SCOMM

#44:15

JAY S. HAMMOND
GOVERNOR

STATE OF ALASKA
OFFICE OF THE GOVERNOR
JUNEAU

The Honorable Jalmar Kerttula
President of the Senate
Alaska State Legislature
Pouch V
Juneau, AK 99811

Dear Mr. President:

Under art. II, sec. 17 of the Alaska Constitution I am allowing FCCSSB 25 to become law without my signature.

I have serious reservations regarding this bill despite its popularity with the legislature. Political realities suggest that a veto reflecting my dissatisfaction would be overridden.

Obviously, the legislature is determined to massively promote hydroelectric development through a system of grants. While I agree that there are many hydro projects throughout the state worthy of promotion, there are also many unworthy, both economically and environmentally. Moreover, I do not favor paying for this development with grants. In my view, low interest loans or partial grants plus bonding would inject a "market test" now absent and compel closer scrutiny of project viability before a community pressed for it.

It's no secret that this hydro bill was a bargaining chip in my efforts to secure a constitutional limitation on spending. Had the latter not passed, I would have vetoed both FCCS SB 25 and FCCS SB 26 for policy reasons even though legislative overrides would have been almost assured. Thus, to those who believe I paid too large a price, this price dwindles when one considers that had I not begrudgingly paid it, the legislature could have compelled it regardless. Moreover, had I not been willing to pay that price, there's no question but that there would have been no spending limitation proposal nor major contribution to the Permanent Fund, both of which are crucial to Alaska's financial future.

There are additional problems with the hydroelectric legislation. In an effort to prevent vetoes, the legislature linked the authorization and appropriation bills so as to

cause delay of those projects which are viable and ready to go should I veto either measure. The Department of Law advises that that provision may be binding. Additionally, not only have I assurances from key legislators that they'll work with me to correct some of the problems, but I have the means of compelling this help. Without their remedies, additional appropriations for questionable projects can be vetoed.

Most importantly, the legislature acceded to my demand that the Alaska Power Authority be reconstituted so that it could be held more closely accountable to policies consistent with public purposes.

While I would have preferred low interest loans or equitable grants, the legislature chose to provide total grants. Accordingly, it is my intent to make every effort next session to bring some equity into the program through amendments.

Pursuant to the advice of the Department of Law, I am pleased that certain blatantly unconstitutional provisions in FCCSSB 25 can be effectively thwarted. I believe that the so-called "blackmail" clause should be ignored. It is nothing more than the wishful thinking of one legislature attempting to bind the acts of future legislatures. The attempted dedication of power revenue for operation and maintenance of energy program projects will not be allowed. All amounts expended for operation and maintenance must first be appropriated by the legislature. The attempt to legislatively determine the path of the Anchorage to Fairbanks transmission line borders on special legislation. Certainly, the design and construction of power projects is presently governed by general law. There is no indication that this transmission line should receive special treatment by the legislature. The experts employed by the Alaska Power Authority will be the best qualified to determine where the right-of-way will be located. To require that the line pass through Denali State Park ignores the rights of all state residents to have generally applicable laws, which are not slanted toward special interests, set the uses and activities which are permitted in state parks.

Thus, while many urged me to veto this bill for the reasons stated above, I have chosen not to do so. Not only would it prove futile, but it is likely that it would so poison the water that I would destroy any chance of cooperation between

Senate and House leadership and me next year to secure long-term improvements. Those who fear this bill as it now stands can help improve the results by proposing and supporting constructive amendments to be considered next year.

Sincerely,

Jay S. Hammond
Governor

MEMORANDUM State of Alaska

TO: Representative Hugh Malone

DATE: June 2, 1981

FILE NO:

TELEPHONE NO:

FROM: Eric P. Yould

SUBJECT: SB25 - Cost of Energy

You asked that I explain how the cost of energy would be established for energy sold from the State system of power projects after 500 megawatts of system capacity is in operation as provided in Sec. 44.83.490(b)(3) of House CS for CS for Sponsor Substitute for SB 25, dated 5/20/81. For each fiscal year the following information would be presented to the Legislature through the Executive Budget process:

1. Status report on funding and construction of projects under construction.

2. Capital cost of investment in projects in operation.

3. Estimated kwh sales of energy from individual projects in the State system.

4. An operation and maintenance budget for the fiscal year by project for the system.

5. A detailed accounting of expenditures from and additional funding requirements for a system contingency fund which would be utilized for unforeseen maintenance or operation requirements associated with the system of projects in operation. (This fund may be capitalized at a percentage of the market value of the system in operation.)

6. An estimated budget for the Power Cost Assistance Program.

7. A suggested rate for energy sales from the State system with an estimate of system revenues based upon the rate.

When 500 MW's of production capacity are in operation, the system may include anywhere from 5 to 15 projects of varying individual capacity. The capital investment could range from $1 to $2 billion dollars. Revenues from the State system must fund (A) operation, maintenance and equipment replacement costs of the power projects; (B) debt service costs of the power projects (associated with revenue bond financing); (C) safety inspection and investigations of the power projects by the Authority; and (D) annual costs of the power cost assistance program. The wholesale cost of energy from the State system would be based upon contracted sales and conservative estimates of sales for the State system since low water years or equipment failures could decrease the energy sales in any year below the average annual energy generation for the system. In addition, system losses in transmission and distribution of energy make the average annual system energy available for sales less than the average annual generation of the system.

Assuming that this section of the bill for rate setting takes effect in 1992 and that system sales are estimated to be 2.5 billion kwh's, revenue requirements would be divided by kwh sales to produce the system wholesale rate of energy. Assuming that revenue requirements are $30 million for (A), $25 million for (B), $2 million for (C), and $68 million for (D), the wholesale cost/kwh would be $\$125.00 \times 10^6 / 2.5 \times 10^9$ or 5¢/kwh.

I am sure you appreciate and understand that what is presented simplistically with rough estimates here would be presented in great detail with hard data if the program was implemented.

Please let me know if you need further explanation of how rates may be established under SB25.

ARLON R. TUSSING & ASSOCIATES, INC.
526 Main Street • Juneau Alaska 99801 • (907) 586-1290

June 4, 1981

To: Representative Oral Freeman
Vice-Chairman, House Finance Committee

From: Arlon R. Tussing

LEGISLATION ON ELECTRIC POWER PROJECT FINANCING AND COST ASSISTANCE: SUMMARY OF JUNE 2 TESTIMONY

I did not prepare a statement in advance of my appearance before the House Finance Committee on June 2. The following is a non-verbatim summary of the points raised in my oral statement and in questioning by Committee members.

1. Hydropower in Alaska is not necessarily cheap.

The Susitna project and most of the projects listed in SB 26 have higher estimated costs per kilowatt of capacity than the actual costs of recently completed nuclear plants in the lower 48. Cost-overruns are likely, and many of the projects will be underutilized in their early years, so that the actual cost per kilowatt actually generated will be very high indeed.

2. Hydropower is the best generating alternative in Alaska because (but only where) it is cheaper than thermal alternatives.

In most cases, the very high initial construction costs of hydro in Alaska will be justified because (1) a renewable energy source keeps operating costs very low, and (2) the plant has a very long life. Not every project listed in SB 26, however, will generate the amount of electricity that is needed more cheaply than thermal alternatives, or more cheaply than any other renewable-resource alternative.

Susitna may be the lowest-cost long-term alternative for the Railbelt, but that is not obvious today. Anchorage now has the lowest-priced thermally-generated power in the whole world (except perhaps Kuwait), because of low-cost natural gas. Alaska has vast natural-gas reserves, and gas prices would have to be increased several-fold and keep rising to make Susitna power cheaper. [Battelle is now investigating this question for the State. Also see Gregg Erickson's report to the House Research Agency.]

3. The lowest-cost long-term generating alternatives should be chosen regardless of the source and method of financing.

Alaska's existing procedures for power-project evaluation (in AS 44.56.180) are among the most businesslike and objective in the nation, yet leave the final decision on project funding to the Legislature. There is no compelling reason to change them.

SB 25 (in both its Senate version and the House Resources Committee version) make project-selection and ratemaking procedures political from the very beginning, and SB 26 (in both versions) short-circuits the established evaluation and review procedures. Together, the two Bills imply that the State will choose and fund projects without regard to whether they are really the lowest-cost alternatives. ["Don't confuse me with facts."] The Bills also invite future Legislatures to change the project-selection, financing, and ratemaking rules again and again and again.

4. Conventional financing and ratemaking arrangements exaggerate the costs of hydropower and obscure its benefits.

Conventional financing and ratemaking arrangements give a very heavy "front-end load" to the price of electricity generated by capital-intensive technologies --- notably hydro but also nuclear. Rates tend to be much too high in the early years and much too low later. The reasons that rates to consumers are distorted include:

(1) straight-line amortization of debt principal (which means that interest payments are very high at the beginning, and decline over the life of the project);

(2) the excess "debt-service coverage" required by lenders, which raises rates by 25 to 50 percent above actual principal and interest-payment needs,

(3) high market interest rates that are largely payments in advance for future inflation (True interest is only 2-4 percent; the remainder of the market rate only compensates the bond-buyers for the fact that inflation shrinks the value of their principal.); and

(4) a penalty for under-utilization of the project's capacity in its early years. (The same annual debt-service payments are spread over a smaller number of kilowatt-hours.)

As a result, an Alaska hydropower project whose average power cost over 25 years of service was only 7 cents per kilowatt-hour might require rates of 40 to 50 cents in its first year of service. These rates might decline to as low as 4 cents after 25 years. (This would be equal to only about 0.4 cents in the year-one dollars, if the long-term inflation rate were 10 percent.) [For a further explanation of the front-end load, its causes, and possible remedies, see my memorandum to Governor Hammond, "A New Approach to Electric Power Project Financing" (November 10,1981).]

Under these circumstances the rates would probably begin at levels much higher than the thermally-generated status quo, and make the project very unattractive to consumers. Lenders would doubt whether the utility could actually levy and collect high enough bills to pay principal and interest, and thus the project might be unfinanceable.

If the project were completed anyway, unrealistically low rates in later years would encourage homeowners and industry to consume electricity as if these rates reflected the real cost of electricity, only to find that their bills suddenly had to increase by two, four, or even ten or more times, once the project's capacity was used up, because new projects would have to be built at new inflated prices, once more with a front-end-loaded debt-service schedule. (This is a pretty close description of what is happening now in the Pacific Northwest.)

5. Reasonable rates for hydropower do not require any State subsidy.

Wherever a large hydro project in Alaska is actually the lowest-cost source of power in the long run, "rate restructuring" can bring consumer electric rates down to reasonable levels, without any subsidy in the form of capital grants, low-interest loans, or power-cost assistance payments. Rate restructuring here means drastically reducing the front-end load in electricity prices by levelizing the project's debt-service (or return to equity) in inflation-adjusted dollars, over the term of its financing (e.g., 25 years).

In the example given in point 4 above, rates would ordinarily start at, say, 45 cents per kilowatt-hour and decline to 4 cents after 25 years, but restructuring would ideally allow them to start at 7 cents and escalate with inflation, so that the first-year and 25th-year price would be the same low constant-dollar average cost. In practice, restructuring would be incomplete, so that rates might start at about 10 cents and fall to 5 cents (in year-one dollars), as the project's generating capacity was fully used.

Beginning in mid-1980, the Governor's office (and its consultants, of which I was one) and the Alaska Power Authority, explored several rate-restructuring arrangements that would have helped local utilities finance their own hydro projects and reduced the initial rates for power from these projects to reasonable levels.

[One of these plans was set out in my November 10, 1980, memorandum cited above. Another memorandum to the Governor, "Power Project Financing Alternatives" (January 23, 1981) compares some of the different approaches, and a third paper, "Putting Various Hydropower Cost Factors into Their Proper Perspective," (February 26, 1981) shows that differences in financial strategies and interest rates tend to have less influence on the actual cost of electricity than non-financial factors such as project selection; construction-cost overruns; completion, licensing and startup delays; engineering design quality; and contractor performance.]

The plan that the Governor finally proposed to the Legislature was a reasonable compromise among these plans but it had three big faults: (1) It was not finalized until after influential Legislators had firmly committed themselves to other approaches; (2) it was too complicated; and (3) the Governor has not supported his own plan firmly or consistently.

6. State equity grants and statewide "postage-stamp" rates tend to encourage (1) bad project selection and (2) wasteful electricity consumption.

If someone else is paying the bill, communities and the utilities that serve them will ignore real costs per kilowatt-hour, and seek the biggest conceivable projects for their construction payrolls, for the prestige of having a big project, and in the hope that "cheap" power (no matter how false that cheapness is) will attract industry.

A statewide postage-stamp rate would also eliminate the incentive of energy-intensive industry to locate where power costs were truly lowest. (Actually, there are only two industries that decide where to locate their plants on the basis of electricity prices --- uranium refining and primary aluminum manufacturing.)

If someone else is paying the bill, utilities have no incentive to operate efficiently, and consumers have no incentive to conserve energy. They will use electrical resistance heat, for example, even where oil, gas, coal, or wood is cheaper and, indeed, even where oil, gas, or coal is used to generate the electricity at less than half the efficiency of burning these fuels directly.

7. There is a straightforward way (a) To finance the lowest-cost electrical generating project in each community or service area, (b) To assure reasonable electric rates beginning in each project's first year of service, (c) To preserve the right project-selection and energy-conservation incentives, (d) To protect the State's investment from inflation, and (e) Eventually to recover for the State treasury the original value of its construction-cost assistance.

The way to reconcile these goals is amazingly simple, and fits easily into either the existing law or a modified SB 25. The State would charge each utility that received a state construction grant, or which distributed electricity from an Alaska Power Authority project, an annual charge for the use of its capital equal to ---

3 percent of the value of the State's investment in any hydro project (as adjusted for changes in the value of money);

5 percent of the (adjusted) value of the State's investment in any coal-fired steam plant; and

6.5 percent of the (adjusted) value of the State's investment in any gas-turbine or diesel generator.

Under this arrangement, rates could begin very low, and they would always stay low because fixed costs would never rise more rapidly than general inflation. For hydro, the first year's charges could be as low as one-sixth of the rates that would be dictated by conventional financing and ratemaking methods. (3 percent of the project's fixed cost as against 18.75 percent [3 percent depreciation plus 12 percent interest plus 3.75 percent excess coverage]).

An annual return of 3 percent on the inflation-adjusted value of the State's investment in hydro means that consumers will get the use of the money for 33-1/3 years without any real interest charge. At the same time, however, the State's investment would be totally protected from erosion because of inflation.

A 5-percent return on any State investment in coal-fired steam plants means that consumers will use the money free of real interest for 20 years, and that the State would get back the entire value of its investment, without reduction by inflation, over that period. Likewise, the 6.5-percent return on any State investment in gas and oil-fired facilities means the State's outlay will be repaid in 15.4 years. These different rates (1) reflect the longer economic life of hydro plants over steam turbines and of steam plants over oil and gas-fired generators, and (2) directly express the Legislature's preference for renewable energy.

8. <u>There are ways by which the State can lower electric costs to consumers even further --- ways that are (a) more equitable than capital grants or low-interest loans, and (b) do not distort project-selection decisions or create incentives for wasteful consumption</u>.

The secret is for the State to pay for the full cost of generating the first (say) 300 kilowatt-hours per month for every residential electric customer in Alaska. This power-cost assistance would be completely separate from any program of state capital grants or construction loans, because everyone would get the same amount of power free, regardless of the technology used to generate the electricity, regardless whether or not the State had helped finance the generating plant, and regardless of the actual cost of its power.

State financial assistance would be directed to the technologies and projects with the lowest long-term generating cost for each community or service area. Consumers would pay rates based upon this (restructured) long-term cost for all consumption <u>above</u> the 300 kilowatt-hours per month. They would thus be encouraged to use electricity for heating where (and only where) it was truly the lowest-cost energy source, and industries heavily dependent on electricity would be encouraged to locate where (and only where) power costs were truly lowest.

<u>NOTE</u>: During the past year, I have served as a consultant to the Legislature, the Governor's office, and RURALCAP on electric power planning and financing issues. My statement here does not necessarily reflect the views of any of these agencies.

Also, I do not claim that any of the ideas presented here are original with me. Most of them have been around for many years under other names or in other applications. I want to state specifically that the Alaska Power Authority and its staff have been working imaginatively on the problem of rate restructuring for some time, and that nothing in my June 2 testimony was intended to diminish or discredit the Authority's efforts or the independent origin of its financing proposals.

Please notify Nancy Lord at Representative Brian Rogers' office on arrival of this telecopy. The original will be mailed to Representative Freeman.

PLEASE NOTE: THE FOLLOWING PAGES WERE TREATED AS A UNIT IN THE ORIGINAL DOCUMENT.

ALASKA STATE LEGISLATURE
HOUSE OF REPRESENTATIVES
RESEARCH AGENCY

Pouch Y, State Capitol
Juneau, Alaska 99811
(907) 465-3991

June 2, 1981

MEMORANDUM

TO: Members of the House Finance Committee

FROM: Alexander Hoke and Jack Kreinheder
Research Staff

RE: Analysis of SB 25 and SB 26 Hydro Legislation
Research Request No. 81-152

We have prepared two sets of computer printouts, which are enclosed, that summarize our analysis of the House Resources CS for SB 25 and the latest House Finance workdraft CS for SB 26. The first set of tables shows the expenditures and opportunity costs of these expenditures for power projects included in the SB 26 workdraft. In the second set, funding for construction of the Susitna project is added to demonstrate the effect of Susitna funding on other power projects and the total cost to the state for all projects.

The first printout of each set shows the total expenditures and opportunity costs for each power project over the period from FY 1982 to FY 2001, while the second printout presents a breakdown of these figures by each fiscal year in this period. The first column of each printout shows the planned expenditures for each project or fiscal year. It is important to note that these expenditures represent the full costs of each project, which for Bradley Lake and Solomon Gulch are higher than the amounts appropriated in SB 26.

Column 2 displays the net annualized cost, or opportunity cost, to the State of these expenditures, which we have calculated as the difference between the market rate of return available to the State (including payback of principal, as well as interest), and the actual return from the power projects. For example, the Bradley Lake project has a total cost in 1981 dollars of about $200 million. The net annualized cost of this expenditure over the period from from FY 1982 to FY 2001 in the noSusitna case is about $155.4 million. This figure is the difference between the amount which the State could receive each year from a loan or bond investment at an 11 percent market rate of interest, and the amount which the State would receive from the "equity return" on hydro projects specified in the House Resources CS for SB 25.

The Resources CS for SB 25 provides that this equity rate of return is 5 percent through 1986. If the legislature has not appropriated at least $5 billion to the power development fund by FY 1986, in other

words if Susitna or another major project is not constructed, the equity return to the State would increase from 5 percent to 10 percent, thereby reducing the opportunity costs to the State (but also increasing power prices).

If Susitna or another major project is developed, the opposite effect would occur. The bill states that when 500 megawatts of generation capacity have been developed, the return to the State from the power projects will be reduced from 5 percent to a level which covers only operations and maintenance costs and other expenses. The opportunity costs to the State would therefore increase at this time. We have assumed that the 500 megawatt threshold would be reached in 1993 in the Susitna case.

Column three of the printouts converts the net annualized cost to the State into present value terms (as of 1981). The discount rate used for this conversion is 10.24 percent, which is the average inflation rate in Anchorage over the past five years, according to the Consumer Price Index.

It is important to note that we have analyzed the opportunity costs of power project expenditures only through 2001. These opportunity costs would be substantially higher than those presented here if the analysis covered the full life of the power projects. Legislative Finance has done a long-term cost analysis which demonstrates this point.

The second set of three columns presents the information discussed above in terms of the expenditure and cost per power consumer to be served by each power project. In some cases where the actual number of consumers was not readily available, we used an estimate based on the average ratio of power customers to population for communities throughout the State. The third set of columns shows expenditures and costs on a per capita basis, based on the 1980 census population figures.

We have also enclosed five graphs which illustrate the information contained in the printouts. Figure 1 shows the per capita distribution of the SB 26 power project funding by election district in the no-Susitna case. Figure 2 shows the same distribution with Susitna construction funding included. In Figure 3, the expenditures, net annualized costs, and present value costs for the no-Susitna case are charted. This graph corresponds to the first three columns of the first computer printout. Figure 4 shows the same expenditures and costs with Susitna included, demonstrating the proportion of these costs which are attributable to the Susitna project.

In Figure 5, we have projected the assistance available under the Power Cost Assistance program between FY 1982 and FY 1992 at several levels of power costs. This chart assumes a 5 percent annual increase in power costs, which is equivalent to a 10 percent annual increase in the cost of fuel.

Although not included with this memorandum, we have also prepared a set of tables which show the expenditures and costs for each project for each fiscal year. We can provide these tables if this more detailed breakdown is necessary.

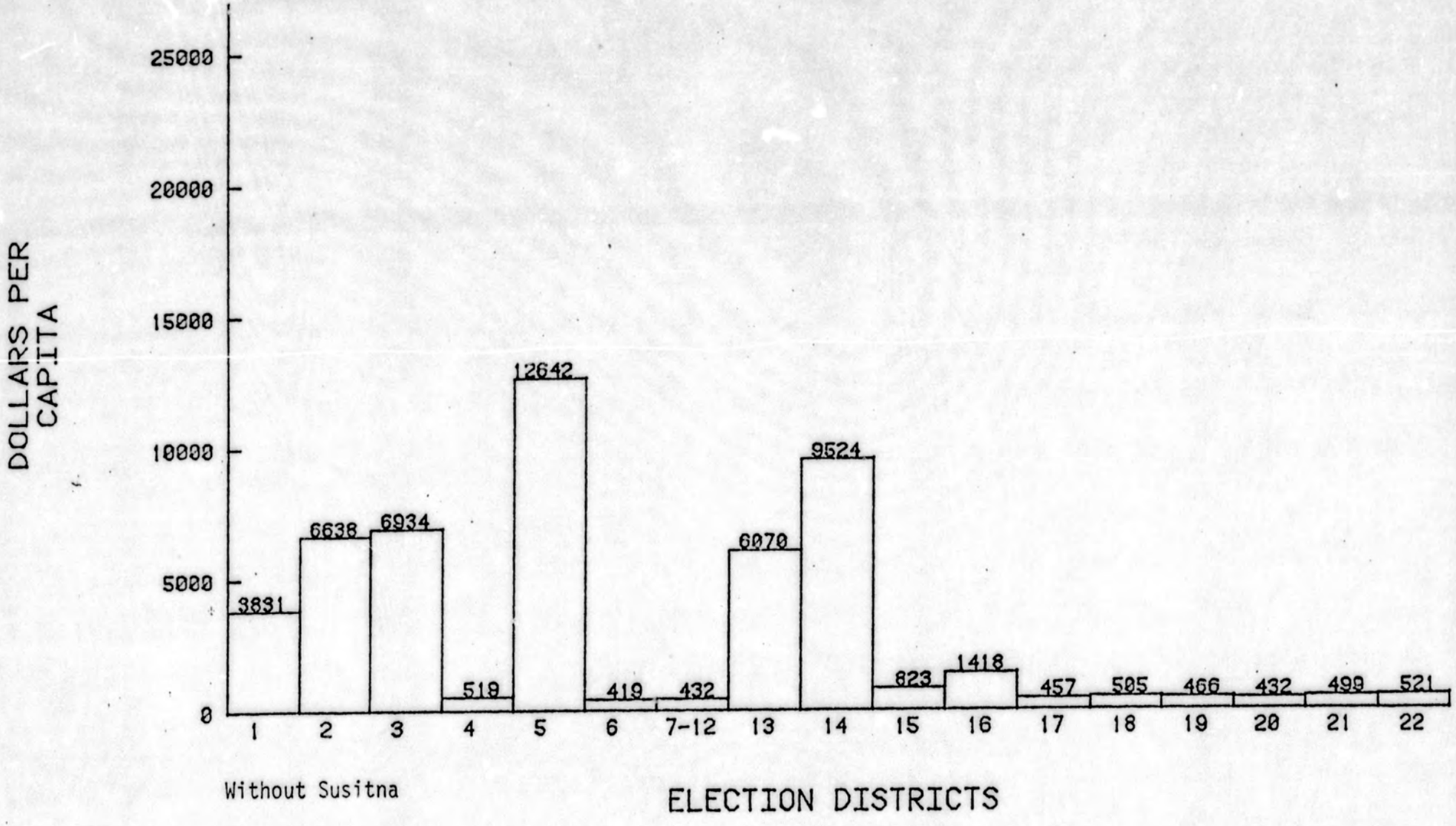
We hope this information is useful. If you have any questions or would like additional information, please let us know.

Enclosures

JK/bf

PER CAPITA DISTRIBUTION OF SB 26 POWER FUNDING (H. FINANCE DRAFT)

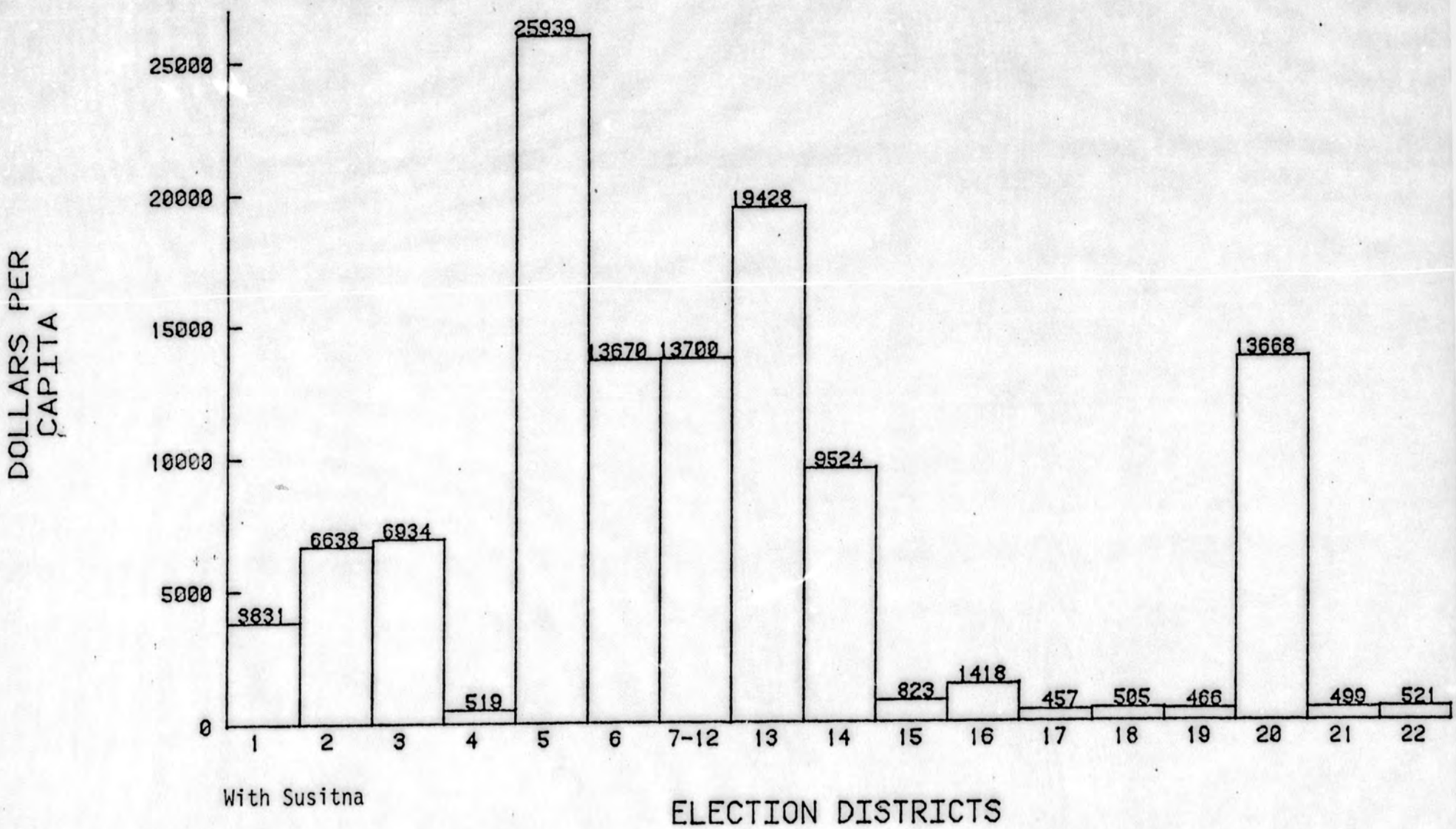
FIGURE 1



PREPARED BY:
HOUSE OF REPRESENTATIVES
RESEARCH AGENCY

PER CAPITA DISTRIBUTION OF SB 26 POWER FUNDING (H. FINANCE DRAFT)

FIGURE 2



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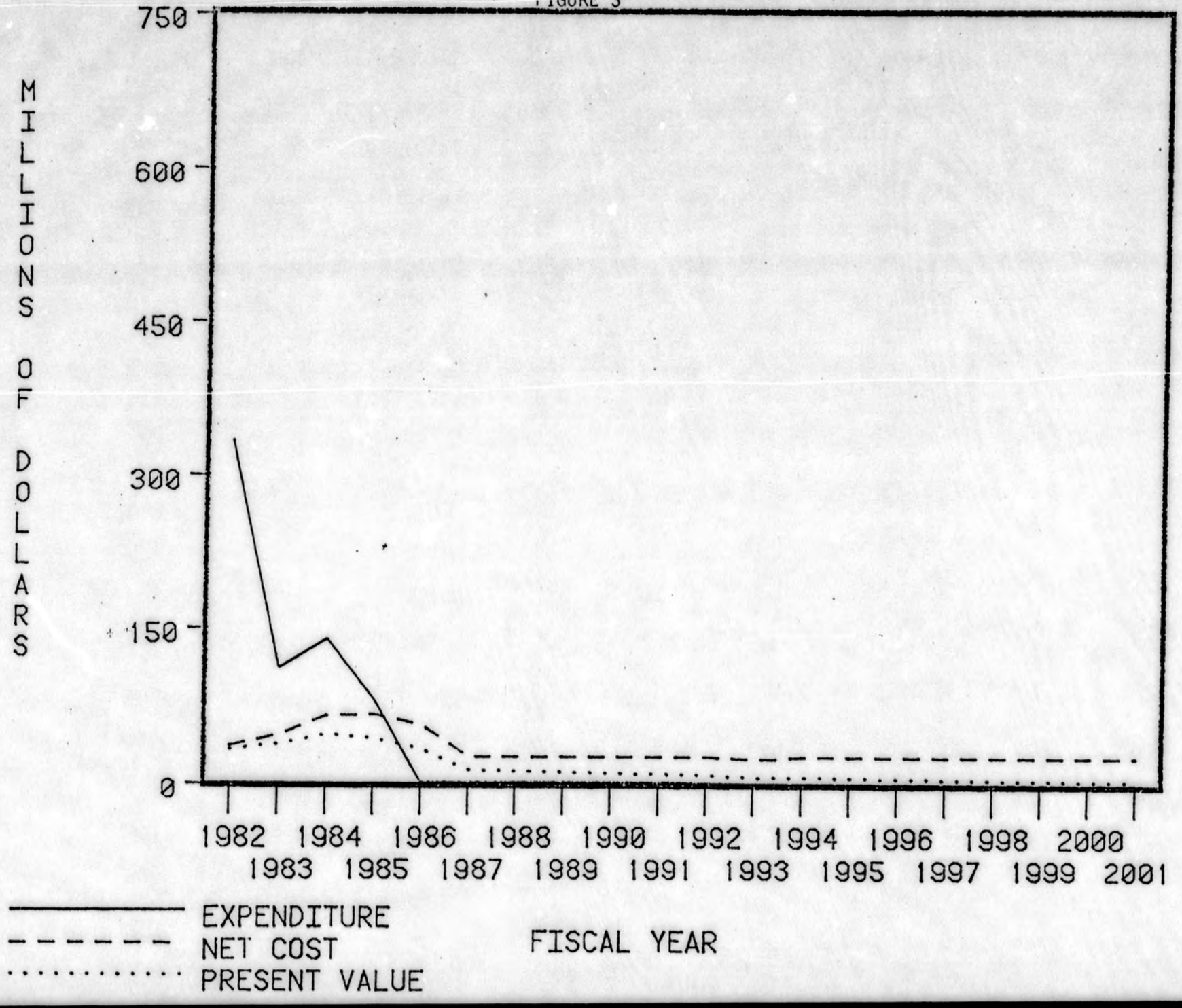
RESEARCH AGENCY

HYDRO FINANCING ANALYSIS - SB 26 (H. RESOURCES VERSION)

ASSUMES NO FUNDING FOR SUSITNA PROJECT

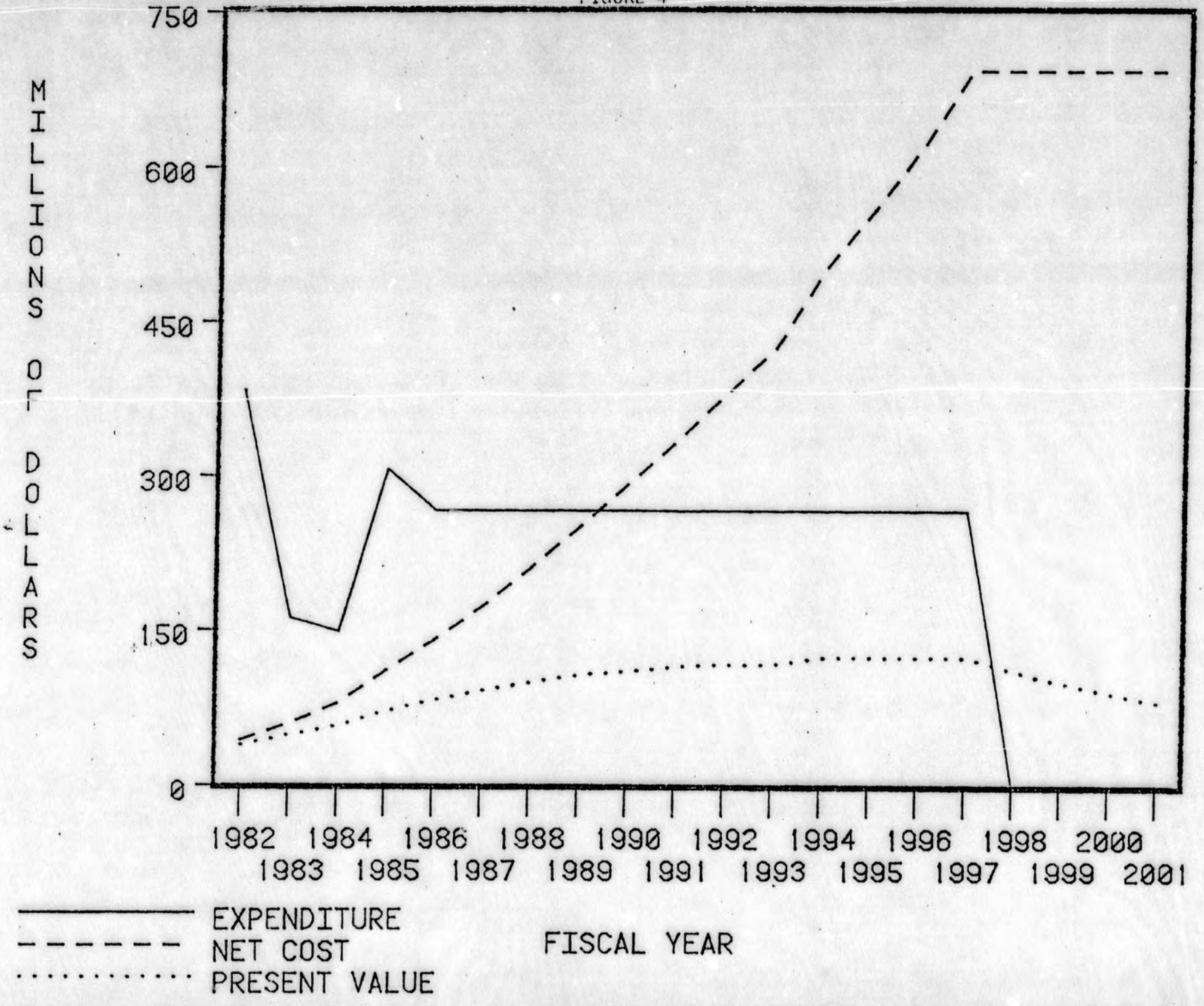
FIGURE 3



HYDRO FINANCING ANALYSIS - SB 26 (H. RESOURCES VERSION)

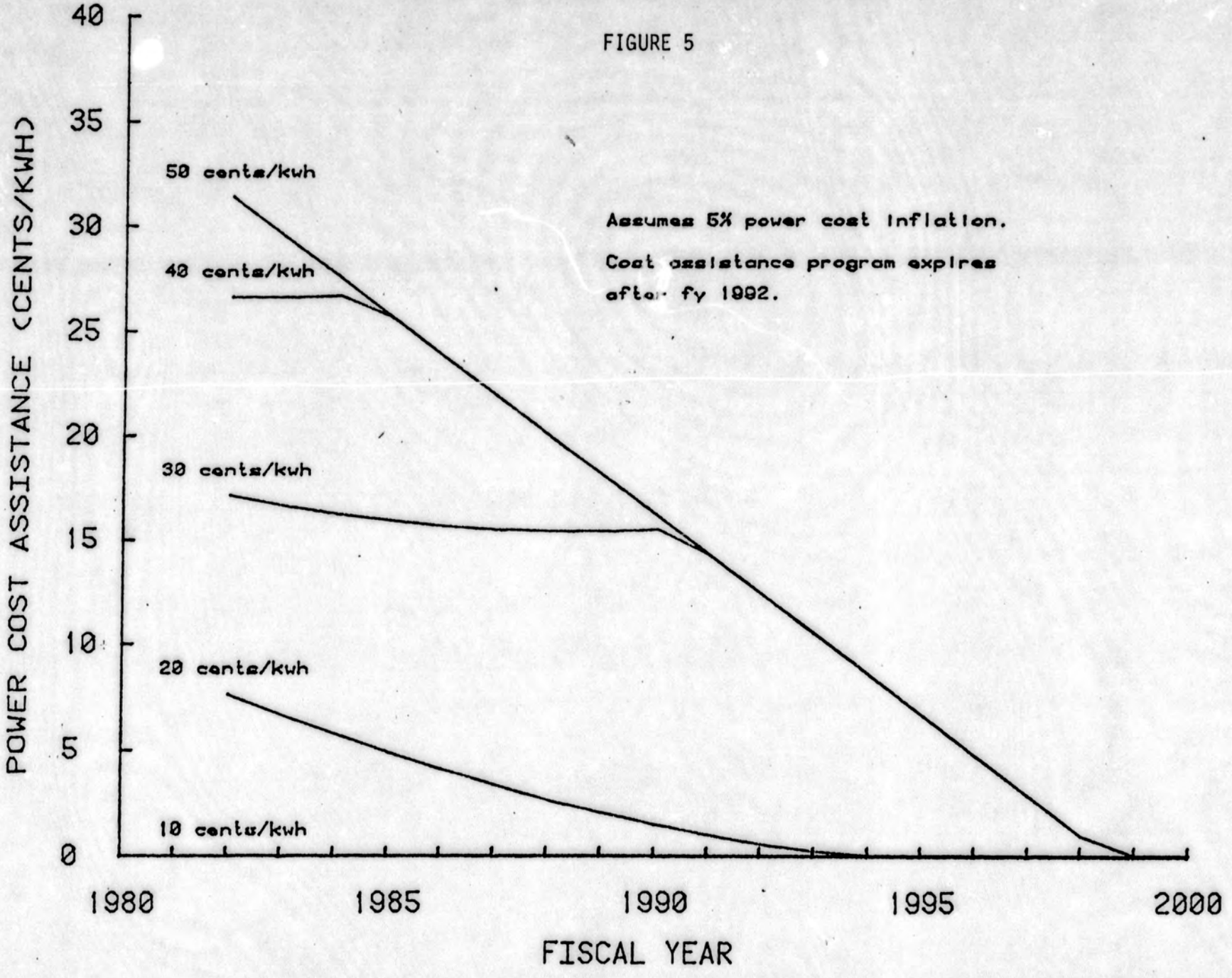
ASSUMES SUSITNA PROJECT FUNDING

FIGURE 4



ELECTRIC POWER COST ASSISTANCE LEGISLATION
SB 26 (HOUSE FINANCE WORKDRAFT)

FIGURE 5



HYDRO FINANCING ANALYSIS - SB 26 (HOUSE FINANCE DRAFT)

PARAMETERS USED IN ANALYSIS:
STATE RETURN ON HYDRO INVESTMENTS CONSIDERED AS CONVENTIONAL LOANS: 5 %

WITHOUT SUSITNA CONSTRUCTION

PREPARED BY
HOUSE RESEARCH AGENCY
JUNE 1, 1981

'EQUITY RETURN' STATE HYDRO INVESTMENTS ARE REPAID:
AT RATE OF 5% OF INITIAL EXPENDITURE UNTIL JULY 1, 1986
AT RATE OF 10% OF INITIAL EXPENDITURE THEREAFTER IF $5 BILLION HAS NOT BEEN APPROPRIATED TO POWER FUND BY JULY 1, 1986
AT RATE SUFFICIENT TO OFFSET COSTS OF OPER., MAINT., AND EQUIP. REPLACEMENT AFTER TOTAL POWER PROJECT OUTPUT EXCEEDS 500 MEGAWATTS

ALTERNATIVE STATE MARKET RETURN ON INVESTMENTS: 11 %
INFLATION RATE 10.24 %

SUMMARY OF ALL POWER PROJECTS - SB 26 (HOUSE FINANCE DRAFT)
TOTAL COST TO STATE FOR PERIOD 1992 TO 2001

(THOUSANDS OF DOLLARS)

PROJECT	EXPENDITURE	ANNUALIZED STATE COST	PRES VAL ANNUALIZED STATE COST	EXPEND. PER CONS.	NET COST PER CONS.	PRES VAL NET COST PER CONS.	EXPEND. PER CAP	NET COST PER CAP	PRES VAL NET COST PER CAP
BRADLEY LAKE	200,000	155,399	68,048	21,431	16,652	7,292	7,977	6,198	2,714
PORT LIONS	1,400	1,136	596	19,718	16,001	8,402	6,511	5,284	2,774
SOLOMON GULCH	68,000	55,182	28,977	33,431	27,130	14,246	11,333	9,197	4,829
SWAN LAKE	53,000	44,985	22,972	14,021	11,901	6,077	4,670	3,964	2,024
TERROR LAKE	81,500	67,905	33,944	28,397	23,660	11,827	8,218	6,847	3,422
TYEE LAKE	40,000	33,399	16,736	19,569	16,340	8,188	6,522	5,445	2,728
ANCH-FBNKS INTERTIE	76,000	68,529	36,846	746	673	361	280	253	136
CRAIG-KLAWOCK INTERTIE	2,000	1,823	1,005	7,117	6,487	3,577	2,372	2,162	1,192
TYEE-KAKE INTERTIE	5,800	5,111	2,716	32,222	28,395	15,093	10,603	9,343	4,966
KOBUK-SHUNGNAK LINE	200	152	76	2,325	1,770	886	778	592	296
BARROW-ATKASOOK LINE	7,062	5,377	2,692	10,088	7,682	3,846	3,017	2,298	1,150
GREEN LAKE	60,618	54,959	21,311	24,247	21,983	8,524	7,802	7,074	2,743
RURAL WASTE HEAT	655	1,645	637	1,048	2,632	1,020	350	879	341
BLACK BEAR LAKE	2,000	5,023	1,947	5,000	12,557	4,869	1,666	4,185	1,623
CHESTER LAKE	1,000	2,511	973	3,030	7,610	2,951	1,011	2,539	984
CHAKACHAMNA LAKE	1,000	2,511	973	9	24	9	3	9	3
GRANT LAKE	1,000	2,511	973	1,628	4,090	1,586	542	1,363	528
BETHEL REG. STUDY	1,000	2,511	973	778	1,956	758	285	716	278
POWER CREEK	700	1,758	681	688	1,730	670	220	554	214
SNETTISHAM	4,500	4,101	2,261	548	500	275	230	210	116
SUSITNA STUDY	18,100	45,458	17,627	177	446	173	87	218	84
TAZIMNA LAKE	2,000	5,023	1,947	5,714	14,351	5,565	1,846	4,638	1,798
RURAL FEAS. STUDIES.	5,600	14,064	5,453	2,568	6,451	2,501	855	2,149	833
RURAL VIL. RECONNAISSANCE	560	1,406	545	194	487	189	64	162	63
HOONAH-JUNEAU INTERTIE	996	907	500	3,112	2,837	1,564	1,471	1,341	739
PELICAN	42	105	40	552	1,387	538	233	586	227
LAKE ELVA	4,500	11,301	4,382	6,818	17,123	6,640	2,250	5,650	2,191
NONDALTON TRANS. SYSTEM	961	2,413	935	17,472	43,882	17,016	5,652	14,197	5,505
AEL&P	7,000	6,575	2,845	952	894	386	400	376	162
UNALASKA GEOTHERMAL	5,000	12,557	4,869	11,627	29,203	11,324	3,843	9,652	3,742
VILLAGE ELECTRIFICATION	6,524	16,385	6,353	1,910	4,797	1,860	636	1,598	619
AVEC POWER COST ASSIST.	10,134	21,503	6,322	2,815	5,973	1,756	723	1,535	451
PORT LIONS COST ASSIST.	448	946	276	6,588	13,918	4,067	2,083	4,402	1,286
KOTZEBUE COST ASSISTANCE	271	662	244	459	1,123	414	132	324	119
TLINGIT-HAIDA COST ASSIST	1,741	3,802	1,174	2,408	5,258	1,624	824	1,801	556
UNALAKLEET COST ASSIST.	280	614	191	1,352	2,967	922	455	998	310
MCGRATH COST ASSISTANCE	275	599	184	2,391	5,210	1,603	774	1,687	519
NOME COST ASSISTANCE	148	368	140	195	486	185	65	162	61
TOTALS	672,015	661,232	299,386	4,945	4,866	2,203	1,823	1,794	812

