
Homer	10	1		11
Indian	2			2
Juneau	17	8	2	27
Kenai	1			1
Ketchikan	9	6		15
Kodiak	15	2		17
Kotzebue	3			3
McKinley	1			1
Nenana	1			1
Nome	6	5		11
Palmer	17	5		22
Pelican	1			1
Petersburg	4			4
Portland Oregon (out of State)		1		1
Santa Cruz, Calif. (out of State)		2		2
Seward	3			3
Sitka	7			7
Soldotna	3			3
Sterling	3			3
Talkeetna	1			1
Togiak	1			1
Tok	1	1		2
Valdez	3			3
Wasilla	11	6		17
Willow	1			1
Wrangell				
TOTAL	327	112	18	457

R-O-F.

Alaska Regional Energy Association Chairman Speaks Out on Rural Energy Issues:

by Ron Olsen

Bob Brean, Chairman of the Alaska Regional Energy Association (AREA), will be participating on an energy panel with other State leaders at the upcoming Alaska Alternative Energy Conference in Anchorage on November 14th. Moderated by Lt. Governor Terry Miller, panelists will include: Lloyd Pernela, Director of the Division of Energy and Power Development; Senator Ed Dankworth; Representative Brian Rogers; Eric Yould, Director of the Alaska Power Authority; and Jim Scuby, Director of the Division of Policy Development and Planning. Entitled, "Forum on Energy Policy for Alaska," there should be a lively mix of energy ideas coming from this panel.

AREA delegates from 14 regional non-profit associations are the leading proponents of a coherent rural energy policy for the State of Alaska. Representing villages across Alaska, AREA meets periodically to exchange energy ideas, discuss energy issues and to fashion solutions to rural energy problems. AREA delegates then work with the people of their regions to advocate for solutions to those problems with appropriate government entities.

Recognizing the importance of the upcoming legislative session in Juneau, AREA delegates met in October to discuss their legislative priorities. AREA is calling for:

1) Regional based energy planning;

2) A comprehensive audit/weatherization energy conservation program for villages;

3) Energy for village appropriate economic development consistent with subsistence life styles;

4) Promotion of village scale agriculture;

5) Minimizing the impact of Outer Continental Shelf (OCS) leasing on villages;

6) Conservation measures for institutional buildings;

7) Expanding bulk fuel storage capability and amending the Division of Business Loans fuel loan program to better meet the needs of villages.

The next meeting of AREA will be in Anchorage, November 16-17. Delegates represent the following organizations:

Aleutian/Pribilof Islands Assoc.

Bristol Bay Native Association

Central Council Tlingit-Haida Indians of Alaska

Cook Inlet Native Association

Copper River Native Association

Kawerak, Incorporated

Kodiak Area Native Association

Koyukon Development Corporation TCC

Mauneluk Association

The North Pacific Rim

North Slope Borough

Nunam Kitlutsisti/AVCP

Tanana Chiefs Conference TCC

Upper Tanana Development Corporation TCC

ALASKA REGIONAL ENERGY ASSOCIATION

ENERGY WORKSHOP

STATEMENT OF THE ISSUE

The dramatic rise in oil prices since 1973, the small, widely spread population, the high cost of living, and the rapidly rising price of transportation combine to help explain why energy costs so much in a village. Rural residents are forced to commit a large and rapidly increasing share of their income on energy and transportation. The very same source of Alaska's current large budget surpluses is ironically causing the most serious threat ever to the continued existence of remote rural Alaskan communities.

Unfortunately, state and federal agencies have been very narrow in their response to this crisis. They responded simply by expanding their welfare system. In certain rural communities more than 50% of the village income results from welfare payments.

METHOD OF DEALING WITH THE ISSUE

The Alaska Regional Energy Association (AREA) was formed in 1979 to serve as a clearinghouse for the exchange of energy information affecting rural Alaska, and to serve as a conduit for expressing the views of the 14 member non-profit associations on energy-related issues affecting their regions. With RurAL CAP's financial support and technical assistance, AREA has been meeting at least quarterly to accomplish this end. Specifically, the goal of the organization is to increase rural Alaskans' degree of control over energy resource decision-making which has a significant effect on the quality of life of residents of rural Alaska.