HYDRO FINANCING ANALYSIS - SB 26 (HOUSE FINANCE DRAFT)

PARAMETERS USED IN ANALYSIS: WITHOUT SUSITNA CONSTRUCTION

STATE RETURN ON HYDRO INVESTMENTS CONSIDERED AS CONVENTIONAL LOANS: 5 %

PREPARED BY
HOUSE RESEARCH AGENCY
JUNE 1, 1981

'EQUITY RETURN' STATE HYDRO INVESTMENTS ARE REPAID:
AT RATE OF 5% OF INITIAL EXPENDITURE UNTIL JULY 1, 1986
AT RATE OF 10% OF INITIAL EXPENDITURE THEREAFTER IF $5 BILLION HAS NOT BEEN APPROPRIATED TO POWER FUND BY JULY 1, 1986
AT RATE SUFFICIENT TO OFFSET COSTS OF OPER., MAINT., AND EQUIP. REPLACEMENT AFTER TOTAL POWER PROJECT OUTPUT EXCEEDS 500 MEGAWATTS

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INFLATION RATE 10.24 %
TOTAL NUMBER OF CONSUMERS SERVED BY HYDRO PROJECTS: 135875
TOTAL POPULATION SERVED BY HYDRO PROJECTS: 368442

SUMMARY OF ALL POWER PROJECTS AND COST ASSISTANCE PROGRAM SB 26 (HOUSE FINANCE DRAFT)

	EXPENDITURE	NET ANNUALIZED COST TO STATE	PRESENT VALUE NET ANNUALIZED COST TO STATE	EXPENDITURE PER CONSUMER	NET COST PER CONS.	PRESENT VALUE NET COST PER CONS.	EXPENDITURE PER CAPITA	NET COST PER CAPITA	PRESENT VALUE NET COST PER CAPITA
FY 1982	332,878,000	36,574,121	32,828,931	2,449	269	241	903	99	89
FY 1983	111,490,000	46,746,850	37,663,271	820	344	277	302	126	102
FY 1984	138,866,000	64,777,610	46,846,101	1,022	476	344	376	175	127
FY 1985	81,285,000	66,155,754	42,943,654	598	486	316	220	179	116
FY 1986	1,243,000	56,324,202	32,817,785	9	414	241	3	152	89
FY 1987	1,214,000	25,670,127	13,425,333	8	188	98	3	69	36
FY 1988	1,192,000	25,840,855	12,130,725	8	190	89	3	70	32
FY 1989	1,138,000	26,009,451	10,959,580	8	191	80	3	70	29
FY 1990	1,022,000	26,166,867	9,896,857	7	192	72	2	71	26
FY 1991	901,000	26,312,037	8,932,703	6	193	65	2	71	24
FY 1992	786,000	26,445,501	8,058,664	5	194	59	2	71	21
FY 1993	0	22,645,501	6,194,069	0	166	45	0	61	16
FY 1994	0	26,445,501	6,492,751	0	194	47	0	71	17
FY 1995	0	26,445,501	5,827,893	0	194	42	0	71	15
FY 1996	0	26,445,501	5,231,117	0	194	38	0	71	14
FY 1997	0	26,445,501	4,695,450	0	194	34	0	71	12
FY 1998	0	26,445,501	4,214,636	0	194	31	0	71	11
FY 1999	0	26,445,501	3,783,057	0	194	27	0	71	10
FY 2000	0	26,445,501	3,395,672	0	194	24	0	71	9
FY 2001	0	26,445,501	3,047,955	0	194	22	0	71	8
TOTALS	672,015,000	661,251,887	299,386,216	4,945	4,866	2,203	1,823	1,794	812

HYDRO FINANCING ANALYSIS - SB 26 (HOUSE FINANCE DRAFT)

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INFLATION RATE 10.24 %

SUMMARY OF ALL POWER PROJECTS - SB 26 (HOUSE FINANCE DRAFT)
TOTAL COST TO STATE FOR PERIOD 1992 TO 2001

(THOUSANDS OF DOLLARS)

PROJECT	EXPENDITURE	ANNUALIZED STATE COST	PRES VAL ANNUALIZED STATE COST	EXPEND. PER CONS.	NET COST PER CONS.	PRES VAL NET COST PER CONS.	EXPEND. PER CAP	NET COST PER CAP	PRES VAL NET COST PER CAP
SUSITNA CONSTRUCTION	3,600,000	6,520,942	1,520,049	35,357	64,045	14,929	13,293	24,079	5,612
BRADLEY LAKE	200,000	385,399	122,893	21,431	41,298	13,169	7,977	15,371	4,901
PORT LIONS	1,400	2,746	980	19,718	38,677	13,809	6,511	12,772	4,560
SOLOMON GULCH	68,000	133,382	47,624	33,431	65,576	23,414	11,333	22,230	7,937
SWAN LAKE	53,000	105,935	37,506	14,021	28,025	9,922	4,670	9,336	3,305
TERROR LAKE	81,500	161,630	56,293	28,397	56,317	19,614	8,218	16,298	5,676
TYEE LAKE	40,000	79,399	27,705	19,569	38,845	13,554	6,522	12,946	4,517
ANCH-FBNKS INTERTIE	76,000	155,929	57,687	746	1,531	566	280	575	213
CRAIG-KLAWOCK INTERTIE	2,000	4,123	1,553	7,117	14,672	5,528	2,372	4,890	1,842
TYEE-KAKE INTERTIE	5,800	11,781	4,307	32,222	65,450	23,929	10,603	21,537	7,874
KOBUK-SHUNGNAK LINE	200	382	131	2,325	4,445	1,524	778	1,487	510
BARROW-ATKASOOK LINE	7,062	13,499	4,629	10,088	19,284	6,612	3,017	5,768	1,978
GREEN LAKE	60,618	54,959	21,311	24,247	21,983	8,524	7,802	7,074	2,743
RURAL WASTE HEAT	655	1,645	637	1,048	2,632	1,020	350	879	341
BLACK BEAR LAKE	2,000	5,023	1,947	5,000	12,557	4,869	1,666	4,185	1,623
CHESTER LAKE	1,000	2,511	973	3,030	7,610	2,951	1,011	2,539	984
CHAKACHAMNA LAKE	1,000	2,511	973	9	24	9	3	9	3
GRANT LAKE	1,000	2,511	973	1,628	4,090	1,586	542	1,363	528
BETHEL REG. STUDY	1,000	2,511	973	778	1,956	758	285	716	278
POWER CREEK	700	1,758	681	688	1,730	670	220	554	214
SNETTISHAM	4,500	9,276	3,495	548	1,131	426	230	476	179
SUSITNA STUDY	18,100	45,458	17,627	177	446	173	87	218	84
TAZIMNA LAKE	2,000	5,023	1,947	5,714	14,351	5,565	1,846	4,638	1,798
RURAL FEAS. STUDIES.	5,600	14,064	5,453	2,568	6,451	2,501	855	2,149	833
RURAL VIL. RECONNAISSANCE	560	1,406	545	194	487	189	64	162	63
HOONAH-JUNEAU INTERTIE	996	2,053	773	3,112	6,416	2,417	1,471	3,032	1,142
PELICAN	42	105	40	552	1,387	538	233	586	227
LAKE ELVA	4,500	11,301	4,382	6,818	17,123	6,640	2,250	5,650	2,191
NONDALTON TRANS. SYSTEM	961	2,413	935	17,472	43,882	17,016	5,652	14,197	5,505
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MCGRATH COST ASSISTANCE	275	599	184	2,391	5,210	1,603	774	1,687	519
NOME COST ASSISTANCE	148	368	140	195	486	185	65	162	61
TOTALS	4,272,015	7,803,702	1,967,640	31,440	57,432	14,481	11,594	21,180	5,340

HYDRO FINANCING ANALYSIS - SB 26 (HOUSE FINANCE DRAFT)

WITH SUSITNA CONSTRUCTION

PREPARED BY
HOUSE RESEARCH AGENCY
JUNE 1, 1981

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SUMMARY OF ALL POWER PROJECTS AND COST ASSISTANCE PROGRAM SB 26 (HOUSE FINANCE DRAFT)

	EXPENDITURE	NET ANNUALIZED COST TO STATE	PRESENT VALUE NET ANNUALIZED COST TO STATE	EXPENDITURE PER CONSUMER	NET COST PER CONS.	PRESENT VALUE NET COST PER CONS.	EXPENDITURE PER CAPITA	NET COST PER CAPITA	PRESENT VALUE NET COST PER CAPITA
FY 1982	382,878,000	42,852,903	38,464,766	2,817	315	283	1,039	116	104
FY 1983	161,490,000	59,403,757	47,860,761	1,188	437	352	438	161	129
FY 1984	188,866,000	83,926,660	60,694,379	1,389	617	446	512	227	164
FY 1985	351,285,000	121,072,106	78,591,481	2,585	891	578	953	328	213
FY 1986	266,243,000	147,152,491	85,739,676	1,959	1,082	631	722	399	232
FY 1987	266,214,000	180,373,605	94,334,390	1,959	1,327	694	722	489	256
FY 1988	266,192,000	218,499,806	102,572,505	1,959	1,608	754	722	593	278
FY 1989	266,138,000	257,928,415	108,683,080	1,958	1,898	799	722	700	294
FY 1990	266,022,000	298,903,062	113,051,403	1,957	2,199	832	722	811	306
FY 1991	265,901,000	341,745,299	116,019,499	1,956	2,515	853	721	927	314
FY 1992	265,786,000	386,876,141	117,891,700	1,956	2,847	867	721	1,050	319
FY 1993	265,000,000	430,935,582	117,870,868	1,950	3,171	867	719	1,169	319
FY 1994	265,000,000	513,253,561	126,011,140	1,950	3,777	927	719	1,393	342
FY 1995	265,000,000	569,490,608	125,500,767	1,950	4,191	923	719	1,545	340
FY 1996	265,000,000	632,130,397	125,040,106	1,950	4,652	920	719	1,715	339
FY 1997	265,000,000	703,831,529	124,966,676	1,950	5,179	919	719	1,910	339
FY 1998	0	703,831,529	112,170,088	0	5,179	825	0	1,910	304
FY 1999	0	703,831,529	100,683,871	0	5,179	741	0	1,910	273
FY 2000	0	703,831,529	90,373,843	0	5,179	665	0	1,910	245
FY 2001	0	703,831,529	81,119,561	0	5,179	597	0	1,910	220
TOTALS	4,272,015,000	7,803,702,045	1,967,640,570	31,440	57,432	14,481	11,594	21,180	5,340

Mark

Alaska Regional Energy Association

327 Eagle Street P.O. Box 3-3908 Anchorage, Alaska 99501 (907) 279-2511

May 11, 1981

Hugh Malone
Alaska State Legislature
Pouch V (MS 3100)
Juneau, Alaska 99811

Dear Representative Malone:

I am writing to express my concern on behalf of the Alaska Regional Energy Association (AREA) that rural as well as railbelt energy needs be addressed directly this session. Specifically, the AREA delegates representing the views of fourteen regional non-profit associations have established the passage of the provisions of CSSSHB 9 as their highest legislative priority. We are concerned that in the current legislative climate; that conservation, regional energy planning, village reconnaissance studies and appropriate technology which will afford rural Alaska a measure of energy self-reliance will be swept between the cracks.

Rural energy problems will not be solved by expanding energy bill paying subsidies as a long term solution. This will only aggravate the village dependence on transfer payment programs.

Although we feel that some form of power production cost assistance is warranted, we do not support it as the only solution to rural energy problems. We recommend that Power Production costs assistance not be a contingency within SB 25 and 26. This issue should be dealt with, separately.

Further, we ask that the provisions of House Bill 9 be given at least equal weight to these bills (i.e. SB 25 and 26). These bills will have a major impact on Alaska's energy future we strongly urge that public hearings be held at regional centers around the state. Public input into decisions of this magnitude is absolutely essential. Hopefully, neither SB 25 nor 26

will pass the House until the Senate has approved the provisions for the aforementioned.

I and other AREA delegates will be available for testimony at any appropriate hearings. Please, notify us.

Thank you for your time and consideration.

Sincerely,

Robert Brean, Chairman
Alaska Regional Energy Association

PLEASE NOTE: THE PRECEDING PAGES WERE TREATED AS A UNIT IN THE ORIGINAL DOCUMENT.

Jim Sarby

4/8/81

Gov's amendments tie large & small producers together

~~Some elements~~

Policy position - equity

Make grants available to all power producers
($2500 per capita)

Market tests should be preserved

debt financing w/restructured payback

equity participation is available to alt. power producers
they can receive equity
but service areas must overlap (utility v. private)
Decision on who gets it will be made by APUC
+ will be able to buy & sell power
— AFA/APUC will award grants to most efficient producer

equity for capital costs only

Would restructure alt. energy loan fund
up to $100K
AIDA rev. bond rate
90% of project cost
75% of useful life - repayment schedule

(don't need equity grant)

HB461

Co-generation ~~equity~~

1 equity can only pay for actual power generation
2 → debt restructuring
~~3~~

Conservation/Weatherization - continue loan & audit program
reimbursement at 90% (landlord pays 10%)
audit program should be unlimited

Weatherization - Alaskanize (adm. by dept)
raise income limit,
audits free, $2200 upt for weath.

Business loans would continue to handle loans / subs. for credit checks

(1) Gov can use veto + OBM to get $2500 grant

(2) split out feasibility study
(3) get rid of authority → administration

(4) administrative changes

→ equity in incentives

STATE OF ALASKA

DEPARTMENT OF COMMERCE & ECONOMIC DEVELOPMENT

DIVISION OF ENERGY & POWER DEVELOPMENT

JAY S. HAMMOND
GOVERNOR

7TH FLOOR MACKAY BLDG.
338 DENALI STREET
ANCHORAGE, ALASKA 99501
PHONE: (907) 276-0508

April 23, 1981

Joyce Roloff
Legislative Information Office
Room 30, Capitol Bldg.
Juneau, AK 99811

Dear Ms. Roloff:

Per your request attached is a copy of the revised working paper, The Potential for Hydroelectric Power Meeting Alaska's Electrical Energy Demand Between 1980-2004. It should be definitely noted that this working paper is very rough in nature and based upon debatable assumptions and therefore, its conclusions are still preliminary and should not be used for more than a general indication of three possible scenarios. Due to a mathematical error contained in the initial document prepared for Representative Gardiner, this report has been revised.

Should you require any additional information, please do not hesitate to contact me.

Sincerely,

Clarissa M. Quinlan
Director

Enclosure:

cc: Charles Webber
Commissioner

CMQ:vlr

April 23, 1981

R-E-V-I-S-E-D

PRELIMINARY WORKING PAPER

The Potential for Hydroelectric Power Meeting Alaska's Electrical Energy Demand Between 1980 & 2004

At the request of Representative Terry Gardiner, the Division of Energy & Power Development has prepared the attached information.

The demand and installed hydroelectric cost estimates are for illustrative purposes only and are not to be construed as representing final or official division estimates.

Included are very general comparisons of three energy demand scenarios representing high, medium and low growth rates. It was assumed (although not accurately) that all additional electric demand would be met by hydropower plants. A 5% inflationary factor was applied and all costs are reflected in 1981 dollars.

The application of a reserve margin was used only to illustrate its impact on total capacity and costs. An attempt was also made to be conservative in estimating the potential for substituting hydrogenerated electricity for traditional heating fuels. For example, only portions (High 30%, Medium 20%, Low 10%) of anticipated new space heating requirements were assumed to substitute electricity for petroleum or natural gas fuels. No additional demand was assumed to be met through such a substitution for the present to the 1984 period.

Other fuel substitution potentials, such as electric cars and, in the long term, hydroelectric produced hydrogen as a substitute transportation, heating and cooking fuel were not included.

The very rough and preliminary nature of this document cannot be overstated. It is for illustration only. It does, however, point out the value for similar in-depth analysis on a regional level.

1979 Alaska Energy End-Use - Billion Btu's

Electricity	-	12,539.2891
Heating Fuel		
- Residential	-	20,949.1300
- Commercial	-	5,079.5400
Natural Gas (heating)	-	16,105.000

ASSUMPTIONS

° Average Annual Electrical Demand Growth Rate

	1979-84	1985-89	1990-94	1995-99	2000-04
High Demand*	14.2%	6.9%	6.8%	7.1%	3.3%
Medium Demand**	7.4	5.2	5.9	4.6	4.6
Low Demand	2.5	2.0	1.5	1.0	.5

* Alaska Power Administration 1978 - Railbelt High Demand
** Alaska Power Administration 1981 - Statewide Medium Growth

° All incremental electrical demand will be met by hydroelectric power.

° All cost estimates in 1981 dollars with 5% inflation rate.

° Space heating fuel substitution rate applied 30% for high, 20% for medium and 10% for low to new annual space heating demand projected at 2.4% which coincides with projected population increase.

° The use of an average reserve margin is not possible in a very preliminary statewide estimates such as this. The 15% reserve margin noted is only for illustrative purposes as a means of reflecting its impact on total costs.

° Load factor assumed 0.05.

° Energy conversion efficiencies = 100%

° Conversion Factor: Kwh = Btu x .000293018

° Cost per installed megawatt = $2.0 million/MW

Existing Projects - 1979 Dollars
Cost per Megawatt

Susitna	-	$1.545 million/MW
Snettisham	-	$ .944
Green Lake	-	$2.818
Swan Lake	-	$3.895
Tyee	-	$2.683
Solomom Gulch	-	$2.666
Terror Lake	-	$2.500

ELECTRICITY

	HIGH			MEDIUM			LOW		
	Increase Increment (Billions of Btu's/Yr)	New Capacity (MW)	Cost Billions	Increase Increment (Billions of Btu's/Yr)	New Capacity (MW)	Cost Billions	Increase Increment (Billions of Btu's/Yr)	New Capacity (MW)	Cost Billions
1979-1984	11,816	790.4	$2.02	5,379	359.8	$0.92	1,648	110.2	$0.28
1985-1989	9,644	645.1	2.10	5,169	345.8	1.13	1,477	98.8	0.32
1990-1994	13,242	885.8	3.68	7,663	512.6	2.13	1,210	80.9	0.34
1995-1999	19,327	1,292.9	6.86	7,754	518.7	2.75	861	57.6	0.31
2000-2004	11,734	784.9	5.32	9,706	649.3	4.40	448	30.0	0.20
		4,399.1	$19.98		2,386.2	$11.33		377.5	$1.45
	15% Reserve Margin								
		5,059.0	22.98		2,744.1	13.03		434.1	1.67
	20% Reserve Margin								
		5,278.9	23.98		2,863.4	13.60		453.0	1.74

SPACE HEATING

	HIGH			MEDIUM			LOW		
	Increase Increment (Billions of Btu's/Yr)	New Capacity (MW)	Cost Billions	Increase Increment (Billions of Btu's/Yr)	New Capacity (MW)	Cost Billions	Increase Increment (Billions of Btu's/Yr)	New Capacity (MW)	Cost Billions
1979-1984	-	-	-	-	-	-	-	-	-
1985-1989	1,834.26	122.70	$0.40	1,222.84	81.80	$0.27	611.4	40.90	$0.13
1990-1994	2,065.20	138.15	0.57	1,376.80	92.10	0.38	688.40	46.05	0.19
1995-1999	2,325.21	155.54	0.83	1,550.14	103.70	0.55	775.07	51.85	0.28
2000-2004	2,617.95	175.13	1.19	1,745.30	116.75	0.79	872.65	58.38	0.40
		591.52	$2.29		394.35	$1.99		197.18	$1.00

YEAR 2004

	HIGH		MEDIUM		LOW	
	Add'l Capacity (MW)	Installed Cost ($Billion)	Add'l Capacity (MW)	Installed Cost ($Billion)	Add'l Capacity (MW)	Installed Cost ($Billion)
Traditional Electricity	4,399.1	$19.98	2,386.2	$11.33	377.5	$1.45
Space Heating Substitution	591.52	2.99	394.35	1.99	197.18	1.00
Total	4,990.62	$22.97	2,780.55	$13.32	574.68	$2.82
Total w/15% Reserve	5,739.21	$26.42	3,197.63	$15.32	660.88	$2.82

April 23, 1981

R-E-V-I-S-E-D

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The application of a reserve margin was used only to illustrate its impact on total capacity and costs. An attempt was also made to be conservative in estimating the potential for substituting hydrogenerated electricity for traditional heating fuels. For example, only portions (High 30%, Medium 20%, Low 10%) of anticipated new space heating requirements were assumed to substitute electricity for petroleum or natural gas fuels. No additional demand was assumed to be met through such a substitution for the present to the 1984 period.

Other fuel substitution potentials, such as electric cars and, in the long term, hydroelectric produced hydrogen as a substitute transportation, heating and cooking fuel were not included.

The very rough and preliminary nature of this document cannot be overstated. It is for illustration only. It does, however, point out the value for similar in-depth analysis on a regional level.

1979 Alaska Energy End-Use - Billion Btu's

Electricity	-	12,539.2891
Heating Fuel		
- Residential	-	20,949.1300
- Commercial	-	5,079.5400
Natural Gas (heating)	-	16,105.000

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Law

Original sponsors: Kerttula, Dankworth, Ziegler, et al

IN THE SENATE BY THE RESOURCES COMMITTEE

HOUSE CS FOR CS FOR SPONSOR SUBSTITUTE FOR SENATE BILL NO. 25 (Resources)

IN THE LEGISLATURE OF THE STATE OF ALASKA

TWELFTH LEGISLATURE - FIRST SESSION

A BILL

For an Act entitled: "An Act relating to the Alaska Power Authority, amending the Alaska Power Authority Act, and providing for the investment of money appropriated for power projects of the Alaska Power Authority; and providing for an effective date."

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

* Section 1. AS 44.83 is amended by adding new sections to read:

ARTICLE 8. ENERGY PROGRAM FOR ALASKA.

Sec. 44.83.400. PROGRAM ESTABLISHED. (a) The energy program for Alaska is established. The program shall be administered by the authority.

(b) The energy program for Alaska is a program by which the authority may acquire or construct power projects with money appropriated by the legislature to the power development fund established in AS 44.83.410. A power project may be acquired or constructed as part of the energy program for Alaska only if the project is submitted to and approved by the legislature in accordance with procedures set out in AS 44.83.177 - 44.83.187.

Sec. 44.83.410. POWER DEVELOPMENT FUND ESTABLISHED. (a) A power development fund is established in the Alaska Power Authority to carry out the purposes of the energy program for Alaska (AS 44.83.400 - 44.83.500).

(b) The fund includes

~~(1)~~ all money appropriated to it by the legislature; ~~and~~

~~(2) interest earned by investment of money in the fund by the Department of Revenue.~~

Sec. 44.83.420. USE OF FUND BALANCE. (a) The fund may be used by the authority to provide money for

(1) reconnaissance and feasibility studies and power project finance plans prepared under AS 44.83.177 - 44.83.181;

(2) the cost of a power project, including but not limited to costs of acquiring necessary licenses, preparing engineering designs obtaining land, and constructing the power project; and

(3) the power production cost assistance fund (AS 44.83.162)

(b) Money in the fund may be used under (a) of this section only for a power project which

(1) meets the revenue requirements of AS 44.83.470; and

(2) operates or will operate

(A) on renewable energy resources, including but not limited to hydroelectric power, wind, biomass, tidal or solar energy, or a method which uses temperature differentials or other physical properties of the ocean;

(B) on coal or peat;

(C) on energy derived from waste heat from thermal generating plants; or

(D) on fossil fuel if none of the other resources or fuels listed in this subsection are economically feasible.

Sec. 44.83.430. INVESTMENT OF FUND. The Department of Revenue shall invest money in ~~the balance of~~ the fund ~~which exceeds the amount the authority determines is necessary to meet requirements of AS 44.83.420 during the current fiscal year. An investment by the Department of Revenue under this subsection shall be made~~ in accordance with AS 37.10.070 and 37.10.075. The Department of Revenue shall provide money in the fund to the authority ~~when~~ after the amount of an expenditure for a project is determined

Sec. 44.83.440. ALLOTMENT TO PROJECTS. (a) The authority shall maintain records of power project allocations from the fund for each power project

(1) approved in accordance with AS 44.83.185; and

(2) for which an allocation is made from an appropriation made by the legislature without specifying an appropriation to a project.

(b) Income earned from investment of money appropriated to the fund shall be deposited in the general fund and may be annually ~~allotted by the authority to power projects for which appropriations have been made by law. The allotment shall be based on the amount of investment income earned during each state fiscal year during or after which the legislature appropriated money to the fund. An allotment of income under this subsection shall be made to each power project for which a specific appropriation has been made in proportion to the unexpended amount appropriated for that project as a percentage of the total amount appropriated by the legislature to the fund.~~ appropriated to the fund by the legislature.

Sec. 44.83.450. REAPPROPRIATION OF FUND BALANCE. (a) If a power project designated by the legislature by law is not constructed, the amount appropriated to it may be reappropriated to other power projects by the legislature.

(b) The legislature may reappropriate money under (a) of this section only for a power project which is economically feasible under AS 44.83.181(b) and only if the project will serve the market area that would have been served by the power project designated by the legislature and not constructed.

Sec. 44.83.460. LAPSE OF EXCESS APPROPRIATIONS. If at the end of construction of a power project appropriations for the power project exceed the amount required for construction of it, the excess lapses

(4) the rate of return specified in AS 44.83.490.

into the general fund.

Sec. 44.83.470. REVENUE REQUIREMENTS. The authority may not use money in the fund for a power project unless, after making a feasibility study under AS 44.83.480, the authority determines that, after construction, operation of the power project will provide revenue sufficient to cover

(1) operation, maintenance, and equipment replacement costs of the power project;

(2) debt service costs associated with the power project; ~~and~~

(3) the costs of safety inspections and investigations of the power project by the authority; and

Sec. 44.83.480. OPERATION OF POWER PROJECT. (a) A power project which is acquired or constructed as part of the energy program for Alaska is owned by the state and shall be administered by the authority.

(b) When a power project has been acquired or constructed by the authority, the project may be operated for the authority under a contract between a qualified utility and the authority.

Sec. 44.83.490. SALE OF POWER FROM POWER PROJECT. ~~(a) The authority shall sell power produced from power projects acquired or constructed under the energy program for Alaska. A utility which purchases power produced by a power project of the authority shall agree with the authority~~

~~(1) to give preference in the sale of power at retail to all classes of consumers of power except industrial consumers;~~

~~(2) to charge industrial consumers of power a rate determined by the authority in accordance with (d) of this section.~~

(a) The authority shall establish a wholesale power rate structure applicable to sales of power to its customers at the busbar of the power project. ~~If, by July 1, 1986, the legislature has not appro-~~

(A) operation, maintenance, and equipment replacement costs of the power project;

(B) debt service costs of the power project; DRAFT Law

(C) safety inspections and investigations of the power project by the authority; and

(D) a rate of return on the amount invested in the power project by the authority of five percent.

~~priated at least $5,000,000,000 to the power development fund, the authority shall, beginning on that date, establish and maintain a wholesale power rate for each power project which rate will return to the authority, on an annual basis, 10 percent of the amount appropriated to the power development fund. In addition,~~ the wholesale power rate shall be established as follows:

(1) until June 30 of the fiscal year in which the production capacity of all power projects acquired or constructed by the authority under the energy program for Alaska exceeds 500 megawatts, the authority ~~may~~ shall establish and maintain a wholesale power rate for each power project which provides annual revenue sufficient to pay ~~rate will return to the authority, on an annual basis, not less than five percent of the amount which the authority has invested in the power project from the fund;~~

(2) beginning July 1 of the first fiscal year following the date on which the production capacity of all power projects acquired or constructed by the authority under the energy program for Alaska exceeds 500 megawatts, the authority shall establish and maintain a single wholesale power rate applicable to all power projects which it has acquired or constructed under the energy program for Alaska; the wholesale power rate shall be computed by the authority annually, and shall equal the rate which the authority estimates is necessary to produce revenue which is sufficient to pay

(A) operation, maintenance, and equipment replacement costs of the power projects;

(B) debt service costs of the power projects;

(C) safety inspections and investigations of the power projects by the authority; and

(D) a rate of return on all amounts invested in the power projects by the authority of three percent. ~~annual costs of the power production cost assistance program (AS 44.83.162);~~

(d) The authority shall transmit the money which it receives from

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Law

The authority shall annually adjust the rate of return specified in (a)(1)(D) and (a)(2)(D) of this section according to changes in the consumer price index for the state compiled by the Bureau of Labor Statistics, United States Department of Labor. The index for November 1980 is the reference base index.

sales of power at rates determined under (b) of this section to the commissioner of revenue for deposit in the state general fund.

(g) ~~The legislature may appropriate to the authority an amount not to exceed five percent of the amount determined under (b)(1) and (2) of this section which the commissioner of revenue estimates will be deposited into the general fund for paying costs of operating and maintaining power projects which it acquired or constructed as part of the energy program for Alaska. The balance of the amount determined under (b)(1) and (2) of this section which the commissioner of revenue estimates will be deposited into the general fund may be appropriated by the legislature to the power production cost assistance fund. The estimates of amounts required for each of the appropriations shall be provided to the governor in the budget submitted under AS 37.07.~~

~~(e) A rate for an industrial consumer under (a)(2) of this section~~

~~(1) may exceed the wholesale power rate determined under (b) of this section;~~

~~(2) may not be less than the rate charged residential consumers.~~

(f) The legislature may, by law, annul or change the wholesale power rate for sales of power which the authority adopts under (b) of this section.

(e) The authority shall estimate the appropriations necessary for the purposes specified in (a)(1)(A)-(C) and (a)(2)(A)-(C) of this section. The estimates required by this subsection shall be provided to the governor in the budget submitted under AS 37.07

Sec. 44.83.500. DEFINITIONS. In AS 44.83.400 - 44.83.500,

(1) "busbar" means the substation which serves as the delivery point from the generation and transmission system of the authority to the transmission and distribution system of the utility;

(2) "fund" means the power development fund;

~~(3) "industrial consumer" means a customer of a utility which customer has a peak power demand in excess of 500 kilowatts per month and uses the power principally for~~

~~(A) manufacturing;~~

~~(B) pipeline transportation;~~

~~(C) the recovery or processing of minerals;~~

~~(D) the processing of timber, agricultural, or seafood products or their by-products; or~~

~~(E) the operation of facilities owned by the federal government;~~

3
(4) "qualified utility" means any of the following which the authority determines is capable of operating and maintaining a power project of the kind and magnitude which has been constructed or is to be constructed to provide power for a market area:

(A) a corporation organized under the Alaska Nonprofit Corporation Act (AS 10.20);

(B) an electric cooperative organized under the Electric and Telephone Cooperative Act (AS 10.25);

(C) a public utility which generates, transmits, or distributes electrical service to the public; and

(D) a regional electrical authority (AS 18.57).

* Sec. 2. AS 44.83.030 is amended to read:

Sec. 44.83.030. MEMBERSHIP OF THE AUTHORITY. [(a)] The authority shall consist of the following directors:

(1) <u>two</u> [FOUR] directors at large to be appointed by the governor and confirmed by the legislature;

(2) <u>three persons appointed by the governor from among the heads of ~~the principal departments~~ state agencies of the executive branch of the state government</u> [THE COMMISSIONER OF COMMERCE AND ECONOMIC DEVELOPMENT

(b) THE COMMISSIONERS OF COMMUNITY AND REGIONAL AFFAIRS, NATURAL RESOURCES, TRANSPORTATION AND PUBLIC FACILITIES, AND REVENUE SHALL HAVE THE RIGHTS AND PRIVILEGES OF DIRECTORS EXCEPT FOR THE RIGHT TO VOTE AND

MAY NOT BE CONSIDERED FOR PURPOSES OF QUORUM OR VOTING].

* Sec. 3. AS 44.83.040 is amended to read:

Sec. 44.83.040. OFFICERS AND QUORUM. The directors [DIRECTOR] shall elect one of their number [THE DIRECTORS AT LARGE] as chairman and may elect other officers they determine desirable. The powers of the authority are vested in the directors, and three directors of the authority constitute a quorum. Action may be taken and motions and resolutions adopted by the authority at a meeting by the affirmative vote of at least three directors. The directors of the authority serve without compensation, but they shall receive the same travel pay and per diem as provided by law for board members.

* Sec. 4. AS 44.83.045(a) is amended to read:

(a) The directors at large shall [MUST] be residents and qualified voters of Alaska and shall comply with the requirements of AS 39.50 (conflict of interests). The directors at large shall serve overlapping four-year terms. [THE FOUR ORIGINAL DIRECTORS AT LARGE HAVE TERMS OF ONE, TWO, THREE, AND FOUR YEARS, RESPECTIVELY.]

* Sec. 5. AS 44.83.080(16) is amended by adding new subparagraphs to read:

(G) an appropriation for a power project acquired or constructed under the energy program for Alaska (AS 44.83.400 - 44.83.500);

(H) appropriations for the power production cost assistance fund (AS 44.83.162), and for operation and maintenance of power projects developed under the energy program for Alaska (AS 44.83.400 - 44.83.500).

* Sec. 6. AS 44.83.090(a) is amended to read:

(a) The authority shall, in addition to the other methods which it may find advantageous, provide a method by which municipal electric,

rural electric, cooperative electric, or private electric utilities and regional electric authorities, or other persons authorized by law to engage in the distribution of electricity may secure a reasonable share of the power generated by a project, or any interest in a project, or for any right to the power and shall sell the power or cause the power to be sold at the lowest reasonable prices which cover the full cost of the electricity or services, including capital and operating costs, debt coverage as considered appropriate by the authority, and other charges that may be authorized by this chapter. Except for a contract entered into under AS 44.83.400 - AS 44.83.500, a [A] contract for the sale, transmission and distribution of power generated by a project or any right to the capacity of it shall provide:

(1) for payment of all operating and maintenance expenses of a project and costs of renewals, replacements and improvements of it;

(2) for interest on and amortization charges sufficient to retire bonds of the authority issued for the project and reserves for them, plus a debt service coverage factor as may be determined by the authority to be necessary for the marketability of its bonds;

(3) for monitoring of the project by the authority or its agents;

(4) for full and complete disclosure to the authority of all factors of cost in the transmission and distribution of power, so that rates to any persons may be fixed initially in the contract and may be adjusted from time to time on the basis of true cost data;

(5) for periodic revisions of the service and rates to persons on the basis of accurate cost data obtained by the accounting methods and systems approved by the directors and in furtherance and effectuation of the policy declared in this chapter;

(6) for the cancellation and termination of a contract upon

violation of its terms by any person;

(7) for security for performance as the authority may consider practicable and advisable, including provisions assuring the continuance of the distribution and transmission of power generated by a project and the use of its facilities for these purposes; and

(8) other terms not inconsistent with the provisions and policy of this chapter as the authority may consider advisable.

* Sec. 7. AS 44.83 is amended by adding a new section to read:

Sec. 44.83.105. BONDS FOR POWER PROJECTS UNDER THE ENERGY PROGRAM FOR ALASKA. The authority shall borrow money and shall issue its bonds on which the principal and interest are payable exclusively from money derived from the power project financed with the proceeds of the bonds for a power project financed under AS 44.83.400 - 44.83.500 from the power development fund if

(1) appropriations to the power development fund for the power project, and interest earned on those appropriations, are insufficient to cover the cost of acquiring or constructing the power project; and

(2) the amount of interest which the authority will pay on its bonds is not more than alternative costs of securing money to pay for the acquisition or construction of the power project.

* Sec. 8. AS 44.83.181(b) is amended by adding a new paragraph to read:

(5) a recommendation as to whether the proposed project is economically feasible; a power project is "economically feasible" if the authority determines that the total costs of the power project are cheaper for the estimated life of the project than other alternatives; in making a determination of economic feasibility under this paragraph, the authority shall evaluate the estimated life of the power project and its alternatives applying the following standard factors:

(A) a general inflation factor for construction and operating costs ~~of seven percent annually~~;

(B) an interest rate ~~of 10 percent~~ for money borrowed for the power project; and

(C) an escalation factor for measuring the comparative cost of oil, gas or coal; ~~the rate to be applied for oil is 11 percent annually, and~~ the rate shall be applied to the fuel cost on the date of determination of economic feasibility.

* Sec. 9. AS 44.25.020 is amended by adding a new paragraph to read:

(5) invest and manage the balance of the power project development fund in accordance with AS 44.83.430.

* Sec. 10. APPLICABILITY OF ACT TO DIRECTORS. (a) The terms of office of all members of the Board of Directors of the Alaska Power Authority serving on the effective date of this Act terminate on the effective date of this Act.

(b) The governor shall appoint two members at large. When making his appointments under this subsection, the governor shall specify the length of the term of office of each member he appoints. Of the members at large first appointed by the governor under this subsection,

(1) one member shall serve a two-year term;

(2) one member shall serve a four-year term.

* Sec. 11. This Act takes effect immediately in accordance with AS 01.-10.070(c).

TELECOPY COVER SHEET

TO: ALL MEMBERS HOUSE FINANCE COMMITTEE PHONE: 465-3706

FROM: KODIAK I.S. BOROUGH SCHOOL DIS. PHONE: 486-3131

INSTRUCTIONS: _____

RECEIVED: DATE: 4/29/81 TIME: 1:05 p.m.

SENT: DATE: 4/29/81 TIME: 1:32 p.m.

BY: (YOUR OFFICE AND PHONE NO.)

DISPOSAL OF ORIGINAL: _____ THROW AWAY

_____ HOLD FOR PICK UP

NUMBER OF PAGES: 1 (NOT COUNTING THIS COVER SHEET)

KODIAK ISLAND BOROUGH SCHOOL DISTRICT
P.O. BOX 886
KODIAK, ALASKA 99615
TELEPHONE: (907) 486-3131

RESOLUTION #801-1

WHEREAS, we support the philosophy of energy efficiency, and

WHEREAS, hydro-power will result in more cost effective educational operation at many of our school sites, and

WHEREAS, we agree with those who believe that State revenues should be used to relieve the cost of living burden of the local citizen, and

WHEREAS, one place that this can occur is through lower costs of educational facilities, now

THEREFORE, BE IT RESOLVED that we urge passage of Senate Bills 25 and 26 as passed by the Senate on March 10, 1981, which will support hydro projects currently ready for construction, and further will provide for hydro development studies in other communities where there is potential of producing power more economically with a hydro facility.

1-28-81
Date

Louise Collins
President, Board of Education
Kodiak Island Borough School District

Approved by Board at Regular Meeting
of April 13, 1981

Net Opportunity Cost to State for Financing an $87 Million Capital Improvement with Various User Repayment Provisions ($ Millions)

Cash Flow to State

	Annual Payment (Nominal Dollars)			Total Value of Payments over Project Life (1981 Dollars)[1]		
	30 year	50 year	100 year	30 year	50 year	100 year
No Principal or Interest Repayment	0	0	0	0	0	0
5% "Equity Return"	4.35	4.35	4.35	60	89	220
10% "Equity Return"	8.70	8.70	8.70	120	178	440
Principal plus 5% Interest	5.66	4.77	4.38	78	98	221
Principal plus 12% Interest	10.80	10.48	10.44	149	214	527

Opportunity Cost

Annual Opportunity Cost (Nominal Dollars)[2]			Total Opportunity Cost (1981 Dollars)[3]		
(10.44)	(10.44)	(10.44)	(149)	(214)	(527)

Net Cost to State[4]

	Annual Cost (Nominal Dollars)			Total Cost (1981 Dollars)		
No Principal or Interest Repayment	(10.44)	(10.44)	(10.44)	(149)	(214)	(527)
5% "Equity Return"	(6.09)	(6.09)	(6.09)	(89)	(125)	(307)
10% "Equity Return"	(1.74)	(1.74)	(1.74)	(29)	(36)	(87)
Principal plus 5% Interest	(4.78)	(5.67)	(6.06)	(71)	(116)	(306)
Principal plus 12% Interest	.36	.04	0	0	0	0

[1] Annuity value of payments discounted at the assumed inflation rate of 10%.
[2] 12% interest on $87 million
[3] $87 million principal plus 12% annual interest compounded over project life with future value discounted to 1981 dollars at the inflation rate
[4] Opportunity cost less cash flow

Prepared By:
Legislative Finance
4-27-81

WHILE IN SESSION:
POUCH V
JUNEAU, ALASKA 99811
(907)465-4925

HOME:
BOX K - COLLEGE
FAIRBANKS, ALASKA 99708
(907)456-2037

BRIAN ROGERS

Alaska State Legislature

29 April 1981

TO: Rep. Fred Zharoff
House Resources Committee

FROM: Rep. Brian Rogers

RE: Energy Financing

I have had a chance to review the draft HCS for SS for SB 25 (Resources) which will be before the Resources Committee shortly. I personally have a number of problems with the bill and wish to point out to you specific areas of concern relating to rural energy needs.

Although this bill has been proposed as a compromise financing plan, it appreas to me to set up an extremely inequitable method of distributing the state's wealth and, I believe, offers almost nothing for the rural areas of the state where the energy needs are most critical.

The bill, as designed, sets up a new fund in the Power Authority -- the power development fund. Money appropriated to it would then be used by the authority to construct power projects as capital projects of the state. The definition of an "economically feasible" project (p. 10) virtually mandates that these projects be hydroelectric unless hydroelectric resources are not available in a given area.

Once a project is complete, a wholesale power rate would be set to recover at least 5% of the capital cost per year. To use an example, the Tazimina project, if it costs $123 million (the APA estimate), the first year would be required to pay $6.15 million. Even if all 7000 residents of the Bristol Bay region were tied into Tazimina power, that would require an average individual payment of $879 that year, plus the costs of distribution, for electricity.

Only after 800 MW of power were on-line through grants from the fund whould an equalized power rate be established for all consumers from the projects. (800 MW would not be on-line until at least 1999 or completion of the second stage of Susitna; this provision guarantees that Susitna would be built.) This equalized rate would not include any consumers except those of the state-owned projects. And not until that time would the legislature be authorized to appropriate money being paid from the state-owned projects to the power production cost assistance fund. This means:

1) Those who don't receive power grants receive nothing under the program until 1999 or later.

2) They may receive nothing even then because all funds, including those for power production cost assistance, must still be appropriated by the legislature.

3) The consumers from the state-owned projects would understand that their electric bills would be used to pay subsidies to the bush, without understanding that their own projects were paid for by grants. Implications from this are particularly troubling, as it would clearly pit urban residents against rural.

The bill goes further, to allow the legislature to "annul or change" the wholesale power rates adopted by the authority in 1999, in effect saying that once Susitna is built, electricity for everyone who's on-board at that time could be given away for free, if the then-legislature decided to do so.

The campanion appropriation, HCS for CS for SB 26 (Finance) will not be again considered by the Resources Committee, but I hope that you will look at it together with SB 25. Although on the face of it it appears to include considerable money for rural areas, please note that the $40 million identified for "power projects in rural areas" (Sec. 17) is appropriated to the power project fund, not the new power development fund. The power project fund is the existing loan fund , which means that the rural areas are in line for loans while others enjoy grants. In effect, SB 25 sets up two separate funds - a grant fund and a loan fund -- with separate standards and criteria, and separate constituencies.

I believe that the version of SB 26 which passed out of Resources Committee is far more equitable than the new finance draft, in terms of the mix of projects included, the areas benefitted and the consistency of financing methods.

The State of Alaska, as you well know, badly needs an energy program. However, to adopt one as single-minded, inequitable, and with such far-reaching ramifications as the one propoosed in SB 25 would clearly not serve the best interests of all Alaskans. I urge you to consider the proposal closely and join me in working for an energy program which benefits all Alaskans.

cc: Bush Caucus Members

TEK MEMBER ALLOCATIONS

DISTRICT	proposed Finance CSSB26	Resources CSSB26
(1)	28.5	34.5
(2)	50.8	61.3
(3)	52.5	52.5
(4)	6.25	9.1
(5)	68.0	29.0
(6)	3.9	4.2
(7-12)	3.9	4.1
(13)	~~6.4~~ 24.4	~~31.2~~ 5.6
(14)	89.2	105.6
(15)	5.0	5.0
(16)	7.0	4.5
(17)	5.5	5.4
(18)	5.0	.5
(19)	8.9	4.7
(20)	~~33.9~~	4.7
(21)	5.2	2.5
(22)	5.0	3.6

Notes: Both have another $5.6 for bush feasibility
$4.8 power production
$2.4 bulk fuel

Resources CS has
15.0 rural electrification
20.0 alternative energy loans
16.3 village energy conservation
12.8 energy conservation/audits
2.3 legislature - coal, gas line
6.9 research + development
1.5 planning

Original sponsors: Kerttula, Dankworth, Ziegler, et al

IN THE SENATE BY THE RESOURCES COMMITTEE

HOUSE CS FOR CS FOR SPONSOR SUBSTITUTE FOR SENATE BILL NO. 25 (Resources)

IN THE LEGISLATURE OF THE STATE OF ALASKA

TWELFTH LEGISLATURE - FIRST SESSION

A BILL

For an Act entitled: "An Act amending the Alaska Power Authority Act and providing for the investment of money appropriated for power projects of the Alaska Power Authority; and providing for an effective date."

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

* Section 1. AS 44.83 is amended by adding new sections to read:

ARTICLE 8. ENERGY PROGRAM FOR ALASKA.

Sec. 44.83.400. PROGRAM ESTABLISHED. (a) The energy program for Alaska is established. The program shall be administered by the authority.

(b) The energy program for Alaska is a program for operation of power projects that are designed, acquired, and constructed by the authority, and constructed with money appropriated by the legislature to the power development fund established in AS 44.83.410. A power project may be designed, acquired, and constructed as part of the energy program for Alaska only if the project is submitted to and approved by the legislature in accordance with procedures set out in AS 44.83.177 - 44.83.185.

Sec. 44.83.410. POWER DEVELOPMENT FUND ESTABLISHED. (a) A power development fund is established in the Alaska Power Authority to carry out the purposes of the energy program for Alaska (AS 44.83.400 - 44.83.500).

(b) The fund includes

(1) all money appropriated to it by the legislature; and

(2) interest earned by investment of money in the fund by the Department of Revenue.

Sec. 44.83.420. USE OF FUND BALANCE. (a) The fund may be used by the authority to provide money for

(1) reconnaissance and feasibility studies and power project finance plans prepared under AS 44.83.177 - 44.83.181;

(2) the cost of a power project, including but not limited to costs of acquiring necessary licenses, preparing engineering designs obtaining land, and constructing the power project; and

(3) the power production cost assistance fund (AS 44.83.162)

(b) Money in the fund may be used under (a) of this section only for a power project which

(1) meets the operation and revenue requirements of AS 44.-83.470; and

(2) operates or will operate

(A) on renewable energy resources; or

(B) on coal, peat or wood, if the authority determines that

(i) the source of the fuel for the project is abundant; and

(ii) renewable energy resources to produce power for the market area of the power project are not available or are not economically feasible; or

(C) on fossil fuel if none of the other resources or fuels listed in this subsection are economically feasible.

Sec. 44.83.430. INVESTMENT OF FUND. The Department of Revenue shall invest the balance of the fund which exceeds the amount the authority determines is necessary to meet requirements of AS 44.83.420 during the current fiscal year. An investment by the Department of

Revenue under this subsection shall be made in accordance with AS 37.-10.070 and 37.10.075.

Sec. 44.83.440. ALLOTMENT TO PROJECTS. (a) The authority shall maintain records of power project allocations from the fund for each power project

(1) approved in accordance with AS 44.83.185; and

(2) for which an allocation is made from an appropriation made by the legislature without specifying an appropriation to a project.

(b) Income earned from investment of money appropriated to the fund shall be allotted by the authority to power projects for which appropriations have been made by law. The allotment shall be based on the amount of investment income earned during each state fiscal year during or after which the legislature appropriated money to the fund. An allotment of income under this subsection shall be made to each power project for which a specific appropriation has been made in proportion to the amount appropriated for that project as a percentage of the total amount appropriated by the legislature to the fund.

Sec. 44.83.450. REAPPROPRIATION OF FUND BALANCE. (a) If a power project designated by the legislature by law is not constructed, the amount appropriated to it may be reappropriated to other power projects by the legislature.

(b) The legislature may reappropriate money under (a) of this section only for a power project which is economically feasible under AS 44.83.181(b) and only if the project will serve the market area that would have been served by the power project designated by the legislature and not constructed.

Sec. 44.83.460. LAPSE OF EXCESS APPROPRIATIONS. If at the end of construction of a power project appropriations for the power project

exceed the amount required for construction of it, the excess lapses into the general fund.

Sec. 44.83.470. REVENUE REQUIREMENTS. The authority may not use money in the fund for a power project unless the authority determines that, after construction, operation of the power project will provide revenue sufficient to cover

(1) operation, maintenance, and equipment replacement costs of the power project;

(2) debt service costs associated with the power project; and

(3) the costs of safety inspections and investigations of the power project by the authority.

Sec. 44.83.480. OPERATION OF POWER PROJECT. (a) A power project which is designed, acquired, and constructed as part of the energy program for Alaska is owned by the state and shall be administered by the authority.

(b) When a power project has been designed, acquired, and constructed by the authority, the project may be operated for the authority under a contract between a qualified utility and the authority.

Sec. 44.83.490. SALE OF POWER FROM POWER PROJECT. (a) The authority shall sell power produced from power projects designed, acquired, and constructed under the energy program for Alaska. A utility which purchases power produced by a power project of the authority shall agree with the authority

(1) to give preference in the sale of power at retail to all classes of consumers of power except industrial consumers;

(2) to charge industrial consumers of power a rate determined by the authority.

(b) The authority shall establish a wholesale power rate structure

applicable to sales of power to its customers at the busbar of the power project. The wholesale power rate structure shall conform to this subsection as follows:

(1) until June 30 of the fiscal year in which the production capacity of all power projects designed, acquired, and constructed by the authority under the energy program for Alaska exceeds 800 megawatts the authority may establish a wholesale power rate for each power project which recovers, on an annual basis, not less than five percent of the amount which the authority has invested in the power project from the fund;

(2) beginning July 1 of the first fiscal year following the date in which the production capacity of all power projects designed, acquired, and constructed by the authority under the energy program for Alaska exceeds 800 megawatts, the authority shall establish a single wholesale power rate applicable to all power projects which it has designed, acquired, and constructed under the energy program for Alaska the wholesale power rate shall be computed by the authority annually, and may not be less than the rate which the authority estimates is necessary to produce revenue that

(A) is sufficient to cover the annual costs of operatin and maintaining all power projects designed, acquired, and constructed as part of the energy program for Alaska; and

(B) will pay the annual costs of the power production cost assistance program (AS 44.83.162).

(c) The authority shall transmit the money which it receives from sales of power at rates determined under (b)(2) of this section to the commissioner of revenue for deposit in the state general fund.

(d) The legislature may appropriate to the authority an amount not to exceed five percent of the amount which the commissioner of

revenue estimates will be deposited in the general fund under (c) of this section for paying costs of operating and maintaining power projects which it designed, acquired, and constructed as part of the energy program for Alaska. The balance of the amount which the commissioner of revenue estimates will be deposited into the general fund under (c) of this section may be appropriated by the legislature to the power production cost assistance fund. The estimates of amounts required for each of the appropriations shall be provided to the governor in the budget submitted under AS 37.07.

(e) When the authority establishes a rate for an individual consumer under (a)(2) of this section, it may charge the industrial consumer a rate which exceeds the wholesale power rate determined under (b) of this section.

(f) The legislature may, by law, annul or change the wholesale power rate for sales of power which the authority adopts under (b)(2) of this section.

Sec. 44.83.500. DEFINITIONS. In AS 44.83.400 - 44.83.500,

(1) "busbar" means the place where electric current generated from sources within a power project is collected and distributed to outgoing feeder transmission lines;

(2) "fund" means the power development fund;

(3) "industrial consumer" means a customer of a utility which has a demand for power in excess of ___ kilowatts per ____ and uses the power principally for

(A) manufacturing;

(B) pipeline transportation;

(C) the recovery or processing of minerals;

(D) the processing of timber; or

(E) the operation of facilities owned by the federal

government;

(4) "qualified utility" means any of the following which the authority determines is capable of operating and maintaining a power project of the kind and magnitude which has been constructed or is to be constructed to provide power for a market area:

(A) a corporation organized under the Alaska Nonprofit Corporation Act (AS 10.20);

(B) an electric cooperative organized under the Electric and Telephone Cooperative Act (AS 10.25);

(C) a utility owned and operated by a municipality; and

(D) a regional electrical authority (AS 18.57).

* Sec. 2. AS 44.83.030 is amended to read:

Sec. 44.83.030. MEMBERSHIP OF THE AUTHORITY. [(a)] The authority shall consist of the following directors:

(1) <u>two</u> [FOUR] directors at large to be appointed by the governor and confirmed by the legislature;

(2) <u>three persons appointed by the governor from among the heads of the principal departments of the executive branch of the state government</u> [THE COMMISSIONER OF COMMERCE AND ECONOMIC DEVELOPMENT.

(b) THE COMMISSIONERS OF COMMUNITY AND REGIONAL AFFAIRS, NATURAL RESOURCES, TRANSPORTATION AND PUBLIC FACILITIES, AND REVENUE SHALL HAVE THE RIGHTS AND PRIVILEGES OF DIRECTORS EXCEPT FOR THE RIGHT TO VOTE AND MAY NOT BE CONSIDERED FOR PURPOSES OF QUORUM OR VOTING].

* Sec. 3. AS 44.83.040 is amended to read:

Sec. 44.83.040. OFFICERS AND QUORUM. The <u>directors</u> [DIRECTOR] shall elect one of <u>their number</u> [THE DIRECTORS AT LARGE] as chairman and <u>may elect</u> other officers they determine desirable. The powers of the authority are vested in the directors, and three directors of the authority constitute a quorum. Action may be taken and motions and

resolutions adopted by the authority at a meeting by the affirmative vote of at least three directors. The directors of the authority serve without compensation, but they shall receive the same travel pay and per diem as provided by law for board members.

* Sec. 4. AS 44.83.045(a) is amended to read:

(a) The directors at large shall [MUST] be residents and qualified voters of Alaska and shall comply with the requirements of AS 39.50 (conflict of interests). The directors at large shall serve overlapping four-year terms. [THE FOUR ORIGINAL DIRECTORS AT LARGE HAVE TERMS OF ONE, TWO, THREE, AND FOUR YEARS, RESPECTIVELY.]

* Sec. 5. AS 44.83.080(16) is amended by adding new subparagraphs to read:

(G) An appropriation for a power project designed, acquired, and constructed under the energy program for Alaska (AS 44.83.400 - 44.83.500);

(H) appropriations for the power production cost assistance fund (AS 44.83.162), and for operation and maintenance of power projects developed under the energy program for Alaska (AS 44.83.400 - 44.83.500).

* Sec. 6. AS 44.83.090(a) is amended to read:

(a) The authority shall, in addition to the other methods which it may find advantageous, provide a method by which municipal electric, rural electric, cooperative electric, or private electric utilities and regional electric authorities, or other persons authorized by law to engage in the distribution of electricity may secure a reasonable share of the power generated by a project, or any interest in a project, or for any right to the power and shall sell the power or cause the power to be sold at the lowest reasonable prices which cover the full cost of the electricity or services, including capital and operating costs,

debt coverage as considered appropriate by the authority, and other charges that may be authorized by this chapter. Except for a contract entered into under AS 44.83.400 - AS 44.83.500, a [A] contract for the sale, transmission and distribution of power generated by a project or any right to the capacity of it shall provide:

(1) for payment of all operating and maintenance expenses of a project and costs of renewals, replacements and improvements of it;

(2) for interest on and amortization charges sufficient to retire bonds of the authority issued for the project and reserves for them, plus a debt service coverage factor as may be determined by the authority to be necessary for the marketability of its bonds;

(3) for monitoring of the project by the authority or its agents;

(4) for full and complete disclosure to the authority of all factors of cost in the transmission and distribution of power, so that rates to any persons may be fixed initially in the contract and may be adjusted from time to time on the basis of true cost data;

(5) for periodic revisions of the service and rates to persons on the basis of accurate cost data obtained by the accounting methods and systems approved by the directors and in furtherance and effectuation of the policy declared in this chapter;

(6) for the cancellation and termination of a contract upon violation of its terms by any person;

(7) for security for performance as the authority may consider practicable and advisable, including provisions assuring the continuance of the distribution and transmission of power generated by a project and the use of its facilities for these purposes; and

(8) other terms not inconsistent with the provisions and policy of this chapter as the authority may consider advisable.

* Sec. 7. AS 44.83 is amended by adding a new section to read:

Sec. 44.83.105. BONDS FOR POWER PROJECTS UNDER THE ENERGY PROGRAM FOR ALASKA. (a) The authority shall borrow money and shall issue its bonds on which the principal and interest are payable exclusively from money derived from the power project financed with the proceeds of the bonds for a power project financed under AS 44.83.400 - 44.83.500 from the power development fund if

(1) appropriations to the power development fund for the power project, and interest earned on those appropriations, are insufficient to cover the cost of designing, acquiring, and constructing the power project; and

(2) the amount of interest which the authority will pay on its bonds is not more than alternative costs of securing money to pay for the design, acquisition, and construction of the power project.

* Sec. 8. AS 44.83.181(b) is amended by adding a new paragraph to read:

(5) a recommendation as to whether the proposed project is economically feasible; a power project is "economically feasible" if the authority determines that the total costs of the power project are cheaper for the estimated life of the project than other alternatives; in making a determination of economic feasibility under this paragraph, the authority shall evaluate the estimated life of the power project and its alternatives applying the following standard factors:

(A) a general inflation factor for construction and operating costs of seven percent annually;

(B) an interest rate of 10 percent for money borrowed for the power project; and

(C) an escalation factor for measuring the comparative cost of oil, gas or coal; the rate to be applied for oil is 11 percent annually, and the rate shall be applied to the fuel cost

on the date of determination of economic feasibility.

* Sec. 9. AS 44.25.020 is amended by adding a new paragraph to read:

(5) invest and manage the balance of the power project development fund in accordance with AS 44.83.430.

* Sec. 10. APPLICABILITY OF ACT TO DIRECTORS. (a) The terms of office of all members of the Board of Directors of the Alaska Power Authority serving on the effective date of this Act terminate on the effective date of this Act.

(b) The governor shall appoint two members at large. When making his appointments under this subsection, the governor shall specify the length of the term of office of each member he appoints. Of the members at large first appointed by the governor under this subsection,

(1) one member shall serve a two-year term;

(2) one member shall serve a four-year term.

* Sec. 11. This Act takes effect immediately in accordance with AS 01.-10.070(c).

Chenoweth

Original sponsors: Kerttula, Ziegler, Ferguson, et al

Funding Information

General Fund	$521,398,000
Other Funds	-0-
	$521,398,000

IN THE SENATE BY THE FINANCE COMMITTEE

HOUSE CS FOR 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 $341,400,000 is appropriated from the general fund to the power development fund of the Alaska Power Authority (AS 44.83.400 44.83.500), to be expended by the authority in the amounts specified for the following listed power projects:

(1)	Bradley Lake	$40,000,000
(2)	Green Lake	52,500,000
(3)	Port Lions	1,400,000
(4)	Solomon Gulch	68,000,000
(5)	Swan Lake	53,000,000
(6)	Terror Lake	81,500,000
(7)	Tyee Lake	45,000,000

* Sec. 2. The sum of $36,900,000 is appropriated from the general fund to the power development fund of the Alaska Power Authority (AS 44.83.400 - 44.83.500) for feasibility studies, to be allocated to the following proposed power projects:

(1)	Black Bear Lake	2,000,000
(2)	Chester Lake	1,000,000
(3)	Chakachamna Lake	1,000,000
(4)	Grant Lake	1,000,000

(5)	Kisaralik	1,000,000
(6)	Power Creek	700,000
(7)	Snettisham	4,500,000
(8)	Susitna	18,100,000
(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, Perryville, Scammon Bay, Shungnak, Tenakee Springs, Togiak, Unalaska	5,600,000

* Sec. 3. The sum of $76,000,000 is appropriated from the general fund to the power development fund of the Alaska Power Authority (AS 44.83.400 - 44.83.500) 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 $2,000,000 is appropriated from the general fund to the power development fund of the Alaska Power Authority (AS 44.83.400 - 44.83.500) for acquisition of a right-of-way for and design and construction of an electrical transmission system connecting Craig and Klawock.

* Sec. 5. The sum of $5,800,000 is appropriated from the general fund to the power development fund of the Alaska Power Authority (AS 44.83.400 - 44.83.500) for acquisition of a right-of-way for and design and construction of an electrical transmission system connecting Petersburg (Tyee Lake power project) and Kake.

* Sec. 6. The sum of $250,000 is appropriated from the general fund to

the power development fund of the Alaska Power Authority (AS 44.83.400 - 44.83.500) for a study examining district heating, coal utilization, and waste heat for Kotzebue.

* Sec. 7. The sum of $42,000 is appropriated from the general fund to the power development fund, of the Alaska Power Authority (AS 44.83.400 - 44.83.500) for reconnaissance work on the rehabilitation and improvement of hydroelectric facilities for Pelican.

* Sec. 8. The sum of $996,000 is appropriated from the general fund to the power development fund of the Alaska Power Authority (AS 44.83.400 - 44.83.500) for a feasibility study examining design and construction of an electrical transmission system between Hoonah and Juneau.

* Sec. 9. The sum of $4,000,000 is appropriated from the general fund to the power project fund of the Alaska Power Authority (AS 44.83.170) for a loan to Alaska Electric Light and Power Company for construction of transmission lines.

* Sec. 10. The sum of $3,000,000 is appropriated from the general fund to the power project fund of the Alaska Power Authority (AS 44.83.170) for a loan to Alaska Electric Light and Power Company for rehabilitation of Salmon Creek II.

* Sec. 11. The sum of $1,500,000 is appropriated from the general fund to the power project fund of the Alaska Power Authority (AS 44.83.170) for a loan to the City of Petersburg for local transmission and distribution lines between Tyee Lake power project substations and existing power plants.

* Sec. 12. The sum of $1,500,000 is appropriated from the general fund to the power project fund of the Alaska Power Authority (AS 44.83.170) for a loan to the City of Wrangell for local transmission and distribution lines between Tyee Lake power project substations and existing power plants.

* Sec. 13. The sum of $560,000 is appropriated from the general fund to the Alaska Power Authority for reconnaissance studies for proposed power

project sites for the following rural communities: Aniak, Atkasook, Brevig Mission, Chefornak, Chuathbaluk, Craig, Diomede, Galena, Golovin, Hooper Bay, Kalskag, Kotlik, Koyuk, Lower Kalskag, Mekoryuk, Newtok, Nightmute, Ruby, St. Mary's, St. Michael, St. Paul, Shageluk, Shishmaref, Stebbins, Teller, Toksook Bay, Tununak, and Unalakleet.

* Sec. 14. 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. 15. The sum of $2,400,000 is appropriated from the general fund to the Department of Community and Regional Affairs for the bulk fuel storag facilities grant fund (AS 44.47.145).

* Sec. 16. The sum of $250,000 is appropriated from the general fund to the Office of the Governor for the fuel emergency fund (AS 44.19.052).

* Sec. 17. The sum of $40,000,000 is appropriated from the general fund to the power project fund of the Alaska Power Authority (AS 44.83.170) for power projects in rural areas.

* Sec. 18. Sections 1 - 8 of this Act take effect on the effective date of an Act entitled "An Act amending the Alaska Power Authority Act; and providing for an effective date."

* Sec. 19. Sections 9 - 17 of this Act take effect immediately in accordance with AS 01.10.070(c).

27 April 1981

TO: REP. BRIAN ROGERS

FROM: NANCY LORD, AA

RE. HYDRO PROJECT FINANCING

I have reviewed the Duncan hydro financing plan and compiled the following list of concerns. Because the plan has not yet appeared in bill form, I am, by necessity, responding to the narrative dated April 13, 1981; it may be that some of the concerns addressed will be corrected as the bill is drafted.

1. The relationship between the 5% "equity return" and the 3.8 cents/kwh to be charged to consumers is nothing more than wishful thinking. The APA computed it by making up a "best case" situation and assuming that all the power produced would be immediately utilized. As an example, using the APA's own assumptions of maximum energy use, the Tazimina project, if it provides 5% equity return, would cost 7.7 cents/kwh wholesale. In contrast, Bradley Lake, at 5% equity return, if all the power were used, would cost 2.8 cents/kwh wholesale.

2. Some of the projects listed as feasible could not, in fact, pay a 5% "equity return" without greatly increasing energy costs to consumers. As an example, the Tazimina project would cost, conservatively, $123 million to construct. A 5% "equity return" would mean a repayment the first year of $6.15 million. If all 5300 residents of the Bristol Bay region utilized the power, each one would have to pay $1,160.38 that year. I doubt whether a family of 4 in Dillingham is currently paying $4,641.50 per year for electricity.

3. The 5% "equity return" bears no relationship to any test of economic feasibility. It appears to have been chosen arbitrarily, its only test being the political one of "sounding good" to those arguing between grants and loans.

4. The proposal includes no requirement for establishing any measure of economic feasibility, or any requirment that projects constructed relate to electricity demand.

5. There is no guarantee of more than a token return on the projects. The 5% "equity return" first pays for operation, maintenance and administrative costs. Then, if there is money left, it goes to the general fund or another fund established. With time the yearly "equity return" remains the same, while the operating and maintenance and administration costs increase, eroding the "equity return" to nothing within a very short time. The concept differs very little, except semantically, from grants.

6. The better projects would have to subsidize the worse. As we saw in #1, a 5% "equity return" would mean quite different rates, even assuming the APA figures. If everyone were arbitrarily charged 3.8 cents/kwh the consumers of Bradley Lake power would be paying more than what their project needed to pay 5%, thus paying part of the costs for another project. Therefore, there is no reason to build a feasible project, and overbuilding is encouraged.

7. The more energy one uses, the greater subsidy one receives. Increased use would be encouraged, and whoever uses the most gets the greatest reward.

8. There are absolutely no incentives for conservation, appropirate energy end-use, or any energy alternatives where hydro power would be available. In order to make the 3.8 cents/kwh approach the 5%, it would be necessary to increase electric consumption to the maximum, but nowhere is there any acknowledgement that maximum consumption would create a need for additional capacity. Energy conservation could be enforced through laws and regulations but that would be exactly contrary to the requirement that available energy be fully consumed.

9. Money from the 5% repayment, after paying operation, maintenance and administrative costs, would be earmarked for spending for conservation and subsidies for the Bush. Since dedications are unconstitutional and any money for other energy-related projects would have to be appropriated by the legislature, there is no reason to tie one to the other. First - of all, even the APA adknowledges that, under the most optimistic case, it would be 1986 before any significant amount of money would be repaid. Conservation efforts, under the 5-year plan now being considered, would be complete by then and power cost assistance for high-cost energy areas is needed until the time that site-specific energy alternatives can be provided. In addition, the politics of the matter are that the hydropower consumers would understand that their electricity payments were subsidizing someone else, an idea that would prove not very popular. The whole concept of tying the repayments, assuming there were some, to other energy projects appears to be a bone tossed to the Bush to make them think they would be getting something from the proposal. In fact, it offers them nothing they don't have without it; they do now and will then have to get legislative appropriations for their projects or subsidies.

10 Only dams would be built under the proposal. There would be no discussion of the alternatives because no alternatives exist once a decision is made to buy a dam, particularly if no feasibility test is involved. There are alternatives to hydro in many places, but not if they're not given a chance to compete on the same grounds. Some alternatives may be included in SB 26 or a separate appropriation bill, but they will be "token" projects needed to provide political balance.

11. All areas of the state would not be included, which means there would be no equity in the distribution of subsidy. Only consumers of hydropower from the state-owned projects would receive the multi-billion-dollar subsidy, with those without hydro projects being left to beg from the general fund.

12. The proposal depends on the construction of the Susitna project. If Susitna is not built the "equity return" required would be doubled to 10%. Since this is politically unacceptable, the proposal amounts to blackmail. The message is: Build Susitna and provide 3 cents/kwh power to the Railbelt or don't build it and all the rest of you hydro users will have to pay twice as much, and anyone without hydro -- well, if you want to live out there you'll have to pay the price.

13. The proposal includes no criteria for deciding whether to build any given project and provides no control on cost overruns. The state would, in fact, be writing blank checks for authorized projects.

14. The proposal, although appropriating only one- tenth the amount this year, commits over $5 billion to hydro projects, a commitment that once made cannot be broken.

15. The proposal provides no timetable for phasing in the new rate structure, nor any transition into the program.

16. The powers and responsibilities of the APA are greatly increased, giving them more money to handle and more freedom to handle it than any other entity in the state, without any of the controls regular state agencies have. This comes at a time when the purposes of the APA are being questioned and both the legislative and executive branches are planning an energy reorganization.

17. The proposal will, by design, include "something for everyone", making it difficult politically to oppose but differing little from ordinary pork except in scale and in the longer-term inequities among Alaskans which will result.

A second memo with specific recommendations will follow.

HYDROELECTRIC POWER RESOURCES

Alaska has an estimated 47 per cent of the nation's undeveloped hydroelectric power potential at about 700 potential hydropower sites around the State. As with all estimates of resources potential, however, this statement is meaningless unless placed in an economic context. The vast majority of the potential sites-- with about 90 per cent of the State's potential-are either: (1) off-limits for development because of their location in federally protected areas; or (2) too expensive to develop, usually because of their distance from the potential consumers.

Notwithstanding this caution, by the year 2000 Alaska is likely to increase its hydroelectric generating capacity for both electrical and thermal energy by between five-fold and 20-fold over current levels. The main incentives for the transition are sharply rising costs of fossil fuels, and fears of even greater cost increases in the future -- particularly for the petroleum and petroleum products which now provide most of Alaska's energy. As protection against continuing inflation in such non-renewable energy sources, the State is likely to increase its reliance on relatively cheap hydropower. The proportion of the State's generation provided by hydropower is projected to increase from about 10-15 per cent of total installed capacity to about 30-50 per cent by the year 2000.

An abundance of falling water-- the essential ingredient in hydropower -- makes possible Alaska's big move into this energy source. The water turns turbines, which supply the

power. The power can then be used at the site or transmitted through electrical lines. Hydroelectric power projects are usually thought of as being large dams on rivers or on the mouths of lakes, such as the well-known Hoover [redacted] on the Nevada - Arizona border or Grand Coulee in Washington State. Many of the most-publicized Alaska hydropower projects now being considered are like this, but others are smaller, mobile turbines which can be taken in and out of streams. "In-stream" hydro projects produce much less power than large dams, but often can be efficient suppliers to local areas, particularly in rural regions.

There are now more than 40 hydroelectric installations in Alaska, ranging in size from 1.5 [redacted] to 47,160 megawatts. Most of the sizable dams are concentrated in wet, mountainous Southeastern Alaska, where heavy rainfall and snowfall combine with steep slopes to produce most of the best potentially feasible sites as well. Most of the other potentially feasible hydropower projects are located in the Southcentral region. With electrical transmission interties, a group of these proposed installations could serve the populous Railbelt from the Kenai Peninsula north to Fairbanks.

Besides providing relatively low-cost energy to Alaskans, some supporters of expanding hydropower capacity assert that the resulting supply of stably priced power will create jobs by luring industry to the State. Others discount this possibility, however, arguing that labor costs and distance from markets are much more important factors in most firms' decisions to locate.

Other cautionary notes about hydropower should be sounded. There are significant environmental costs associated with dams in their siltation of rivers and streams (sometimes, as in [redacted]

Columbia River (in Washington and Oregon), causing great damage to fisheries). Some scenic and recreational values are also lost in hydropower development, as dams flood terrain and replace free-flowing rivers with large lakes.

More troublesome than the environmental considerations may be the economic questions. Though dams yield relatively cheap power, it's not free by any means. Building dams requires heavy front-end construction costs, and the turbines must also be replaced periodically. The State's bubble of petroleum prosperity could be used in part to pay for hydropower project construction, and some Alaskans favor this course. Others are concerned such a policy will lead to the building of too many dams which cannot generate enough revenues to pay for their operation and maintenance.

Excess capacity can be a particular problem with hydropower development because dams cannot be phased in incrementally. Unlike some other energy technologies -- such as wind generation --dam-building is an all or nothing proposition. An easy trap is to build a dam which from the day it begins operation produces far more power than the potential consumers can use. This happened when the Canadian province of Newfoundland built one of the world's largest hydro projects at Churchill Falls. After the project began operation in 1971, Newfoundlanders found they could not use all the new power and ended up exporting much of it to Quebec at distress sale prices.

Finally, the imposing size, high visibility, and apparent permanence of dams can distort the thinking of policy-makers. Dams lend themselves to the "monument complex", a syndrome in which political leaders push for gargantuan projects. The projects are sometimes named after their prime sponsor, are handy for use as a backdrop in

photography and films, and acquire a life of their own in the minds of many beyond their economic merits.

(Source: U.S. Army Corps of Engineers)

GEOTHERMAL RESOURCES

Alaska has an estimated 20 per cent of the geothermal potential in the U.S. Once again, it's important not to be misled by this figure. As with coal, hydropower, and hard-rock minerals, most of the potential of tapping steam energy from hot springs will not be economically feasible to develop within the lifetime of anyone reading these sentences. The Division of Energy and Power Development of the State's Department of Commerce and Economic Development has identified five sites feasible to develop now, and another 10 potential sites which could be developed by the year 2020. If all 15 of those sites were producing in 2020, it is estimated that Alaska would still be contributing less than one per cent to total U.S. geothermal production.

It is more enlightening to say that in 40 years' time, geothermal energy could satisfy the needs of two regional centers - Nome and Unalaska - and perhaps half a dozen smaller sites around Alaska.

The prescription for geothermal is the same as for other energy resources in an uncertain world: more research and analysis.

(Source: Division of Energy and Power Development, Alaska Department of Commerce and Economic Development)

PEAT AND OTHER BIOMASS RESOURCES

Millions of acres of Alaska are covered by marshes, moss, and reeds. These lowlands are concentrated along the coast of the Bering Sea in Western Alaska and the Yukon and Tanana Rivers in the Interior, and are usually thought of as being nice for ducks and messy for duck hunters. Yet these lands may hold an energy resource unusual to Americans: peat.

By one of the most conservative estimates, Alaska has 51 per cent of America's peatland about 10 per cent of all the peat in the world. In a world which has seen oil prices increase more than 10-fold in less than 10 years, peat is gaining attention as a potentially major source of energy. It has already attained that status in Finland and Ireland, the latter country where 80 per cent of the electrical load is produced by peat, as is most space heating. Alaska's goal over the next 10 years should be to continue investigating the economic potential of its peat resources. Some experts predict Alaska will be selling peat by the year 2000, with the economics of shipping peat briquettes to Asia rivaling those of eastbound coal exports.

Other possibilities for energy production from organic material ("biomass") exist in Alaska, particularly in conjunction with the development of agriculture. When barley is harvested, for example, a portion is unfit for human consumption. One possible use for this residual is to combine it with fishmeal to produce a high-protein

superfeed for hogs and chickens. Another use is to distill the residual into methanol which could then be used as fuel for humans' vehicles.

(Source: Alaska Department of Commerce and Economic Development)

Chenoweth

Original sponsors: Kerttula, Ziegler, Ferguson, et al

Funding Information

General Fund	$519,987,500
Other Funds	-0-
	$519,987,500

IN THE SENATE BY THE RESOURCES COMMITTEE

HOUSE CS FOR CS FOR SENATE BILL NO. 26 (Resources)

IN THE LEGISLATURE OF THE STATE OF ALASKA

TWELFTH LEGISLATURE - FIRST SESSION

A BILL

For an Act entitled: "An Act making appropriations to various state agencies for energy-related projects, and repealing an appropriation for a hydroelectric project; and providing for an effective date."

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

* Section 1. The sum of $261,600,000 is appropriated from the general fund to the power project fund of the Alaska Power Authority (AS 44.83.170) for loans in the amounts specified for the following listed power projects:

(1)	Green Lake	$ 5,000,000
(2)	Ouzinkie	1,700,000
(3)	Port Lions	1,400,000
(4)	Snettisham (Crater Lakes)	4,500,000
(5)	Solomon Gulch	29,000,000
(6)	Swan Lake	65,000,000
(7)	Terror Lake	100,000,000
(8)	Tyee Lake	55,000,000

* Sec. 2. The sum of $14,624,500 is appropriated from the general fund to the power project fund of the Alaska Power Authority (AS 44.83.170) for a loan to the Fairbanks North Star Borough for the following purposes:

(1)	energy management program	$ 12,152,077
(2)	solar collector retrofit	1,211,760
(3)	waste heat greenhouses	1,260,663

* Sec. 3. The sum of $6,795,000 is appropriated from the general fund to the Alaska Power Authority for Fairbanks district heating.

* Sec. 4. The sum of $4,000,000 is appropriated from the general fund to the power project fund of the Alaska Power Authority (AS 44.83.170) for a loan to Alaska Electric Light and Power Company for construction of transmission lines.

* Sec. 5. The sum of $3,000,000 is appropriated from the general fund to the power project fund of the Alaska Power Authority (AS 44.83.170) for a loan to Alaska Electric Light and Power Company for rehabilitation of Salmon Creek II.

* Sec. 6. 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. 7. The sum of $2,000,000 is appropriated from the general fund to the power project fund of the Alaska Power Authority (AS 44.83.170) for acquisition of a right-of-way for and design and construction of an electrical transmission system connecting Craig and Klawock.

* Sec. 8. The sum of $5,800,000 is appropriated from the general fund to the power project fund of the Alaska Power Authority (AS 44.83.170) for acquisition of a right-of-way for and design and construction of an electrical transmission system connecting Sitka (Green Lake power project) and Kake.

* Sec. 9. The sum of $200,000 is appropriated from the general fund to the Alaska Power Authority for a single ground wire return between Kotzebue and Shungnak.

* Sec. 10. The sum of $5,600,000 is appropriated from the general fund to the Alaska Power Authority for reconnaissance studies for proposed power project sites for the following rural communities: Akhiok, Ambler, Angoon, Aniak, Atka, Atkasook, Brevig Mission, Buckland, Chefornak, Chignik, Chignik Lagoon, Chignik Lake, Chuathbaluk, Cold Bay, Craig, Diomede, Elim, False

Pass, Galena, Golovin, Goodnews Bay, Grayling, Gustavus, Hoonah, Hooper Bay, Hydaburg, Ivanoff Bay, Kalskag, Kaltag, Karluk, Kiana, King Cove, Klawock, Kotlik, Kotzebue, Koyuk, Larsen Bay, Lower Kalskag, Mekoryuk, Metlakatla, Newtok, Nightmute, Nikolski, Nome, Old Harbor, Perryville, Ruby, St. Mary's, St. Michael, St. Paul, Savoonga, Scammon Bay, Shageluk, Shishmaref, Shungnak, Stebbins, Teller, Tenakee Springs, Togiak, Toksook Bay, Tununak, Unalakleet, Unalaska, and White Mountain.

* Sec. 10. The sum of $30,850,000 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	2,000,000
(2)	Bradley Lake	4,000,000
(3)	Chester Lake	1,000,000
(4)	Chakachamna Lake	1,000,000
(5)	Grant Lake	1,000,000
(6)	Kisaralik	1,000,000
(7)	Power Creek	700,000
(8)	Susitna	18,100,000
(9)	Takatz Lake	50,000
(10)	Tazimina Lake	2,000,000

* Sec. 12. The sum of $440,000 is appropriated from the general fund to the Alaska Power Authority for a feasibility study of the Fairbanks district heating extension.

* Sec. 13. The sum of $996,000 is appropriated from the general fund to the Alaska Power Authority for a feasibility study examining design and construction of an electrical transmission system between Hoonah and Juneau.

* Sec. 14. The sum of $42,000 is appropriated from the general fund to the Alaska Power Authority for a feasibility study examining the rehabilitation and improvement of hydroelectric facilities for Pelican.

* Sec. 15. The sum of $4,500,000 is appropriated from the general fund to the Alaska Power Authority for a feasibility study for the Lake Elva hydroelectric project.

* Sec. 16. The sum of $20,000 is appropriated from the general fund to the Alaska Power Authority for payment as a grant to the City of Fairbanks for sewer plant energy conservation and management.

* Sec. 17. The sum of $400,000 is appropriated from the general fund to the Alaska Power Authority for payment as a grant to the Kuskokwim Native Association for electrification projects in Chuathbaluk, Crooked Creek, Sleetmute, and Stony River.

* Sec. 18. 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. 19. The sum of $10,000,000 is appropriated from the general fund to the Alaska Power Authority for the rural electrification revolving loan fund.

* Sec. 20. The sum of $5,000,000 is appropriated from the general fund to the Alaska Power Authority for geothermal well drilling at Unalaska.

* Sec. 21. The sum of $4,000,000 is appropriated from the general fund to the Department of Administration for payment of rural electrification grants to municipalities.

* Sec. 22. The sum of $1,580,000 is appropriated from the general fund to the Department of Commerce and Economic Development, division of energy and power development, for programs under AS 44.33.030 - 44.33.060, to be allocated as follows:

(1)	preparation of state energy plan	$500,000
(2)	regional energy planning	100,000
(3)	state-federal liaison	100,000
(4)	citizens' information and	

	assistance	100,000
(5)	data collection and computer application	700,000
(6)	professional seminars	80,000

* Sec. 23. The sum of $12,800,000 is appropriated from the general fund to the Department of Commerce and Economic Development, division of energy and power development, for energy conservation refunds, grants and audits, to be allocated as follows:

(1)	performance of energy audits	$4,000,000
(2)	energy conservation grants and refunds	8,800,000

* Sec. 24. The sum of $16,200,000 is appropriated from the general fund to the Department of Commerce and Economic Development, division of energy and power development, for regional energy planning, energy audits, weatherization and conservation, community training, and reconnaissance studies under the low-income energy conservation program.

* Sec. 25. The sum of $20,000,000 is appropriated from the general fund to the Department of Commerce and Economic Development, division of small business loans, for alternative energy and energy conservation loan programs, to be allocated as follows:

(1)	alternative energy and energy conservation loans	$10,000,000
(2)	alternative energy business loans	10,000,000

* Sec. 26. The sum of $2,400,000 is appropriated from the general fund to the Department of Community and Regional Affairs for the bulk fuel storage facilities grant fund (AS 44.47.145).

* Sec. 27. The sum of $1,000,000 is appropriated from the general fund to the Department of Community and Regional Affairs for payment of rural electrification grants to unincorporated communities.

* Sec. 28. The sum of $200,000 is appropriated from the general fund to

the Department of Education for teacher training and curriculum development and for satellite television relating to energy-related subjects in elementary and secondary school curricula.

* Sec. 29. The sum of $60,000 is appropriated from the general fund to the Department of Natural Resources for an aquifer drilling project at McGrath.

* Sec. 30. The sum of $2,300,000 is appropriated from the general fund to the Department of Natural Resources for a northwest Alaska coal resources investigation.

* Sec. 31. The sum of $2,650,000 is appropriated from the general fund to the Department of Transportation and Public Facilities for construction of a road between the Nome area road system and Pilgrim Hot Springs.

* Sec. 32. The sum of $550,000 is appropriated from the general fund to the Department of Transportation and Public Facilities for installation of coal-fired heating systems in the schools of the Railbelt and Delta-Greeley regional educational attendance areas.

* Sec. 33. The sum of $250,000 is appropriated from the general fund to the Office of the Governor for the fuel emergency fund (AS 44.19.052).

* Sec. 34. The sum of $350,000 is appropriated from the general fund to the University of Alaska for energy conservation improvements.

* Sec. 35. The sum of $150,000 is appropriated from the general fund to the University of Alaska for upper division and graduate courses related to energy courses and professional studies.

* Sec. 36. The sum of $200,000 is appropriated from the general fund to the University of Alaska, division of community colleges and rural education, for development of energy studies within community college curricula.

* Sec. 37. The sum of $500,000 is appropriated from the general fund to the University of Alaska, division of community colleges and rural education, for vocational and job training programs related to energy.

* Sec. 38. The sum of $6,400,000 is appropriated from the general fund to the Alaska Energy Center for expenses of operations of the center during the fiscal year ending June 30, 1982.

* Sec. 39. The sum of $830,000 is appropriated from the general fund to the Alaska Energy Center for the following feasibility studies relating to energy projects of the center:

(1)	Angoon tidal power project	$500,000
(2)	Kotzebue district heating and coal utilization study	100,000
(3)	Kotzebue waste heat study	150,000
(4)	Mary's Igloo -- design of an energy efficient community in conjunction with relocation	50,000
(5)	St. Mary's waste heat and district heating study	30,000

* Sec. 40. The sum of $500,000 is appropriated from the general fund to the Alaska Energy Center for wind reconnaissance studies and research statewide.

* Sec. 41. The sum of $1,100,000 is appropriated from the general fund to the Alaska Energy Center for the following projects:

(1)	Pilgrim Hot Springs geothermal test well	$ 700,000
(2)	Sheldon Point wind project	300,000
(3)	Skagway construction of wind generating system	100,000

* Sec. 42. The sum of $300,000 is appropriated from the general fund to the Legislative Affairs Agency for the Joint Gas Pipeline Committee for a study of alternative methods of transporting Prudhoe Bay natural gas to market.

* Sec. 43. Section 1(1), ch. 54, SLA 1980 is repealed.

* Sec. 44. Section 22 of this Act takes effect on the effective date of an Act entitled "An Act establishing assistance and information programs on energy in the Department of Commerce and Economic Development; and providing for an effective date."

* Sec. 45. Sections 25 - 27 of this Act take effect on the effective date of an Act entitled "An Act relating to departments and programs of state government which are concerned with energy; and providing for an effective date."

* Sec. 46. Section 42 of this Act takes effect on the effective date of an Act or resolution by which the First Session of the Twelfth Legislature directs its Joint Gas Pipeline Committee to prepare a report concerning alternative methods of transporting Prudhoe Bay natural gas to markets.

* Sec. 47. This Act takes effect immediately in accordance with AS 01.-10.070(c).

Senator Gilman
Representative Malone
Representative Gardiner

Introduced: _____
Referred: _____

IN THE _____

By: _____

JOINT RESOLUTION NO. _____

IN THE LEGISLATURE OF THE STATE OF ALASKA

TWELFTH LEGISLATURE-FIRST SESSION

Proposing that the U. S. Congress take certain actions to permit timely construction of the Bradley Lake Hydroelectric Project.

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

WHEREAS, the U. S. Army Corps of Engineers is completing a General Design Memorandum on the Bradley Lake Hydroelectric Project; and

WHEREAS, the U. S. Army Corps of Engineers is requesting authorization and funding from Congress to initiate construction of the Project; and

WHEREAS, the Congress may not appropriate funds for the Project in a manner to permit expeditious construction of the Project; and

WHEREAS, the Bradley Lake Hydroelectric Project is an economically, environmentally, and technically feasible renewable energy project which should be constructed as early as possible; and

WHEREAS, the State of Alaska through the Alaska Power Authority desires to develop the Project as early as possible;

BE IT RESOLVED that the Alaska State Legislature respectfully requests the U. S. Congress to authorize the Bradley Lake for construction, authorize the U. S. Army Corps of Engineers to accept non-federal funds for construction of the Project, and establish that the General Design Memorandum prepared by the U. S. Army Corps of Engineers satisfies all requirements for a Federal Energy Regulatory Commission License to construct the Project.

COPIES of this resolution shall be sent to the

Draft 4/19/81 bB
PROPOSED APA-RURALCAP ELECTRIC POWER FINANCING PROGRAM

The following program emphasizes (1) reduced electricity costs for all Alaskans beginning immediately, (2) equity in the distribution of benefits from State financial aid, (3) efficiency in electricity consumption, and enhanced conservation incentives, (4) selection of the most efficient mix of projects, (5) cost-effectiveness in the use of State money, (6) State-ownership of State-assisted power projects, and (7) a return to the State's investment in such projects.

Reduced Electricity Costs for All Alaskans
Equity in the Distribution of Benefits

Lifeline quota. Every residential electricity customer in Alaska will receive up to, say, 500 kilowatt-hours per month (the "lifeline quota")[1] without charge.[2] The State would pay the cost of this lifeline quota partly (a) through the Alaska Power Authority's financial contribution to new generating projects and partly (b) through a remodeled Power Production Cost Assistance program.

1. 500 kwh is just an illustrative figure that might be adjusted upward or downward, depending on how deeply the Legislature wants to subsidize electric power generation and consumption. 500 kwh per household per month is enough to cover all current electricity needs of most rural Alaskans, but is not enough to encourage the use of electricity for space-heating where it is not truly the lowest-cost source of energy.

A possible variation would be to graduate the size of each household's lifeline quota according to the number of persons in the household --- e.g., 250 kwh per month for one person plus 50 kwh for each additional person up to five. This approach seems more equitable, but it would probably invite fraud and would be difficult to administer. Another variation would be to graduate the size of the lifeline block according to climate --- for example, 1 kwh for every 2 degree-days.

2. Consumers would receive only the wholesale generating costs of the lifeline quota free. Each customer would continue to pay his share of local distribution and administrative costs --- partly to keep pressure on local utilities to operate efficiently.

In contrast with the provisions of SB 25-26 and their House counterparts, benefits under this program will not be limited to customers of new projects or hydro-based generating capacity; they will be equal throughout Alaska, regardless of the actual local cost of generation; and they will begin immediately, rather than waiting on the completion of new projects.[3]

Efficiency in Electricty Consumption
Enhanced Conservation Incentives

Marginal-cost pricing. The State's subsidy of electric power generation and consumption will be limited to paying, directly or indirectly, for the lifeline quota of all Alaska households. Consumers would, however, pay the full cost[4]

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3. The lifeline concept might be phased in with the completion of new, more efficent generating capacity statewide, however, in order to reduce the total State outlay for power production assistance in the early years of the program. The initial lifeline quota might begin at 100 kwh per month in fiscal 1982, for example, and increase 100 kwh per month each year (or 10 kwh per month per month) until 500 kwh per month was reached in 1986 (1985).