During the past year the Alaska Regional Energy Association's emphasis has been shifting from attention toward short-term crisis intervention responses like energy assistance and fuel loans toward longer-run solutions like capital assistance for energy production and conservation.

The workshop was conducted as a regular meeting of AREA, and was chaired by Bob Martin. Each delegate, representing a member non-profit native association or development corporation received a briefing packet in the mail several weeks before the meeting. The packet contained an analysis of the significant issues identified by AREA previously as potential legislative priorities, as well as copies of related bills and resolutions pending in the Alaska State Legislature. These packets were updated in Juneau the first day of the workshop to include the most current information available on each issue.

Several joint meetings were held with the Village Energy Workshop group to discuss and compare legislative priorities. Both groups listened to presentations by Representatives Brian Rogers, Terry

Gardiner and Joe Chuckwuk, and asked these House leaders on energy legislation many questions about their priorities for this year. Also, on the final day of workshops the two workshops met jointly to present their conclusions to each other.

BILL # or SUBJECT	DESCRIPTION	ACTION
Village Energy Reconnaissance & Conservation Program: SSHB 9	Reconnaissance & Weatherization program that will provide funds to weatherize every home in rural Alaska	#1 priority Resolution (attached)
Power Production Cost Assistance Program	Subsidizes high cost of electrical energy	motion passed to support the program and expand it to include commercial facilities.
Power Production Cost Assistance Program	Subsidizes high cost of electrical energy	motion passed that the 40¢/kwh be regionalized according to the cost of living.
Alaska Statute 46.11.030 (c)	Residential energy audit grants and loans	motion passed to increase the amount of materials made avaliable in accord with actual cost of transportation & materials in rural Alaska
North Slope Borough Resolution #6-81	Energy Conservation Policy	motion passed to endorse the policy and recommend that other regions adopt a similar approach
North Slope Borough Resolution #6-81	Energy Conservation Policy	motion passed to send the policy to appropriate state energy agencies for use as a model for state policy on energy conservation

BILL # or SUBJECT	DESCRIPTION	ACTION
SB 25 SB 26	Power Project Development Fund Appropriation for Power Project Development Fund	motion passed to support both bills with amendments: to make the factors used to determine economic feasibility of a project set out in Section 5 be more realistic for the rural Alaskan area where the project is to be located and for the time when the project is to be built.
HB 289	An Act relating to the establishment of Regional Energy Authorities	motion passed to support the bill with an amendment to designate the 14 member non-profit organizations of the Alaska Regional Energy Association as eligible to form energy authorities
HB20 and HB21	Providing for the development of electrical service in rural areas and a special appropriation to the Department of Commerce and Economic Development for the Rural Electrification Fund	Motion passed to support both bills
CH001 SLA 1980	RurAL CAP fuel loan program	motion passed to support the extension of the expiration date
SB166	An Act amending the eligibility qualifications of an electric utility for power production cost assistance payable by the Alaska Power Authority	motion passed to support the bill
CSSB174 (Finance)	An Act making supplemental appropriations to the Alaska Power Authority for the Power Production Cost Assistance Program	motion passed to support the bill
CSHB 9	Relating to Departments and programs of State government which are concerned with energy	AREA supports provisions of this bill that would expand the responsibility of the Alaska Power Authority by substituting "energy" for "power" throughout their authorizing legislation

BILL # OR SUBJECT	DESCRIPTION	ACTION
SSHB 9	Related to Departments and programs of state government which are concerned with energy	AREA has established the need for state funding of regional energy planners at the regional non-profit level. This is an integral part of the #1 priority established by AREA: the Village Energy Reconniassance & Conservation Program. This bill would be an appropriate place to authorize these positions.