4. The appropriate structure of electric rates for power in excess of a consumer's lifeline quota will differ depending on the way the power is generated, the amount of surplus generating capacity, and the nature of local demand. Where excess hydro generating capacity exists, it is in the community's interest to use as much of that capacity as possible by establishing promotional rates for residential and small-commercial space-heating, and for interruptible industrial service.

The details of rate design for consumption in excess of the lifeline quota can be left to the APUC or to contractual arrangements between the Power Authority and unregulated utilities, under two general rules: (a) that rates for power consumption not covered by any customer's lifeline quota should cover the entire cost of that additional consumption, and (b) that no class of customer should pay less per additional kwh than the variable operating costs for generating that additional kwh. (See note 5 below.)

of any power they consume in excess of 500 kwh per month, and would never pay less for additional kilowatt-hours than the cost of fuel and other variable operating costs necessary to generate those additional kilowatt-hours.[5,6]

Selection of the Most Efficient Mix of Projects
Cost-Effectiveness in the Use of State Money

The immediate reduction in basic electricity costs for all Alaska consumers would reduce the urgency that consumers and legislators now feel to fund specific projects which may or may not be the lowest-cost alternatives, and which may or may not be ripe for construction.

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5. This provision is necessary (1) to discourage consumers from heating with oil or gas-generated power when they could have used much less oil or gas if they had burned it directly as a heating fuel, and (2) to create the right conservation incentives.

If a state subsidy permitted consumers to pay only (say) 3 cents per additional kwh, when it actually cost the utility an additional 15 cents for fuel to generate an additional kwh, many consumers would use electricity in place of oil even if it would have cost them much less than 15 cents to get the same heat directly from oil. Households would, in addition, have no reason to spend more than 3 cents per kilowatt-hour to conserve energy, despite the fact that the community as a whole would save 15 cents for every kwh that did not have to be generated.

6. Granting every residential customer 500 kwh per month without charge would in itself remove any incentive for households to conserve energy unless they were already consuming more than 500 kwh. In order to offset this undesirable effect, each customer who used less than 500 kwh would receive a monthly conservation credit equal to the value of one-half of the fuel and other variable operating costs avoided by the utility.

The conservation credit would be applied first against the customer's electric bill. (Recall from note 2 that consumers are spared only the generating costs for their first 500 kwh, but still have to pay their share of distribution and administrative costs.) If the conservation credit exceeded these components of a customer's electric bill, the balance of the credit would be paid out in a voucher that could be used to buy oil, gas, firewood, or approved energy conservation devices or improvements.

Project selection and evaluation would take place according to the procedures already established in AS 44.83.180+ rather than in ad hoc pork barrel trading among legislators. The legislature would retain final authority, however, over the appropriation of funds for specific projects.[7]

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7. The present law assumes that project selection will be made using sound methods of feasibility analysis. Valid economic comparisons between alternative generation technologies or alternative projects require the use of the best current estimates of future fuel and construction-cost inflation, market interest rates, and the like. §5 of CSSSSB 25 would make valid cost comparisons impossible by requiring the Alaska Power Authority to use assumptions which, even if they were they best possible assumptions today, would probably be false and misleading at the time any particular feasibility determination was made.

The provisions of §5 are not even valid today, however, and seem to be expressly designed to give misleading results. The combination of (A) "a general inflation factor for construction and operating costs of seven percent annually" and (C) "an escalation factor for measuring the comparative cost of oil, gas or coal; the rate to be applied is 11 percent annually . . " implies a long-term increase in constant-dollar fuel prices of about 4 percent. This is a highly questionable estimate for future oil-price escalation, and a grossly excessive one for future coal and natural gas prices in Alaska.

The assumptions stipulated in the Senate bill may have been deliberatedly selected to favor hydro projects over coal, oil, or gas-fired projects, even where expected life-cycle costs in an unbiased analysis would favor thermal generation. If this is to be the policy of the legislature, the proper way to express such a policy is directly and openly with a provision that "the hydroelectric or other renewable energy project with the lowest constant-dollar life-cycle cost of electricity shall be the preferred alternative unless the average constant-dollar life-cycle cost of power from the hydroelectric or other renewable energy project exceeds that of the best fossil-fired alternative by [say] 15 percent or more."

Legislation such as §5 of SB 25, requiring the Alaska Power Authority to assume that two and two make five will serve no legitimate public purpose. It would utterly destroy the credibility of the Authority's feasibility determinations, and would very likely compel a future legislature that wanted to understand a proposed appropriation to contract for its own unbiased analysis.

State Ownership of State-Subsidized Power Projects
A Return to the State's Investment

All new state-assisted electrical generating plants will be built and owned by the Alaska Power Authority, and financed with appropriated equity, revenue bonds, or both.[8] The Authority may either (a) operate such plants and sell the power to utilities at wholesale, (b) contract for utilities to operate the plants in behalf of the Authority, which would sell the power at wholesale, or (c) lease the plants to the utilities.

In each case, the utility will pay the Authority a wholesale price for electricity, or a lease payment for the plant made up of (a) all fixed and variable costs incurred by the Authority in connection with the project, including operation and maintenance costs, depreciation, interest on debt, and return to appropriated equity at market rates[9],

8. Some of the rationale for State ownership of State-subsidized projects is set out in the Power Authority's "Proposed Energy Program for Alaska" (undated). The Authority will have responsibility for financing and construction, because as the representative of all the people of Alaska, it is presumably less responsive to local pressures to build oversized, goldplated, or otherwise non-optimal projects at State expense.

9. There are three reasons to require payment of a return on State-supplied equity: (a) A market rate of return to appropriated equity reflects the actual life-cycle cost of the project to the people of Alaska; ignoring or discounting this cost can give misleading signals and lead project sponsors to select excessively capital-intensive technologies or oversized projects, when some alternative could produce the same power at lower costs. (b) Part of the earnings on State-supplied equity can be used to offset the cost of providing 500 kwh per month free to each residential consumer. (c) Funds will be needed in the future for expansion and replacement of electrical generating facilities, and for other public purposes, but the State's long-term oil-revenue outlook is uncertain; the return of and on equity can build up a reserve fund for future energy investments.

less (b) credit for the value of all electricity consumed under the lifeline quotas of the utility's residential customers.

The Power Authority would schedule return of and on the State's equity investment so as to reduce unreasonably high front-end power costs, and to levelize constant-dollar electric rates over the project's life.[10]

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9 (continued). The rate of return on an amount of appropriated equity which, together with externally-bonded debt, accounts for less than 75 percent of project cost, would be the AAA utility revenue bond rate at the time of financing; the rate of return on equity contributions in excess of 75 percent of project cost would be the AAA utility revenue bond rate plus 2 percentage points.

Providing a direct subsidy for one part of a project's fixed costs, and charging a full market rate of return for the remainder as proposed here is in principle equivalent to a below-market interest rate for the whole investment, as provided in the House Resources Committee bill. Isolating the subsidy element is the better policy, we believe, because it is easier to determine the amount of the subsidy and who benefits from it.

10. One of the obstacles to revenue-bond financing of hydropower and other capital-intensive generating technologies in Alaska is the fact that conventional financing and ratemaking methods result in highly "front-end-loaded" debt-service schedules, which require electric rates in the first few years of project life to be several times higher than the project's long-term constant-dollar average cost per kwh. Governor Hammond's power project financing proposal includes one method for levelizing project debt-service in constant dollars. Earlier proposals by the Authority and Tussing contained alternative means for accomplishing the same end.

re: Hydro

/ Swick & Plain / Rhode

4/13

Senate bill - grants

Gov bill - equity grants

levelized payback

Rhode plan - a) 1/2 cost of project as grant
1/2 must be taken to bond market
rigorous cost estimates
rigorous economic analysis

b) feasibility studies are moved out of APA
to Off of Gov

If project can't make it w/o some bond market tea
What can Senators live with - they want individual credit

Gov looking at overhauling office

Need 2 lines of defense - feasibility stud
- bond market

Costs of electricity - substitute subsidy on good projects

"not everyone lives in the shadow of a dam."

Mark

Alaska State Legislature

Senate

Office of the President

Official Business

Pouch V
State Capitol
Juneau, Alaska 99811

April 17, 1981

Dear Legislator:

I do not like to be critical of my colleagues; however, a member of the House of Representatives recently sent you a letter questioning the necessity of $500 million for hydro development. In all fairness to this critical issue, I felt it necessary to respond because this legislation provides the first step in creating an energy-independent Alaska.

The statistic he used that electrical generation presently is 12% of the total Alaskan energy consumed is blatantly false. In some rural areas, it is only 12%; however, by way of example, the railbelt consumes as much as 30%. Practically speaking, the average for the state as a whole is closer to 20%.

He indicated a concern that low cost electricity will create a demand for electricity for heating homes and operating cars. It would certainly have that effect. However, I see that as a great plus because it will transfer the energy consuming patterns from being based on diesel or gas, nonrenewable resources, to electricity, a renewable resource.

He argues that low cost energy (electricity) will double or triple the amount of capacity of these projects. He has consistently attacked the hydro projects because of their excess capacity. In fact, by his own admission he has criticized the project in his own district (Swan Lake) because of its excess capacity. This excess capacity simply means that these projects would be used more efficiently from the start.

His closing statement that $500 million funding for the various projects in Senate Bills 25 and 26 is a "flash in the pan" is ridiculous. A typical hydro project has a life expectancy of approximately 100 years.

It is a common fact that these projects will hold their value better than the dollars would. For the sake of argument, let's assume

that the "doom and gloom" people are correct in that by the year 2000 we will not have the revenue that could be used to finance future projects. As a practical matter, the value and the potential revenue these projects represent could be pledged along with proposed new projects that are needed at that time and obtain absolutely the very best bond rating for raising the needed revenue. Once the initial investment in these projects is made, the state has perpetually created a base from which to raise money whenever it is needed for future projects.

In closing, I would like to leave you with this most critical point: the energy proposal does not propose to solve all the energy problems of the State, and no one has claims it will. It is the first step in the development of a complete energy plan that will provide the necessary energy needs for future generations of Alaskans.

The ultimate solution to some of our energy needs are not even known yet.. The fact that the hydro proposal does not solve every energy problem must not be permitted to be accepted as an excuse for not doing what we can now. Gregg Erickson recently completed a study for the Legislative Affairs Agency titled, Natural Gas and Electric Power: Alternatives for the Railbelt. In considering possible alternatives to the Susitna Project, he noted that it will "produce power for centuries, whereas the life of Alaska's known gas resources, as any reasonably projected rate of consumption, are measured in decades." We should not allow imprudent legislation to take the place of a program which can provide up to 50% of our energy needs for future generations of Alaskans.

Sincerely,

Senator Jalmar Kerttula
Senate President

JK/GT/aj

STATE OF ALASKA
THE LEGISLATURE

LEGISLATIVE AFFAIRS AGENCY

POUCH Y · STATE CAPITOL
JUNEAU, ALASKA 99811
907-465-3800

MEMORANDUM April 20, 1981

SUBJECT: HCS CSSB 26 (Resources)

TO: Representative Terry Gardiner
Attn: Mark Wittow

FROM: John B. Chenoweth
Legislative Counsel

You cannot do anything about it in this appropriations bill, but you may want to verify that the two legislative committees receiving substantial sums in this bill have authority to operate during the forthcoming interim. Specifically, is it clear that the Joint Gas Pipeline Committee and the [House] Special Coal Committee are constituted with the powers of interim committees?

I should take the opportunity to remind you, again, that Sec. 32, appropriating for road construction, does not fit the bill title. I suspect the governor has an excuse to veto this appropriation not because it is without merit but to hold harmless the rest of the bill against a claim that it contains matter not noted in its title, a violation of Article II, section 13.

JBC:ljb

Enclosure

Bob -
This went to me by mistake
MW

Original sponsors: Kerttula, Ziegler, Ferguson, et al

Funding Information

General Fund	$572,202,500
Other Funds	-0-
	$572,202,500

IN THE SENATE BY THE RESOURCES COMMITTEE

HOUSE CS FOR CS FOR SENATE BILL NO. 26 (Resources)

IN THE LEGISLATURE OF THE STATE OF ALASKA

TWELFTH LEGISLATURE - FIRST SESSION

A BILL

For an Act entitled: "An Act making appropriations to various state agencies for energy-related programs and projects, and repealing an appropriation for a hydroelectric project; and providing for an effective date."

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

* Section 1. The sum of $309,100,000 is appropriated from the general fund to the power project fund of the Alaska Power Authority (AS 44.83.170) for loans in the amounts specified for the following listed power projects:

(1)	Green Lake	$ 52,500,000
(2)	Ouzinkie	1,700,000
(3)	Port Lions	1,400,000
(4)	Snettisham (Crater Lakes)	4,500,000
(5)	Solomon Gulch	29,000,000
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(7)	Terror Lake	100,000,000
(8)	Tyee Lake	55,000,000

* Sec. 2. The sum of $14,624,500 is appropriated from the general fund to the power project fund of the Alaska Power Authority (AS 44.83.170) for a loan to the Fairbanks North Star Borough for the following purposes:

(1)	energy management program	$ 12,152,077
(2)	solar collector retrofit	1,211,760
(3)	waste heat greenhouses	1,260,663

* Sec. 3. The sum of $6,795,000 is appropriated from the general fund to the Alaska Power Authority for Fairbanks district heating.

* Sec. 4. The sum of $4,000,000 is appropriated from the general fund to the power project fund of the Alaska Power Authority (AS 44.83.170) for a loan to Alaska Electric Light and Power Company for construction of transmission lines.

* Sec. 5. The sum of $3,000,000 is appropriated from the general fund to the power project fund of the Alaska Power Authority (AS 44.83.170) for a loan to Alaska Electric Light and Power Company for rehabilitation of Salmon Creek II.

* Sec. 6. 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. 7. The sum of $2,000,000 is appropriated from the general fund to the power project fund of the Alaska Power Authority (AS 44.83.170) for acquisition of a right-of-way for and design and construction of an electrical transmission system connecting Craig and Klawock.

* Sec. 8. The sum of $5,800,000 is appropriated from the general fund to the power project fund of the Alaska Power Authority (AS 44.83.170) for acquisition of a right-of-way for and design and construction of an electrical transmission system connecting Petersburg (Tyee Lake power project) and Kake.

* Sec. 9. The sum of $200,000 is appropriated from the general fund to the Alaska Power Authority for construction of a single ground wire return between Kotzebue and Shungnak.

* Sec. 10. The sum of $215,000 is appropriated from the general fund to the Alaska Power Authority for construction of a single wire ground return transmission line between Napaskiak and Oscarville.

* Sec. 11. The sum of $5,600,000 is appropriated from the general fund to the Alaska Power Authority for reconnaissance studies for proposed power

project sites for the following rural communities: Akhiok, Ambler, Angoon, Aniak, Atka, Atkasook, Brevig Mission, Buckland, Chefornak, Chignik, Chignik Lagoon, Chignik Lake, Chuathbaluk, Cold Bay, Craig, Diomede, Elim, False Pass, Galena, Golovin, Goodnews Bay, Grayling, Gustavus, Hoonah, Hooper Bay, Hydaburg, Ivanoff Bay, Kalskag, Kaltag, Karluk, Kiana, King Cove, Klawock, Kotlik, Kotzebue, Koyuk, Larsen Bay, Lower Kalskag, Mekoryuk, Metlakatla, Newtok, Nightmute, Nikolski, Nome, Old Harbor, Perryville, Ruby, St. Mary's, St. Michael, St. Paul, Savoonga, Scammon Bay, Shageluk, Shishmaref, Shungnak, Stebbins, Teller, Tenakee Springs, Togiak, Toksook Bay, Tununak, Unalakleet, Unalaska, and White Mountain.

* Sec. 12. The sum of $30,850,000 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)	Bethel regional study - Kisaralik	1,000,000
(2)	Black Bear Lake	2,000,000
(3)	Bradley Lake	4,000,000
(4)	Chester Lake	1,000,000
(5)	Chakachamna Lake	1,000,000
(6)	Grant Lake	1,000,000
(7)	Power Creek	700,000
(8)	Susitna	18,100,000
(9)	Takatz Lake	50,000
(10)	Tazimina Lake	2,000,000

* Sec. 13. The sum of $440,000 is appropriated from the general fund to the Alaska Power Authority for a feasibility study of the Fairbanks district heating extension.

* Sec. 14. The sum of $996,000 is appropriated from the general fund to the Alaska Power Authority for a feasibility study examining design and construction of an electrical transmission system between Hoonah and Juneau.

* Sec. 15. The sum of $42,000 is appropriated from the general fund to the Alaska Power Authority for a feasibility study examining the rehabilitation and improvement of hydroelectric facilities for Pelican.

* Sec. 16. The sum of $4,500,000 is appropriated from the general fund to the Alaska Power Authority for a feasibility study and design for the Lake Elva hydroelectric project.

* Sec. 17. The sum of $20,000 is appropriated from the general fund to the Alaska Power Authority for payment as a grant to the City of Fairbanks for sewer plant energy conservation and management.

* Sec. 18. The sum of $400,000 is appropriated from the general fund to the Alaska Power Authority for payment as a grant to the Kuskokwim Native Association for electrification projects in Chuathbaluk, Crooked Creek, Sleetmute, and Stony River.

* Sec. 19. 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. 20. The sum of $10,000,000 is appropriated from the general fund to the Alaska Power Authority for the rural electrification revolving loan fund.

* Sec. 21. The sum of $5,000,000 is appropriated from the general fund to the Alaska Power Authority for geothermal well drilling at Unalaska.

* Sec. 22. The sum of $4,000,000 is appropriated from the general fund to the Department of Administration for payment of rural electrification grants to municipalities.

* Sec. 23. The sum of $1,580,000 is appropriated from the general fund to the Department of Commerce and Economic Development, division of energy and power development, for programs under AS 44.33.030 - 44.33.060, to be allocated as follows:

(1) preparation of state energy plan $500,000

(2) regional energy planning 100,000
(3) state-federal liaison 100,000
(4) citizens' information and assistance 100,000
(5) data collection and computer application 700,000
(6) professional seminars 80,000

* Sec. 24. The sum of $12,800,000 is appropriated from the general fund to the Department of Commerce and Economic Development, division of energy and power development, for energy conservation refunds, grants and audits, to be allocated as follows:

(1) performance of energy audits $4,000,000
(2) energy conservation grants and refunds 8,800,000

* Sec. 25. The sum of $16,200,000 is appropriated from the general fund to the Department of Commerce and Economic Development, division of energy and power development, for regional energy planning, energy audits, weatherization and conservation, community training, and reconnaissance studies under the low-income energy conservation program.

* Sec. 26. The sum of $20,000,000 is appropriated from the general fund to the Department of Commerce and Economic Development, division of small business loans, for alternative energy and energy conservation loan programs, to be allocated as follows:

(1) alternative energy and energy conservation loans $10,000,000
(2) alternative energy business loans 10,000,000

* Sec. 27. The sum of $2,400,000 is appropriated from the general fund to the Department of Community and Regional Affairs for the bulk fuel storage facilities grant fund (AS 44.47.145).

* Sec. 28. The sum of $1,000,000 is appropriated from the general fund

to the Department of Community and Regional Affairs for payment of rural electrification grants to unincorporated communities.

* Sec. 29. The sum of $200,000 is appropriated from the general fund to the Department of Education for teacher training and curriculum development and for satellite television relating to energy-related subjects in elementary and secondary school curricula.

* Sec. 30. The sum of $60,000 is appropriated from the general fund to the Department of Natural Resources for an aquifer drilling project at McGrath.

* Sec. 31. The sum of $2,300,000 is appropriated from the general fund to the Department of Natural Resources for a northwest Alaska coal resources investigation.

* Sec. 32. The sum of $2,650,000 is appropriated from the general fund to the Department of Transportation and Public Facilities for construction of a road between the Nome area road system and Pilgrim Hot Springs.

* Sec. 33. The sum of $550,000 is appropriated from the general fund to the Department of Transportation and Public Facilities for installation of coal-fired heating systems in the schools of the Railbelt and Delta-Greeley regional educational attendance areas.

* Sec. 34. The sum of $250,000 is appropriated from the general fund to the Office of the Governor for the fuel emergency fund (AS 44.19.052).

* Sec. 35. The sum of $350,000 is appropriated from the general fund to the University of Alaska for energy conservation improvements.

* Sec. 36. The sum of $150,000 is appropriated from the general fund to the University of Alaska for upper division and graduate courses related to energy courses and professional studies.

* Sec. 37. The sum of $200,000 is appropriated from the general fund to the University of Alaska, division of community colleges and rural education, for development of energy studies within community college curricula.

* Sec. 38. The sum of $500,000 is appropriated from the general fund to the University of Alaska, division of community colleges and rural education, for vocational and job training programs related to energy.

* Sec. 39. The sum of $6,400,000 is appropriated from the general fund to the Alaska Energy Center for research, development, and demonstration projects.

* Sec. 40. The sum of $3,330,000 is appropriated from the general fund to the Alaska Energy Center for the following feasibility studies relating to energy projects of the center:

(1)	Angoon tidal power project	$ 500,000
(2)	Kodiak waste heat cogeneration project	2,500,000
(3)	Kotzebue district heating and coal utilization study	100,000
(4)	Kotzebue waste heat study	150,000
(5)	Mary's Igloo -- design of an energy efficient community in conjunction with relocation	50,000
(6)	St. Mary's waste heat and district heating study	30,000

* Sec. 41. The sum of $500,000 is appropriated from the general fund to the Alaska Energy Center for wind reconnaissance studies and research statewide.

* Sec. 42. The sum of $1,100,000 is appropriated from the general fund to the Alaska Energy Center for the following projects:

(1)	Pilgrim Hot Springs geothermal test well	$ 700,000
(2)	Sheldon Point wind project	300,000
(3)	Skagway construction of wind	

generating system 100,000

* Sec. 43. The sum of $2,000,000 is appropriated from the general fund to the Legislative Council for the House Special Committee on Coal for a feasibility study concerning site selection and rail and road connections for a major coal export facility.

* Sec. 44. The sum of $300,000 is appropriated from the general fund to the Legislative Council for the Joint Gas Pipeline Committee for a study of alternative methods of transporting Prudhoe Bay natural gas to market.

* Sec. 45. Section 1(1), ch. 54, SLA 1980 is repealed.

* Sec. 46. The unexpended and unobligated portion of the appropriation made to the Legislative Council in sec. 43 of this Act lapses into the general fund June 30, 1982.

* Sec. 47. Section 23 of this Act takes effect on the effective date of an Act entitled "An Act establishing assistance and information programs on energy in the Department of Commerce and Economic Development; and providing for an effective date."

* Sec. 48. Sections 26 - 28 of this Act take effect on the effective date of an Act entitled "An Act relating to departments and programs of state government which are concerned with energy; and providing for an effective date."

* Sec. 49. Section 44 of this Act takes effect on the effective date of an Act or resolution by which the First Session of the Twelfth Legislature directs its Joint Gas Pipeline Committee to prepare a report concerning alternative methods of transporting Prudhoe Bay natural gas to markets.

* Sec. 50. This Act takes effect immediately in accordance with AS 01.-10.070(c).

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

MEMORANDUM

TO: Sen. Jay Kerttula
Sen. Ed Dankworth

FROM: Rep. Terry Gardiner

DATE: April 15, 1981

RE: Energy

Here's starting from scratch.

THE GOALS:

A. Invest large sums of surplus State cash in renewable energy (targeting on hydro)

B. Insure enough funds in future years for (i.e. Susitna and future energy projects)

C. Make sure only good projects are built

D. Lower extreme high energy costs in rural Alaska in short run and long run

Specifically, I am starting to draft a plan according to the above goals and following the outline below:

A. Cash fund existing energy projects ready to go to construction.

B. These projects would make an equity payment for the life time of the project when the projects are operational (the rate will be determined by matching it to needs for future projects and future subsidies for rates)

C. Rural subsidy set at 200% of average State electrical rate

1. interim finance by State appropriation to Power Production Assistance Program
2. long-term finance from equity return program

D. Review APA to make sure we have economic projects with this new plan.

Also I am reviewing the schedule of funding to complete all stages of Susitna construction to insure funding will be available for that project.

1.) Fund conservation & weatherization

2.) G.F. Power Prod

3.) Fund R+D

HYDRO

Alaska State Legislature

Speaker of the House of Representatives

Official Business

Pouch V
State Capitol
Juneau, Alaska 99811

MEMORANDUM

TO: Representative Terry Gardiner, Co-Chairman
House Committee on Resources

FROM: Representative Jim Duncan
Speaker of the House

DATE: April 13, 1981

RE: Equity Return Financing for Hydro-Electric Projects

One of the most critical issues facing this and subsequent legislatures is the need to provide reliable, low-cost power to citizens of the state, for this and future generations. Development of our renewable hydro-electric resources can give us the opportunity to do this. I think it is important that the benefits derived from hydro-electric power be equitably distributed to provide parity in power costs on a statewide basis. Therefore, at my request, Eric Yould and Terry McGuire have developed a financing proposal for hydro-electric projects based on a fixed rate of return on equity. It appears to be a sound, viable alternative to both grant and loan financing, as it provides not only a return on our investment but, when fully operational in 1989, equity in power costs for all Alaskans as well.

As envisioned, projects built with state capital and owned by the state (APA), would be required to return a percentage of the project value annually to APA over the useful life of the project. At a 5% rate of return, for example, local utilities operating the facilities could cover operation and maintenance expenses and forward the remainder to APA. The Authority estimates that if all the projects listed on page two of the attached summary were operational, wholesale power could be produced for 3.8¢ per kilowatt-hour (without Susitna), while still allowing a 5% return on equity, less an average of 1.5% for annual operating and maintenance expenses.

This figure (3.8¢) would be the wholesale power rate charged for Green Lake and Solomon Gulch when they come on line in 1982, with money from the equity return used to bring the wholesale cost of power from these projects down to this amount. When Swan Lake and Lake Tyee come on line in 1984, followed by Terror Lake in 1985 and Bradley Lake in 1986, sufficient power will be produced to allow a 3.8¢ wholesale charge per kilowatt-hour, with the additional revenue produced by a 5% return on equity then being available to subsidize power production costs and other energy-related projects (i.e., conservation, weatherization, etc.) on a statewide basis. The basis of this is the fact that the larger projects will produce much larger amounts of power at a cheaper wholesale rate than the initial (Solomon Gulch and Green Lake) projects. In this sense, the program is dependent on a few large power producers which have readily available markets.

It should be emphasized that the 3.8¢ per kilowatt-hour rate is for wholesale costs. Only power production is subsidized, with the retail rate to consumers being adjusted upward to account for the varying distribution and administrative costs incurred by the different local utilities to whom the wholesale power is sold. It would then be in the interest of the local utilities to encourage and promote conservation, efficient management practices and distribution to control their retail rates. Susitna start-up in the 1990's would both increase the amount of return on investment and lower wholesale power costs from 3.8¢ to 3¢ per kilowatt-hour. Susitna is the long-term anchor in this program.

The funds generated by an equity return would be available by legislative appropriation for essential and related energy programs such power production assistance, weatherization, development of other renewable energy resources, enforcement of building codes and other projects which promote the efficient use of energy while subsidizing the rates of those who must continue using expensive energy such as diesel. This program would create the mechanism to not only reduce energy costs statewide but also create parity in energy costs on a statewide basis when the projects on page 2 are fully operational in 1989.

Success of an equity return scheme depends on state ownership of projects, a strong commitment to energy conservation, development only of feasible projects, and in all likelihood, a separate rate structure for industrial users.

I strongly support an equity return method of hydro-electric financing in concept, realizing that many details are yet to be worked out. I would strongly recommend that this method of financing be worked into a committee substitute for SB 25. I think it will answer the Senate's desire for direct investment, while at the same time provide the state with a return on investment over the life (not just 30 - 50 years) of a project. All of the projects listed on page 2 of the attached summary are feasible under an equity return scheme, indicating that the feasibility of future projects would be protected as well.

I have asked Legislative Attorney Billy Berrier to draft the appropriate language for inclusion in SB 25 establishing the program at a 5% return on equity.

I urge consideration of this concept by the Resources Committee and would be willing to appear before the Committee in support of the concept.

JD:jp

Attachment

ALASKA POWER AUTHORITY

ENERGY PROGRAM FOR ALASKA (EPA)

The following pages are an attempt to address diverse energy issues, concerns, and strategies with a comprehensive program. It has the potential of being supported by all Alaskans, eliminate regional differences, provide reasonable cost energy statewide, and ensure financing of energy development. The potential benefits to Alaskans could exceed the benefits provided by other distribution programs of the state's non-renewable income.

The institutional framework exists to establish this program, as do the revenues to finance the program. It would require legislation to empower the Public Utilities Commission and the Alaska Power Authority to implement some aspects of the program.

The program should be evaluated today while major decisions on state investment in, or subsidy of, capital intensive renewable energy projects are being debated. The program should be comprehensive and rational, provide equitable benefits to all Alaskans and regions of Alaska, and provide a basis for sound decisions and future development. The program would not produce results overnight. The projects which may be developed would require years to construct, and the benefits of the program could only be distributed as the return on state investments increase. In the meantime, financial resources are available and means can be found to meet near-term needs until such time as the program is fully functioning.

This paper analyzes some implications of a comprehensive state subsidy of power development. A major impact of the program would be to lower energy costs statewide to benefit all Alaskan consumers. The program would also levelize the power production cost of energy statewide. This analysis would not have been performed in previous years when limited state assistance in financing of power project was considered. Today, there is considerable support for state investment in, and subsidy of, renewable energy projects in the form of low interest loans or grants. program of state investment can provide reasonable cost energy for all areas of Alas It can promote economic development and provide a benefit that directly impacts the disposable income of Alaskans without being subject to taxation. A program of this nature would be unique in that it has never been, to our knowledge, attempted on a statewide basis anywhere else in the United States. The question is, how can the distribution of the benefits from state investment in renewable energy projects be equitably distributed to all Alaskans?

The Power Production Cost Assistance Program was created to address the current high cost of energy in predominantly rural areas of Alaska. This program, no matter what its ultimate form may be, was established in the Power Authority since there was some consideration that operating subsidies provided through the program could be, eventually, offset by capital investment in renewable energy development. Although, the concept is commendable, the fact must be recognized that for many areas of rural Alaska, the most ecomomic solution may be limited to weatherization, increased efficiency in diesel generation, and waste heat utilization. This situation will make termination of the Power Production Cost Assistance Program extremely difficult, particularly since Alaskans in these areas would not receive the benefits of state investment in renewable energy projects.

In past years, the concept of raising the cost per kilowatt hour of energy sold from power projects owned by the state by an amount necessary to subsidize rural energy costs was not supported since state assistance in development of the projects was not significant. However, if state assistance increases significantly, a policy to equitably distribute the benefits of state investment could be established. The renewable energy projects represent a state resource in most cases, and they do not necessarily exist for the benefit of a single community or region. State investments in energy should to the extent possible equitably benefit all Alaskans. But this investment has implications beyond the ability to equitably distribute the benefits. It will encourage economic development which must be controlled, and industrial energy demand should not necessarily be provided the same benefits from state investment in power projects as other classes of Alaskan consumers, except when it will create an industry that would otherwise not materialize and has an overall positive state benefit. It will also provide less incentive for conservation, when conservation through increased efficiency and weatherization may be in many cases the most economically feasible area for state investment or subsidy. Therefore, any policy which artifically lowers the price of energy must support an effective program of energy conservation.

A policy of state investments must be directed only toward projects which are economically feasible, to include both renewable energy generation projects and conservation. The potential size and impact of transfer payments for rural operating subsidies and conservation measures from a return on state investments could be substantial. The following analysis is based upon current dollar estimates and is intended to illustrate the program and issues surrounding it.

In FY 82, the Power Production Cost Assistance Program is estimated to cost approximately $4.5 million as it is presently established. The program is funded with general fund appropriations. Assistance could be expanded in various ways by broadening the base of eligible customers, by increasing the percentage of assistance beyond 85% of the portion of power production costs eligible for assistance, or by lowering the base power production cost escalator from 7¢ to 6¢. Any one measure or a combination of these measures could increase the FY 82 cost of the program to $10, $20, or even $30 million per year. Assuming the latter figure, there is also potential for price induced increases in demand, which could be assumed over time to cause the cost of the program to increase significantly to, perhaps, $90 million per year. General fund appropriations for this program would be extremely difficult to continue.

If the State invested in renewable energy projects, it would be possible to establish an equity return on that investment. The advantage of an equity return is that it can be established to minimize the cost of energy impact on the consumers of energy from the project, and provide a constant source of revenue to fund other programs, like the Power Production Cost Assistance Program and conservation. Where as a grant provides no return and a low interest loan provides a limited return for the 30 to 50 year repayment period, an equity return continues for the useful life of the project. The amount of this return in current dollars based upon a 5, 7, and 9% equity return on the construction cost of various projects is shown below. The equity rates of return approximate the principal and interest payments respectively on 3.0%, 5.7%, and 8.0% loans for a 30 year term to finance construction. The table is in millions of 1981 dollars.

Project(s)	Capital Construction Cost (1981 $)	Annual Equity Return 5%	7%	9%
Black Bear Lake	$ 28.0	$ 1.40*	$ 1.96	$ 2.52
Tazimina	123.0	6.15*	8.61	11.07
Bradley Lake	170.0	8.50	11.90	15.30*
Green Lake	55.0	2.75	3.85	4.95*
Port Lions	1.4	.07*	.10	.14
Solomon Gulch	68.0	3.40*	4.86*	6.12
Chester Lake	9.0	.45	.63*	.81
Terror Lake	85.0	4.25	5.95*	7.65
Lake Tyee	60.0	3.00	4.20*	5.40
Swan Lake	87.0	4.35	6.09*	7.83
SUB-TOTAL	$ 686.4	$ 34.12	$ 48.15	$ 61.79
Susitna	3,500.0	175.00	245.00	315.00*
TOTAL	$4,186.4	$209.12	$293.15	$376.79

The above table does not reflect all the potential projects which may be found feasible and subsequently developed. The table does not reflect that from 1% to 2% of the capital construction cost will represent the annual Operation and Maintenance costs for each project. In addition, the cost of energy from individual projects, due to varying project costs per kilowatt or the amount of excess capacity in the early years of operation, may not permit the same rate of return for each project at initial operation. The asterisks in the table for each project represent an estimate of the return that would be possible without adversely impacting the cost of energy in each project area in the early years of operation. Clearly, the potential exists to more equitably distribute the benefits of state investment in energy projects. Without Susitna, an expanded Power Production Cost Assistance Program could be funded with the equity return on feasible energy projects. Including Susitna, power costs could be considerably reduced or stabilized statewide with a potential for a return to the general fund.

If all projects were funded with grants, the wholesale cost of energy would only have to recover the annual operation, maintenance and administrative costs of the projects, or approximately 1.5% of the capital costs of construction. The grant funding alternative would require $10.24 million in revenue from the projects excluding Susitna, and $70.54 million including Susitna. The wholesale cost of energy in cents per kilowatt hour for this situation (which is equivalent to an equity return rate of 1.5%) is depicted below along with the cost of energy for various other rates of return.

	1.5%	5%	7%	9%
Without Susitna	1.3	3.8	5.4	6.9
With Susitna	1.1	3.0	4.2	5.4

Under the 5% return situation, $34.12 million is recovered excluding Susitna, and $209.12 million is recovered with Susitna. Of the return with Susitna, $70.54 million would again pay for O&M and administration, and $138.58 million would be available for power production cost assistance, conservation, new project construction, or a return to the general fund.

The various rates of return are illustrated to demonstrate the approximate wholesale cost of energy from the system, and the amount of the generated return which could be made available for alternative purposes. The overall rate of return could be adjusted to provide statewide benefits through other projects and programs and still result in a low cost of energy. Again, the rate of return associated with individual projects could be established in direct relation to the economic feasibility of the project and the relative power production costs in the project market area.

Many actions would be necessary to implement this statewide program.

1. State investment should only be made in those projects that are economically feasible. If a community or region can be provided electric power in a least cost manner only through more efficient diesel generation and conservation, then state assistance should be provided to stabilize the cost. The assistance would be through a power production cost assistance program and a conservation program funded with the return on equity from projects which were feasible for development.

2. The projects developed through state investment must be owned by the state as capital projects of the state. Individual projects can be leased for operation and maintenance to utilities in the market area served by the projects. It is necessary to establish the project owner as the state since the renewable resource projects would be constructed with state funds (non-renewable income), the renewable resources should benefit all Alaskans, and a common wholesale power cost for the energy produced from all projects could only be established for those projects owned by the State.

3. With lower energy costs, the demand for energy could increase in areas of the state currently experiencing the highest cost of energy production. It is likely that conservation efforts would be diminished unless energy efficiency standards for building construction are adopted, diesel generation efficiency standards are adopted, and energy conservation programs are strongly supported. Examples may include inefficient use of electric heat in poorly weatherized

buildings, or poor maintenance and inefficient use of diesel generation. Electric heat could be restricted to buildings that meet certain standards and where it is a more efficient use for heating purposes. A minimium of 8 kwh's per gallon of fuel could be established as a standard for diesel generation, and efficiency that is attainable for even small diesel generators. Individual consumers who fail to meet the weatherization standards for electric heat could be charged a premium, and communities which fail to maintain and efficiently operate their diesel generation could be provided assistance based solely on the minimium efficiency standards.

4. Separate rate structures for industrial uses could be established to either encourage or discourage industrial consumption dependent upon state policy. However, this policy would have to be consistently applied and studied further before it is established.

Both the Power Production Cost Assistance Program and the Energy Conservation Program could be continuously funded from the return on the economically feasible renewable resource projects. The opportunity exists today to establish Alaska's renewable energy future. State investment in renewable energy could prove to be a valuable State asset for the future. The program could equitably distribute benefits in the form of reasonable cost energy to all Alaskans. The capital energy projects of the State are an infrastructure investment which can provide a measurable return to the State and its residents while assisting in economic development.

This conceptual program would not impact the existing generation, transmission and distribution systems of the retail utilities. Local control would be maintained wherever possible. The project selection and development process would be controlled as currently provided in A.S. 44.83 and in Power Authority regulations. Only the feasible projects based upon technical, economic, and environmental evaluation parameters would be proposed for State investment.

Swick & Plains's ?
testimony ?
we want to sell bonds
but . . .

Duncan – penalizes good project
subsidizes bad projects

50% grants – 50% loans – interest rates

Pure Endowment →
use earnings
not principle

No ceiling on total amount of bonding

[illegible]

construction cost overruns

grants/equi loans → ratepayers → other state residents

regionally adjust per capita formula

PROJECT FINANCING
tax-exempt
arbitrage

grant → project ← revenue bond to project
↓
to enough & make project viable
app. 30%

equal amount deposited in PF
to provide interest earning for PF

Need limit on amount that can funded
50%
flat edict better

Only way to screen out some projects

create bureaucratic
team – separate feasibility studies

interest rates → can act as screen

double earnings
(taxable earnings
tax-exempt rate)

① Certain projects will get built
② low rates
③ bonds taken care of
($ for future)

Sponsor for large $ → but const. limit on spending

~~Pam~~ - please return
Royce to me

This has funding for district projects in it - see p. 4

MW

JOSEPH McINTIRE
Executive Director

SKIP ROY
Technical Director

Alternative Energy Technical Assistance Program

1577 "C" Street
Anchorage, Alaska 99501

Phone 277-5151

FUND REQUEST

1982

The Alternative Energy Technical Assistance Program, Inc. requests $161,500 for FY-82 to continue and expand its programs in order to meet the large number of requests for its services.

AETAP was funded by the Alaska State Legislature in 1980 to provide the bridge between interested decision makers around the state and the practicing alternative energy professional community. The appended quarterly report of the Technical Director summarizes the projects AETAP has facilitated during its first three months of operation. It was envisioned as an "action organization", with a committment to springboard as many projects into existence as possible, utilizing its funds and staff to help small businesses, government agencies, individuals and non-profit corporations plan and implement alternative energy programs. The central philosophy of the AETAP Board of Directors is to limit the number of projects carried out in-house to a minimum, thus freeing staff time and funds to facilitate projects. This also avoids unfair competiton between AETAP, a state-funded non-profit corporation, and private businesses.

In addition to serving as a catalyst for projects, AETAP is providing the following services:

- Promoting statewide awareness of the technical and economic feasibility of alternative energy technologies by one-on-one counselling with decision makers, by facilitating educational forums on existing alternative energy projects, by teaching technical classes at the community colleges, and by facilitating seminars for alternative energy professionals.

- Promoting the mainstreaming of alternative energy technologies into the relevant professions-planners, architects, engineers, government agencies, builders, real estate appraisers and sales, and financial officers.

- Providing technical counsel and referral services for existing alternative energy businesses.

- Increasing the number of qualified alternative energy professionals working in Alaska.

- Providing direct technical and hands-on counselling to DOE/AT and Northern Technology Grant recipients (on referral from the Division of Energy and Power Development).

- Providing critical analysis and evaluation for state energy policy development.

- Identifying barriers to the development of alternative energy in Alaska, including implementation of existing state programs, and working to remove them.

- Serving as a clearing house for project information, people seeking employment and those needing employees with an alternative energy background.

- Facilitating neighborhood groups interested in energy projects, including energy-efficient food production.

This request for FY-82 will increase AETAP's professional/ technical staff to three, with a fourth person as half-time clerical and half-time research assistant. The new technical position will be working in the field with grant recipients and other individuals who have initiated alternative energy projects and need additional design or hands-on knowledge in order to complete their projects. Among the projects AETAP hopes to facilitate next year are an energy demonstration project in conjunction with a Point McKenzie dairy farm, a summer intern program for college students interested in alternative energy, a state policy ensuring good energy conservation standards for federally subsidized rural housing, and facilitating developemnt of a communications network for local energy-efficient food production projects. AETAP openly seeks suggestions for needed projects from everyone and will devote the remainder of its efforts to facilitating programs suggested to us.

The resume of the Acting Director is also appended.

1982 Budget Summary

Salary, Leave, Benefits	$118,290.00
Travel and Transportation	15,000.00
Services and Contractual	24,110.00
Commodities & Supplies	1,700.00
Education and Reference Material	1,200.00
Equipment Capitalized	1,200.00
TOTAL	$161,500.00

For further information, please contact:

Skip Roy, Acting Director
Alternative Energy Technical Assistance Program
1577 "C" Street, Suite 298
Anchorage, Alaska 99501
(907) 277-5151 / 279-8215

QUARTERLY PROJECT SUMMARY, April 6, 1981
Technical Director
Alternative Energy Technical Assistance Program

The Technical Director is currently involved in the following projects:

Anchorage Integral Urban House

This project was initiated by Skip Roy during October, 1980 and was brought to AETAP by him on January 5, 1981. Funding commitments have been received from the Division of Energy and Power Development and the Alaska Energy Center. Funds in hand total $100,000 of discretionary funds provided by Clarissa Quinlan, D.E.P.D. These funds are being handled by Don Markle, Contracts Officer. Markle has asked Skip Roy to select a five-person interim board to decide how the project should be structured. Besides Roy and Markle, commitments have been received from Sharon Davidoff, architect, and Ann Wieland, Science Coordinator, Anchorage City Schools. Other candidates include Jeff Lowenfels, garden columnist, Anchorage Daily News, (and local attorney), and Mrs. Lowell Thomas. A large Advisory Committee will be selected by the board. The first stage in planning the project will be to bring consultants from the New Alchemists to Alaska for brainstorming. Authorization for this is in process and final arrangements will be announced soon.

Anchorage Solar Home Tour

This project, initiated by AETAP, is actively co-sponsored by AERC, AAE, and the Energy Extension Service, and passively sponsored by a number of professional groups such as the Multiple Listing Service, the Alaska Home Builders Association, The American Society of Landscape Architects. The date is May 2, 1981. A one credit hour class will be offered through Anchorage Community College starting April 15. This class will meet for four 2-hour sessions before the tour, include the tour, and then meet for two 2-hour sessions after the tour. Public speaking arrangements have been arranged for two of the passive sponsor organizations, and at least three others will be scheduled. Permission has been received from one homeowner and is expected from three others this week.

Anchorage Solar Feasability Study

This project was instigated by Skip Roy during September, 1980 discussions with Bob Shipley, Western Sun's Alaska representative. This is a $10,000 contract; AETAP has been selected, but no contract has been signed. A copy of AETAP's proposal is appended. AETAP will instigate a strong community participation effort in conjunction with this project by training as many interested citizens in the process of solar site assessment as possible. The goal is to locate and assess at least 300 homes with solar potential and then inform the owners of the possibilities. If a large enough pool of projects emerge, efforts will be coordinated with one of the business development projects to start a solar construction and installation firm. Discussions with the Alaska Public Interest Research Group holds promise for joint efforts in the community outreach aspects.

Alternative Energy Projects for the Alaska State Park System

The State Parks are seeking funding to include three alternative energy projects in the 1981 construction budget. Chip Dennerlein, head of parks, and Sandy Rabinowitch, Facilities Planner, have met with the Technical Director to select three possible projects and develop budget proposals for the Legislature. Projects include retrofitting passive solar into the Morgan's Landing Ranger Station, wind power for water pumping at Clam Gulch, and an $8,000,000 wind and solar Administration and Public Use Facility for Kachemak Bay State Park on the Homer Spit. AETAP has also supplied technical information on these projects to the appropriate legislators. By incorporating alternative energy into an existing agency budget, we have been able to make wind and solar consideration part of standard planning processes, thus profiting from the educational benefits without creating separate "Demonstration Projects."

Bering Straits Native Corporation Wind Project

This project was referred to AETAP by AERC. Bob Whisenhunt, Director of Ancillary Business Development, BSNC, determined that alternative energy represented the best business opportunities for BSNC as a result of standard business planning procedures. He had no previous interest in alternative energy and the decision was based on profit motives. After a series of conversations, a meeting between Whisenhunt and Mark Nevell was arranged. They are currently developing a $60,000 feasability study to examine franchise manufacturing of a leading wind generator in Anchorage. If results are positive, BSNC may commit $5-10 million to the project. Skip Roy has been asked to work with Whisenhunt on an advisory capacity as the project continues.

Local Food Production

Recent meetings in Juneau with staff of the Small Agriculture Subcommittee have resulted in incorporation of several important projects in pending legislation. First, the idea of a library of high latitude agriculture literature, translation, indexing, digesting and distribution has been made part of a new position in the Division of Natural Resources. Second, a program of $50,000 grants will be available for rural and urban community gardening projects. Third, the subcommittee will try to have a state-wide meeting of garden project leaders so they can develop an organizing structure. And fourth, they are seeking state land for a combined research and demonstration facility. The committee will be operating as an interim committee through the summer. Discussions with Sue Greene, Governor Hammond's Aide on Commerce, revealed that Bob Palmer, Director of Agricultural Development is being pressured by the Governor to include plans for local food production. This is a result of efforts by Sue Greene and Bella Hammond. Sue Greene was placed in contact with the Small Agriculture Subcommittee by AETAP and they are working together on pending legislation. A related project, a Point McKenzie Energy Demonstration Farm is being pursued in conjunction with the Audobon Society. This is still in an incipient phase, pending outcome of legal action.

Anchorage Alternative Energy Hands-On Shop

This project, originally suggested as an in-house AETAP project for 1982, has been placed on Senator Fischer's priority list for funding. We are providing funding levels and back-up documentation to Sumner Putnam, Fischer aide. It is fairly certain to be funded; it will be necessary to find an existing non-profit to carry out the project.

McGrath Community Plan

The planning firm of Parbyshire & Associates has asked for assistance in including alternative energy in the development plan for McGrath. Initial discussions indicate that some education will be necessary in addition to providing a bridge to existing experts. Discussions are underway to make alternative energy a standard item in their planning menu.

Solar Planning Seminar for the Alaska Chapter, American Society of Landscape Architects

Work with Sandy Rabinowitch on the State Parks project has resulted in an invitation to address the local A.S.L.A. meeting on April 7, 1982. Landscape architects are traditionally the professionals responsible for the siting of houses and other aspects. Rules of thumb and economics will be presented, hopefully using the Homer Spit Facility (State Parks) as a working example.

Solar Planning, State Division of Lands

This project is a result of a year long effort by Susan Heikkala, formerly a planner, DNR, Terry Dale, formerly with DEPD, and Skip Roy. Contact with Ted Smite, Director, Division of Lands, led to a meeting with the Planning Committee. At that time, Helen Neinhauser, Director of Planning, appointed Bill Betlock of the South Central office as liason. The project will actually begin on April 6, with choice of a 1982 unit for solar planning. This unit will serve as a basis for developing solar planning constraints for all future disposal.

Village Energy Demonstration Project

AETAP is providing technical consultation to Rural CAP to develop a proposal for a large scale energy retrofit project, incorporating all possible local energy resources into one demonstration village. The Alaska Energy Center has committed a large sum for this project.

THE ANCHORAGE SOLAR FEASIBILITY STUDY

A Proposal by

The Alternative Energy Technical Assistance Program, Inc.

The Alternative Energy Technical Assistance Program (AETAP) proposes to determine statistically the number of residential applications for active solar space heating, active solar water heating, passive solar space heating and passive solar water heating that exist in the Anchorage area. In addition, AETAP will donate in-kind services in order to carry this project beyond the level of study outlined in the scope of work.

Outline of Work

These tasks are essential for meaningful results:

Task 1: Determine the month-by-month net Btu yield of each of the four technologies, using nationally-recognized state-of-the-art, Alaska-specific computer programs developed by Davis Alternative Technology Associates, via phone link (Telenet) from Anchorage to Davis and Berkeley, California. (The computer facilities of Wind Systems Engineering will be used as Anchorage terminal, word processor and data processor.)

Task 2: Determine the calendar period of relevance by subjecting the results of Task 1 to detailed economic analysis.

Task 3: Select a statistically valid sample population of 300 sites using a simple cartesian process utilizing a map base as opposed to a name-list. This is important because site-specific solar access is determined by a combination of physical geography and the built environment, not economic or ethnic population demography.

Task 4: Perform a field visit to each site, recording solar access and obstructions for each of three possible collector sites: roof mount, south wall mount, and separate collector (garage, yard or other). Recording will be photographic, utilizing a standard SLR 35mm camera with a special reticle that superimposes the Anchorage sun chart. Photographic records of the south facade of the building will also be collected in order to assess physical problems that might be present in solar retrofitting.

Task 5: Analyze and summarize the data into a format suitable for use in developing a small business marketing plan using the Alaska Renewable Resource Corporation guidelines. This process will weigh such site factors as bare branch and leaf shading coefficients, natural reflectance, and nature of the existing building.

Task 6: Select areas of Anchorage with high solar potential and develop a map outlining them. Define combinations of physical geography and the built environment that yield high solar potential. Develop planning rules of thumb and guidelines in cooperation with the municipal planning authorities. Outline areas of future growth potential that have high solar potential.

Task 7: Prepare a 10-page report designed for real estate developers, financial community, municipal officials, and entrepeneurs presenting the findings in an easily understood graphic form. The technical and statistical research will be available as appendices.

AETAP believes that the great inherent value of the study as outlined above will be greatly enhanced by the following in-kind service contributions by AETAP staff:

Task 8: Train 20 community people in solar site selection and evaluation; in return, each person will be asked to locate 10 houses with good solar potential, thus creating a bank of potential applications.

Task 9: Each site with good potential located by Task 5 and Task 8 will be contacted outlining possibilities for projects, available state and federal subsidies, sources of further information, and design and construction firms specializing in solar products and projects.

Personnel:

AETAP believes that one of the major difficulties in AE development in Alaska is the lack of suitably trained professionals working in the state. AETAP will use this contract as a lever to bring a solar energy specialist with a national reputation to Alaska as a project manager and researcher. Bruce Melzer, a solar consultant who worked in Alaska for about 6 months in 1979-80 has agreed to relocate permanently in Alaska after managing the project (see attached resume'). He is recognized as a national

solar consultant who worked in Alaska for about 6 months in 1979-80 has agreed to relocate permanently in Alaska after managing the project (see attached resume'). He is recognized as a national authority on solar access and planning, solar retrofit hands-on programs, as well as being a professional journalist and photographer. He has great experience in interpreting computer analysis and has managed several projects with budgets in excess of the $10,000 available for this project. Melzer has suggested that he personally perform the solar research, the field work, the analysis and the reporting in order to thoroughly familiarize himself with the access and construction problems, to maintain the highest possible control over the data, and to minimize overhead costs. Working with Melzer on an advisory basis will be Skip Roy, Technical Director of AETAP. Dr. Matt Berman, an energy economist very familiar Railbelt solar problems, will be hired as a consultant to provide economic structure and review, as well as statistical design consultation (see attached resume'). Marketing input, structure and control will be developed using Alaska Renewable Resource Corporation guidelines. Bob Whisenhunt, director of Ancillary Business Development for Bering Straits Native Corporation, has agreed to act as an advisor on the business developing and marketing aspects of the project. He brings 16 years experience in all aspects of business development, planning and financing to the project. He has recently completed a study of alternative energy business opportunities for BSNC. Financial coordination will be by the AETAP budget process, which is identical to the state budgeting procedure, insuring maximum accountability. Joe MacIntire, Executive Director of AETAP will have ultimate financial responsibility.

For clarification or further information contact:

Skip Roy, Technical Director
Alternative Energy Technical Assistance Program, Inc.
1577 "C" Street, #297
Anchorage, Alaska 99501
277-5151(W) 276-0711(H)

CHARLES "SKIP ROY
Technical Director and Acting Executive Director
Alternative Energy Technical Assistance Program
1577 "C" Street, #298
Anchorage, Alaska 99501
(907) 277-5151 / 279-8215 / 276-0711

DATE OF BIRTH: February 22, 1945

MARITAL STATUS: Unmarried

ALTERNATIVE ENERGY EXPERIENCE:

January 1981 - Present

Technical Director and current Acting Executive Director, Alternative Energy Technical Assistance Program, Inc., a state funded non-profit corporation.

May 1979 - January 1981

Founder and Manager, Alaska Renewable Energy Associates (formerly Alaska Solar Project).
Projects include:
The Homer House, Alaska's first passive solar home
Energy Conservation package for Cutler residence
Passive Solar Addition for the Homer Middle School
Passive Solar for Delta Junction Community Education Building
Dillingham Elderly Housing Project-Passive Solar Feasibility
Passive Solar for Petersburg Elderly Housing Project
Economic Feasibility of the Double Envelope House, 6 Alaskan cities
Energy Conservation for Kake, Chevak and Kwethluk Headstart Schools
Wind Generator for Chevak - project supervision in progress
Solar Research, Development and Education package for Weatherization staff, Rural CAP
Passive Solar Design Seminar, Copper Center Branch, Prince William Sound Community College and Anchorage Community College
Eaglewood II, preliminary calculations for Jimmy Anderson, Architect
Energy-efficient greenhouse design for 12 Alaska communities in progress D.O.T.P.F./Rural CAP
Malick double-envelope greenhouse addition, Juneau
Passive Solar home designs in Anchorage area for Frichtl, Weeldreyer, Buehl, Schleiff, Stogsdill, Puckett, Kimball, Dotson, Whitney and Wallace Mann residences.
Design Analysis for Thompson residence
Steering Committee, First Alaskan Alternative Energy Conference
Resource Person, Citizen's Participation Conference, Energy Committee
Horizontal to Vertical & Tilt Conversion Computer Program "HV", for 17 Alaska Communities
Breadbox hot water heater construction project, Palmer, Alaska
Passive & Active Solar for the Bethel Senior Citizens Community Center
Technical Reviewer, 1980 Department of Energy Appropriate Technology Grant Program
Power Alternatives Subcommittee, Alaska Legislature
Wind Power Potential for Railbelt Area
Passive Solar Feasibility for Railbelt area research document
Funding proposals for Conservation, Renewable Energy Research & Development, Demonstration, Education and Outreach.

Alternatives to Susitna, subcontract to Battelle N.W., Inc.
Village Energy Reconnaisance Study: Shungnak, Kiana, and Ambler,
Subcontractor.

August 1978 to June 1979

Davis Alternative Technology Associates, Davis, California.
Project Manager, Energy Analyst, Writer/Editor.
Projects include:
California Energy Code Compliance calculations, 24 buildings.
Impact of Passive Solar, 6 major growth areas of California.
Passive Solar Tax Credit Development, Analysis & Critique.
Breadbox hot water heater design, analysis and installation,
Farm Labor Center, Indio, California.
Monitoring Project/Maeda-Nittler Residence.
Passive Solar Media Package (Preliminaries).
Experiment design for underground pipe cooling project.
Underground house monitoring project.
Double envelope house monitoring project.
Alaska Research Project.

February 1978 to August 1978

Living Systems, Winters, California, Writer/Editor.
Planning Solar Neighborhoods draft, Winner of a national award for energy conservation, 1978, for American Society of Planning Officials and HUD.
Base line research document for 2 HUD publications:
Site Planning for Solar Access, HUD PDR 481.
Solar Access for Residential Development, HUD PDR 485.
The Suncatcher & The Cool Pool, with Jonathan Hammond.

PREVIOUS EXPERIENCE INCLUDES:

Farming/Homesteading, Georgetown, Arkansas, 1971-1978.
Surveying, Ozark Mtn. Surveyors, Huntsville, Arkansas, 1975-1978.
Concrete Construction and Management, Fritz Concrete, 1973-1974.
Teacher, Science and Math, Elkins Public Schools, 1972-1973.
Archeology, Geology & Speleology
Various expeditions and project employment, 1965-1978.
Commercial Diver, Ft. Lauderdale, Florida, 1968-1971.
Copper tube bending and other factory work.

EDUCATION INCLUDES:

Graduate work in Archeology, University of Arkansas.
B.S., Indiana University, 1971, concentration in Geology,
Anthropology and Creative Writing.
Senior Research Project: "Fredericksburg Cave, Hydrology and Stratigraphic Control of Cavern Formation." Dean's List, 1971.
Other Publications include about 25 articles on cave exploration and speleology, including 6 national awards. 50,000 words completed on novel in progress.

REFERENCES ON REQUEST

STATE OF ALASKA

OFFICE OF THE GOVERNOR

DIVISION OF POLICY DEVELOPMENT AND PLANNING

POUCH AD
JUNEAU, ALASKA 99811
PHONE: 465-3573

April 16, 1981

Honorable Hugh Malone
Alaska State Legislature
Pouch V
Juneau, Alaska 99811

Dear Representative Malone:

I would like to invite you and your staff to attend a briefing on the status of the Railbelt Electrical Power Alternatives Study. The briefing will be conducted by the prime contractor, Battelle Northwest Laboratories, and will describe the purpose and design of the study and progress made to date. While a firm date and location have not yet been established, we expect to hold the briefing during the second week in May. Notices will be posted around the Capitol announcing the time and place of the briefing.

The Railbelt Electrical Power Alternatives Study is part of the State's effort to investigate the hydroelectric potential of the Susitna River, as well as other alternatives available to meet the electrical power needs of Alaska's Railbelt region. During the 1979 session of the Alaska Legislature, $8.2 million was appropriated to the Alaska Power Authority to begin a feasibility analysis of developing the hydroelectric potential of the Susitna River. In September, 1979, a major engineering and construction firm, Acres American, Inc., was selected to perform this Study and work commenced. During the 1980 session, an additional $12.2 million was appropriated for further phases of the Study. However, $1.365 million of this amount was appropriated to the Office of the Governor for the purposes of obtaining an independent assessment of all viable alternatives for providing electric power to the Railbelt. The appropriation specifically requested that the assessment of alternatives be deleted from the Acres American contract to insure the appearance as well as the substance of an impartial study of alternatives.

In late June, 1980, Governor Hammond established an interagency committee to manage the Railbelt Electrical Power Alternatives Study. The Committee consists of: Mr. Ron Lehr, Director of the Division of Budget and Management; Ms. Clarissa Quinlan, Director of the Division of Energy and Power Development; Mr. Charles Conway, Chairman of the Board of Directors of the Alaska Power Authority; and Ms. Frances A. Ulmer, Director of the Division of Policy Development and Planning. In addition to oversight of the "Alternatives Study," the Committee has responsibility for management of the Cook Inlet Tidal Power Study which was funded by the 1980 Legislature. The Committee has retained the services of Arthur Young and Co. of Anchorage to serve as Project Manager for these studies. The Project Manager is responsible for the day-to-day administration of both studies, for insuring coordination among interested parties, and for providing other staff services to the Committee as needed.

During July, 1980, existing staff in the four agencies represented on the Policy Review Committee cooperated in preparing a request for proposals which was mailed to approximately 125 engineering, economics, and planning consulting firms throughout the nation. Advertisements were also placed in statewide and national newspapers. As the request for proposals required that proposals cover the entire Study effort and not simply individual tasks, firms were encouraged to joint venture to put together teams providing all of the necessary expertise.

On August 29, 1980 (the due date for proposals), fourteen proposals were received by the Committee. In order to keep the "Alternatives Study" on track with the concurrent Susitna Feasibility Study, an accelerated selection process was pursued. After intensive review by the staff, the Policy Review Committee on September 4, 1980, selected four proposals for more in-depth evaluation and oral presentations.

The four finalists brought their teams to Anchorage for a question and answer session with the Committee and the public. Immediately following these briefings, the Committee met and selected Battelle Pacific Northwest Laboratories as the prime contractor for the "Alternatives Study." Other members of the Battelle team include: the Institute of Social and Economic Research of the University of Alaska; Ebasco Services/Envirosphere Company (engineers); Haggard, Tousley, and Brain (attorneys); and Preston, Thorgrimson, Ellis, Holman, and Fletcher (attorneys). Additional subcontractors, including Alaskan firms and individuals able to provide Alaskan expertise, will be added to the team as necessary.

An important part of the "Alternatives Study" is a public participation program designed to allow interested Alaskan organizations and individuals to participate closely in the development of this Study. During the week of April 6, three workshops were held in Anchorage and Fairbanks to allow organizations expressing an interest in the electric power future of the Railbelt to comment on several aspects of the Study. During the week of May 4, Battelle will conduct a series of community meetings throughout the Railbelt to inform the general public about the Study and receive comments.

The Railbelt Electrical Power Alternatives Study is scheduled for completion in March, 1982, to coincide with completion of the Susitna Feasibility Study being conducted by Acres American, Inc., for the Alaska Power Authority. These two studies will provide the information needed by the Legislature and the Governor to make a decision about whether the State should proceed with development of the Susitna project or pursue other alternatives. Your active interest and participation in the development and review of this study will help to insure its quality and ultimate utility.

Sincerely,

Fran

Frances A. Ulmer
Director

Rogers
Cotten Gardiner
Duncan Fuller
Meekins Smith
Freeman Malone

Hydro 3/16

Hydro - ① Energy is one of few areas where we could put $ and get something back in return. Malone

Loans + grants - if they're free, everybody wants one unlimited demand Freeman + Rogers

+ market test

demand a function of interest

Coal adds more benefits than hydro

Hydro - just provides electricity

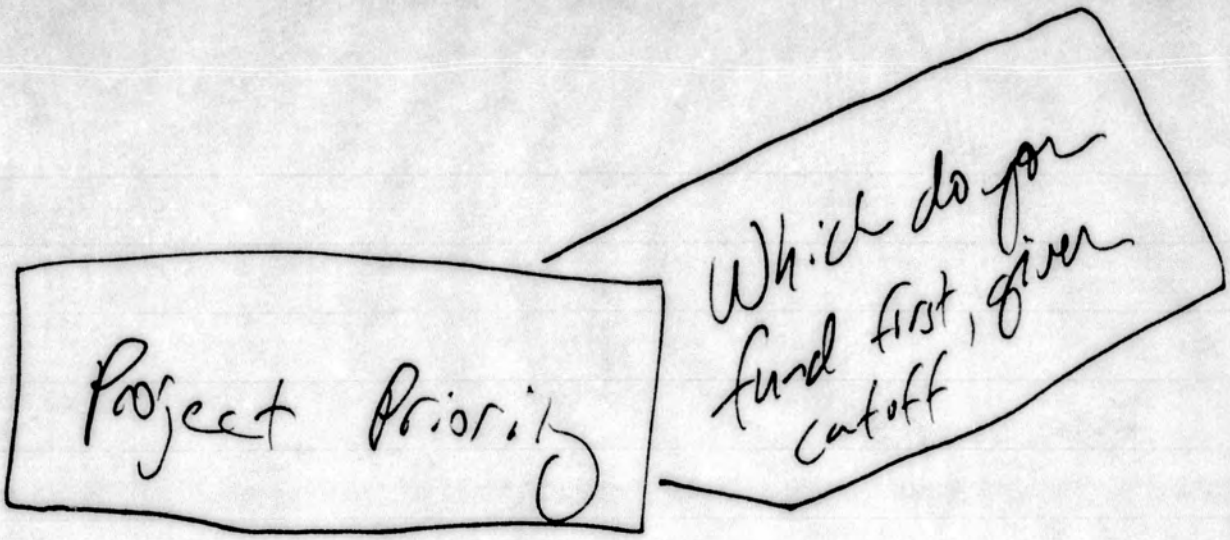
main need - transportation

Subsidy to equalize cost of power? Miller

Cotten - market tests needed / has APA turned down any projects

Gov's bill - equitable grants will provide some help in rates + levelized payback - 3% at beginning - 9% at end

Gardiner - problems w/SB 25 . . . .



① Payback – usual exceptions

② Which offers best returns / potential benefits

Consider benefits (ends) then select best project (means)

Original sponsors: Kerttula, Dankworth, Ziegler, et al

Offered: 3/5/81
Referred: Rules

IN THE SENATE BY THE FINANCE COMMITTEE

CS FOR SPONSOR SUBSTITUTE FOR SENATE BILL NO. 25 (Finance)

IN THE LEGISLATURE OF THE STATE OF ALASKA

TWELFTH LEGISLATURE - FIRST SESSION

A BILL

For 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."

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

* Section 1. AS 44.83.030(a) is amended to read:

(a) The authority shall consist of the following directors:

(1) four directors at large to be appointed by the governor and confirmed by the legislature;

(2) the commissioner of commerce and economic development;

(3) the commissioner of natural resources;

(4) the commissioner of revenue;

(5) the commissioner of transportation and public facilities;

(6) the commissoner of community and regional affairs.

* Sec. 2. AS 44.83.040 is amended to read:

Sec. 44.83.040. OFFICERS AND QUORUM. The directors [DIRECTOR] shall elect one of the directors at large as chairman and other officers they determine desirable. The powers of the authority are vested in the directors, and five [THREE] directors of the authority constitute a quorum. Action may be taken and motions and resolutions adopted by the authority at a meeting by the affirmative vote of at least five [THREE] directors. The directors of the authority serve without compensation, but they shall receive the same travel pay and per diem as provided by law for board members.

* Sec. 3. AS 44.83.110(g) is amended to read:

(g) When the authority has created and established a capital reserve fund, the commissioner of revenue may lend surplus money in the general fund to the authority for deposit in a capital reserve fund in an amount equal to the capital reserve fund requirement. The loans shall be made on such terms and conditions as may be agreed upon by the commissioner of revenue and the other members of the authority, including without limitation terms and conditions providing that the loans need not be repaid until the obligations of the authority secured and to be secured by the capital reserve fund are no longer outstanding.

* Sec. 4. AS 44.83.100 is amended by adding a new subsection to read:

(e) The authority shall issue bonds the principal and interest of which are paid only from the money derived from the project financed with the proceeds of those bonds for a power project previously financed from the power project development fund (AS 44.83.400). Bonds may be issued under this subsection only if

(1) the appropriations to the power project development fund for that power project, and interest earned on those appropriations, are insufficient to cover the cost of the power project; and

(2) the rate of interest which the authority will pay on the bonds is not more than alternative costs of securing money to pay for the power project.

* Sec. 5. AS 44.83.181(b) is amended by adding a new paragraph to read:

(5) a recommendation as to whether the proposed project is economically feasible; a power project is "economically feasible" if the authority determines that the total costs of the power project are cheaper for the estimated life of the project than other alternatives; in making a determination of economic feasibility under this paragraph, the authority shall evaluate the estimated life of the power project

and its alternatives applying the following standard factors:

(A) a general inflation factor for construction and operating costs of seven percent annually;

(B) an interest rate of 10 percent for money borrowed for the power project; and

(C) an escalation factor for measuring the comparative cost of oil, gas or coal; the rate to be applied is 11 percent annually, and the rate shall be applied to the current fuel cost at the date of determination of economic feasibility.

* Sec. 6. AS 44.83 is amended by adding new sections to read:

ARTICLE 8. POWER PROJECT DEVELOPMENT FUND.

Sec. 44.83.400. FUND ESTABLISHED. (a) A power project development fund is established in the Alaska Power Authority to carry out the purposes of AS 44.83.400 - 44.83.480.

(b) The fund includes

(1) all money appropriated to it by the legislature; and

(2) interest earned by investment of money in the fund by the Department of Revenue.

Sec. 44.83.410. USE OF FUND BALANCE. (a) The fund may be used by the authority to provide money for

(1) reconnaissance and feasibility studies and power project finance plans prepared under AS 44.83.177 - 44.83.181; and

(2) the cost of a power project, including but not limited to costs of acquiring necessary licenses, preparing engineering designs, obtaining land, and constructing the power project.

(b) Money in the fund may be used under (a) of this section only for a power project which

(1) meets the operation and revenue requirements of AS 44.-83.460; and

(2) operates or will operate

(A) on renewable energy resources; or

(B) on coal, peat or wood, if the authority determines that

(i) the source of the fuel for the project is abundant; and

(ii) renewable energy resources to operate the power project are not available or are not economically feasible; or

(C) on fossil fuel if none of the other resources or fuels listed in this subsection are economically feasible.

Sec. 44.83.420. INVESTMENT OF FUND. The Department of Revenue shall invest the balance of the fund which exceeds the amount the authority determines is necessary to meet requirements of AS 44.83.410 during the current fiscal year. An investment by the Department of Revenue under this subsection shall be made in accordance with AS 37.-10.070 and 37.10.075.

Sec. 44.83.430. ALLOTMENT TO PROJECTS. (a) The authority shall maintain records of power project allocations from the fund for each power project

(1) approved in accordance with AS 44.83.185; and

(2) for which an allocation is made from an appropriation made by the legislature without specifying a project.

(b) Income earned from investment of money appropriated to the fund under AS 44.83.400(b) shall be allotted by the authority to power projects for which appropriations have been made by law. The allotment shall be based on the amount of investment income earned during each state fiscal year in or after which the legislature has appropriated money to the fund. An allotment of income under this subsection shall

be made to each power project for which a specific appropriation has been made in proportion to the amount appropriated for that project as a percentage of the total amount appropriated by the legislature to the fund.

Sec. 44.83.440. REALLOCATION OF FUND BALANCE. (a) If a power project designated by the legislature by law is not constructed, the amount appropriated to it may be reappropriated to other power projects by the legislature.

(b) The legislature may allocate money under (a) of this section only for a power project which is economically feasible under AS 44.83.-181(b) if the project will serve the market area that is to be served by the power project designated by the legislature and not constructed.

Sec. 44.83.450. LAPSE OF EXCESS FUNDS. If appropriations for a power project exceed the amount required for construction of the power project, the excess lapses into the general fund.

Sec. 44.83.460. OPERATION AND REVENUE REQUIREMENTS. The authority may not use money in the fund for a power project unless the authority determines that, after construction, operation of the power project will provide revenue sufficient to cover

(1) operation, maintenance, and equipment replacement costs of the power project;

(2) debt service costs associated with the power project; and

(3) the costs of safety inspections and investigations of the power project by the authority.

Sec. 44.83.470. OPERATION OF POWER PROJECT BY QUALIFIED UTILITY. If, after construction, a power project that is constructed with proceeds from the fund will be operated by a qualified utility, the authority shall enter into an agreement with the qualified utility

(1) to assure that operation of the power project by the qualified utility will provide sufficient revenue to meet the requirements of AS 44.83.460; and

(2) to assure that the power project is operated in a safe manner.

Sec. 44.83.480. DEFINITIONS. In AS 44.83.400 - 44.83.480,

(1) "fund" means the power project development fund;

(2) "qualified utility" means any of the following which the authority determines is capable of operating and maintaining a power project of the kind and magnitude which has been constructed or is to be constructed to provide power for a market area:

(A) a corporation organized under the Alaska Nonprofit Corporation Act (AS 10.20);

(B) an electric cooperative organized under the Electric and Telephone Cooperative Act (AS 10.25);

(C) a utility owned and operated by a municipality; and

(D) a regional electrical authority (AS 18.57);

* Sec. 7. AS 44.83.410(b), added by sec. 6 of this Act, is amended by adding a new paragraph to read:

(3) upon completion, charges rates for power which it sells which provide a rate of return to the authority of seven percent a year of the amount allocated to the power project by the authority from the fund .

* Sec. 8. AS 44.83.460, added by sec. 6 of this Act, is amended by adding a new paragraph to read:

(4) payment to the authority of a rate of return of seven percent a year of the amount allocated to the power project by the authority from the fund.

* Sec. 9. AS 44.25.020 is amended by adding a new paragraph to read:

(5) invest and manage the balance of the power project development fund in accordance with AS 44.83.420.

* Sec. 10. Sections 1, 2, and 3 of this Act take effect immediately in accordance with AS 01.10.070(c).

* Sec. 11. Sections 4, 5, 6 and 9 of this Act take effect July 1, 1981.

* Sec. 12. Sections 7 and 8 of this Act take effect July 1, 1986, if on that date the total amount appropriated by the legislature to the power project development fund (AS 44.83.400) is less than $5,000,000,000.

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).

Original sponsor: Ferguson

Funding Information
General Fund $3,590,000
Other Funds -0-
$3,590,000

Offered: 3/4/81
Referred: Rules

IN THE SENATE BY THE FINANCE COMMITTEE

CS FOR SENATE BILL NO. 174 (Finance)

IN THE LEGISLATURE OF THE STATE OF ALASKA

TWELFTH LEGISLATURE - FIRST SESSION

A BILL

For an Act entitled: "An Act making supplemental appropriations to the Alaska Power Authority; and providing for an effective date."

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

* Section 1. The sum of $1,050,000 is appropriated from the general fund to the Alaska Power Authority, power production cost assistance fund (AS 44.-83.162), to cover costs of the power production cost assistance program for the fiscal year ending June 30, 1981.

* Sec. 2. The sum of $2,540,000 is appropriated from the general fund to the Alaska Power Authority for the study of the Susitna River hydroelectric project for the fiscal year ending June 30, 1981.

* Sec. 3. This Act takes effect immediately in accordance with AS 01.10.-070(c).

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

PROPOSED HOUSE ENERGY PROGRAM

I. POWER (ENERGY) PROJECT REVOLVING LOAN FUND

A. APPROPRIATION: $400,000,000
B. Fund shall be used as a financing source for the development of utility scale energy projects around the state
   1. May be used for reconnaissance studies, feasibility studies, pre-construction and construction phases
   2. Loans must be authorized by the Legislature
   3. All projects funded through the legislative process must go through the existing feasibility determination process under the statutes governing the Alaska Power Authority
   4. Renewable energy-based projects shall be given preference over those using fossil fuels
C. Governor shall submit annually in his budget a list of projects ready to be funded for reconnaissance, feasibility, and construction phases
   1. Feasibility shall be determined according to existing statutes (AS 44.83.181), a least-cost life-cycle formula, and responsible load growth projections
   2. Separation of powers in regard to planning and financing roles among state agencies, to prevent conflict of interest
   3. Equal consideration, perhaps in competitive arrangement between the Alaska Power Authority and the Alaska Energy Center, of large-scale, centralized power production, and small-scale, decentralized power proeuction
   4. Load growth analysis shall include end use analysis, which will include planning for energy conservation and best use of available energy resources
D. Loan terms
   1. Interest shall be (x) percent, determined to be the average return to the general fund over the past ten years
   2. Term of the loan shall be 35 years, but may be extended to 50 years
   3. Repayment may be delayed
   4. Repayment of interest shall be leveraged, providing for low interest rates in the beginning, gradually escalating over time
      a. This provides for low interest rates for today's residents
      b. Will tend to ensure that future residents help pay a more realistic share of the project cost
      c. Increasing rate base and inflation should offset the graduated increase in interest charges
E. Final bill should include, as the Governor's bill does, a mechanism to ensure that this leveraged interest payback does not unduly burden future residents of communities where growth does not meet projections, or if for some other reason residents cannot meet the debt obligation easily

II. ENERGY DEVELOPMENT FUND

A. APPROPRIATION: $50,000,000
B. Funds may be appropriated annually by the Legislature from the interest income of the fund for the Alaska Energy Center or other entity, for energy development projects which show promise to benefit the nation as a whole
   1. The fund is intended to be part of Alaska's commitment to help develop a secure national energy base, and to demonstrate that Alaska is using part of its oil wealth to benefit the nation as a whole
   2. The board of directors of the Alaska Energy Center and the governor may suggest to the Legislature projects which they consider appropriate for consideration
   3. Projects may involve research and development of technologies, demonstration projects, or commercialization of feasible projects
   4. Preference shall be given to renewable energy-based technologies, but may extend to any non-nuclear technology which offers measurable and cost-effective promise to reduce the nation's dependence on foreign fossil fuels
   5. Projects considered may be directed toward any manner in which energy is used or consumed, such as generation of electricity, transportation and other fuels, space heating or cooling, industrial processes, energy transfer or transport, archetecture, engineering, or community planning
C. The Governor shall submit annually in his budget requests for appropriation of the fund

III. ALASKA ENERGY CENTER

A. APPROPRIATION: $12,000,000; of which approximately half shall be a continuation of funding appropriated for FY 81, and half shall be new appropriation
B. Alternative Technology and Energy grant and loan fund shall be transferred to toe center; funding provided for FY 81 shall be carried over to FY 82
C. Management of state-funded demonstration projects and research and development
D. Archetectural design for northern climates
E. Fossil fuel research, development and demonstration (R, D & D)
F. Renewable energy and conservation R,D&D
G. Transportation fuel and technology R,D&D
H. Agricultural energy production and consumption R,D&D
I. Center for Innovation
J. Assist with Northern Technology grant program
K. Stabilizing rural Alaska's energy future (self-sufficiency)
L. Become fiscally self-sufficient for own operating budget within ten years
M. Create new businesses and jobs in Alaska's private sector

IV. RURAL ENERGY SELF-SUFFICIENCY and interim stabilization

A. APPROPRIATIONS: existing programs
1. Existing programs (funding is as appropriated in FY 81)
   a. Governor's fuel emergency fund (AS 44.19.179) $ 250,000
   b. Bulk fuel revolving loan fund (AS 45.87.010) 1,604,500
   c. Bulk fuel storage facilities grant fund (AS 44.47.140) 1,173,000 #2
   d. Power Production Cost Assistance Program (AS 44.56.162) 4,800,000
   e. SUB TOTAL $7,891,500
2. federal energy assistance program (administered by the Department of Health and Social Services; state will probably be required to pick up full costs 7,367,600
   a. program was funded in FY 81 with $7,183,800 in federal funds, and $183,800 in state match
   b. designed to assist low-income people pay their energy bills, both URBAN AND RURAL
   c. <u>funding figure shown indicates the entire state's account, both urban and rural</u>
   d. best way to offset this cost is through an effective weatherization and energy conservation program
3. SUBTOTAL: existing programs at FY 81 funding levels $15,259,100

B. APPROPRIATIONS: new programs (see below) 15,000,000

* C. TOTAL APPROPRIATIONS * $30,259,100 *
1. does not include project development costs, which will come from the POWER PROJECT REVOLVING LOAN FUND (see: I.A.)
2. does not include demonstration projects or other benefits to be derived from the ALASKA ENERGY CENTER (see III.)

D. NEW PROGRAMS: COMPREHENSIVE RURAL ENERGY DEVELOPMENT PLAN
1. Regional planning to assist communities, with technical assistance from the state
2. Energy audit program designed for rural application; complete community audit/weatherization program, to save implementation cost; will offset future fuel needs
3. Weatherization and retrofit, partially funded by the state on a sliding scale based upon ability to pay
4. Reconnaissance studies
5. Community involvement: education, employment, emphasis on local self-help and employment/training
6. Project development
   a. Demonstration projects by Alaska Energy Center
   b. Feasibility analysis and construction through Alaska Power Authority, Alaska Energy Center, etc.
   c. Entire communities would be considered as "projects," since the goal would be to integrate each community so as to minimize energy waste and develop new energy technologies adapted to local conditions and needs
7. Integrate energy-efficient design into new housing construction
8. Consider transportation energy component as integrated part of the whole.

V. ENERGY CONSERVATION

A. APPROPRIATION: $20,000,000
B. Audit, weatherization and retrofit program as exists in state law (AS 45.89.010-100)
C. State should extend its life-cycle costing requirements to include its vehicle fleet and other equipment (legislation to be introduced this session)

VI. STATE ENERGY PLAN

A. APPROPRIATION: $1,000,000
B. Plan to be prepared by the Division of Energy and Power Development
   1. Resource reconnaissance as energy resources apply to needs and potential utilization by nearby communities
   2. Technical assistance regionally, or to municipalities
      a. May contract with municipalities, regional associations, etc., for the regional/local plans to be done locally to meet requirements of the overall state energy plan
      b. May do the plans directly, in which case political subdivisions are required to cooperate
   3. Energy emergency preparedness as component of state plan
      a. Preparation of contingency action plan to meet localized, statewide, or national energy emergencies
      b. Several phases of energy emergency, only the most severe of which would require full use of emergency powers by the governor; others would be met with lesser authority (legislation to be introduced this session)
      c. Energy emergency planning to be done by DEPD and the Division of Emergency Services, Dept. of Military Affairs
   4. Energy data collection, interpretation, dissemination and retrieval
      a. DEPD is lead agency for energy planning,
      b. DEPD is state repository of energy data, with efficient retrieval system and dissemination process
      c. All state agencies involved in energy must cooperate with DEPD in this effort
      d. Confidentiality clause where appropriate to protect private or commercial interests under existing standards
   5. Plan to be completed as a high-priority need, and the top priority of the division

VII. ENERGY AGENCY REORGANIZATION

A. Existing administration of energy planning, research, development and other elements necessary to attack the state energy problems, suffers from a lack of direction and coordination, being spread over nearly every department of state government
B. Administrative reorganization is necessary, but is too complex to be tackled on a large scale this year; however some things can and should be done

(Agency reorganization, continued from page 4)

C. In 1980, the House of Representatives approached Governor Hammond to try to resolve the problem
   1. Gov. Hammond agreed that a problem exists, and assigned the problem to the Division of Planning and Policy Development (DPDP) in his office
   2. The House, through the House Research Agency, commissioned the National Conference of State Legislatures to investigate the problem
   3. There was agreement that these two efforts would be done on a cooperative, though separate, basis
   4. Results
      a. Governor's investigation: not yet available, though both DPDP and the Commissioner of Commerce and Economic Development are currently concluding their efforts
      b. House investigation (NCSL): NCSL found this project to be more complex than they had anticipated, and have suggested a two-phase approach with more work to be done next interim; however, their initial report is forthcoming and likely to be available before April

D. Suggested interim solutions
   1. Create a new position, Deputy Commissioner of Energy, in the Department of Commerce and Economic Development
      a. Prime duty: state energy planning function, as outlined in VI above
      b. work in conjunction with the Alaska Energy Center, the Alaska Power Authority, and the various departments with responsibilities in energy
         (1) Department of Natural Resources (resource mapping, resource leasing, permits, etc.)
         (2) Department of Environmental Conservation (lead agency in many permit application procedures for resource development; environmental protection, air and water quality, control over hazardous substances, etc.)
         (3) Department of Fish and Game (protection of game and fish and their habitat; permit application review, etc.)
         (4) Department of Military Affairs: Division of Emergency Services
         (5) Department of Health and Social Services (low-income and elderly energy assistance programs, some weatherization funds (federal))
         (6) Department of Transportation and Public Facilities (design and construction, energy auditing and retrofit, transportation research (currently), research into methods of energy conservation and power, heating, and lighting: etc.)
         (7) Department of Education (education curricula; design and construction of school and recreation facilities for the department
         (8) Department of Community and Regional Affairs (local government assistance, bulk fuel facilities, etc.)

(Agency reorganization, continued)

(9) University of Alaska (research and resource mapping)

2. Redefine the role of the Division of Energy and Power Development, and the division's responsibilities
   a. energy planning under the deputy director
   b. data bank
   c. liaisson with federal government, and with Alaskan communities, other agencies, etc., especially in regard to potential or actual impacts of federal proposals or policies
   d. energy education and public information
      (1) work with UA, the community colleges, and the Department of Education to develop energy education curricula for the public schools, CC and university programs (including graduate study), and vocational training programs in the energy field
      (2) work with UA, the CC's, and vocational schools to develop vocational education, professional seminars and other adult services
      (3) work with professions and trade unions to develop informational and educational programs to suit the needs of those who would attend
      (4) public outreach, information dissemination, referral services
   e. Energy Extension Service (existing, modeled after the agricultural extension service)
   f. state audit/grant/retrofit program implementation and oversight

VIII. ENERGY AS A FUNDAMENTAL PLANNING COMPONENT
   A. Extend life-cycle costing and energy efficiency standards now applicable to state construction, to include all aspects of state purchasing, such as its vehicle fleets where possible, equipment and appliance purchasing
   B. Adopt a program emphasizing energy end-use
   C. Energy demand should be a fundamental planning component when assisting the development of new industries and programs; including site selection, energy supply, availability, demand, and price impact; transportation modes and delivery systems, etc.
   D. Examples:
      1. Land disposal program: how to provide energy for remote parcels
      2. agricultural development: energy sources, supply and cost, and how this will relate to crop and livestock economics and the small family farm (energy costs are putting a record number of family farms out of business in the Lower 48
      3. fisheries development: remote ports, harbors and processing plants; vessel fuels; electricity and other energy needs (the U.S. shrimp fleet in the Gulf States are tied up and out of business because of fuel prices)

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Appendix #1

RURAL ENERGY PROGRAM

I. Regional planning
   A. Fundamental part of state energy planning effort
   B. Stress should be on local control, with technical support provided by state energy offices (DEPD, APA, AEC, APUC, etc.)
   C. Hire regional energy planners for each ANCSA region
   D. Planning based on local needs, local resources, and concept of end-use analysis and energy conservation in seeking options

II. Energy auditing
   A. Apply state auditing program to rural Alaska in an organized manner, community by community, as determined by the region
   B. Apply state grant and loan programs for weatherization/retrofit to rural Alaska in appropriate manner, as determined regionally
      1. Added costs must be taken into consideration
      2. Work to be performed by local residents to the ultimate extent possible, as determined regionally and by program contractors and contracting authority

III. Weatherization and retrofit
   A. Apply state grant and loan program, adapted for rural Alaska
   B. To be done on community-by-community basis, to take advantage of most cost-efficient means of accomplishing the goal
   C. Rural conditions must be taken into account
      1. Program cost will be more because of transportation of people and materials to isolated villages
      2. Materials must be ordered early, and in one lot, so most efficient and cost-effective transportation method can be used
      3. Impress upon the Governor the need to expedite administrative processing of this program, especially the first year, so the work can start before the winter stops work; by the second year, contracting and other procedures should be smoother and not in need of extraordinary pressure to meet this deadline
   D. Partial, but not total, financial assistance by the state
      1. State audit and basic ($300 plus perhaps a rural differential) grant program to be made available in the Bush thru program
      2. State to offset loss of federally funded weatherization programs if necessary, for low-income, elderly, etc.
      3. State loan program ($5,000 maximum, at 5% interest thru 1984) as a component of the financing mechanism
         a. grants may supplement 1 and 2 on a sliding scale based on ability to pay
         b. the ability of this program to offset other public assistence should be a criterion for determining the financial arrangements

IV. Resource Reconnaissance
- A. Collection of data on existing energy supplies, resources potentially available for use with renewable resources taking precedence; and on conversion processes, waste heat utilization and co-generation, end use analysis, existing and potential residential, commercial, and industrial demand
  - a. Energy audits will be part of this process
  - b. Focus will be to study each community as a complete energy system
- B. Demand forecast for residential, commercial, industrial, and public service (schools, city offices, recreational, health, utility) sectors, and for transportation requirements
- C. Development of most appropriate resource bases and technologies to create a stable energy delivery system, based on local preference, economics, resource supply and demand, end use, and other factors important to project development

V. Community involvement
- A. Education, both in schools and vocational institutions, and for members of the public as to what they can do to conserve energy, and why this will benefit them directly; including job training.
- B. Local employment is to be a primary consideration to the utmost extent possible
- C. Technologies adopted should be ones which can employ local people, either untrained or with public training (which is a component of the overall state energy plan)
- D. Village leaders and members of the community should be involved in deciding how best to resolve their energy problems in a manner that is consistent with their lifestyles, cultural considerations and traditions, and local needs and preferences

VI. Project development
- A. Alaska Energy Center
  1. Archetectural design for northern climates for new housing
  2. Integrated village energy planning (lead agency with the $$$)
  3. Energy demonstration projects, leading to commercialization with APA, ARRC, etc.
- B. Utility scale project development with existing technology where available, with APA as lead agency and AEC and other agencies providing integrated energy planning

- C. Integrated approach
  1. Power production
  2. Appropriate design for new housing
  3. village gardening as a component, including attached solar greenhouses and use of waste heat to warm soil for planting
  4. transportation component, unaddressed up to now
  5. Local social needs taken into consideration

VII. Continuation of existing assistance programs
A. Continue funding for power production assistance program
B. Continue funding for bulk fuel storage program, as necessary

VIII. Energy emergency preparedness, rural component (part of overall state energy planning process)

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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 23, 1981
(revises memo of March 20, 1981)

TO: Rep. Terry Gardiner
Co-Chairman

FROM: Bob Speed, BA.

RE: House energy plan: breakdown of delivery cost $513,259,100, tentative total

Your instructions were that the House Leadership estimates that about $500 million is available for appropriation to energy this year, and that I should base my assumptions on that.

My revised budget comes to $513 million, after correcting some estimates upward after further investigation, rather than the earlier figure of $499.8 million.

The breakdown is as follows:

$400,000,000	appropriation to the Power Project Rev. Loan Fund
50,000,000	appropriation to the Energy Development Fund
12,000,000	appropriated to the Alaska Energy Center
30,259,100	estimated for rural energy needs (basic services)
20,000,000	for the conservation audit/grant-refund/retrofit prog.
1,000,000	for development of a state/local energy plan
$513,259,100	TOTAL

I might add that the $400 million for the power project revolving loan fund is more than sufficient to cover the needs of expected project development this year, including reconnaissance studies for Bush communities, and feasibility studies, as well as construction funding for projects ready to be built.

These figures do not reflect departmental operating or capital budget requests for anticipated operations and projects for FY 82 which are requested in the Governor's budget request. The figures do not include costs of adding a deputy commissioner of energy in the Department of Commerce, or any other costs of restructuring the agency delivery system which is being discussed in various quarters.