All of the issues and bills considered by the Alaska Regional Energy Association were rated as high priorities. The delegates identified the Village Energy Reconnaissance and Conservation Program, including full funding of the regional energy planners, as the #1 legislative priority of the organization.

Rural Alaska Community Action Program, Inc.

CPC RESOLUTION #81-9

ENTITLED: Urging Full Funding for the Village Energy Reconnaissance and Conservation Program

WHEREAS, energy costs of up to 50¢ per kilowatt-hour for electricity and $3.00 per gallon for fuel oil are distressingly common in rural Alaskan communities, and

WHEREAS, low-income residents of rural Alaska are unable to bear the impact of these high and steadily rising costs, and

WHEREAS, the very existence of many communities is threatened by these excessive costs, and

WHEREAS, state and federal welfare payments make up more than 50% of the total income of some rural communities, including a total of $10 million per year statewide for direct energy welfare bill-paying assistance, and

WHEREAS, the need for these energy welfare payments will continue to grow dramatically unless the state acts to lower the cost of energy in rural Alaska, without recourse to operating subsidies, and

WHEREAS, agencies such as the Alaska Power Authority, the Division of Energy & Power Development, the Department of Community and Regional Affairs, the Institute for Social and Economic Research, the Alaska Regional Energy Association and RurAL CAP have joined together to develop a program that would reduce household energy bills by an average of <u>at least</u> 30% per household statewide, and

WHEREAS, the present value of the net energy savings from this program would be at least $433 million in avoided energy costs over the next 20 years, and

WHEREAS, every house in rural Alaska could be properly insulated to meet Alaskan climatic conditions by the fourth and final year of this program, and

WHEREAS, local and regional non-profit contractors would be used, and local hire would be used exclusively in the installation of weatherization materials in local communities, and

WHEREAS, this program would provide funding for regional energy planners, which are urgently needed to address regional energy problems, and

WHEREAS, the reconnaissance studies in this program would gather vital data on the best mix of sources of energy generation, designed to reduce the long-term cost of energy produced in villages for heating, electrical needs and transportation; now, therefore be it

RESOLVED: That the Alaska Regional Energy Association urges speedy passage by the Alaska State Legislature and the approval by the Governor of the Village Energy Reconnaissance and Conservation Program and be it further

RESOLVED: That AREA urges the Alaska State Legislature and the Governor to fund this program at a level that will allow each homeowner in rural Alaska to install the optimal quantity of energy saving materials in his/her house over the next four years.

Adopted by the Delegates to the Citizens Participation Conference, March 19, 1981, in Juneau, Alaska.

Gordon Jackson

Gordon Jackson, President
RurAL CAP Board of Directors

Philip J. Smith, Executive Director
RurAL CAP

Rural Alaska Community Action Program, Inc.

CPC RESOLUTION #81-10

ENTITLED: "Urging Full Support of House Bill 289, Entitled, 'An Act Relating to Regional Energy Authorities,' with an Amendment to Designate the 14 Member Non-Profit Organizations of the Alaska Regional Energy Association as the Authorized Designees

WHEREAS, AS 18.57 creates Regional Electrical Authorities limited to the production of electrical energy, and

WHEREAS, the electrical generation represents only a small part of the energy requirements for rural Alaskans, and

WHEREAS, there is a need for regional coordination to achieve local planning and development, and

WHEREAS, there is an urgent need for appropriate alternative energy approaches; now, therefore, be it

RESOLVED: That the Alaska Regional Energy Association urges speedy passage by the Alaska State Legislature and and the approval by the Governor of House Bill 289, an Act relating to Regional Energy Authorities.

Adopted by the Delegates to the Citizens Participation Conference, March 19, 1981, in Juneau, Alaska.

Gordon Jackson

Gordon Jackson, President
RurAL CAP Board of Directors

Philip J. Smith, Executive Director
RurAL CAP

Rural Alaska Community Action Program, Inc.

CPC RESOLUTION #81-11

ENTITLED: Supporting Passage of Legislation Establishing the Power Project Development Fund and a Special Appropriation

WHEREAS, Energy costs of up to 50¢ per kilowatt hour of electricity and $3.00 per gallon for fuel oil are distressingly common in rural Alaska communities, and

WHEREAS, low income residents of rural Alaska are unable to bear the impact of these high and steadily rising costs, and

WHEREAS, the very existence of many communities is threatened by these excessive costs, and

WHEREAS, power production development is essential to the reduction of energy costs in Alaska, and

WHEREAS, the Power Project Development Fund outlined in Senate Bill 25 provides funding for significant power project development in Alaska, and

WHEREAS, the funds may be used for reconnaissance and feasibility studies and power project finance plans, and

WHEREAS, the funds may be used for the cost of a project, including the costs of acquiring necessary licenses, preparing engineering designs, obtaining land and constructing the power project; now, therefore, be it

RESOLVED: That the Alaska Regional Energy Association supports the passage of Senate Bill 25 and 26, and be it further

RESOLVED: That the factors used to determine economic feasibility set out in Section 5 of SB 25 be more realistic for the rural area for which the project is being considered.

Adopted by the Delegates to the Citizens Participation Conference, March 19, 1981, in Juneau, Alaska.

Gordon Jackson, President
RurAL CAP Board of Directors

Philip J. Smith, Executive Director
RurAL CAP

Rural Alaska Community Action Program, Inc.

CPC RESOLUTION #81-12

ENTITLED: In Support of Continued Funding for the Power Production Cost Assistance Program

WHEREAS, The cost of power production in rural Alaska is rising disproportionately to rural incomes, and

WHEREAS, the cost of power is affected by regional circumstances, and

WHEREAS, commercial facilities in some communities can assist in resolving community energy needs, and

WHEREAS, financial support of the Power Production Cost Assistance Program is desirable; now, therefore be it

RESOLVED: That the Alaska Regional Energy Association supports passage of Senate Bill 166 to expand the eligibility qualifications of utilities, and passage of CSSB 174, ($1,050,000 appropriation), and be it further

RESOLVED: That the Alaska Regional Energy Association recommends the 40¢/kwh cap on Power Production Cost Assistance be regionalized to reflect cost of living differentials.

Adopted by the Delegates to the Citizens Participation Conference, March 19, 1981, in Juneau, Alaska.

Gordon Jackson, President
RurAL CAP Board of Directors

Philip T. Smith, Executive Director
RurAL CAP

ENERGY WORKSHOP

ALASKA REGIONAL ENERGY ASSOCIATION DELEGATES	REPRESENTING
Pat Petrivelli	Aleutian/Pribilof Islands Assoc.
Mark Siegars	Bristol Bay Native Association
Bob Martin	Central Council, Tlingit-Haida Indians of Alaska
Pete Ezi	Cook Inlet Native Association
Clyde Stoltzfus	Copper River Native Association
Phil Kaluza	Kawerak, Inc.
Tom Peterson	Kodiak Area Native Association
Larry Jones	Mauneluk Association
Sharon Zandman Zeeman	The North Pacific Rim
Will Theuer	Tanana Chiefs Conference
Bob Brean	Upper Tanana Development Corp.
John Quirk	Koyukon Development Corporation
Kent Grinage	North Slope Borough
David Cartier	Nunam Kitlutsisti

RESOURCE PERSONS	
Representative Brian Rogers	Alaska State Legislature
Representative Terry Gardiner	Alaska State Legislature
Representative Joe Chuckwuk	Alaska State Legislature
Dave Gray	Legislative Liaison
Nancy Lord	Rep. Brian Roger's Office
Bob Speed	Rep. Terry Gardiner's Office
Dave Hutchins	Alaska Rural Energy Cooperative
Alephe Morris	Senator John Sackett's Office

GUESTS	
Lois Kaufman	Energy Consultant
Mary Lee Jones	Central Council, Tlingit-Haida Indians of Alaska

RURAL CAP STAFF	
Bob Lohr	Director, Rural Energy
Terry Berman	Energy Consultant
Naomi Woloshin	Energy Researcher

VILLAGE ENERGY RECONNAISSANCE AND CONSERVATION PROGRAM

I. INTRODUCTION

One of the most critical issues facing rural communities in Alaska today is energy. The high cost of energy and the problems associated with delivery of energy have continually plagued rural communities, calling into serious question their continued existence beyond this decade. At present, these communities are dependent on annual operating subsidies of $9.6 million to meet their energy needs.