Furthermore, any new demonstration projects legislators want to include would be at additional cost. These, however, should be discouraged this year, as the Energy Center is probably maxed out as far as its ability to handle additional work. The projects they plan should provide good results; further projects would probably only decrease their effectiveness.

12-1115
Chenoweth

IN THE HOUSE BY THE RESOURCES COMMITTEE

HOUSE BILL NO.

IN THE LEGISLATURE OF THE STATE OF ALASKA

TWELFTH LEGISLATURE - FIRST SESSION

A BILL

For an Act entitled: "An Act relating to energy: establishing a power project revolving loan fund in the Alaska Power Authority, transferring the alternate energy and technology loan fund, and establishing an energy development fund; and providing for an effective date."

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

* Section 1. AS 44.83 is amended by adding new sections to read:

ARTICLE 8. POWER PROJECT REVOLVING LOAN FUND.

Sec. 44.83.400. FUND ESTABLISHED. (a) A power project revolving loan fund is established in the Alaska Power Authority to carry out the purposes of AS 44.83.400 - 44.83.500.

(b) The fund includes

(1) all money appropriated to it by the legislature; and

(2) amounts paid, as principal and interest, on loans made by the authority from the fund.

Sec. 44.83.410. USE OF FUND BALANCE. The fund may be used by the authority to make loans for the cost of a power project, including but not limited to costs of acquiring necessary licenses, preparing engineering designs, and construction of the power project.

Sec. 44.83.420. ADMINISTRATION OF FUND. The authority shall make loans from the fund for purposes authorized by AS 44.83.410 for a power project designated by the legislature by law, in an amount determined by the legislature by law, if and the power project

(1) operates or will operate on renewable energy resources;

or

(2) operates or will operate on coal, oil, oil shale, natural gas, peat or wood, and the authority determines that renewable energy resources to operate the power project are not available in amounts sufficient to sustain the power project.

Sec. 44.83.430. INVESTMENT OF FUND BALANCE. (a) The Department of Revenue shall invest and manage the balance of the fund which exceeds estimated loan and grant requirements under AS 44.83.410 for the current fiscal year.

(b) An investment by the Department of Revenue under this subsection shall be made in accordance with AS 37.10.070 and 37.10.075. Income earned from investment of money appropriated to the fund shall be deposited by the commissioner of revenue in the general fund.

Sec. 44.83.440. DESIGNATION OF PROJECTS. (a) The provisions of AS 44.83.177 - 44.83.183 apply to power projects proposed for construction with a loan provided from the fund established in AS 44.83.400.

(b) The governor shall submit a proposal for a power project to the legislature. When the report of the division of budget and management examining the feasibility study and plan of finance is completed as required by AS 44.83.183, it shall be submitted to the legislature.

(c) The legislature shall consider and must approve each proposal for a power project. The legislature may approve a power project only by enacting law authorizing that project.

Sec. 44.83.450. LIMITATION ON ACTIVITIES OF AUTHORITY ON POWER PROJECTS. (a) The authority may not proceed with work on the engineering or design phase of a power project proposed by the governor under AS 44.83.440 until the legislature approves the proposed new project. However, the authority may proceed with the engineering or design work necessary to meet the requirements for submission of a license applica-

tion for the proposed new project to the Federal Energy Regulatory Commission without obtaining legislative approval of the proposed new project.

(b) The authority may not proceed with engineering, design, or construction of a power project not presented under AS 44.83.440 for which the legislature has appropriated money until a feasibility study has been completed in accordance with AS 44.83.181.

Sec. 44.83.460. ALLOTMENT TO PROJECTS. The authority shall maintain records of loans from the fund for power projects designated by the legislature.

Sec. 44.83.470. LOAN TERMS AND CONDITIONS. (a) Except as provided in (d) of this section, a loan for a power project under AS 44.-83.400 - 44.83.500 may not be made for a period in excess of 35 years.

(b) The average rate of interest on the entire outstanding balance of a loan made under AS 44.83.400 - 44.83.500 may not exceed the average rate of return to the state of amounts invested under AS 37.10.070 during the 10 state fiscal years preceding the date on which a law appropriating from the fund to the power project becomes effective.

(c) The authority shall make a loan for a power project under this section only if the borrower agrees to repay the loan in accordance with a graduated repayment schedule. The period during which the borrower's payments may increase, the rate of increase and the interest rate applicable shall be fixed for the term of the loan at the time of its origination. The amount of each payment may not be changed more often than once each year, and the first change may not occur sooner than one year after the due date of the first scheduled payment on the loan.

(d) When the rate of interest applicable to a loan installment due under (c) of this section equals the average rate of interest

determined under (b) of this section, the board of directors of the authority and the borrower may agree to extend the repayment schedule for the loan by not more than 15 years, with repayment to continue during the period in which the loan is extended at the rate of interest determined under (b) of this section. The duration of an extension agreed to under this subsection may not exceed a number of months necessary to obtain a rate of return for the loan equal to the rate of interest determined under (b) of this section. The commissioner of revenue must consent in writing to an extension of a repayment schedule agreed to under this subsection.

(e) Unless adjusted under (d) of this section, the interest payment calculated on any installment may exceed the average rate of interest determined under (b) of this section.

(f) Principal and interest payments payable on a loan made under AS 44.83.400 - 44.83.500 begin on the date that the borrower certifies to the authority that the power project for which the loan was made is producing power. The date for payment of the first installment on a loan may be postponed if the commissioner of revenue and the board of directors of the authority recommend a postponement, and the governor agrees to the postponement and notifies the legislature of his approval of the postponement.

Sec. 44.83.480. LOAN LIMITATIONS. The amount which may be loaned by the authority for a power project under AS 44.83.420 may not exceed the amount of money appropriated by the legislature to the power project.

Sec. 44.83.490. REALLOCATION OF FUND BALANCE. (a) Amounts repaid by a borrower for a loan made for a power project under AS 44.-83.400 - 44.83.500 may be reallocated to other power projects only by law.

(b) If a power project designated by the legislature by law is not constructed, the amount appropriated to it may be reallocated to other power projects only by law.

Sec. 44.83.500. DEFINITIONS. In AS 44.83.400 - 44.83.500,

(1) "fund" means the power project revolving loan fund;

(2) "graduated repayment schedule" means a loan repayment schedule having scheduled payments to be made directly by the borrower which begin at a level lower than that necessary to fully amortize the loan within its term and which gradually increase to a predetermined level, after which the amount of each payment remains constant.

* Sec. 2. AS 44.25.020 is amended by adding a new paragraph to read:

(5) invest and manage the balance of the power project revolving loan fund in accordance with AS 44.83.430.

* Sec. 3. AS 45.88.010 is amended to read:

Sec. 45.88.010. FUND ESTABLISHED. There is established in the Alaska Energy Center [DEPARTMENT OF COMMERCE AND ECONOMIC DEVELOPMENT] the alternative technology and energy revolving loan fund to carry out the purposes of this chapter. Loans made under this chapter may be used

(1) to develop means of energy production utilizing energy sources other than fossil or nuclear fuel, including, but not limited to, windmills, water and solar energy devices; and

(2) to develop and implement methods of energy production, waste disposal, recycling, food production, transportation, building design, and industrial enterprise which may be more efficient, less costly, and less energy intensive than those methods presently utilized and which are appropriate to the Alaska environment.

* Sec. 4. AS 45.88.020 is amended to read:

Sec. 45.88.020. POWERS AND DUTIES OF THE ALASKA ENERGY CENTER

[DEPARTMENT] IN ADMINISTERING THE FUND. (a) The Alaska Energy Center [DEPARTMENT] may

(1) make loans for the purchase, construction, and installation of alternative energy systems and for the development and implementation of more efficient, less costly, less energy intensive, and more appropriate technologies;

(2) promulgate regulations necessary to carry out the provisions of this chapter.

(b) The Alaska Energy Center [DEPARTMENT], in coordination with the Alaska Council on Science and Technology, shall develop eligibility standards for loans made under this chapter and adopt guidelines for the determination of loan terms.

* Sec. 5. AS 45.88.040(a) is amended to read:

(a) The Board of Directors of the Alaska Energy Center [COMMISSIONER] may sell or transfer at par value or at a premium or discount to any bank or other private purchaser for cash or other consideration the mortgages and notes held by the Alaska Energy Center [DEPARTMENT OF COMMERCE AND ECONOMIC DEVELOPMENT] as security for loans made under this chapter.

* Sec. 6. AS 46.12.120 is amended by adding new paragraphs to read:

(6) administer the alternative technology and energy revolving loan fund (AS 45.88);

(7) administer the energy development fund (AS 37.17).

* Sec. 7. AS 37 is amended by adding a new chapter to read:

CHAPTER 17. ENERGY DEVELOPMENT FUND.

Sec. 37.17.010. FUND ESTABLISHED. An energy development fund is established. The fund includes

(1) all money appropriated to it by the legislature; and

(2) interest earned by the investment of money in the fund.

. . .

Sec. 37.17.020. INVESTMENT OF FUND BALANCE. The Department of Revenue shall invest and manage the balance of the fund in accordance with AS 37.10.070. Income earned from investment of money appropriated to the fund shall be redeposited in the fund, unless appropriated by the legislature under AS 37.17.030.

Sec. 37.17.030. USE OF FUND BALANCE. The fund may be used

(1) as a source of appropriations for the operation of the Alaska Energy Center (AS 46.12); and

(2) for developing and implementing advanced energy technology which, in the judgment of the legislature, is of national significance.

Sec. 37.17.040. INCLUSION IN ANNUAL BUDGET. The governor shall include in the operating and capital improvements programs and plans which he recommends to the legislature under AS 37.07.020 his recommendations for use of the interest earned by the investment of money in the fund.

Sec. 37.17.050. DEFINITION. In this chapter, "fund" means the energy development fund.

* Sec. 8. This Act takes effect July 1, 1981.

3/2/81

DRAFT
Law

For an Act entitled: "An Act relating to power development financing."

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

* Section 1. AS 44.83 is amended by adding new sections to read:

Sec. 44.83.172. POWER PROJECT EQUITY FUND. (a) There is established the power project equity fund which is separate from any other money or funds of the authority.

(b) The equity fund consists of money appropriated by the legislature and interest earned from investment of money in the equity fund. The commissioner of revenue shall invest any surplus in the equity fund in the manner specified in AS 37.10.070.

(c) If the legislature approves a project as provided in AS 44.-83.185 and makes an appropriation from the equity fund for the project, the authority shall make a grant to a qualified utility. A qualified utility may receive more than one grant under this section. However, all grants received by a qualified utility under this section may not exceed $2,000 for each person residing in the service area of the project. The authority shall determine the population of the service area of a project based on the latest census prepared by the United States Census Bureau. If the power produced by a project will be sold to more than one qualified utility, the authority shall prorate the amount of a grant according to the percentage of use of the power by each qualified utility served by the project. The authority shall consult with the appropriate municipalities and utilities before it prorates a grant under this subsection if projects are interconnected.

(d) A qualified utility may only use a grant under this section to finance capital improvements for power generation or distribution systems. A grant under this section may not be used to pay the cost of operating, maintaining, or purchasing fuel for a project. A grant under this section may not be included in the rate base for a qualified utility.

(e) In this section,

(1) "project" means a plant, facility, works, or system which produces power from renewable sources or fossil fuels if the feasibility study establishes that a renewable source for the production of power is not economically feasible; and

(2) "qualified utility" means

(A) a utility as defined in AS 42.05.701(2)(A) including a utility exempted under AS 42.05.711;

(B) a nonprofit organization determined by the authority to be capable of operating and maintaining a project of the size and type for the community or region served by the project.

(f) The dollar amount in (c) of this section changes, according to and to the extent of changes in the consumer price index for the state compiled by the Bureau of Labor Statistics, United States Department of Labor (the index). The index for November, 1980 is the reference base index. If the index is revised, the change is calculated on the basis of the revised index.

(g) Before a project which produces 1.5 megawatts of power or less may receive a grant under this section:

(1) the authority shall make a feasibility study which includes the information required by AS 44.83.181(b)(1) -- (3) to determine if the project is economically feasible; and

(2) the division of budget and management shall review the

feasibility study for compliance with (1) of this subsection and submit a report of its findings to the governor.

Sec. 44.83.174. DEBT ASSISTANCE. (a) The authority shall

(1) estimate the annual debt service of bonds to be issued for the project, including an estimate of the amount financed, interest rate, and term of bonds;

(2) obtain an estimate from the division of budget and management of the long-term rate of inflation during the term of the bonds; and

(3) using (1) and (2) of this subsection, the authority shall estimate the amount of money needed by the owner of a project to pay the difference between the debt service which would be paid to bond holders and that debt service adjusted according to constant dollar terms.

(b) If requested by the division of budget and management, the authority shall prepare an alternate to the estimate of the amount determined in (a)(3) of this section. The estimate must be based on the annual debt service of the project calculated on the basis of a rate of interest provided by the division of budget and management.

(c) The authority shall include the amounts determined in (a) and (b) of this section as a part of the plan of finance required by AS 44.-83.181, if required for the project.

Sec. 44.83.175. DEBT ASSISTANCE LOANS. (a) The authority shall establish a separate account for each project for which an appropriation is made by the legislature for a debt assistance loan. The authority shall make loans from the account to the owner of a project so that the payment of debt service made by the owner of the project on bonds is level in constant dollar terms. The authority may increase or decrease the amount of the loan to reflect the terms established at the sale of bonds if those terms are different from those

used to make the estimates required in AS 44.83.174(a). If the appropriation made for debt assistance for a project exceeds the payments made under this subsection, the excess lapses into the general fund.

(b) The authority shall set the terms for repayment of the loan after consulting with the division of budget and management. The rate of interest set for repayment of the loan is the same as the rate of interest set for the bonds issued for the project.

(c) The authority shall pay any money received in repayment of a loan under this section to the commissioner of revenue for deposit in the general fund.

Sec. 44.83.176. POWER PROJECT COMPLETION LOAN FUND. (a) There is established the power project completion loan fund. This loan fund consists of appropriations from the legislature and payments of principal and interest on loans made from the loan fund. The commissioner of revenue may invest any surplus in the loan fund. Interest earned on investments made by the commissioner of revenue shall be deposited in the general fund.

(b) The purpose of the loan fund is to provide financing for a project if

(1) the cost of completing the project exceeds the money available for the project for a reason established by regulations adopted by the authority under (f) of this section; or

(2) the project is unable to pay the cost of redeeming bonds issued for the project because of a natural disaster which impairs the ability of the project to earn enough revenue to redeem the bonds as they become due.

(c) Subject to appropriations for this purpose, the authority shall determine the amount to be loaned for a project and, if the governor approves, may make a loan from the loan fund.

(d) The terms for a loan under (b)(1) of this section are as follows:

(1) the rate of interest is the same rate set for the bonds of the authority issued for the project;

(2) for a project which is not financed by bonds of the authority, the rate of interest is the average weekly rate of interest reported in the Weekly Bond Buyer for municipal revenue bonds for the 12 months preceding the loan application;

(3) the amount loaned may not exceed more than 20 percent of the original estimate of the cost of constructing the project other than the cost of debt service to redeem the bonds first issued for the project; and

(4) the owner of the project shall agree to repay a loan made under this section by the issuance of additional bonds or another method of financing within five years after the loan is made.

(e) The terms for a loan under (b)(2) of this section are as follows:

(1) the amount loaned may not exceed the debt service on bonds issued for the project for one year after the natural disaster and other expenses of the project which are determined necessary by the authority; and

(2) the rate of interest on the loan is the same rate set for the bonds issued to finance the project.

(f) The authority shall adopt regulations under AS 44.62 which prescribe the circumstances under which a project qualifies for a project completion loan under (b)(1) of this section. These regulations shall establish procedures for

(1) determining the costs of a project for which a loan may be made under this section; and

(2) audits which will avoid unexpected costs.

(g) The owner of a project for which bonds of the authority are issued for a purpose set out in (b) of this section is eligible for a debt assistance loan under AS 44.83.174.

* Sec. 2. AS 44.83.181(c)(3) is amended to read:

(3) an appropriation from the power project equity [GENERAL] fund

[(A) TO PAY DEBT SERVICE ON BONDS OR FOR OTHER PROJECT PURPOSES; OR

(B)] to reduce the amount of debt financing for the project;

* Sec. 3. AS 44.83.181(c)(4) is amended to read:

(4) a debt assistance loan under AS 44.83.175 [FROM THE GENERAL FUND];

* Sec. 4. AS 44.83.181(c)(7) is amended to read:

(7) a loan from [THE POWER PROJECT FUND (AS 44.83.170(a)), OR FROM] the renewable resources investment fund (AS 37.11.050); or

* Sec. 5. AS 44.83.185(a) is amended to read:

(a) The authority shall submit a feasibility study and plan of finance for a proposed new project to the legislature. When the report of the division of budget and management [EXAMINING THE FEASIBILITY STUDY AND PLAN OF FINANCE] is completed as required by AS 44.83.183 or 44.83.172(g), it shall be submitted to the legislature.

* Sec. 6. AS 44.83.185(c) is amended to read:

(c) The legislature shall consider and must approve all proposed new projects. However, approval by the legislature is not required if the new project is exempt under AS 44.83.187 and the owner of the project has not applied for an equity grant under AS 44.83.172. [EXCEPT PROPOSED NEW PROJECTS THAT ARE EXEMPT UNDER AS 44.83.187.] The legis-

lature may approve a proposed new project only by enacting law authorizing that project.

* Sec. 7. AS 44.83.187(a)(1) is amended to read:

(1) requires an appropriation from the state general fund, from the power project <u>equity</u> fund, or from the renewable resources funds; or

* Sec. 8. AS 44.83.170 is repealed.

Mark Watson

PUTTING VARIOUS HYDROPOWER COST FACTORS INTO THEIR PROPER PERSPECTIVE

Elaboration of a memorandum prepared for
The Office of the Governor, State of Alaska,
January 14, 1981

By Arlon R. Tussing
February 26, 1981

PUTTING VARIOUS HYDROPOWER COST FACTORS INTO THEIR PROPER PERSPECTIVE

Most recent debate over an Alaska hydropower-financing regime has concerned ---

* the relative effect on electicity costs of financing with revenue bonds, general obligation bonds, and direct loans from the State treasury;
* the impact of various financing schemes on project and statewide bond ratings, and the effect of those ratings on power costs; and
* the total economic impact of different financing schemes on Alaskans when the consumer price of electricity and the treasury's potential earnings from other investments are both taken into account.

These are important questions, as the cost of electricity does depend powerfully on several financing variables. The table on page 3 compares the impact of several financial and non-financial factors on average electricity costs from an idealized Alaska hydroelectric project over the term of its financing, whether those costs are all paid by electricity consumers or paid in part by the state treasury. The upper part of the table shows that the impact of some of the financial variables --- specifically the choice between revenue and general obligation bonds, and revenue-bond ratings --- are relatively insignificant.

Comparing the financing variables on the upper part of the table to the planning, design, and management variables below shows that electric power costs tend to be less sensitive to financing methods in general than to the effects of over- or underbuilding, engineering errors, construction delays, and cost overruns --- all of them commonplace occurrences on major capital projects.

The risk and frequency of such cost-inflating events is not independent of the financing method, however. Large state capital grants, state general-obligation funding, state overrun or completion guarantees, or a statewide power-cost equalization policy could undermine the incentives of communities, utilities, or the Alaska Power Authority to forecast demand realistically, choose and design the right size and kind of projects, employ competent contractors, supervise them competently, and manage the projects efficiently.

The Washington Public Power Supply System [WPPSS or "Woops"] is a classic illustration of financial overassistance encouraging bad planning, mismanagement, engineering and construction incompetence, predatory behavior by construction unions, and worse. The result has been prolonged construction delays, tenfold or greater cost overruns, and a real possibility that the plants may never be licensed to generate power. The hypothetical instances of bad planning, delays, or overruns in the following table are, of course, far less serious than those that have afflicted WPPSS projects, so my contrast between financing and non-financing influences on electricity costs may be unrealistically conservative.

The table refers to the increase that each of the changes listed would cause in the project's average life-cycle electricity costs. These costs are measured by the total constant-dollar revenue required per kilowatt-hour of electricity sold, over 25 years of operation. The assumptions that were used throughout the table are shown in the technical notes that follow it; changing any of these assumptions would of course alter some of the numbers in the table, but we would expect the ranking of the factors to remain about the same.

PUTTING VARIOUS HYDROPOWER COST FACTORS INTO THEIR PROPER PERSPECTIVE

The following table compares the sensitivity of hydropower costs to several financial, design, and construction variables.

Variable	Increases average life-cycle electric cost by
Financial variables	
1. Financing with A-rated revenue bonds rather than medium-grade G.O. bonds	0.4 percent
2. Financing with A-rated rather than AA-rated revenue bonds	2.4 percent
3. Loss of arbitrage	7.5 percent
4. Financing with medium rather than prime G.O. bonds	8.0 percent
5. 15-year instead of 30-year amortization	18.3 percent
6. Financing with AA (taxable) utility bonds rather than AA (tax-exempt) municipal bonds	44.1 percent
Planning, design, and construction variables	
7. Underbuilding based on a 3-percent expected load growth --- actual load growth 6 percent	21.0 percent
8. 25-percent cost overrun	25.0 percent
9. 3-year delay in start of construction	27.3 percent
10. 25-percent derating of plant	32.0 percent
11. 8 years instead of 5 years to complete	48.5 percent
12. 50-percent cost overrun	50.0 percent
13. Overbuilding based on 6-percent expected load growth --- actual load growth 3 percent	54.5 percent
14. 3-year delay in commissioning	65.1 percent
15. Overbuilding based on 6-percent expected load growth --- actual load growth zero	106.7 percent
16. Non-operability & abandonment	200.0 percent
17. Cases 11, 12, and 13 all apply	361.0 percent

NOTES

General: Average life-cycle electric cost is the total revenue required per kilowatt-hour sold, years 6 through 30 inclusive. Except where otherwise indicated, the construction period is 5 years with equal annual outlays; operating life and permanent financing are 25 years; project is hydro or other 100-percent fixed-cost technology; financing is 100 percent debt; interest rates are the same for construction and permanent financing. Interest cost is 10 percent unless otherwise indicated.

Any electricity supply shortfalls during years 6 to 15 that result from delays, derating, or underbuilding are made up by thermally-generated power. The unit cost of thermally-generated supplemental power is assumed to be twice the average life-cycle cost of power from the project in question (if it had been completed and operated according to design).

Interest rate figures are from Salomon Brothers Bond Market Roundup for the week ending January 9, 1981 [copy attached].

Financial Variables

1. A-rated 30-year electric revenue bonds at 10.25 percent vs. medium-grade 30-year G.O. bonds at 10.20 percent.

2. A-rated 30-year electric revenue bonds at 10.25 percent vs. AA-rated 30-year electric revenue bonds at 10.00 percent.

3. Medium-grade 30-year G.O. bonds at 10.20 percent vs. prime 30-year G.O. bonds at at 9.40 percent.

4. 15-year prime G.O. bonds at 8.60 percent, amortized over 15 years, vs. 30-year prime G.O. bonds at 9.40 percent, amortized over 30 years.

5. Arbitrage here refers to the ability of the state to invest its surpluses in taxable securities at relatively high interest rates while its agencies or subdivisions continue to borrow at lower interest rates in tax-exempt bond markets. The IRS will disallow a federal tax exemption for state or municipal bonds that are clearly issued for arbitrage purposes (i.e., "to profit at the expense of the U.S. Treasury"). Row 5 compares the combined cost of power to consumers and the State treasury under two financing proposals presented to the Governor's office earlier in the year, one of which would, and one of which would not, permit the State to make offsetting investments in taxable securities markets. For details, see Tussing's January 23, 1981 memorandum to Governor Hammond, Appendix A.

6. AA-rated 30-year taxable utility bonds at 14.50 percent vs. AA-rated tax-exempt electric revenue bonds at 10.00 percent.

Planning, design, and construction variables

7. Plant is designed to reach optimum load factor after 10 years of operation at 3 percent annual load growth. At 6 percent annual growth the capacity constraint is reached in the third year of operation (year 6) The cost of supplementary thermal power generation through the tenth year of operation (year 15) is added to the total cost figure in determining life-cycle average cost.

8. Self-explanatory.

9. Construction outlays and operation are both delayed 3 years. Term of financing and life of project are unchanged. Additional cost is the difference between the cost of an added 3 years of thermal power generation and the unit cost of power from the project in question.

10. "Derating" is official recognition of the inability to attain design-capacity operation. The plant is designed to reach its optimum load factor after 10 years of operation, at 3 percent annual load growth. With 25-percent derating, the capacity constraint is reached in the first year of operation (year 6). Power shortfall for ten years is made up by thermal power generation.

11. Equal annual construction outlays are stretched out from 5 to 8 years but total is unchanged; amortization is reduced from 25 to 22 years. The cost of 3 years of thermal power generation is added to total costs in determining average costs.

12. Self-explanatory.

13. Plant is designed to reach optimum load factor after 10 years of operation, at 6 percent annual load growth. The higher unit cost reflects lower utilization rates caused by growth at only 3 percent.

14. Project is completed on schedule, but actual startup is delayed 3 years because of technical or licensing problems; amortization is reduced from 25 to 22 years. The cost of 3 years of thermal power generation is added.

15. Plant is designed to reach optimum load factor after 10 years of operation, at 6 percent annual load growth. Additional unit costs reflect lower utilization rates caused by lack of load growth.

16. Plant is completed but fails to operate or receive operating license. Demand must be met by thermal power generation.

17. Self-explanatory. [1.485 x 1.5 x 1.545 = 4.61]

Mark W. Hand

MEMORANDUM

14 February, 1981

To: Tom Singer
From: Arlon R. Tussing

Re: Power Project Equity Fund

As we agreed earlier in the week, I have provided some draft language on the relation between grants from the Equity Fund and electric rates [subsection e]. In providing the groundwork for this specific language I began from the beginning and edited the preceding subsections.

Two changes are intended to improve the "equity" of the grant distribution: (c.2) provision for exclusion from the eligible resident population of persons [e.g., on floating fish processors or at Prudhoe Bay] who would not in fact be served by a utility project, and (c.1, c.4) deduction of the present value of previous interest subsidies granted by the Authority. To forestall litigation, (c.5) the Authority's determination on populations, prorationing, and the value of previous subsidies is made final.

The language on electric rates in (e) excludes the grant from a utility's rate base (where applicable) and provides otherwise that the grant must be used to effect lower rates as if it reduced a rate base. For utilities or others who are not under APUC jurisdiction, (e.3) permits the Authority to require rate reductions by contract as a condition of the grant. Rate reductions (e.2) must be in the form of lump-sum reductions in monthly bills and not reductions in unit prices (per kwh) in the case of even partially fossil-fired systems where such a rate structure would encourage fuel waste.

The delineation of eligible projects (f) has been cleaned up.

Edited legislative language for "An Act relating to the Alaska Power Authority, after Baldwin draft #2, dated 2/9/81. By Tussing, 13 February 1981

Sec. 44.83.172 POWER PROJECT EQUITY FUND (a) There is hereby established a Power Project Equity Fund (hereinafter the Equity Fund), which shall be separate from any other money or funds of the Authority.

(b) The Equity Fund shall consist of money appropriated by the Legislature and interest earned on money in the Equity Fund. The Commissioner of Revenue shall invest any surplus in the Equity Fund in the manner specified in AS 37.10.070.

(c) There is hereby authorized to be appropriated to the Equity Fund $800,000,000, which shall be the only appropriation of State moneys to the Equity Fund. Any moneys remaining in the Equity Fund on December 31, 1985 shall be returned to the General Fund.

(d) (1) Grants for power projects. The Authority may make grants from the Equity Fund to Alaska utilities or other owners of proposed electrical generation projects that are eligible under subsection (f) of this section, in the amount of $2,000 for each 1980 resident of the project's service area, less the value of any previous subsidy granted by the Authority for electrical generation projects serving the same service area.

(2) The Authority shall determine the 1980 resident population of each service on the basis of the 1980 decennial Census of the United States, but the resident population of a project's service area shall not include any person whose residence could not or would not in fact be served by electrical power from the project.

(3) Where the service areas of more than one utility or proposed project coincide or overlap, or where a proposed project will provide electricity to more than one service area, the Authority shall allocate any grant from the Equity Fund under this section among utilities or projects in proportion to the number of customers that are or would be served by ~~the~~ each utility or project.

(4) A direct loan granted by the Authority to a utility or other owner of an electrical generating project at a rate of interest lower than the market rate of interest shall be considered a subsidy for the purpose of paragraph (2). The value of any such interest subsidy is the difference between the actual interest cost of the direct loan and the market interest cost on an otherwise identical loan, reduced to present value at a discount rate equal to the market rate of interest. For the purposes of this paragraph, the market rate of interest is the rate of interest that the utility or project owner incurred or would have had to incur for revenue bond financing of the project subsidized by the direct loan.

(5) The Authority shall consult with all affected municipalities and utilities before apportioning any grant among utilities or projects under paragraph (3), but the judgment of the Authority shall be final with respect to the 1980 resident population of any service area, the apportionment of grants from the Equity Fund among service areas or projects, the market rate of interest, or the value of any previous subsidy. [Alternatively, you may want allow interested parties to contest the Authority's decisions on these matters, but only on the ground they are arbitrary and capricious.]

(e) (1) Rate reductions. A utility or other recipient of a grant from the Equity Fund under this section may use the proceeds of that grant only to pay a portion of the fixed capital costs of an electrical generation project. The amount of such a grant shall not become part of any utility's rate base, and shall result in a reduction of the rates charged and collected for electricity generated by the project by an amount no less than the reduction in the cost of interest and debt-amortization attributable to the grant.

(2) In any service area served in whole or in part by fossil-fuel or other thermal generating capacity (except for reserve generating capacity) the rate-reductions required under this subsection shall, insofar as practical, take the form of a lump-sum reduction in the monthly charge to each customer of the utility or project, and shall in no case take the form of a reduction of the rate per incremental unit of electricity.

(2) The Authority, as a condition of a grant under this section, may require any utility or other owner of a proposed generating project not subject to the rate-making jurisdiction of the Alaska Public Utilities Commission to execute a contract with the Authority providing for the rate-reductions required by this subsection.

(f) An electrical generation project shall be eligible for a grant under this section only if (1) it produces electricity from a renewable resource, (2) it is a cogeneration project or (3), in the judgment of the Authority, no alternative generation project using a renewable resource or cogeneration project is technically and economically feasible. For the purposes of this subsection, renewable resources include but are not necessarily limited to, hydro, wind, solar, and nuclear fusion energy.

Mark W. How

ARLON R. TUSSING & ASSOCIATES, INC.
526 Main Street • Juneau Alaska 99801 • (907) 586-1290

MEMORANDUM

28 February, 1981

To: Frances Ulmer, Director
Division of Policy Development and Planning

From: Arlon R. Tussing

Re: FINANCING ALTERNATIVE ENERGY PROJECTS (The Alaska Power Authority as technical and financial clearinghouse for alternative energy, in place of the Alaska Energy Center).

On February 6, I provided at your request an outline of possible machinery and standards by which the Alaska Energy Center would help finance non-utility power projects, cogenerators, and conservation investments. Several commentators inside and outside of state government have since suggested that it would be better to give the Alaska Power Authority, rather than the Energy Center, the main responsibility for alternative energy financing.

Tom Singer has asked me to explain the case for giving the lead on alternative energy financing to the Power Authority, and to describe how the responsibilities of the Power Authority, the Energy Center and the APUC, would be reallocated under such an arrangement. I believe this issue to be as much a matter of political judgment as of economics or administrative efficiency, and I do not personally have a firm position on the question. Here, nevertheless, are the elements of the case for the Power Authority, followed by a revised statement of the program I offered on February 6.

My memorandum of that date proposed to establish the Energy Center as a

> "one-window" service to assess the technical and economic viability of proposed alternative energy projects; to package State, federal, and private financing for such projects; to prepare and submit permit applications; to help deal with contractors, utilities, the APUC, and other regulatory bodies. APUC jurisdiction would be expanded to the extent necessary to implement the program . . .

You are already familiar with the rationale for an independent state-sponsored institution committed to and with a vested interest in alternative energy, including decentralized electricity generation. The most substantial opposing arguments, however, are that

(1) the Power Authority already has related responsibilities and experience, while the Energy Center would have to begin a new program that overlaps the Authority's mission, entirely from scatch; that

(2) the new role proposed for the Energy Center would tend to overwhelm and compromise its research and development mission; that

(3) taking all responsibility for alternative energy, non-utility generation, cogeneration, and conservation away from the Power Authority would cement its identification with capital-intensive central-station generating technologies, and guarantee that there would be a permanent adversary relationship between the utilities and the Power Authority on the one hand, and the sponsors of alternative energy and the Energy Center on the other; and that

(4) the Power Authority could resolve most of the technical, rate, and other problems independent power producers and cogenerators will have with Alaska utilities (and vice versa) by negotiation and by means of contracts, without recourse to formal proceedings before the APUC or in the courts.

In the following revision of my February 6 outline, the institutional commitment to alternative energy is vested in a new Division [of Alternative Energy, Cogeneration, and Energy Conservation] in the Alaska Power Authority. The Division would be the one-window technical and financial service for non-utility power generators and cogenerators, giving them a somewhat expanded version of the services the Authority is now empowered to give the electric utilities.

The main focus of the Energy Center will remain alternative energy research and development, but it will cooperate financially and technically with the new Division of the Power Authority in alternative energy <u>demonstration</u> projects, and will play a general promotional and advocacy role for alternative energy. The legislation would specifically prohibit these activities on the part of the Power Authority with respect to both central-station and alternative energy technologies, projects, or plans.

ALASKA ALTERNATIVE ENERGY PROGRAM

ONE-WINDOW SERVICE. A newly-established line Division [of Alternative Energy, Cogeneration, and Energy Conservation]* in the Alaska Power Authority would become a one-window service for qualified applicants wanting to design, install, and finance certain alternative energy projects. The Division would have a separate budget line, with its operating expenses subject to annual legislative review and appropriation. It would have dedicated or revolving funds for all those purposes, and only those purposes, for which the the Authority has such funds for assistance to utility power projects.

A. Qualified applicants may include ---

1. households,
2. groups of households,
3. small businesses, and
4. municipalities.

B. Alternative energy projects may include ---

1. Self-sufficient power generation --- consumer-owned electrical generating facilities to serve consumers outside the service area of any existing utility, or not economic to connect to an existing utility;

2. "Opt-out" power generation --- consumer owned electrical generating facilities to serve consumers within the service area of an existing utility, but which would not be connected to the utility, depite the fact that the consumers are currently connected or are [in the opinion of the utility] economically feasible to connect;

3. Supplemental power generation --- consumer-owned electrical generating facilities to serve consumers who are or would be connected to an existing utility ror backup or supplemental power;

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* The ultimate name of the Division will have to be different. As the organization will surely be known by its intials, let us find something more acceptable than DAECEC.

4. Cogeneration --- commercial or industrial facilities that are or would be connected to an existing utility, and which produce electrical power as a by-product or joint product with some other commodity or service [e.g., industrial process steam];

5. Small power producers --- non-utility electrical generating facilities that are or would be connected to an existing utility, and which may or may not be cogenerators, producing power in whole or in part for sale to an existing utility; and

6. Energy conservation projects --- residential, small-commerical, or small-industrial consumer-owned investments in equipment or structural improvements that will create substantial energy savings.

C. Services provided by the Division regarding alternative energy projects include ---

1. Technical & economic feasibility assessments;

2. Comprehensive financial packaging, including assistance in getting federal loans, grants, and tax credits; private loans; and State loans and grants under this and other programs;

3. Preparing license and permit applications to local, state, and federal agencies, and representing applicants before permitting agencies; and

4. Assistance and representation in dealing with contractors, utilities, and the APUC and other regulatory bodies.

D. To be eligible, a project must ---

1. Be technically feasible and reliable --- of proved technology and design [*] of a type and scale appropriate to the location and service, and installed and serviced by responsible, competent parties;

---

* The Energy Center would have lead responsibility for financing alternative energy research and development projects. The Division would be permitted and encouraged to participate in financing and other arrangements for Energy Center-sponsored and assisted demonstration projects.

2. Be clearly cost-effective in terms of energy production or savings over its economic life --- even if it had no subsidy;

3. Be of undoubted net benefit to its owner(s) over its economic life, in terms of the value of energy produced or saved, as measured by lowest-cost alternative;

4. Generate sufficient cash flow in terms of revenues generated or payments avoided to cover its debt-service and operating and maintenance costs at all times, by a reasonable margin; and

5. Not result in higher energy costs to others.

E. State financial assistance through the Division ---

1. Will be complementary to financing from other sources, to the extent practical;

2. May include direct loans or partial guarantees for non-State financing;

2. May be subordinate to other financing;

3. Requires equity participation by the owner(s), including "sweat-equity" under specificed circumstances;

4. May have a term no longer than the project's realistic useful life, or that of the uses or structure(s) it serves, whichever is less;

5. May have an escalating debt-service schedule intended to lower the project's early cash-flow requirements, to the extent permitted by a rate of increase in project's total debt-service requirements (including debt service from other sources) not exceeding 5 percent per year;

6. Shall carry an interest rate appropriate to the collateral or other security of the financing [See "H" below.]; and

7. Shall be a joint liability of the property (ies) served and on which the project is located.

G. Cash grants of the same per-capita amount as may be granted to Alaska utilities or central-station power projects under the proposed Equity Fund [$2,000 per capita?] ---

1. May be granted for alternative energy projects not connected to a utility [self-sufficient and opt-out power generation projects]; but

2. A utility may require a connection charge equal to the unamortized portion of any such equity grant [on a ten-year amortization schedule] prior to making a connection to any property, or subsequent subdivision of any property, served by the project.

H. State loans and State-guaranteed loans shall be secured by appropriate means, and the interest rate or guarantee fee on such loans shall reflect the type and quality of the security. For example, the interest rate on loans secured by ---

1. The salvage or resale value of equipment shall be comparable to current Anchorage bank rates on machinery and equipment loans.

2. Property(ies) served by the project and/or on which the project is located shall be comparable to prevailing Anchorage rates on residential second deeds of trust.

3. A contract with a utility to which the property and facility are connected, shall be no comparable to recent revenue-bond rates on Authority-assisted central-station projects [See "J" below].

I. Costs incurred by the Division for technical and economic assessments, filing fees, appearances before regulatory bodies, and other specified costs directly attributable to a given alternative energy project financed in whole or in part by a State loan under this program, shall be reimbursed by the applicant, normally by an addition to the loan principal.

J. Debt service on State loans or financial packages arranged by the Authority under this program, for any alternative energy project connected to an existing utility, may be made a conditional liablity of the utility and the Authority may require the utility to collect such debt-service charges as a surcharge on its regular billing(s) to property(ies) served by the project. Under a contract among the project owner(s), the Authority, and the utility, payment of the surcharge shall become a condition of continued utility service to the property or, more importantly, of service to any new customer on the property or any subdivision of it [*].

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* The refusal or contractual inability of the utility to hook up or serve a new customer on the property can be a powerful incentive to clear up any delinquency, because it will make the property unsaleable. It is important that any such burden on a property be duly recorded.

RELATIONS BETWEEN THE DIVISION, THE ENERGY CENTER, AND THE ALASKA PUBLIC UTILITIES COMMISSION

A. The Alaska Energy Center's role in this program, in addition to its established research and development function, would be ---

1. Promotional: to publicize established and practical alternative energy, cogeneration, and energy conservation technologies for Alaska, and this and other technical and financial assistance programs; and to encourage and assist Alaskans to participate in them;
2. Demonstration: to establish and fund, or participate with the Power Authority in establishing or funding first-generation demonstrations in Alaska of technologies and equipment proved elsewhere or in different applications [The two organizations are intended to have overlapping jurisdictions, and either would be allowed to take the lead or act alone on demonstration projects.];
3. Advocacy: to represent (at its discretion) the interests of alternative energy project owners or would-be owners, or to assist them in dealing with contractors, utilities, the Authority, the APUC, and other regulatory bodies.

B. Additional APUC jurisdiction. The APUC already has major responsibility regarding utility connections, charges, and payments to cogenerators and small power producers under PURPA, but APUC does not now generally have jurisdiction over rates and terms of service for municipal utilities, the Alaska Power Authority, or federal power projects.

The legislation establishing the Alaska Power Authority is explicit, however, that the Authority shall have no regulatory jurisdiction over electric utilities, and the Energy Center is certainly not a suitable regulatory body. Thus, any additional regulatory authority that implementation of this program may require should be in the APUC, but it is not obvious now just what additional jurisdiction and duties are necessary.

A working group representing the Authority, the Energy Center, and the APUC, would be established and charged to report through the Commissioner of Commerce to the 1982 Legislature its recommendations for enlargement or amendment of APUC jurisdiction, and other organizational or regulatory measures that might be necessary to implement this program. The issues on which the group shall report includes the need, if any, for enlarged jurisdiction to ---

1. Approve or determine rates and terms of service for standby service to supplemental power projects;

2. Approve or determine "avoided costs" for each utility, as defined under PURPA, and the rates and terms of service on which utilities must purchase or wheel power from cogenerators and small power producers;

3. Order utilities to connect properties served by alternative energy projects and to execute contracts with cogenerators and small power producers; and

4. Order utilities to contract with the Alaska Power Authority and owners of alternative energy projects for collection of debt-service on State-financed, guaranteed, or packaged loans [See "J" above.].

2-5-81

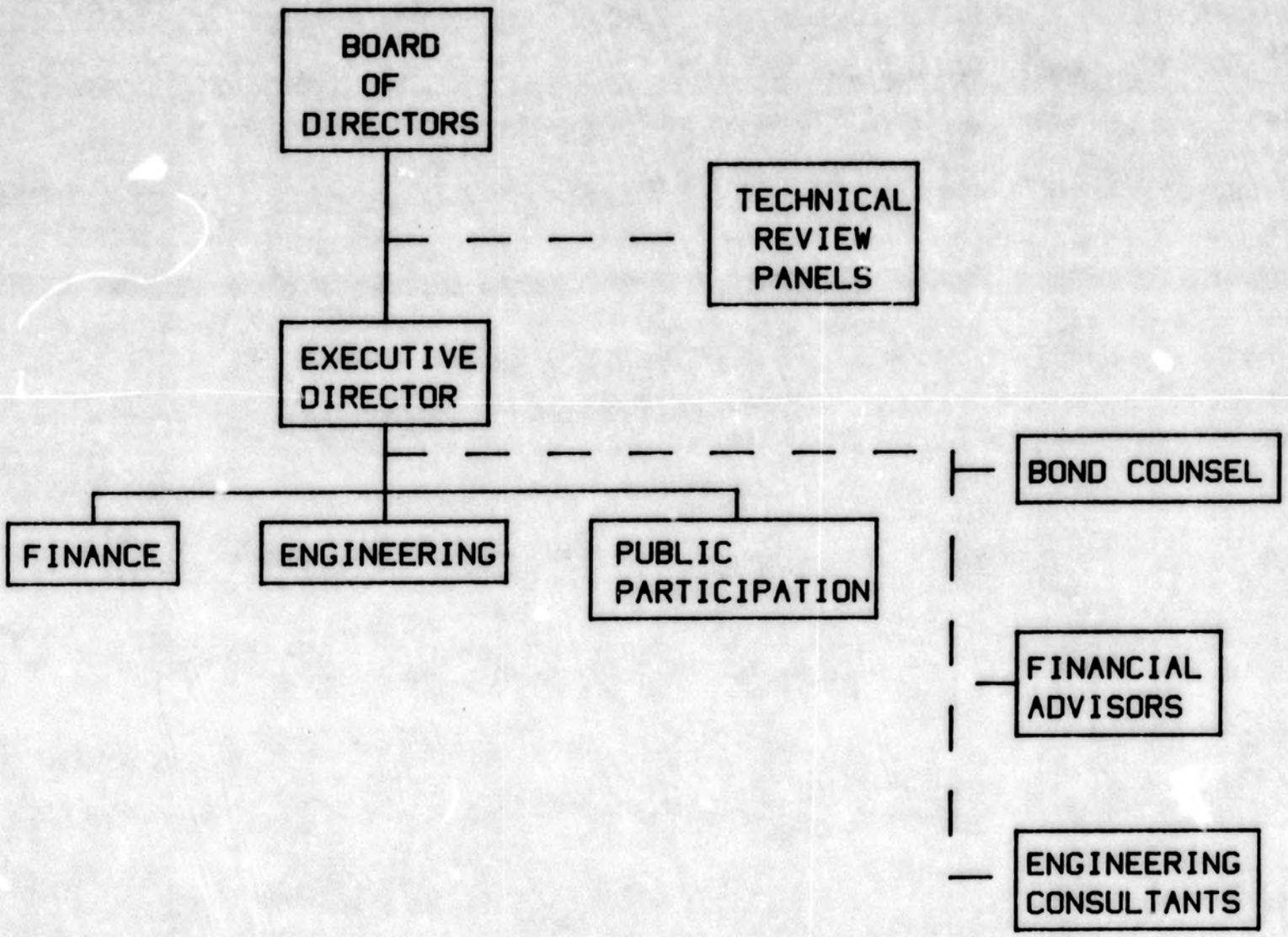
Tyee. Dick Ballard

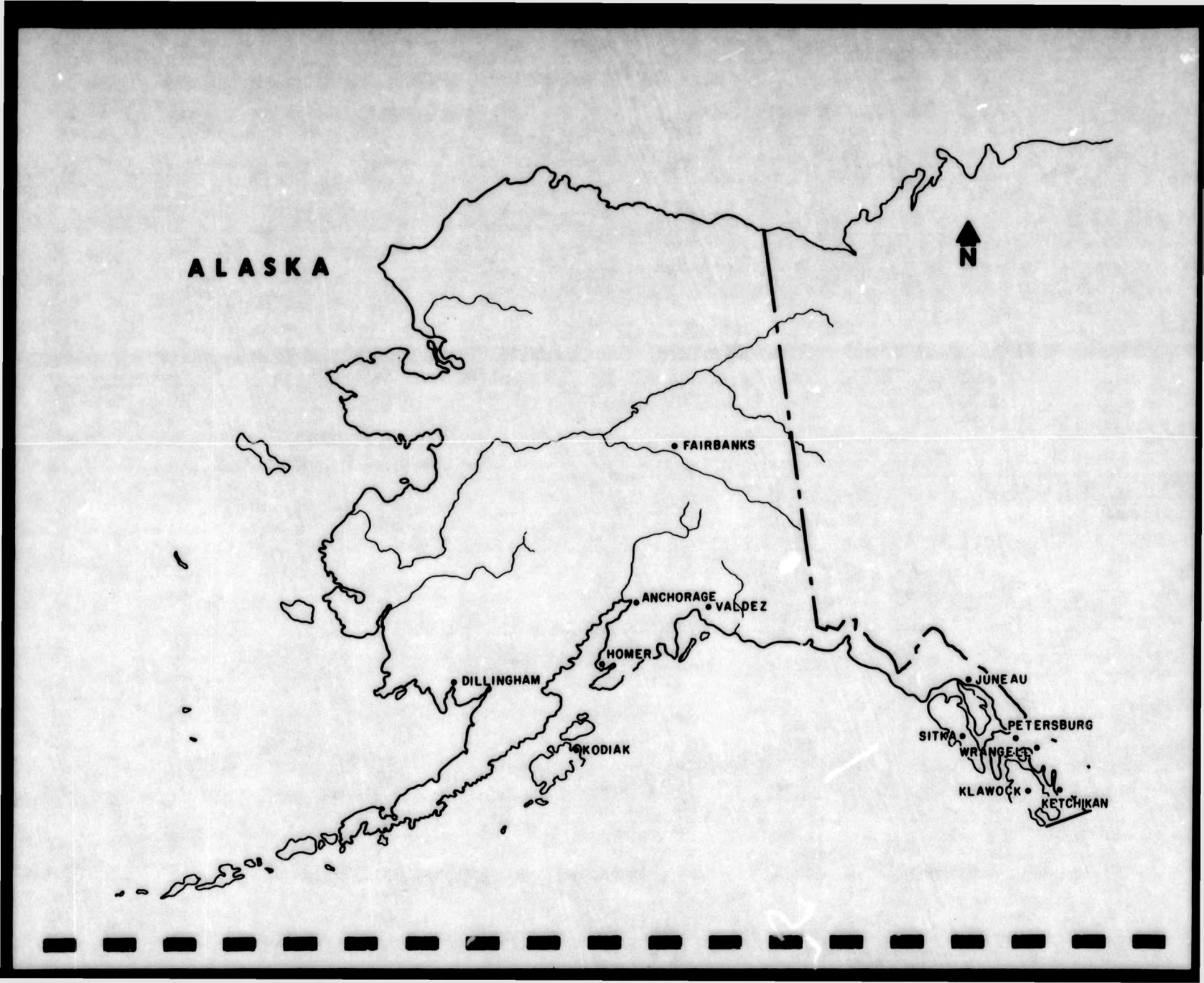
ALASKA POWER AUTHORITY

PURPOSE

Promote, develop and advance the general prosperity and economic welfare of the people of Alaska by providing a means of constructing, acquiring, financing and operating power production facilities limited to fossil fuel, wind power, tidal, geothermal, hydroelectric, or solar energy production and waste energy conservation facilities.