The Village Energy Reconnaissance and Conservation Program offers a comprehensive approach to solving the rural energy problem. Its aim is to reduce both the need for annual operating subsidies and the cost of energy to the rural consumer through the use of energy conservation measures and a switch to energy resources that present the lowest possible cost to a given community or region. To this end, the Village Energy Reconnaissance and Conservation Program:

- o assesses the heat and power requirements for each rural community
- o surveys available energy resources and technology
- o develops village and regional energy plans
- o provides energy conservation programs for each rural community.

This program will produce several accomplishments. Rural citizens, utilities, regional organizations and the State of Alaska will have the information necessary to develop solutions for energy problems. On a practical level, the program audits and weatherizes every home in rural Alaska and begins the installation of low-cost energy systems, such as woodburning stoves, which provide alternatives to high-price oil. Weatherization alone results in a 30 percent or more reduction in energy consumption for space heating.

Additional benefits of the program include the creation of more than 350 seasonal construction jobs per year for three years and, through training programs that are part of this program, the creation of a labor force with energy-related skills.

In its coordinated and integrated approach to solving rural energy problems, agencies participating in the development of the VERC program are:

- Alaska Power Authority
- Division of Energy and Power Development
- Alaska Energy Center
- Institute for Social and Economic Research
- Rural Alaska Community Action Program, Inc.
- Regional non-profit organizations

The program operates through several existing agencies with a range of experience and expertise in the energy field.

Although several agencies are involved in the program, the citizens of rural Alaska play a central role in the program, particularly in implementing community programs. At the local level, the program takes a self-help approach, using the available local resources, whether those be labor, materials or, more importantly, ideas.

II. THE RURAL ENERGY PROBLEM

The rural energy problem is linked to reliance on petroleum products as sources of energy. Securing a winter's fuel oil supply is much more difficult and expensive in rural Alaska than in urban Alaska--especially in villages located in the Western, Northern, and Interior regions of the State. There is no road system connecting rural Alaska, and air charter for fuel deliveries is prohibitively expensive. Most villages which are accessible by barge may be reached only in the summer months (June through September). During the few months that the rivers are navigable, barges must deliver the yearly fuel supply for the entire village.

The villages must place orders for fuel supplies in early spring. If villages were to wait any longer, most barge companies would have committed their space to other more lucrative contracts for construction projects, canneries, and local school districts. Low water or early freeze-up may close rivers to barge navigation early enough that barge companies may not be able to complete their scheduled deliveries.

Alaskan villages must pay cash when they place their annual fuel order in the Spring, although village residents usually receive wage income through fishing, cannery work, local construction projects or firefighting only at the end of the summer.

While air charter transportation of fuel is a possibility, such transportation often triples the delivered cost of fuel. The table below shows the cost that three villages presently face for three types of deliveries.

Village	Price ($ Per Gallon) As of December, 1980: Heating Fuel Oil #1		
	Barge (Bulk)	Air (Bulk)	Air (Drum)
Mekoryuk	$1.365	$3.406	$4.261
Kongiganak	$1.316	$2.271	$2.771
Nightmute	$1.426	$2.776	$3.371

Each petroleum price hike hits rural residents even harder than urban residents. Village residents are affected twice by price increases, paying first for increases in the basic product price and then for transportation costs which are driven higher by rising fuel prices. Transportation costs may add approximately 35% of the price of the heating fuel brought to the village by barge.

Another major problem in the villages is inadequate bulk fuel storage. Villages, already struggling to produce funds to pay for economical barge delivery of fuel, are further hampered

by insufficient storage for an entire winter's heating fuel supply even if sufficient funds for this supply would guarantee its delivery.

III. PREVIOUS AGENCY EXPERIENCE IN RURAL ALASKA

Since the program draws upon the agencies in Alaska with the most experience in rural energy programs, it can build upon past programs and use existing expertise. The program attempts to complement rather than duplicate past work.

The experience of the Alaska Power Authority in performing reconnaissance studies provides substantive background for the program. The Power Authority has completed studies in 31 villages located in the Koniag, NANA, Doyon, Calista, Bering Straits and Bristol Bay regions. These studies provide information on the cost, availability, and suitability of various energy technologies in Alaska.

The program uses existing resource assessments to provide the information base for a comprehensive energy plan. These resource assessments include the Division of Energy and Power Development's long-term energy plan, the Power Authority's survey of northwest Alaska coal resources, the Corps of Engineer's statewide survey of small hydropower potential, the Geophysical Institute's study of geothermal energy resources,

and resource assessments by private firms, including the regional corporations.

The program uses the demonstrated practical skills of direct service agencies in energy conservation techniques. This includes the expertise of RurAL CAP in weatherizing rural homes and the experience that the Division of Energy and Power Development has gained through its new energy audit program.

IV. STUDY SCOPE AND COORDINATION

The program addresses the energy problems in every rural Alaska community. To achieve economies of scale, the work program is administered by region with work being performed on both a regional and local basis.

The foundation for the program activities is the work plan. Drawing upon the expertise of the participating agencies, the designated lead agency develops work plans for each region. In order to build on previous studies in developing the work plan, the lead agency conducts extensive literature searches to obtain existing energy-related data and information on appropriate technologies.

The work plan for each region has four steps:

- preliminary activities
- site visits
- energy plans
- implementation

A. Preliminary Activities

The staff hired by the regional non-profit corporation under contract visits each village in the region to:

- o elicit community views on potential solutions to the energy crisis.
- o coordinate future program activities with the village leadership.
- o identify residents interested in receiving energy-related training.

B. Site Visit

A small team consiting of energy auditors, engineers, and educators visits each village to perform reconnaissance studies. The major tasks of these studies are:

- o the audit of each building in the village to at least state residential energy audit standards.
- o gathering of information to estimate village energy supplies, conversion processes, waste heat and end use.
- o examination of existing space heating and power generation facilities.

C. Energy Plans

The regional planning team prepares a report on an energy plan for the region. In this report, the staff evaluates and compares economic, environmental

and technical factors for each alternative plan. Where additional data is needed to define available energy resources, the staff outlines the required exploration program for the particular resources. Exploration includes such activities as wind speed recording, stream gaging, or coal field exploration. Also included in the report are proposed energy projects and recommendations for feasibility studies.

D. Implementation

The participating agencies (regional non-profit organizations, regional housing authorities, utilities, Division of Energy and Power Development, Alaska Power Authority, RurAL CAP) jointly develop regional energy strategies. Village residents then implement those projects where the greatest energy savings are indicated.

V. PROGRAM ELEMENTS

The Village Energy Reconnaissance and Conservation Program includes eight elements:

- o regional energy planning
- o energy auditing
- o reconnaissance studies
- o weatherization
- o community participation and education
- o reporting
- o program management and agency coordination
- o evaluation

panded weatherization programs.

While performing audits, the auditors also attempt to educate the community about energy conservation through activities in which the community can participate.

The third part of energy auditing is the development of a system for computerized data analysis and storage. An automated data processing system performs heat-loss analysis from the audits and processes the resulting data. This facilitiates the engineering analysis through which optimal conservation measures are determined.

C. Reconnaissance Studies

The reconnaissance element of the program consists of four primary activities. First is the collection of data on present energy supplies, energy conversion processes, waste heat, and end uses of energy. The purpose of this activity is to develop a village energy balance sheet showing where energy comes from and how it is used. The energy audits are a major source of data for these village energy accounts.