- o Financing
- o Feasibility Study Funding
- o Develop, Own and Lease
- o Develop, Own, Operate and Wholesale


BOARD OF DIRECTORS
TECHNICAL REVIEW PANELS
EXECUTIVE DIRECTOR
BOND COUNSEL
FINANCE
ENGINEERING
PUBLIC PARTICIPATION
FINANCIAL ADVISORS
ENGINEERING CONSULTANTS


ALASKA
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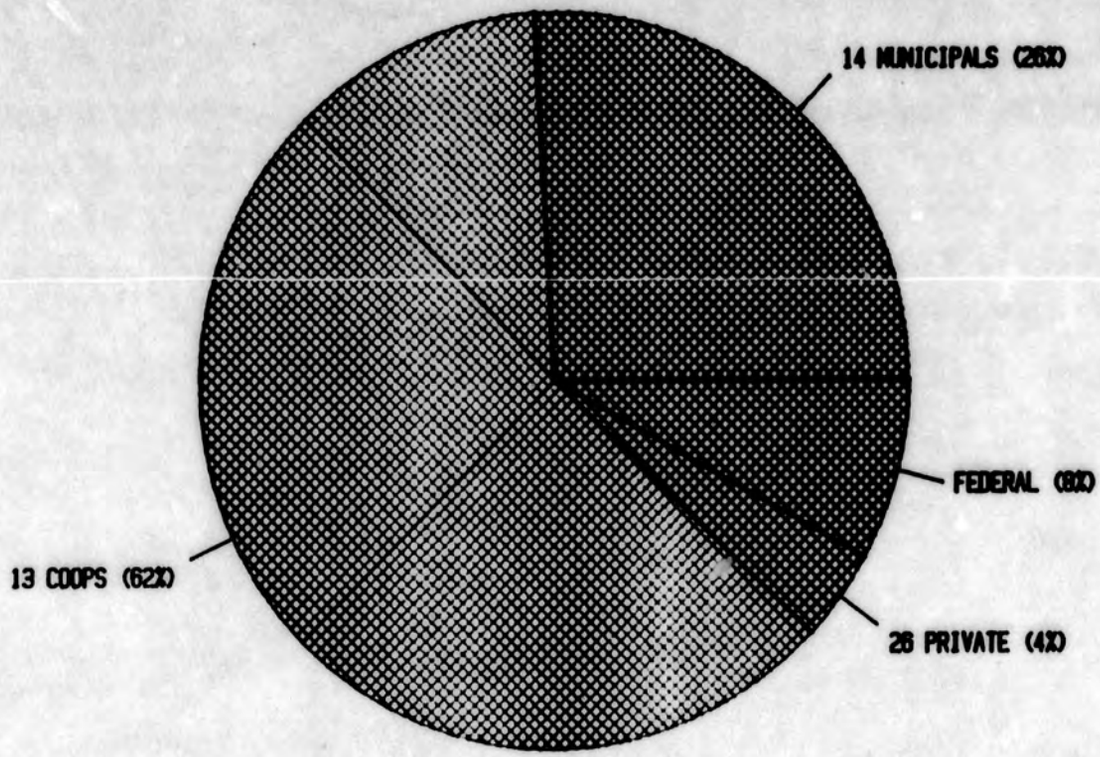
ANCHORAGE
VALDEZ
HOMER
DILLINGHAM
KODIAK
JUNEAU
PETERSBURG
SITKA
WRANGELL
KLAWOCK
KETCHIKAN

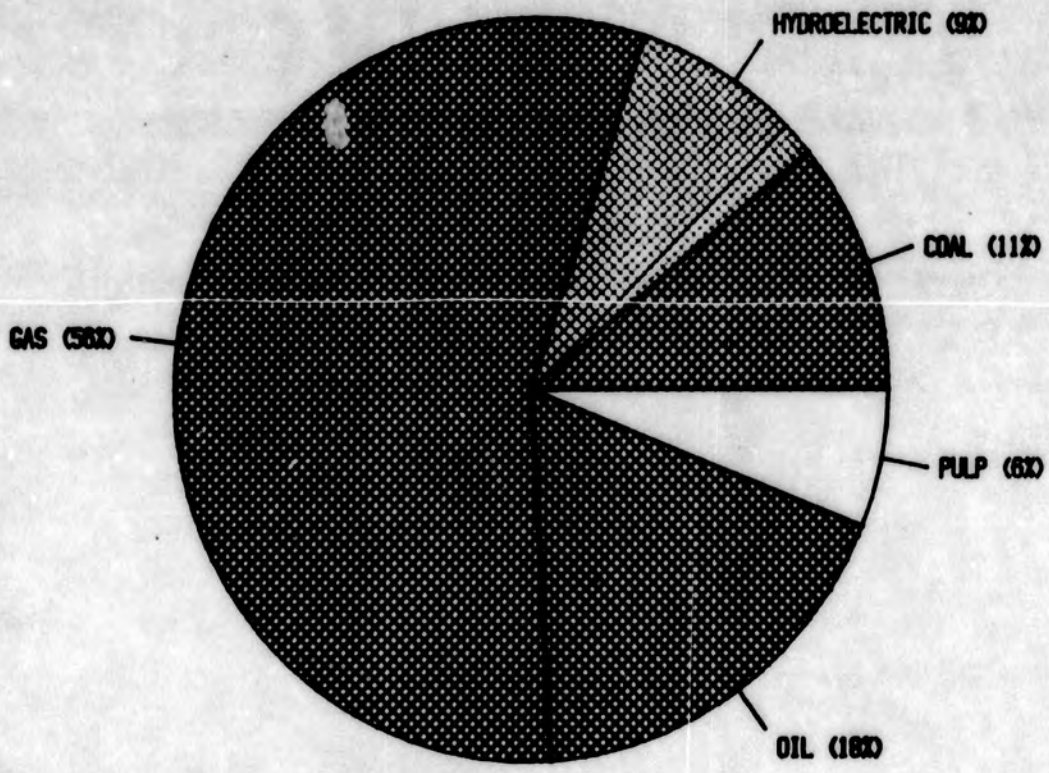
GENERATION BY TYPE OF UTILITY

1979 UTILITY GENERATION - 3,066 GWH



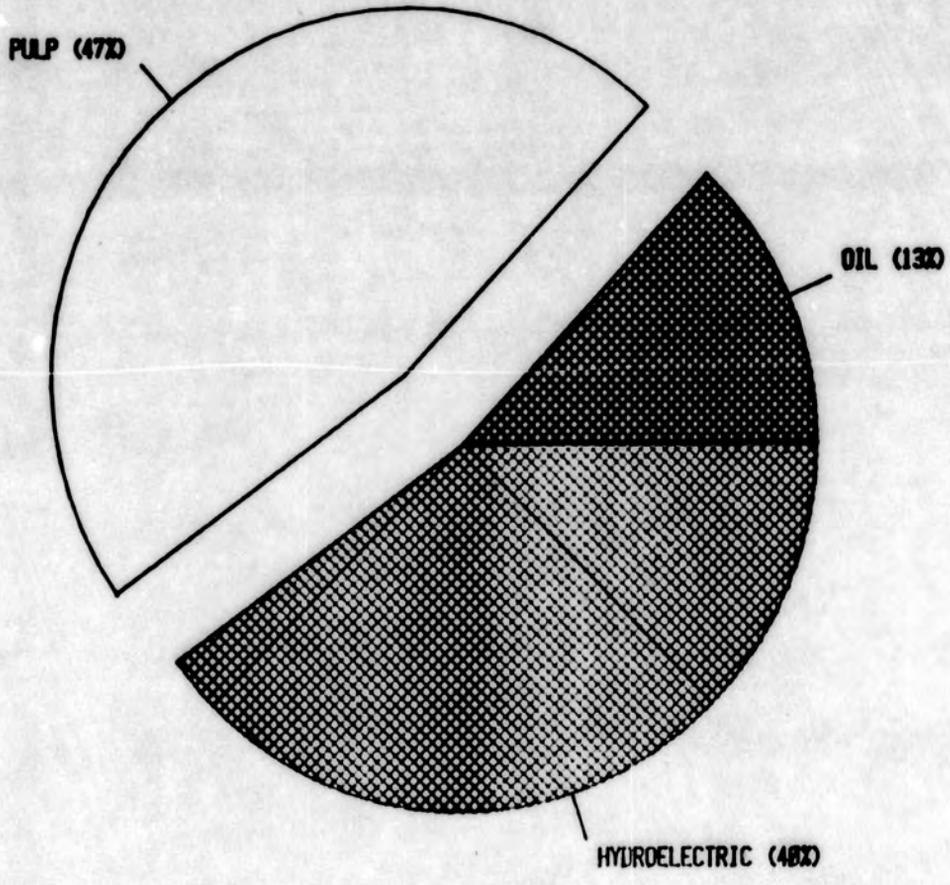
STATEWIDE GENERATION BY ENERGY SOURCE

1979 STATEWIDE GENERATION - 4,836 GWH



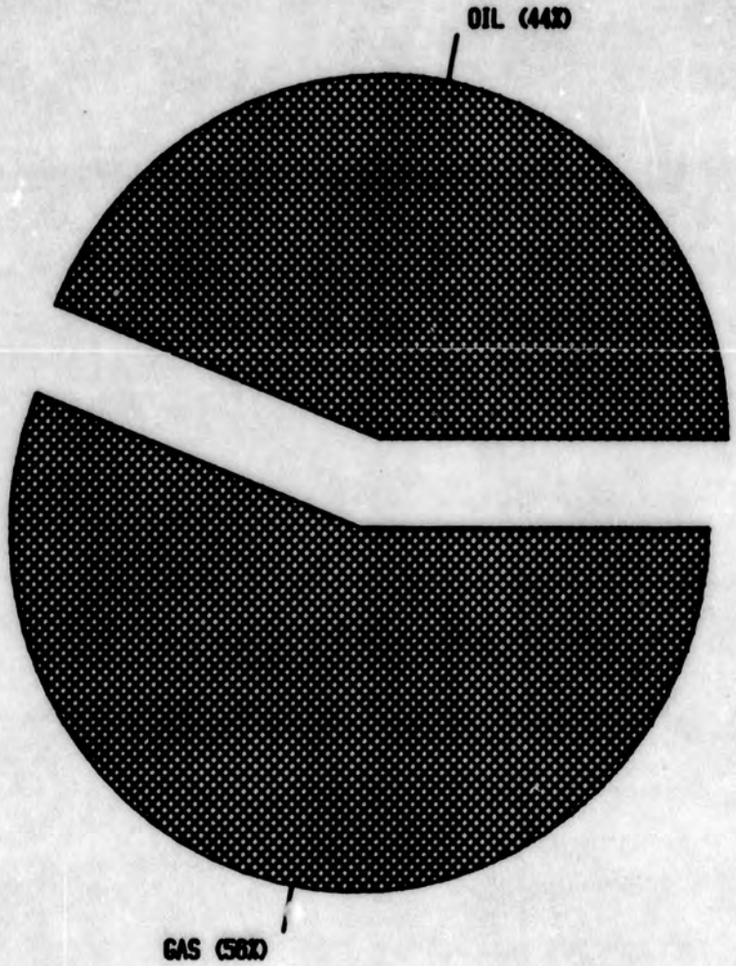
SOUTHEAST GENERATION BY ENERGY SOURCE

1979 SOUTHEAST GENERATION - 657 GWH



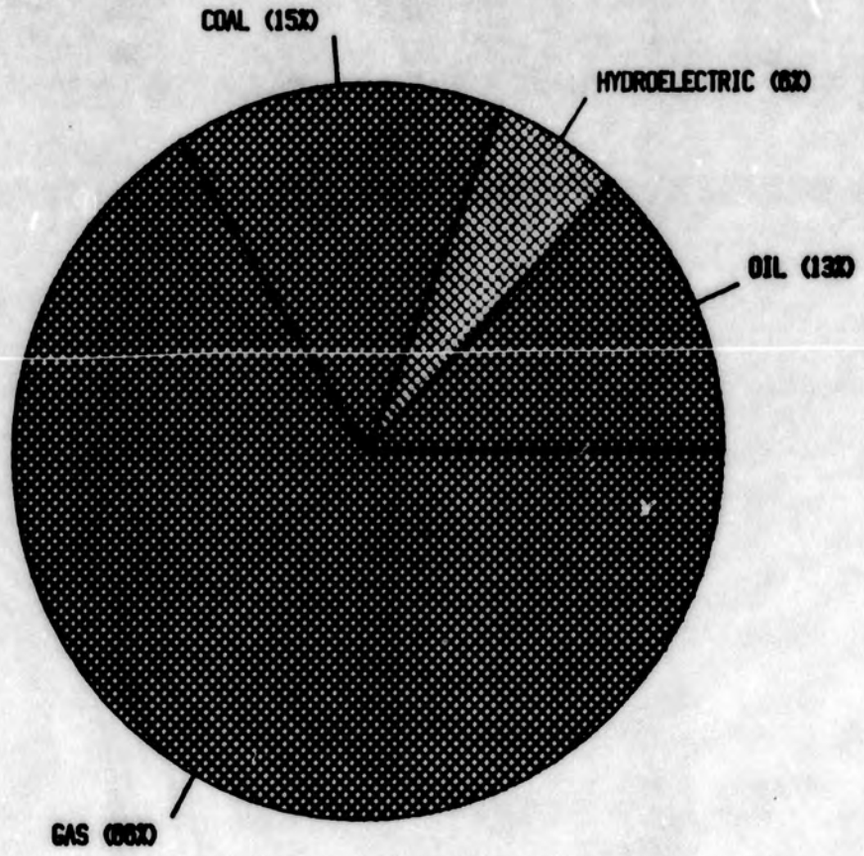
RURAL GENERATION BY ENERGY SOURCE

1979 RURAL GENERATION - 782 GWH



RAILBELT GENERATION BY ENERGY SOURCE

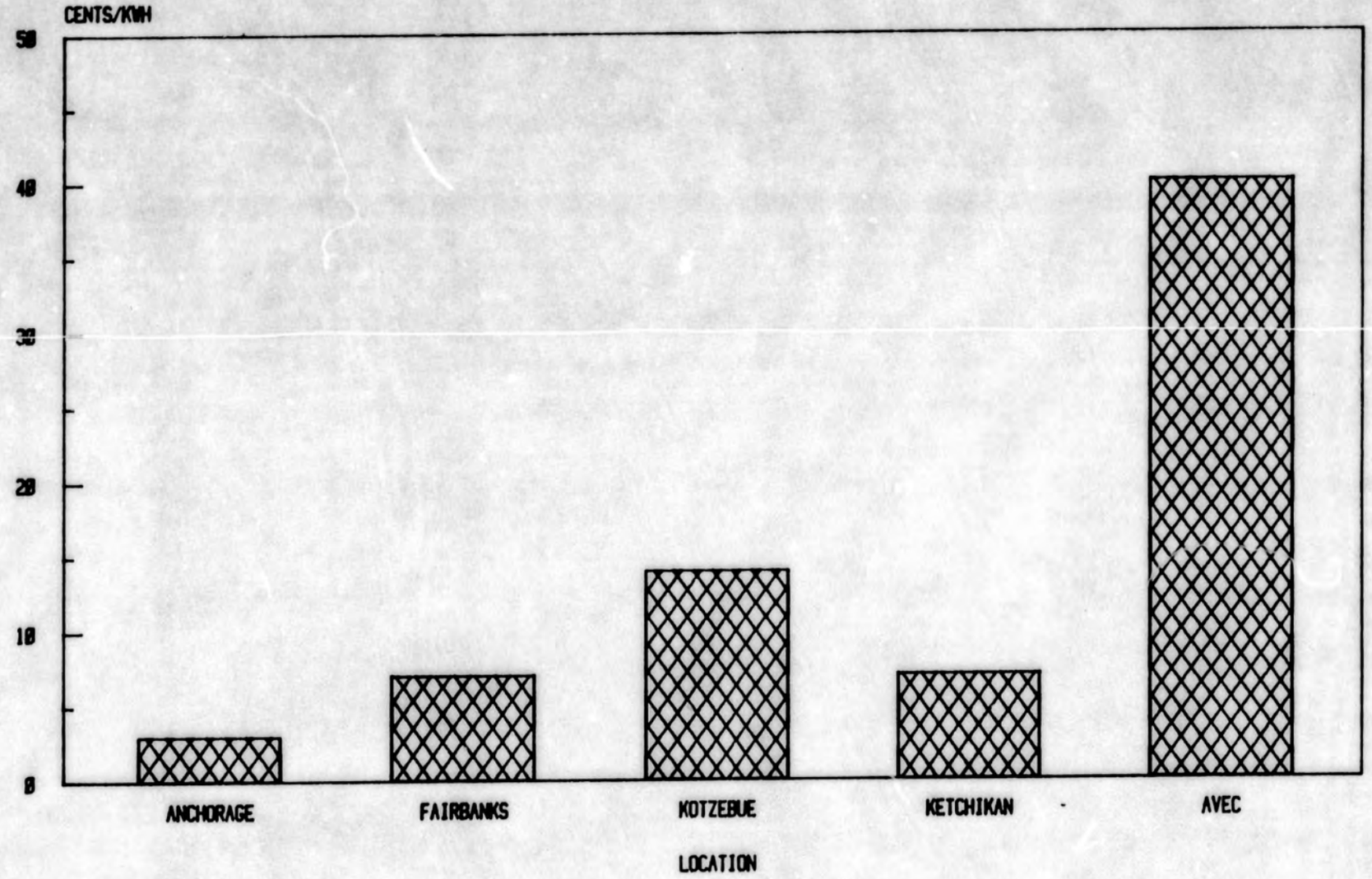
1979 RAILBELT GENERATION - 3,397 GWH

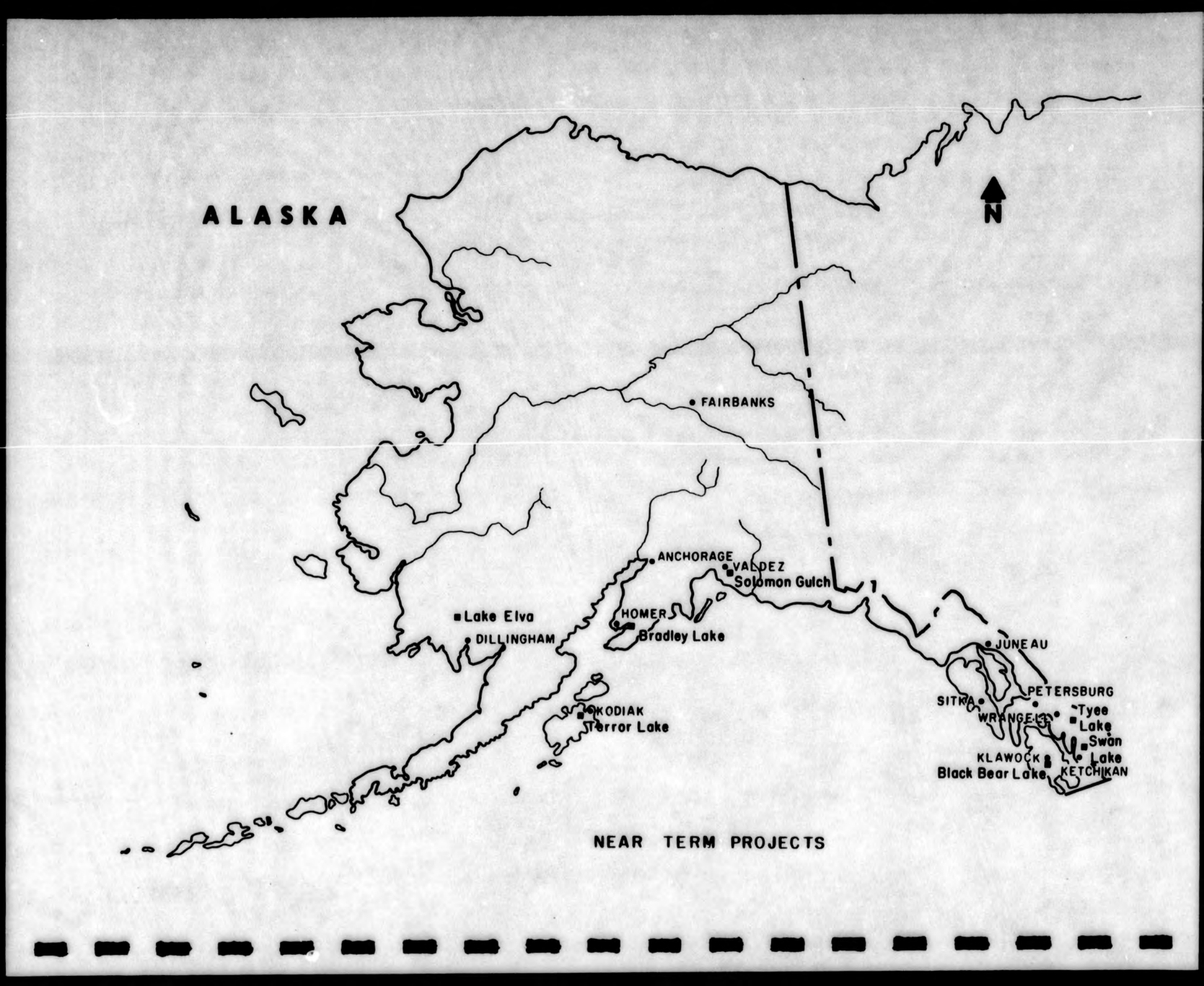


ALASKA FUEL COST TRENDS

	PREVIOUS COST (YEAR)	CURRENT COST (YEAR)	ANNUAL RATE OF INCREASE
HEALY COAL	$4.50/ton (1967)	$14.50/ton (1979)	10%
AVEC DIESEL OIL	$0.35/gal (1973)	$1.40/gal (1980)	22%
COOK INLET GAS	$0.15/mcf (1971)	$1.50/mcf (1980)	29%

COST OF POWER, 1980




ALASKA
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FAIRBANKS
ANCHORAGE
VALDEZ
Solomon Gulch
Lake Elva
DILLINGHAM
HOMER
Bradley Lake
JUNEAU
PETERSBURG
SITKA
WRANGELL
Tyee Lake
Swan Lake
KLAWOCK
Black Bear Lake
KETCHIKAN
KODIAK
Terror Lake
NEAR TERM PROJECTS

SOLOMON GULCH HYDROELECTRIC PROJECT

LOCATION: Adjacent to the Alyeska Pipeline Terminal at Valdez

MARKET: Valdez and Glennallen, population approximately 6,000

TYPE: Rockfill dam at outlet of Solomon Lake, auxiliary dam and spillway, penstock, powerhouse, and 104 mile 115 KV transmission line.

OUTPUT: 12 MW installed capacity
56,000,000 Kwh average annual energy

CAPITAL REQUIREMENTS: $20,000,000 remaining

undr way

Kod — David Nesse

TERROR LAKE HYDROELECTRIC PROJECT

LOCATION: Kodiak Island

MARKET: Kodiak and the USCG station, service area population approximately 8,000

TYPE: Rockfill dam at outlet of Terror Lake, four small diversion dams, diversion channels and shafts, power tunnel, powerhouse, 17 miles of 69 KV transmission line.

OUTPUT: 20 MW installed capacity
132,000,000 Kwh firm annual energy

CAPITAL REQUIREMENTS: $110,000,000 ÷ 20 = 5½ mill/kw

Robt. Arnold - Ketch 4 ① Interest rate high -

Ted Ferry

SWAN LAKE HYDROELECTRIC PROJECT

LOCATION: 22 miles northeast of Ketchikan near Carroll Inlet.

MARKET: Ketchikan, service area population 12,600

TYPE: 190 foot high thin arch concrete dam raising the level of Swan Lake, with a power tunnel, powerhouse, port facility, switchyard and 31 miles of 115 KV wood pole transmission lines.

OUTPUT: 22 MW installed capacity
67,000,000 Kwh of firm annual energy

CAPITAL REQUIREMENTS: $110,000,000 with a State ÷ 22 £5 000 000 contribution of $18,000,000

(Port Director) — Dick Ballard – ① "3000/person – ugh" –
② of $15 mil, 1 yr delay, incr. interest, + COL
eroded 12+ mil.
③ "Sub-lunar loan" won't work.

TYEE LAKE HYDROELECTRIC PROJECT

LOCATION: 40 miles southeast of Wrangell near Bradfield Canal

MARKET: Petersburg and Wrangell, service area population 6,400

TYPE: Lake tap of 1,370-foot elevation Lake Tyee, power tunnel, surge tank, powerhouse, and 83 miles of 115 KV transmission lines.

OUTPUT: 30 MW installed capacity
133,000,000 Kwh of firm annual energy

CAPITAL REQUIREMENTS: $60,000,000 with a State contribution of $15,000,000

GREEN LAKE HYDROELECTRIC PROJECT

LOCATION: 10 miles southeast of Sitka on the Vodopad River.

MARKET: Sitka, service area population 8,800.

TYPE: 280-foot-high double-curvature, concrete-arched dam at the outlet of existing Green Lake, with a 1,910-foot-long power tunnnel, powerhouse, access roads, substation and 8 miles of 69-KV wood pole transmission lines.

OUTPUT: 16.5 MW installed capacity
64,900,000 KWh average annual energy

CAPITAL REQUIREMENTS: Total $62,000,000 with a State contribution of $8,200,000. Remaining requirements of $5,000,000.

SNETTISHAM HYDROELECTRIC PROJECT

LOCATION: 28 miles southeast of Juneau on the Speel Arm of Port Snettisham

MARKET: Juneau and Douglas, service area population 23,000.

TYPE: The Crater Lake phase will include a lake tap, 7,800-foot-long power tunnel and penstock, access road and third generator in the existing powerhouse.

OUTPUT: 27 MW installed capacity

CAPITAL REQUIREMENTS: $70,000,000 ÷ 27 = $

POWER CREEK HYDROELECTRIC PROJECT

LOCATION: 7 miles northeast of Cordova

MARKET: Cordova, population approx. 2,500.

TYPE: 80-foot-high concrete dam, intake, 8,000 foot-long penstock, powerhouse, and 6 miles of transmission line. Run-of-river project.

OUTPUT: 5 MW installed capacity
32,000,000 KWh average annual energy

CAPITAL REQUIREMENTS: $51,000,000

HEWLETT PACKARD

SCAMMON BAY HYDROELECTRIC PROJECT

LOCATION: Spring-fed stream at Scammon Bay.

MARKET: Scammon Bay, population 200.

TYPE: 8-foot rock-filled gabion dam, intake structure 3,500-foot-long penstock, and powerhouse. Run-of-river project.

OUTPUT: 150 KW installed capacity
529,000 KWh average annual energy

CAPITAL REQUIREMENTS: $2,100,000

HEWLETT PACKARD

SMALL HYDROELECTRIC PROJECTS

LOCATION: Streams located near population centers and in areas of relatively high precipitaion and topographical relief. Regional studies of small-scale hydroelectric potential have been completed for Southeast Alaska, Kodiak Island, Alaska Peninsula, Aleutian Islands, Southwest Alaska, and AVEC villages.

TYPE: Generally run-of-river projects providing replacement energy as available.

OUTPUT: Typically 100 KW to 1 MW installed capacity

COST: Typically $5,000-15,000 per installed KW

PORT LIONS HYDROELECTRIC PROJECT

LOCATION: On Port Lions River at Kizhuyak Bay on Kodiak Island

MARKET: Port Lions, population 250.

TYPE: 7-foot-high sheet pile forebay dam, upstream storage dam, 2,100 feet of steel penstock, and powerhouse. Run-of-river project.

OUTPUT: 180 KW installed capacity
715,000 KWh average annual energy

CAPITAL REQUIREMENTS: $1,500,000

Communities that exhibit the potential for economic small-scale hydroelectric development:

Chignik Bay	Atka	Ouzinkie	Kaltag
Chignik Lagoon	Nikolski	Port Lions	Kiana
Chignik Lake	False Pass	Larsen Bay	Shungnak
Perryville	Unalaska	Ambler	Togiak
Ivanoff Bay	Akhiok	Elim	Angoon
Cold Bay	Karluk	Goodnews Bay	Tenekee Springs
King Cove	Old Harbor	Grayling	Gustavus

BLACK BEAR LAKE HYDROELECTRIC PROJECT

LOCATION: 8 miles east of Klawock on Prince of Wales Island

MARKET: Klawock, Craig, and Hydaburg, service area population 1,200 year-round.

TYPE: 28-foot bin wall and rockfill dam at outlet of Black Bear Lake, penstock, powerhouse, and 52 miles of 23 KV transmission line.

OUTPUT: 5 MW installed capacity
22,000,000 Kwh firm annual energy

CAPITAL REQUIREMENTS: $30,000,000

BRADLEY LAKE HYDROELECTRIC PROJECT

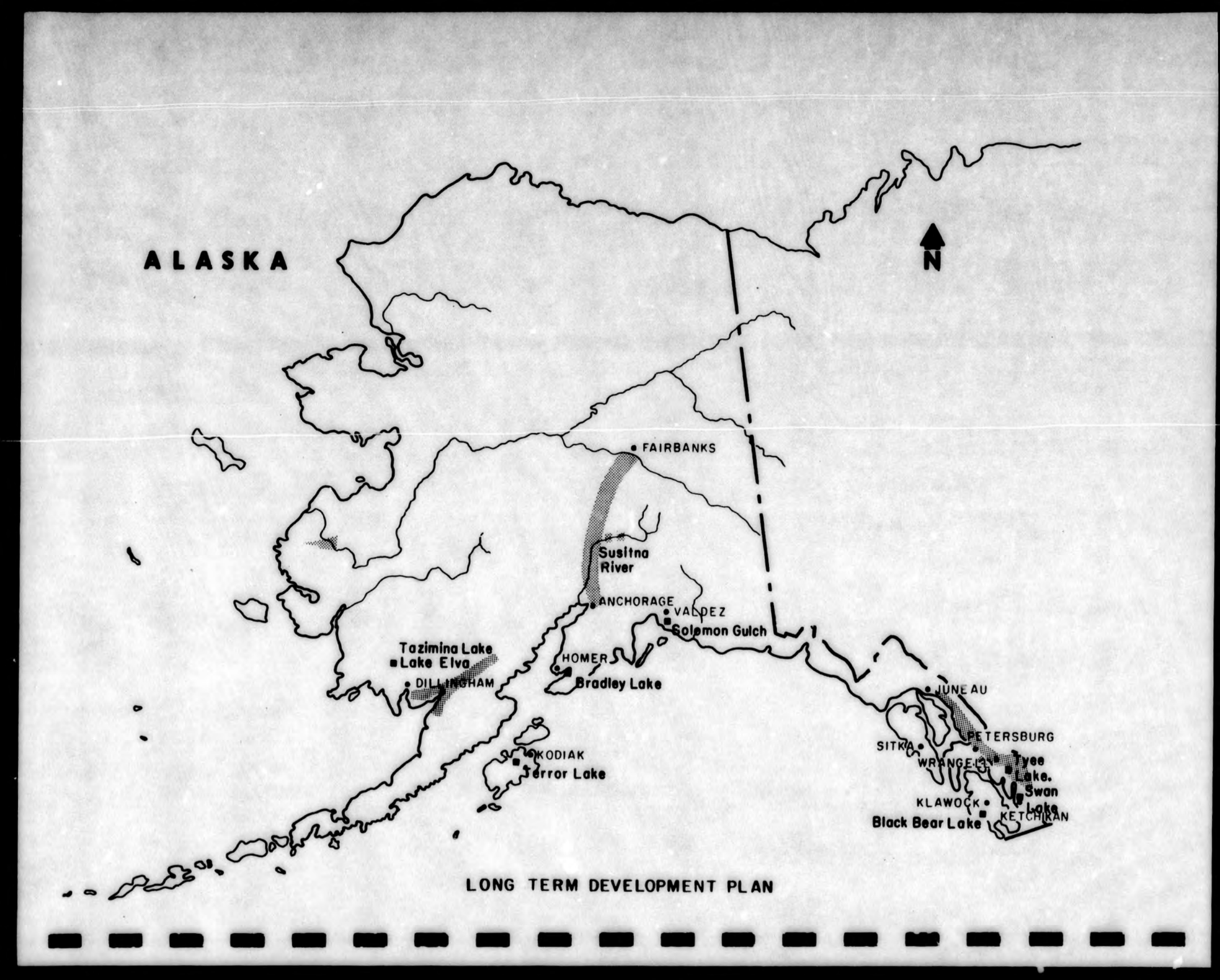
LOCATION: At the head of Kachemak Bay near Homer on the Kenai Peninsula

MARKET: Kenai Peninsula and perhaps Anchorage. Kenai Peninsula population 22,000.

TYPE: 100-foot concrete gravity dam at the outlet of Bradley Lake, diversion channels, lake tap, power tunnel, underground powerhouse, switchyard, and 10 miles of 115 KV wood pole transmission line.

OUTPUT: 70 MW installed capacity
306,000,000 Kwh firm annual energy

CAPITAL REQUIREMENTS: $200,000,000


ALASKA
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Susitna River
ANCHORAGE
VALDEZ
Solomon Gulch
Tazimina Lake
Lake Elva
HOMER
DILLINGHAM
Bradley Lake
JUNEAU
PETERSBURG
SITKA
WRANGELL
Tyee Lake.
Swan Lake
KLAWOCK
KETCHIKAN
Black Bear Lake
KODIAK
Terror Lake
LONG TERM DEVELOPMENT PLAN

TAZIMINA HYDROELECTRIC PROJECT AND INTERTIE

LOCATION: North of Lake Iliamna on the west side of Cook Inlet

MARKET: Fifteen communities in the Bristol Bay Region

TYPE: Earthfill 38-foot forebay dam, earthfill 45-foot storage dam, penstock, powerhouse, access road and 181 miles of 138 KV transmission line.

OUTPUT: 18 MW installed capacity (first stage)
79,000,000 Kwh firm annual energy

CAPITAL REQUIREMENTS: $80,000,000

WEST CREEK HYDROELECTRIC PROJECT

LOCATION: West Creek in the vicinity of Skagway

MARKET: Skagway and Haines, market area population 2,400.

TYPE: 107-foot-high concrete dam, 11,000-foot-long power tunnel, surge tank, powerhouse and transmission facilities.

OUTPUT: 5.4 MW installed capacity
27,000,000 KWh average annual energy

CAPITAL REQUIREMENTS: $55,000,000

SOUTHEAST INTERTIE

LOCATION: Southeast Alaska

MARKET: Juneau, Petersburg, Wrangell, Ketchikan and intermediate communities

TYPE: Interconnection of major hydroelectric facilities (Snettisham, Tyee and Swan) and adjacent load centers.

PURPOSE: Reliability and exchange of economy energy.

RAILBELT INTERTIE

LOCATION: Southcentral Alaska

MARKET: Anchorage and Fairbanks

TYPE: Interconnection of existing systems at 138 KV

PURPOSE: Reserve sharing and economy energy exchange

CAPITAL REQUIREMENTS: $55,000,000

SB 25 + 26 (Kertulla) — ① Low int. financing
② Norfed statewide prog.
③ adequate funding
④ Fund @ today cost (income tabal. inflation)
⑤ $ for un-feasable projects stay in area.