Different agencies have different data requirements.

For example, the Division of Energy and Power Development has specific needs related to its functions in long-term energy and contingency planning. Therefore, coordination of data collection efforts is important to ensure that all cooperating entities gain the specific information needed for their respective activities.

Second, there is a forecast of village energy requirements. It is based on certain assumptions about the future price of energy and explicit projections of the end uses identified in the energy balance. The impact of weatherization and other conservation measures planned as part of this program are accounted for in the forecast. Sectors used in the forecast include the residential, commercial, industrial, public utility, and transportation sectors.

Third, contractors assess local energy resources. To augment their knowledge of local energy resources gained from an exhaustive literature search, they undertake field visits and sampling, as appropriate. The survey of resources includes:

- o wind, solar, hydroelectric and geothermal potential
- o local sources of coal, oil, gas and peat
- o waste
- o regional electric system interties.

Fourth, the region develops alternative energy plans based on energy needs, local preferences, energy resources and available technologies. These plans, in turn, are evaluated and compared on the basis of economic, environmental and technical factors.

D. Weatherization

Weatherization consists of installing insulation and other energy-saving materials. The results of the audit determine the appropriate amount of insulation, caulking and other building materials to be installed. When the present value of future energy savings is equal to or greater than the cost of materials used for weatherization, the installation of these materials is then justified on economic grounds.

There are two benefits associated with weatherization. One is energy cost savings. In its seven years of experience in running weatherization programs throughout rural Alaska, RurAL CAP has found savings of 30% or more on heating costs for weatherized homes. During 1980, over 900 homeowners in six regions of the State participated in the Federally funded weatherization program administered by the Division of Energy and Power Develcpment. The second benefit is jobs for rural Alaskans. Since

the above program was conducted entirely with locally hired construction crews, it also created significant rural employment opportunities.

E. Community Participation and Education

Community participation and education in this program has two major goals:

- o to educate youth and adults in rural Alaska about energy conservation issues and methods in their villages.
- o to involve youth and adults in discussions, assessments and decisions on future development of local energy resources for their villages (and regions), in consultation with energy professionals.

Community participation and education would be informal, entertaining, highly participatory, and appropriate to rural Alaska. Rather than lectures and written materials, the primary methods of education would be slides, models, posters in public buildings and other visual displays. The education program would focus on instruction in conservation measures through entertaining presentations and materials and participation in audits. For example, as a kick-off for audits, program

staff might organize a community gathering where people actually participate in an audit.

A two person team, hired on the basis of a full year commitment, is responsible for coordinating community outreach activities in a village. The team visits each village at least twice:

- o a preliminary visit to coordinate participation in the program
- o a visit after regional alternatives are specified to explain the alternatives available to the village and the region and to elicit village preferences.

Eighteen to twenty teams are required for the program, with each team responsible for 25-30 villages. The teams also coordinate the energy audit program for the village.

Special attention is given to the hiring and training of team members. Members of the team are hired on the basis of skills in rural sensitivity and communication and education, but serve also as energy auditors. Therefore, a comprehensive training program for them includes:

- o energy auditor training
- o training in community involvement and public participation
- o exposure to the funding source
- o participation in reconnaissance studies under the supervision of engineers
- o orientation to rural Alaska, regional corporations, village life and communications, and working in rural Alaska.

To educate the community and generate interest in the program, the teams use the schools extensively. Examples of activities in schools are:

- o conducting energy audits with youth in schools not only to educate them, but also to encourage adult participation in a demonstration energy audit.
- o setting up an energy experiment for school children. For example, children could test the village houses throughout the school year for temperatures, drafts, fuel consumption, and other conservation indicators.

In addition to involving the community in audits, the teams facilitate exchanges between the community and technical staff by ensuring that:

- o visuals prepared for educating the community are technically accurate
- o technical presentation prepared for village meetings are interesting, entertaining, and easily understood

- o technical staff collect information by the most appropriate methods and with as much village interaction as possible.
- o difficult engineering concepts are well interpreted
- o "readable" and useful summaries of alternatives and technology profiles are available (readable here may mean through the use of slides, T.V., radio....rather than through written words only).

To assure continuity between the regional program and the community programs, the regional energy planner actively participates in community programs. First, the planner contributes to training sessions for the teams. Second, the planner becomes a team member on as many village site visits as possible and when appropriate. Third, the energy planner participates in discussions about use of community preference data in developing regional energy strategies.

F. Reporting

Reporting is of two types. One is the written materials developed as part of the community participation and education element. The other is a draft and final report for each village and region, which includes data, analysis, and recommendations. Three types of recommendations offered by the reports are

- ö actions that can be implemented immediately, such as waste heat utilization
- o additional energy resource data needs such as wind speed, steam flow or coal quality
- o the need for detailed feasibility studies of specific energy-related projects.

G. Program Management and Agency Coordination

Program management and the responsibility for the effective and timely completion of this program resides in the Department of Commerce and Economic Development. Several full-time project managers assigned to specific regions are required to administer contracts and reimbursible services agreements, insure quality control, and coordinate the energy reconnaissance program.

H. Evaluation

This program is evaluated continuously both by qualitive and quantitive measures. Qualitative measures include suggestions received through public participation. Each year before new contracts are awarded for reconnaissance studies, appropriate adjustments are made in the different elements of the program.

In addition, actual sampling of the reduction in

the use of heating fuels by selected homeowners provides a quantitative audit of the energy savings resulting from retrofits.

VI. ECONOMIC BENEFITS

The economic benefits of the program, as shown in Exhibit II, are large. Based on the value of energy savings over a 20 year period, the direct economic benefits of the program are estimated at $533.3 million, or a benefit to cost ratio of 5 to 1. The payback period for the cost of the program is less than four years. This represents an average savings per household of $663 per year.

VII. PROGRAM TIMETABLE

Scheduled to operate over a three-year period, the program will begin in July, 1982, and complete its work by July 1985 By July 1985, the program will have audited and weatherized over 40,000 homes and provided resource assessments for every rural community in Alaska.

EXHIBIT I

THREE YEAR PROGRAM BUDGET SUMMARY

PROGRAM ELEMENT	PERSONNEL RESOURCES	ESTIMATED BUDGET (MILLIONS)
A. REGIONAL ENERGY PLANNING	Performed under contract	4.25
B. ENERGY AUDITING		
1. Training	Performed under contract	.27
2. Audits	Performed under contract	7.20
3. Data Processing	Contract	.25
C. WEATHERIZATION	Performed under contract	80.44
D. ENGINEERING	Performed under contract	4.20
1. End Use Analysis		
2. Energy Forecast		
3. Resource Assessment		
4. Plan Formulation and Evaluation		
E. COMMUNITY/INVOLVEMENT AND EDUCATION		4.00
	Performed partly under contract and partly by program managers and regional planners	
F. PROGRAM MANAGEMENT AND AGENCY COORDINATION	4 (three new positions)	.92
TOTAL		$101.53

EXHIBIT II

Value of Energy Savings Over 20 Year Period

Average cost of oil	$1.70/gallon
Average consumption	13 0 gallons/house
Average energy savings	30%/house
Average savings/house in 1981 dollars	$ 663 ./year

20 year savings/house = $13,260

$13,260 x 40,218 homes = $533.3 Million energy savings

Derivation of population figure:

Source: 1980 Census of Population and Housing, Preliminary Reports, Jan. 1981

Statewide:	162,359 homes
Less: Anchorage Borough	-70,292
Fairbanks North Star Borough	-22,495
Juneau Borough	-7,663
Kenai Peninsula Borough (less English Bay & Port Graham)	-11,575
Mat-Su Borough	-10,116
	40,218

BENEFIT/COST RATIO:
Better than 5/1

Payback Period:
Less tan 4 Years