Dave Hutchins

SUSITNA HYDROELECTRIC PROJECT

LOCATION: Upper Susitna River NE of Talkeetna between Anchorage and Fairbanks

MARKET: Fairbanks, Anchorage, Matanuska Valley, Kenai Peninsula

TYPE: 810-foot rockfill dam and powerhouse at Watana (first stage)

635-foot concrete gravity dam and powerhouse at Devil Canyon (second stage)

364 miles 345 KV transmission line

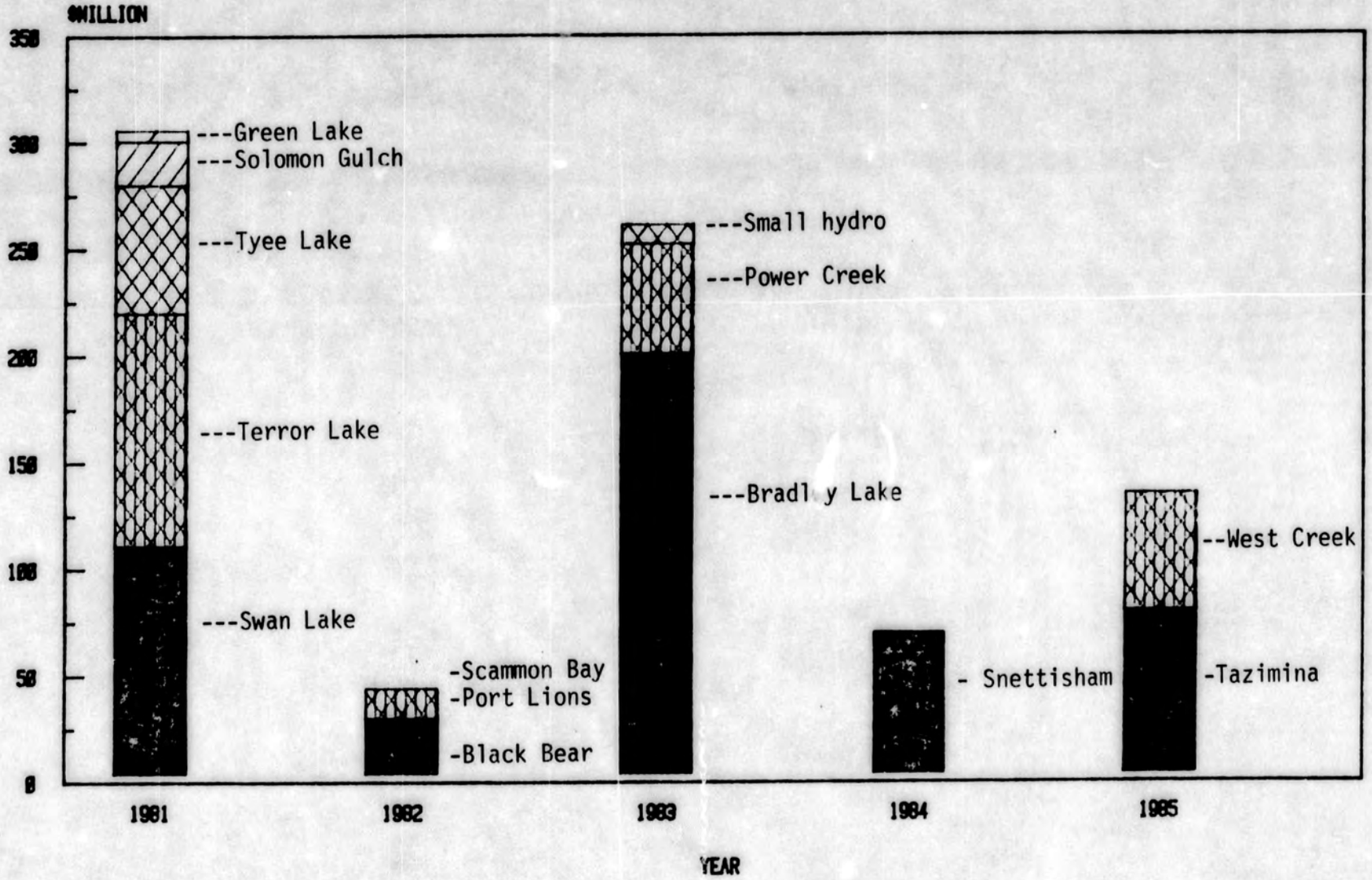
FIRST STAGE OUTPUT: 700 MW installed capacity
3,100,000,000 Kwh firm annual energy

ULTIMATE OUTPUT: 1,392 MW installed capacity
6,100,000,000 Kwh firm annual energy

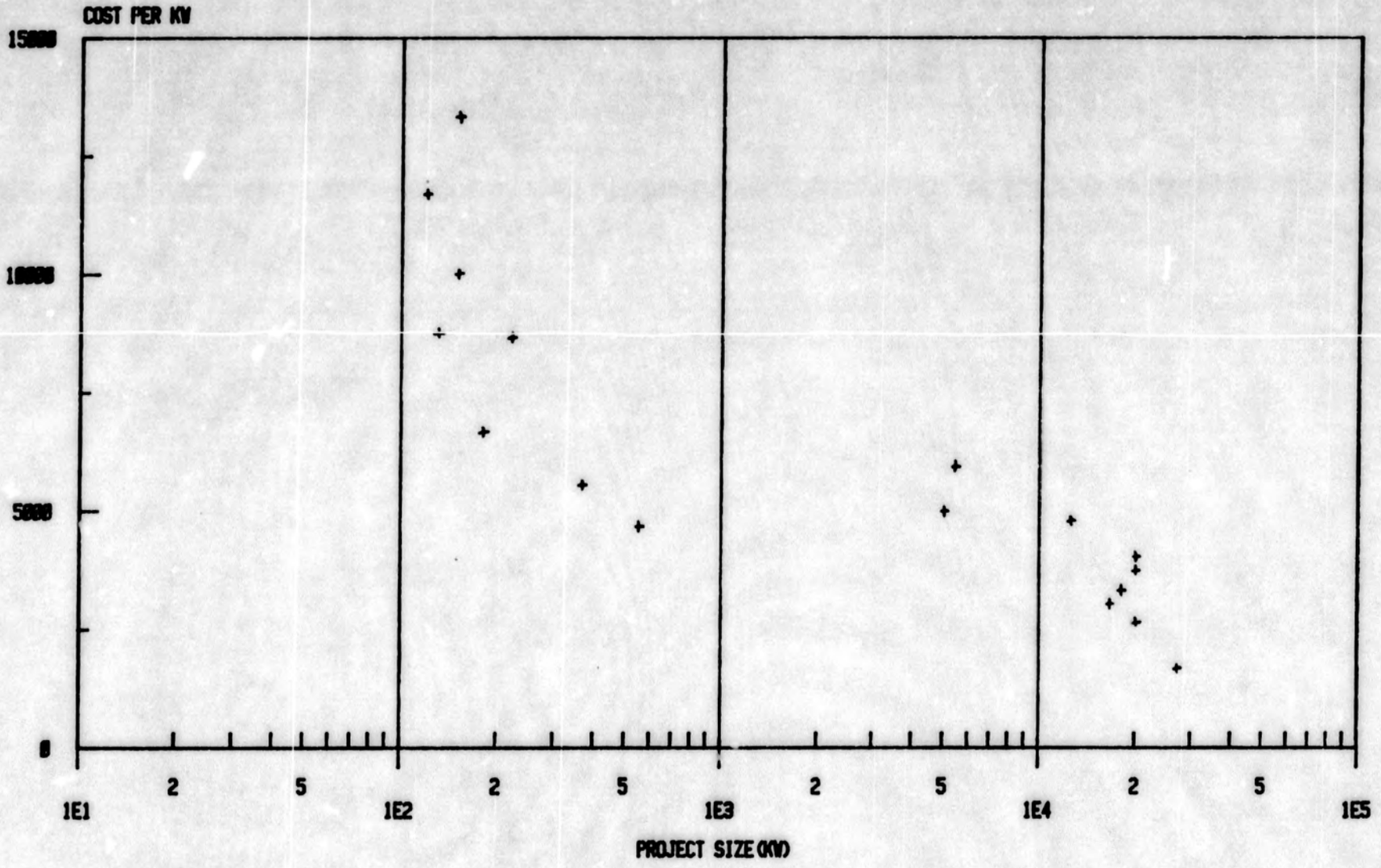
COST ESTIMATE (October 1978): $ 2.5 billion ÷ 1392 = $1,817,529

ESTIMATE OF CAPITAL REQUIREMENTS

(EXCLUDING SUSITNA)



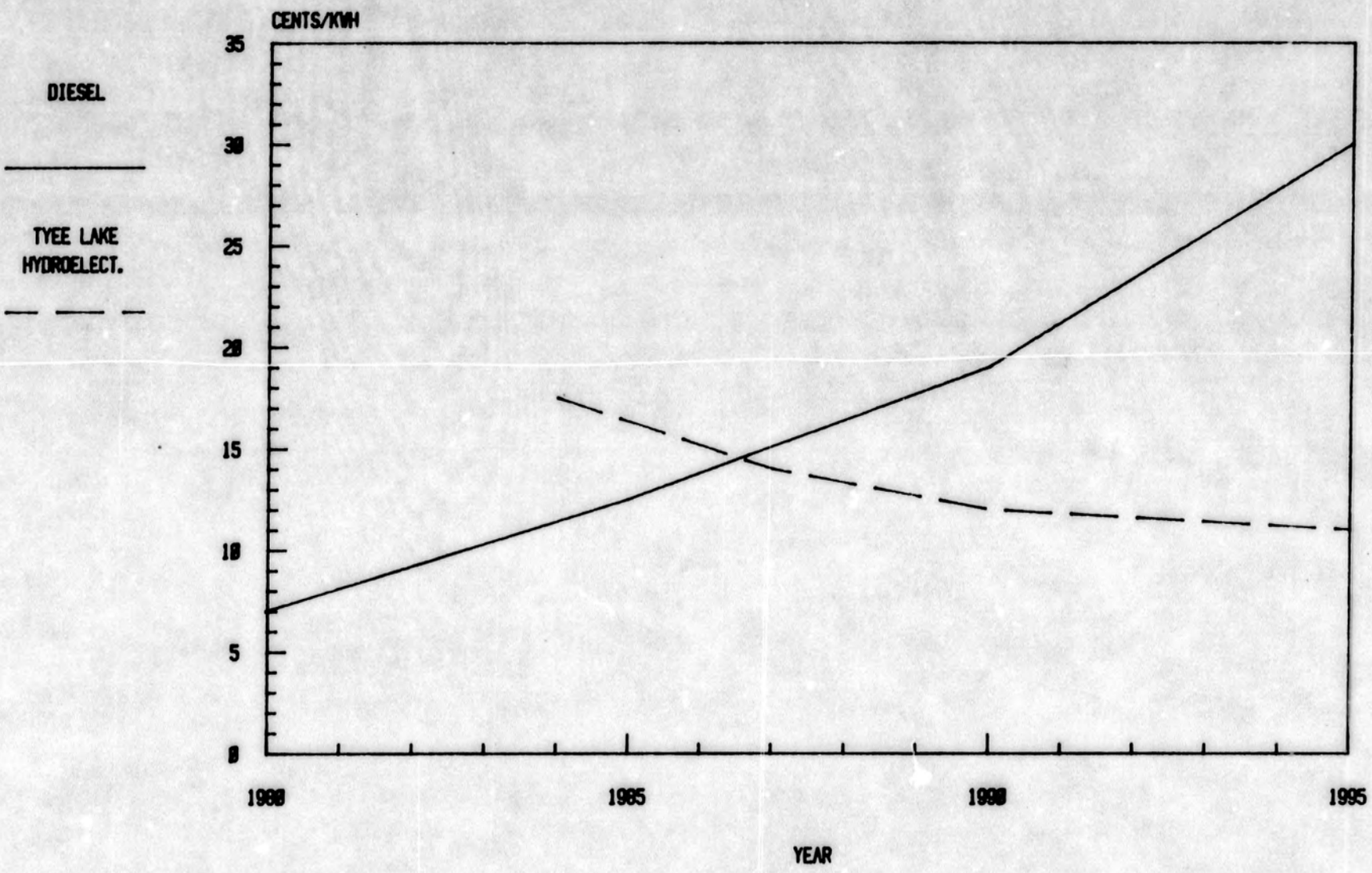
RELATIONSHIP OF COST TO SIZE



HEWLETT PACKARD

TYPICAL COST OF POWER OUTLOOK

BUSBAR COST



FINANCING ALTERNATIVES

- POWER AUTHORITY REVENUE BONDS
- STATE GENERAL OBLIGATION BONDS
- REVENUE BONDS WITH STATE GUARANTEES
- STATE GENERAL FUND LOAN (EQUITY INVESTMENT)
- STATE GENERAL FUND APPROPRIATION
  - debt service payment
  - reduction of bondable costs
- NON-STATE ASSISTANCE
  - Federal (REA & FFB)
  - CFC

Introduced: 3/19/81
Referred: State Affairs

IN THE HOUSE BY ROGERS AND BUCHHOLDT

SPONSOR SUBSTITUTE FOR HOUSE BILL NO. 9

IN THE LEGISLATURE OF THE STATE OF ALASKA

TWELFTH LEGISLATURE - FIRST SESSION

A BILL

For an Act entitled: "An Act relating to departments and programs of state government which are concerned with energy; and providing for an effective date."

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

* Section 1. AS 37.12.125(6) is amended to read:

(6) "renewable resource" means

(A) non-human living organisms;

(B) natural components of the environment, including the air, land, and water; [AND]

(C) energy systems which are naturally recurring or replenished; and

(D) energy conservation.

* Sec. 2. AS 43.20.037(d)(1)(B)(ii) is amended to read:

(ii) a method of architectural design and construction which provides for the collection, storage and use of direct radiation from the sun or which provides for the retention of heat by the use of an amount or quality of insulation which exceeds the amount or quality of insulation required by building performance standards adopted by the Department of Transportation and Public Facilities under AS 44.42.020(14); and

* Sec. 3. AS 44.33.020 is amended by adding a new paragraph to read:

(25) develop and administer a village energy conservation program for the benefit of the people of rural areas of the state,

PLEASE NOTE: THE FOLLOWING PAGES WERE TREATED AS A UNIT IN THE ORIGINAL DOCUMENT.

A.P. 1/9/81 INCOMPLETE

1. Two related problems --- financing and rates: In much if not most of Alaska, the lowest-cost power source in the long run is hydropower or some other capital-intensive technology. But the front-end costs of hydro projects, for example, may well exceed the funds that sponsors (individual Alaska utilities, the Alaska Power Authority, or others) could borrow in private capital markets on the strength of their own assets or assured revenues.

Even where the sponsors are able to finance hydro or other capital-intensive generating projects conventionally, moreover, private lenders are likely to insist on debt-service schedules and ratemaking arrangements that would cause consumer prices for electricity from the new project to exceed the life-cycle average cost of that power by several times.

2. The solution --- generally. Alaska's large cash balances allow the State to assist generating project sponsors ---

(a) to finance hydro and other highly capital-intensive generating technology at lower capital costs than most sponsors could obtain independently (if indeed they could finance their preferred projects at all), and at the same time

(b) to "levelize" the consumer price of electricity so that today's ratepayers can share the long-term benefits created by the new projects.

3. Three methods of State assistance. In order to assure financing of capital-intensive electrical generating projects at a reasonable cost, and to levelize consumer prices over time, three general methods are available to Alaska:

(a) State guarantees of all or part of the project debt, to make it marketable despite the financial weakness of the project and/or the sponsors;

(b) Direct State purchases of all or part of the project debt, despite the risks to the State attendant on the financial weakness of the project and/or the sponsors; and

(c) State bridging grants or loans to fill part of the gap between the long-term cost of electricity and the assured revenues the project or its sponsors must have in its early years in order to finance it conventionally.

4. The three methods are equivalent. These three methods are precisely identical in principle. Any one of them can be used to support or substitute for any specified part (say, 50 percent) of the project debt, while permitting the balance to be sold in the private revenue-bond market.

Any one of the three methods (or a combination of two or more) can be used to set first-year debt-service revenue requirements (and thus first-year electric rates) over a wide range of possible levels. In each case the State's willingness to accept financial risks that the private market, the utilities, or the ratepayers can not or will not accept is an implicit "subsidy", which makes financing possible under more acceptable terms than could otherwise be obtained on the private market.

Any of the three methods can be structured so as to recapture from ratepayers the whole value of that subsidy --- or any part of it --- over the life of the power project in question. Any of the three methods is compatible with some form of external "market test" of project viablity, but each of them is vulnerable to being turned into a permanent subsidy or into an incentive for pyramid-building and gold-plating.

5. Differences in implications. The three approaches may differ significantly in ---

(a) their influence on the interest cost of external debt,

(b) the State's benefits from "arbitrage" (the ability to borrow for power projects at lower interest rates in the tax-exempt bond market, while investing surplus state revenues at higher rates in taxable securities),

(c) the time at which the financial risk to the State is greatest,

(d) the value of state funds or other assets that are immobilized for the duration of the project financing,

(e) the Constitutional and legal prerequisites, and

(f) organizational feasibility and administrative complexity.

The specific design of a financing project, however, is likely to have more influence on most of these factors than the choice between the three general methods.

6. Putting the various cost factors into proper perspective Not all of the considerations listed in 5 are of equal significance. Too much of the recent debate within State government in Alaska has centered on the ratings and interest cost for various kinds of debt. The Bank of America team, for example, placed great weight on the proposition that the interest cost of general obligation (G.O.) bonds is always cheaper than for otherwise-equivalent revenue bonds, collateralized or not.

Some financial experts disagreed with B of A, but what is significant is how little difference this issue, per se, seems to make. The table appended to this memorandum shows that the choice between revenue-bond and G.O.-bond financing makes only a 0.4 percent (four-tenths of one percent) difference in the average electricity cost over the 25-year operating life of a hydro project, all other things being equal.

LAW OFFICES
WOHLFORTH & FLINT
A PROFESSIONAL CORPORATION
900 WEST 5TH AVENUE, SUITE 605
ANCHORAGE, ALASKA 99501

ERIC E. WOHLFORTH
ROBERT B. FLINT
TIMOTHY G. MIDDLETON
PETER ARGETSINGER
W. J. PAT SORSBY

TELEPHONE
AREA CODE 907
276-6401

December 24, 1980

Hon. Jay Hammond
Governor, State of Alaska
Pouch A
Juneau, Alaska 99811

Dear Governor Hammond:

By direction of the Alaska Power Authority I have analyzed the paper submitted to you by Arlon Tussing on November 10, 1980, entitled "A new approach to Electric Power Project Financing" and the paper submitted by the Bank of America dated December 19, 1980 entitled "Proposed Alternative Power Financing Strategy".

1. As Bank of America letter states it, the Guaranty Fund as outlined by Mr. Tussing would be "illegal" under IRS arbitrage regulations. This means that under Internal Revenue Service Ruling 80-13 Bonds issued by the State or the Power Authority secured by a pledged fund of equal size to the bond issue would result in loss of tax exemption for the bond issue unless the yield on fund investments were limited to the bond yield. Under this Revenue Ruling and the sections of the Code cited therein the maximum amount of a pledged fund is 15% of the original face amount of the bonds issued.

2. Mr. Tussing states that lenders almost always insist on a straight line amortization schedule for the revenue bonds of project financed utility developments (page 16, Tussing Memorandum). For some reason Mr. Tussing ignores, as does the Bank of America the only large recently completed Electric Revenue Bond financing in the State, namely the $54 million Municipal Utilities Revenue Bond Issue of the City and Borough of Sitka sold on June 14, 1979. This bond issue is typical of electric revenue bond issues in that the bonds mature in 40 years on a level debt service basis after completion of the project. (See page A-17 of the Official Statement where it is stated that at an assumed 7 ½% interest rate on the bonds there would be approximately level debt service over 36 years).

You may be assured that 25 to 40 year, level debt service bond issues are typical of hydro electric tax exempt bond issues.

3. The issue then is not "levelizing" rates as is stated by Mr. Tussing but rather the two separate issues of the correct means of

reducing power rates and then the correct means of providing for an equitable repayment or recapture of a State subsidy necessary to reduce power rates. Again reference to page A-17 of the Sitka Official Statement shows that rates in that City are "levelized" from 1983 through 1988 at approximately 6.4 cents.

4. It is clear that either issuing general obligation bonds of the State as in the Bank of America Memorandum or bonds fully collateralized by funds of the State (which unfortunately would not be tax exempt bonds unless investments of the fund were limited to the bond rate) would reduce power financing costs. In both cases the required extra coverage of 25% or 35% could be eliminated and rates reduced. However, the memoranda do not show how interest sensitive power costs are to rates in terms of actual case examples of power financing. For example, both Table 4 and 5 of Mr. Tussing's Memorandum assume that interest during the first several years of the project would be paid from rates charged to the consumer rather than capitalized from the bond issue as is typical in revenue bond power financings. The Bank of America implies that general obligation bonds would permit scheduling of bond principal only after construction. It typically is so scheduled in revenue bond construction projects. The Bank talks of "traditional level" principal payments. The traditional repayment schedule is level debt service after construction.

5. The Bank of America Memorandum does not allude to the fact that any guaranty of the State by bonds would require voter approval. Clearly, a State guarantee of debt would enhance the credit rating on the bonds and reduce interest costs. The Bank of America Memorandum does not indicate the interest rate savings to the State which would be produced by the general obligation bonds as opposed to revenue bonds. The Bank of America Memorandum states that a State guaranty would eliminate the need for funded interest during construction, a debt service reserve account and an excess debt service coverage requirement. Of course capitalized interest can be eliminated if the State pays it from general revenue and the elimination of a debt service reserve account is not necessarily cost effective since such account may be funded with bond proceeds which may be invested on an unlimited yield under existing Internal Revenue Service Regulations if limited in size to 15 percent of the bond issue.

6. The "trade-off" for elimination of an excess debt service coverage requirement which, together with the lower interest cost of general obligation bonds, is the key to reduced power costs under the Bank of America Memorandum will be compensated for by a "up-front guaranty fee" for the risk the State would be assuming. The same bond guaranty fee is a feature of the Tussing Memorandum. Mr. Tussing states on page 12 that if the State relieves lenders of all or a part of the usual financing risks to reduce debt serice coverage requirements, or to prolong the repayment of principal, the resulting cost to the State can be measured or at least estimated. He further

states "this cost incurred by the State is a part of the true cost of power from the new project and ought to be born by the consumers through a guaranty fee added to bond interest rates".

Neither memorandum quantifies the amount of the bond guaranty fee. Given an efficient market the estimate of assumed additional risks of the State which, if the bonds were revenue bonds, would be extracted by investors in the additional coverage requirement would be equal to the cost to the consumer of the additional coverage requirement. The Bank of America would capitalize the bond guaranty fee from bond proceeds for each individual project and provide for its repayment by consumers in latter years rates.

Without an actual case based on assumptions of borrowing costs and rate levels it is difficult to determine whether such a plan is equitable or feasible or what its effect on power consumers would be.

Recapture of subsidy is a separate determination from a plan of finance. The Bank of America plan of finance simply provides for the optimum bondholder security, namely general obligation bonds and a compensating Energy Development Fund as an accounting device for subsidy payment and recapture. The Energy Development Fund is not pledged to the bonds although it will pay interest during construction.

The Fund would receive a guaranty fee initially "to compensate its [the State's] willingness to absorb the risks of default". What would be the amount of the fee?

The Fund would pay interest during construction on the bonds.

The Fund would receive payments from consumers in latter years when level rates produce excess earnings.

It is submitted that this subsidy payment and recapture mechanism does not require a fund but merely an accounting formula and legislative enactment.

Subsidy costs and repayment methods can be provided under any plan of finance. The issue is the correct plan of finance to reduce power costs. A separate issue is a means of recapturing the subsidy required to reduce power costs.

7. Finally the Bank of America cites as a reason for the issuance of general obligation bonds the increased market capability due to the ability of banks to underwrite such issues. The benefits of commercial bank underwriting long term power debt are not quantifiable since such

debt has typically been issued on a revenue bond basis with banks prohibited from underwriting.

Very truly yours,

WOHLFORTH & FLINT

By Eric E. Wohlforth
Eric E. Wohlforth

EEW/amP

cc: Ms. Francis A. Ulmer, Director
Div. of Policy Development & Planning

Mr. Ron Lehr, Division of Budget and Management

Lt. Governor Terry Miller

ALASKA POWER AUTHORITY

MEMORANDUM

MEMO TO: Fran Ulmer
Div. of Policy Dev. & Planning

DATE: December 24, 1980

FROM: Eric P. Yould
Executive Director
Alaska Power Authority

SUBJECT: Comments on Arlon Tussing's Memorandum

Provided below are comments on Arlon Tussing's Memorandum: A New Approach to Electric Power Project Financing. Actually, I am gratified to see that Mr. Tussing realizes the complexity of financing projects in Alaska and the benefits of hydroelectric project development. Mr. Tussing confirms many concepts the Power Authority has supported for some time. However, the paper is an academic treatment of a real problem that requires innovative solutions that are both practical and in the best interest of the State. Mr. Tussing's paper, being so academic, has certain weaknesses that must be addressed.

1. Mr. Tussing's proposal for a Guarantee Fund would most likely be contrary to the IRS regulations on arbitrage and investments earnings of the fund would have a restricted yield.

2. Levelized debt service is the preferred schedule for repayment of principal and interest for capital intensive revenue financed projects. I am somewhat surprised that Mr. Tussing was not aware of this.

3. A Guarantee Fund would not necessarily eliminate debt service coverage requirements unless it was a large fund with a strong guarantee, which as mentioned in (1) above would likely be restricted by the IRS. Another aspect of the coverage requirement is that coverage revenues are generally used for operation and maintenance of the utility systems once debt service payment is assured. This is recognized by both the utility and the bond investor. The utility must collect revenue to insure proper operation and maintenance of the system, and the investor wants revenues collected for this purpose to help insure the continued operation of the financed project for its useful life. Therefore, elimination of coverage requirements will not always be in the interest of either the utility customers or the bond investor. It only impacts negatively when coverage requirements are excessive. In fact, elimination of debt service coverage would probably not reduce retail rates to consumers since the utility would have to maintain an adequate revenue stream anyway in order to provide for utility operation and maintenance. Consequently, there is little if any benefit to eliminating a reasonable debt coverage.

4. Advance payments for future inflation is a characteristic of any levelized debt service schedule in financing a capital intensive project. It cannot be resolved without refunding of early maturity debt and thereby either lengthening the debt repayment schedule or increasing the debt service in the latter years of the schedule. This in some respects eliminates one of the most desirable aspects of financing and operating a capital intensive alternative energy project. His technique is not generally accepted in the municipal market and it would carry an interest penalty. However, if it were accepted, it would largely eliminate the subsidy issue.

5. Underutilization of capacity is a major factor in power project financing in Alaska which must be addressed. The method used by Mr. Tussing to correct for this problem is the same as for adjusting for inflation in (4) above. The concept is desirable, however, it is most difficult to put into practice. The most effective way for the state to assist in correcting this problem is to provide more assistance in financing projects in return for more control of the projects and control over rate setting for the sale of project power to insure an adequate return to the state over the useful life of the project.

The following are a few comments on the Proposed Alternative Power Financing Strategy from Bank of America,

1. Page 1. Revenue Bonds carrying a full faith and credit guarantee would require voter approval and could impact to some degree the State's credit and ability to insure General Obligation debt in the future. Voter approval is not timely for immediate projects which should be financed, and if it were to be requested, it should be for a large authorization for possible projects statewide.

2. Page 2. Debt service schedules for long term capital intensive power project financing are levelized with increasing principal and declining interest payments. Consequently, there is no benefit to be gained by this proposal.

His

3. Page 3. Periodic payments to consumers would be subject to taxation. However, payments to utilities to achieve the same purpose which are structured similar to the Power Production Assistance Program would not have this problem.

4. Page 4. A State guarantee would not eliminate the need for funded interest during construction, since the IDC would have to be paid by the utility or the state from some source.

In conclusion, the Bank of America financing strategy, as the Tussing Memorandum, represents advice on investment banking issues from sources that are not experienced in the long term public power financing market. While I believe that both the Tussing and Bank of America efforts are sincere attempts to establish an equitable power financing program, their ideas are generally unworkable nor do they ameliorate the debt service burdens during the earlier years of a hydropower project's life.

We look forward to meeting with you and your representatives on December 29th to discuss these ideas, and others that we believe are workable.

cc: Governor Hammond
Terry Miller
Ron Lehr

ARLON R. TUSSING & ASSOCIATES / 880 H St., Suite No. 210, Anchorage, Alaska 99501

23 January, 1981

To: Frances Ulmer
From: Arlon R. Tussing

Re: POWER PROJECT FINANCING ALTERNATIVES

The enclosed is a revised copy of my January 21 memorandum to Governor Hammond. This version corrects some typos and contains a few stylistic improvements.

The revised version also reflects a recalculation of the interest cost comparison between direct State loans and the loan guarantee plus rate relief fund approach. The new figures are somewhat more favorable to Ron Lehr's approach but not sufficiently so to affect my recommendations.

I have calculated and included in this version the net interest cost to the State under the repayment formula included in Eric Wohlforth's draft legislation. Deferring amortization of the State loan until after retirement of other project debt would result in a significant loss of potential revenue to the State --- a present value equivalent to about 29 percent of the original loan principal. I do not believe that a loss of this size is acceptable or necessary to achieve acceptable electric rates.

enc

1220 19th Ave. N.W. Suite No. 201 Washington D.C. 20036 2720 Rainier Bank Tower Seattle Washington 98101 (206) 447-0321

ARLON R. TUSSING & ASSOCIATES / 880 H St., Suite No. 210, Anchorage, Alaska 99501

23 January, 1981

To: Governor Hammond
Via: Frances Ulmer
From: Arlon R. Tussing

Re: POWER PROJECT FINANCING ALTERNATIVES

1. State guarantees vs. subordinated loans. In a November 19 memorandum to you, I proposed a State loan-guarantee program to lower initial rates on hydroelectric projects that is almost identical to the one Ron Lehr presented last week. Discussions with Power Authority and Bank of America people, Eric Wohlforth, Sterling Callagher, and others have convinced me, however, that the guarantee approach carries unacceptable risks and may not even be workable.

The alternative proposal using direct State loans is essentially a modification of an approach that the Power Authority has already implemented successfully for Sitka's Green Lake project. Its specifics reflect suggestions by Terry McGuire of the Power Authority, Eric Wohlforth, and me. In my judgment, this approach is superior to using State loan guarantees plus a rate-relief fund.

The two methods of State assistance have precisely the same purposes and economic effects, and either method can be structured to yield any desired level of initial electric rates, and any desired allocation of costs and risks between the ratepayers and the State treasury. Either is compatible with a project-by-project vote of the people, or with an overall program authorization. The differences are significant, however:

a. Interest costs. Theoretically, the use of tax-exempt G.O. bonds should result in lower net interest costs, mainly because the State funds that would otherwise be committed to a direct loan could be invested in taxable securities at a higher rate of return. This is Ron Lehr's chief argument for preferring guaranteed loans and a rate relief fund over direct loans from the State.

Eric Wohlforth and the Power Authority argued last week that the loan-guarantee approach would not result in lower net interest costs (or, what is the same thing, higher net earnings for State funds). I believe that Ron Lehr is probably right in principle, provided his scheme is workable. In Appendix A's illustrative case, the difference amounts to 7.5 percent of total costs. In my judgment, however, this saving is overshadowed by other considerations:

1220 19th Ave. N.W. Suite No. 201, Washington D.C. 20036 / 2720 Rainier Bank Tower, Seattle, Washington 98101 (206) 447-0321

b. Arbitrage. The Internal Revenue Service may determine that State-guaranteed bonds coupled with a rate relief fund as provided in Ron Lehr's plan is an illegal "arbitrage" scheme --- a device to borrow money in tax-exempt bond markets and invest it in taxable securities in order to "profit at the expense of the U.S. Treasury."

The experts we have heard disagree about how likely it is the IRS would actually condemn this plan, but arbitrage is in fact its chief purpose and its chief merit. What is clear is that we have no way of knowing how the IRS would actually rule, except after authorizing and preparing a specific bond offering.

c. Marketability. Thirty and 40-year electric revenue bonds are commonplace, but G.O. bonds with a maturity of more than 20 years may not be marketable in today's markets. Having to amortize the project debt in (say) 20 years instead of 30 would itself offset any interest-cost advantage from the guaranteed-loan approach.

On first impression it seems incredible that a bond with two sources of repayment should be harder to market than a bond with only one, but specialists from several investment houses have told me that this is indeed the case. See appendix B for an explanation.

d. Bond ratings. The State's G.O.-bond rating is sensitive to the volume of Alaska State and local G.O. bonds outstanding. Three hundred million or so dollars in general obligation debt to finance power projects in Alaska would not be likley to have any effect on the State's rating. But if general fund guarantees and a rate relief fund are chosen now to finance smaller projects, it may be difficult to deny the same treatment to the Susitna project, whose debt may be large enough to affect all of Alaska's bond ratings. This development could of course wipe out any interest-cost advantage from using the guarantee approach.

Just as with the marketability risk, it seems preposterous that using the kind of "double-barreled" bond guarantee proposed by Ron can not get around the danger of lowered ratings. Illogical or not, however, the problem is a real one. [See appendix B for an explanation.] And just as we found with respect to the "arbitrage" problem, experts differ on how much risk there actually is to the State's ratings, but once again the danger cannot be measured with any confidence until it is too late.

e. Simplicity. The subordinated loan scheme that the Power Authority and I endorse is simple: It requires only two kinds of debt to provide any desired time-profile of electric rates. Appendix A illustrates a financing that consists of $9.1 million in conventional revenue bonds at 10 percent interest, and an $9.1 million subordinated loan from the State at about 12 percent. Deferring debt-service on the State loan reduces the first-year fixed cost of electricity by half.

The guarantee plan, in contrast, requires three tiers of debt in order to obtain the same electric rate profile. Financing would consist of (a) $9.1 million in conventional revenue bonds, (b) $9.1 million in collateralized revenue bonds or G.O. bonds, and (c) nine annual loans of $.09 to $1.0 million each from the rate relief fund to make up the difference between the utility's revenues and scheduled debt service on the revenue and G.O. bonds. The rate relief fund would need an initial capital appropriation of at least $3.47 million in order to provide these annual loans out of interest and retirement of its investments.

In contrast to the guarantee approach, the simplicity of direct loans would permit an exactly parallel scheme to be adopted for non-utility power projects. (I still owe you a proposal for such a program, which would probably be in AIDA rather than in the Power Authority.)

The direct loan approach is easier to design, easier to administer, and easier to explain to legislators, the public, and (most importantly) investors.

2. Capital subsidies. Either direct State loans or loan guarantees plus a rate relief fund can serve as an alternative to subsidies, because either one of them can bring the initial cost of electricity from capital-intensive generating projects down to acceptable levels. I personally see no more reason for the State to subsidize electricity as such than to subsidize beer, oranges, or shotguns.

If the State cannot avoid granting new subsidies, however --- perhaps because direct appropriations and interest-rate subsidies have already been granted to some communities --- Ron Lehr's suggestion of a once-and-for-all capital subsidy of $1,000 per capita is one of the most elegant ideas around.

This per-capita subsidy plan is one way of transferring oil wealth to the people in a very broad, egalitarian manner. It doesn't seem to confront any State or Federal Constitutional issues, and the benefits are not taxable. Restricting the grant to capital projects and to renewable energy, however, would deny its benefits to exactly those people who need State relief most desperately --- residents of isolated bush communities who have no alternative to diesel power for the forseeable future.

The grant principal should, rather, be eligible for use on new capital investments either on hydro and other renewable energy or on conservation. Utilities, communities, or isolated groups that had no immediate prospect for such investments, however, could be allowed to invest their grant money, and to use only its earnings for fuel or other operating costs.

The earnings on the subsidy, whether invested in generating equipment or securities, should not be used to reduce rates per kilowatt-hour --- particularly in thermal-powered systems. Such a unit-price subsidy encourages people to consume more electricity than they otherwise would because they don't have pay its full cost. Rather, utilities should be required to distribute the subsidy benefits in the form of a flat monthly credit per customer. (Say, $10 per month less on each bill, rather than 4 cents less per kilowatt-hour.)

3. Popular vote. According to Alaska's Constitution, a general obligation bond issue requires a vote of the people, but any legislation authorizing or appropriating funds for direct State loans could easily provide for a referendum, either for the program as a whole or for each project.

You have made a strong case for a popular vote where the wealth of all Alaskans would be used to subsidize power projects that benefit only a part of the population. If the State's power financing program is designed (as we have proposed) so that the ratepayers reimburse the State at market rates for any money it lends and for any financial risks it bears, the case for a vote is less compelling.

Which kind of vote to require, however, is a real dilemma under either type of program: a project-by-project referendum invites citizens to vote only for the projects in their own region, and against all the others. A referendum that encompasses projects in all parts of the State is almost certain to pass and to carry along with it poorly-selected as well as deserving projects. I don't know the way out of this dilemma.

APPENDIX A

Cash-flow comparison of loan-guarantee plus rate relief fund and State subordinated loans.

Explanation of table. The table on page 8 compares otherwise equivalent plans for reducing initial electricity rates from a new hydroelectric project. For simplicity, only post-construction debt is considered. The initial debt figure of $18.154 million was chosen because it results in a levelized annual debt service of $2 million over 25 years at 10 percent.

Guaranteed loans plus rate relief fund. In the financing plan that uses a guaranteed loan plus a rate relief fund, the utility sells $18.154 million in level debt-service 25-year serial bonds at an effective rate of 10 percent. [The January 8, 1981 yield on 30-year AA electric revenue bonds was 10.00 percent; the yield on medium-grade 30-year G.O. bonds was 10.20 percent, and on prime 30-year G.O. bonds 9.40 percent.]

The rate relief fund lends the utility just enough to cover the revenue deficiency shown in column 3 for years 1 through 9. The fund then recovers these loans plus 12-percent interest [reflecting the greater financial risk of these loans compared to the senior bonds] from the utility's surplus revenues in years 10 through 25.

Starting with a $1 million first-year debt-service requirement, rather than $2 million, load growth and inflation together will safely support a revenue increase at 8.522 percent per year without increases in real rates per kilowatt-hour. This is the rate of escalation needed to pay off the same $18.154 million debt in just 25 years with the assistance of the rate relief fund.

A rate relief fund of $3.467 million, invested in U.S. Treasury issues of the maturities shown in column 5, and the [January 8] yields shown in column 6, would allow the interest earnings and retirement of bonds at maturity to cover the revenue deficits shown in column 3. The rate relief fund would earn a discounted cash-flow (DCF) rate of return on its investments in U.S. Treasury certificates of 12.69 percent, and the combination of these investments and the loan to the State would yield a DCF return of 12.13 percent on the original $3.647 million over the 25-year term of the loan.

Direct State loans. In the alternative financing plan, conventional level debt-service revenue bonds at 10 percent provide $9.077 million, half of the total (post-construction) capital at 10 percent interest, and require $1 million in annual revenues for 25 years. The other $9.077 is a subordinated loan from the State.

The revenue and rate profiles are the same as for the guaranteed loan and rate relief fund, as shown in column (1). The State thus receives debt service on the schedule shown in column 8. Because this example was designed to result in the same revenue stream and hence the same electric rates under both plans, the DCF rate of return to the State on a direct loan would be somewhat less —— 10.93 percent —— than the 12.13 percent it would earn on the smaller appropriation to the rate relief fund.

Interest cost comparison. The stream of debt service payments on the direct State loan, shown in column 8, has a present value of $7.713 million at a discount rate of $12.13 percent. This would be the rate of return on the State's investment under the loan guarantee approach, and is a reasonable proxy for the opportunity cost of the money committed to the direct loan. The lower interest earnings on an outlay of $9.077 million thus have a present cost to the State of $1.364 million, or 7.5 percent of the $18.154 million total project cost.

The loss of arbitrage earnings with a present value of $1.364 is more impressive, however, if it is compared with the $9.077 million subordinated loan. By this way of reckoning, the State would lose 15.0 percent of the value of its investment by passing up the opportunity to invest its funds in one, high-interest securities market and to borrow in another, lower-interest market. Even so, I do not believe that this potential gain would be worth the added complexity and the risks described elsewhere in this paper.

The Power Authority Proposal. The $1.346 million loss-of-earnings figure above is based upon a repayment schedule for the direct State loan that coincides with the 25-year term of the conventional revenue bonds. If repayment of principal on the State's loan were deferred until revenue bonds were paid off, however, as proposed by the Power Authority, the effective cost to the State would be much higher.

At the same effective interest rate as in Appendix A (10.93 percent), the payment schedule contemplated in Eric Wohlforth's January 14 draft legislation would have a present value of only $6.308 million. The present cost of the State's earnings loss would thus be $2.709 million, 14.9 percent of the project cost, and 29.8 percent of the original loan.

Beating the market? At least one member of the Governor's staff has argued that calculations like the foregoing are misleading, because the State can invest the rate relief fund and its general fund balances in taxable industrial bonds, for example, at considerably better yields than for U.S. Treasury bonds.

It is a truism that the State can always find higher-interest-rate investments than government bonds. Twenty-year U.S. bonds had a yield of 12.20 percent during the first week of January, and 30-year bonds 11.88 percent. During the same period, long-term AAA utility bonds had yields from 11.31 to 14.00 percent, and long-term A utilities 13.33 to 15.00 percent. Yields on long-term AAA industrial bonds were 11.98 to 12.50 percent, and A industrials earned 12.87 to 13.50 percent.

It does not follow from these rate spreads that the State can actually expect to earn a higher rate of return over the long run than the rate on government bonds. That supposition ignores the reason that industrial and private utility bonds have higher market rates of interest than U.S. governments.

The spread in rates between different securities of the same term reflects the consensus of investors regarding the risk of loss. In principle, the interest premiums for private utility and industrial bonds over risk-free investments like U.S. Treasury debt should be just enough that their total earnings --- net of losses --- will be exactly the same over the long run, given a sufficiently diversified portfolio of non-government securities.

Compare, for example, a typical portfolio of industrial bonds acquired ten or fifteen years ago, after allowance for Chrysler, Penn Central, Equity Funding, Youngstown Sheet and Tube, and Kaiser Steel. The actual earnings on that portfolio might have been higher than a comparable portfolio of U.S. Treasury issues acquired at the same time --- and it might have been lower. In either case, however, the difference could not have been predicted when the investment was made, and the market prices of the various securities at that time reflected the assumption that there would be no difference.

The yield on U.S. treasury bonds is thus the highest interest rate the State can COUNT ON earning.

COMPARISON OF

LOAN GUARANTEE PLUS RATE RELIEF FUND (Lehr)

vs.

STATE SUBORDINATED LOANS (APA-Tussing)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
		GUARANTEED LOANS PLUS RATE RELIEF FUND					DIRECT STATE LOANS	
		Debt		Rate Relief Fund ($3.467 m, 12%)			Debt	Debt
	Utility	Service,					Service	Service
	Revenue	$18.154m	Revenue	Interest	Maturing Securities		$9.077m	$9.077m
	(Increases	10% Reve-	Deficit	on U.S.			10% Reve-	State
Year	8.52% p.a.)	nue Bonds (10%)	(Surplus) (2)-(1)	Securities	Amount (3)-(4)	Yield (%)	nue Bonds	12% Loan (1)-(7)
1	1.00	2.00	1.00	.45	.55	13.95%	1.00	.00
2	1.09	2.00	.91	.37	.54	13.06	1.00	.09
3	1.18	2.00	.82	.30	.53	12.82	1.00	.18
4	1.28	2.00	.72	.23	.49	12.71	1.00	.28
5	1.39	2.00	.61	.17	.44	12.60	1.00	.39
6	1.51	2.00	.49	.12	.37	12.51	1.00	.51
7	1.63	2.00	.37	.07	.30	12.48	1.00	.63
8	1.77	2.00	.23	.03	.20	12.39	1.00	.77
9	1.92	2.00	.08	.01	.07	12.36	1.00	.92
10	2.09	2.00	(.09)				1.00	1.09
11	2.27	2.00	(.27)				1.00	1.27
12	2.46	2.00	(.46)				1.00	1.46
13	2.67	2.00	(.67)				1.00	1.67
14	2.90	2.00	(.90)				1.00	1.90
15	3.14	2.00	(1.14)				1.00	2.14
16	3.41	2.00	(1.41)				1.00	2.41
17	3.70	2.00	(1.70)				1.00	2.70
18	4.02	2.00	(2.02)				1.00	3.02
19	4.36	2.00	(2.36)				1.00	3.36
20	4.73	2.00	(2.73)				1.00	3.73
21	5.13	2.00	(3.13)				1.00	4.13
22	5.57	2.00	(3.57)				1.00	4.57
23	6.04	2.00	(4.04)				1.00	5.04
24	6.56	2.00	(4.56)				1.00	5.56
25	7.12	2.00	(5.12)				1.00	6.12
Net earnings (DCF)			12.13%			12.69%		10.93%
Present value @ 12.13%								$7.71m

APPENDIX B

Why bonds with a double guarantee may convey no advantage.

General obligation vs. revenue bonds. It is not always the case that a government's "full faith and credit" is better security than a utility's revenues. There is practically no difference in interest cost between medium-grade revenue bonds and medium-grade G.O. bonds, for example. Prime G.O. bonds are easier to sell and command lower interest rates than AAA electric utility bonds, but the interest cost for low-rated G.O. bonds is higher than for comparable grades of revenue bonds.

Thirty- and forty-year electric revenue bond issues are commonplace, moreover, but 30-year G.O. bonds may be unmarketable today. And lenders readily accept levelized debt service schedules for revenue bonds (provided they have adequate excess debt-service coverage), but they ususally demand straight-line amortization of general obligation debt.

The rate spread and the marketability differences probably reflect the fact that it is impossible to project a government's fiscal position two decades or more into the future, and the belief that an insolvent government has more effective means to ward off its creditors and less assurance it can improve its revenues than an insolvent utility — witness New York City's ability to avoid either raising taxes or going into bankruptcy court.

Two sources of repayment. My November 10 financing proposal and Ron Lehr's January proposal both contemplated bonds with "double-barreled" security, however. Project revenue would be the primary source of repayment, but these revenues would be supplemented by the proceeds of direct State loans, and backstopped by some kind of State loan guarantee. A major purpose of the guarantee would be to substitute for the excess-coverage indenture covenant that is customarily attached to revenue bonds, and they would thus be necessary only in the early years of a project's life, before inflation and load growth raised the acceptable level of utility revenues enough that they would easily cover conventionally-scheduled debt-service.

That, in any case, is the plan's logic. Why, then. should lenders treat doubly-secured bonds as general obligation bonds, ignoring their first source of repayment, just because the "full faith and credit" of the State is pledged to them? Conversely, why should they regard fully-collateralized bonds without a "full faith and credit" guarantee, as nothing more than revenue bonds, ignoring their second source of payment?

Is it reasonable to believe, specifically, that a 30-year bond with two sources of repayment would be harder to market than a straight revenue bond of the same term, or that a large issue of such bonds would jeopardize the ratings of all of Alaska's G.O. bonds? I argued vehemently against the first proposition when Merril Ring presented it in San Francisco, and was quite skeptical of the second when it was advanced by the Power Authority's advisors, because they seemed economically illogical.

I have subsequently referred this issue to investment specialists at Bank of America, Bache Halsey, Goldman Sachs, Metropolitan Life, Sun Life, and Salomon Brothers, and to two bond counselors who do not wish to be identified (perhaps so their colleagues or clients won't find out they are giving free advice). Their response was nearly unanimous in general outline, and unanimously dogmatic.

Nine sober men. There is a Russian proverb to the effect that, if nine sober men say you are drunk, you better lie down. The "nine sober men test" demands some rationale for the market's alleged behavior —- or at least for the belief in that behavior. None of my recent informants was able to convey to me why, logically or illogically, a bond with two sources of repayment is judged by only one of them, and not always the stronger of the two. I believe that there is a reasonable explanation, however.

The capital market abhors innovation and nonconformity. Institutional investors and other bond buyers want safety, an easily ascertainable market value at all times, and easy marketability. All that investors, pension fund trustees, auditors, or shareholders reading an annual statement really need to know about the bonds in a given portfolio is their amount, term, and coupon, are they backed by project revenues only or by the full faith and credit of the sponsor, and what is their rating in Moody's or Standard and Poor's.

Investors typically don't want to know anything else, because they want to believe that the next buyer doesn't need to know anything else. Otherwise, the value of the bonds would be uncertain, and they would be hard to sell when the need arises. Buyers are thus not necessarily behaving irrationally if they shun debt issues with gimmicks, novel sources of repayment, fine print or unusual footnotes.

Thus, bonds are either revenue bonds or general obligation bonds. If there have to be two sources of payment, the market presumes the reason is that the first isn't sufficiently reliable, and only the second is worthy of attention. You and I may understand that the State's guarantee is needed and relevant only to the first ten years or so of project life, but investors don't want to depend on sophisticated comparisons between the long-term prospects of the utility and those of the State's general fund. Alaska's fiscal outlook is very clouded beginning in the 1990's. It should not be surprising, therefore, that the market's valuation of its loan guarantees should be equally clouded.

PUTTING COST FACTORS INTO THEIR PROPER PERSPECTIVE

The following table compares the sensitivity of hydropower costs to several financial, design, and construction variables.

Variable	Increases average life-cycle electric cost by
Financial variables	
1. Financing with A-rated revenue bonds rather than medium-grade G.O. bonds	0.4 percent
2. Financing with A-rated rather than AA-rated revenue bonds	2.4 percent
3. Financing with medium rather than prime G.O. bonds	8.0 percent
4. Loss of arbitrage	16.4 percent
5. 15-year instead of 30-year amortization	18.3 percent
6. Financing with AA (taxable) utility bonds rather than AA (tax-exempt) municipal bonds	44.1 percent
Planning, design, and construction variables	
7. Underbuilding based on a 3-percent expected load growth --- actual load growth 6 percent	21.0 percent
8. 25-percent cost overrun	25.0 percent
9. 3-year delay in start of construction	27.3 percent
10. 25-percent derating of plant	32.0 percent
11. 8 years instead of 5 years to complete	48.5 percent
12. 50-percent cost overrun	50.0 percent
13. Overbuilding based on 6-percent expected load growth --- actual load growth 3 percent	54.5 percent
14. 3-year delay in commissioning	65.1 percent
15. Overbuilding based on 6-percent expected load growth --- actual load growth zero	106.7 percent
16. Non-operability & abandonment	200.0 percent
17. Cases 10, 12, and 13 all apply	361.0 percent

NOTES

General: Average life-cycle electric cost is the total revenue required per kilowatt-hour sold, years 6 through 30 inclusive. Except where otherwise indicated, the construction period is 5 years with equal annual outlays; operating life and permanent financing are 25 years; project is hydro or other 100-percent fixed-cost technology; financing is 100 percent debt; interest rates are the same for construction and permanent financing. Interest cost is 10 percent unless otherwise indicated.

Any electricity supply shortfalls during years 6 to 15 that result from delays, derating, or underbuilding are made up by thermally-generated power. The unit cost of thermally-generated supplemental power is assumed to be twice the average life-cycle cost of power from the project in question (if it had been completed and operated according to design).

Interest rate figures are from Salomon Brothers Bond Market Roundup for the week ending January 9, 1981 [copy attached].

Financial Variables

1. A-rated 30-year electric revenue bonds at 10.25 percent vs. medium-grade 30-year G.O. bonds at 10.20 percent.

2. A-rated 30-year electric revenue bonds at 10.25 percent vs. AA-rated 30-year electric revenue bonds at 10.00 percent.

3. Medium-grade 30-year G.O. bonds at 10.20 percent vs. prime 30-year G.O. bonds at at 9.40 percent.

4. This case contrasts the sum of net costs to the ratepayers and the State of (a) making a direct loan to the project sponsor at the market rate (10.00 percent) on AA-rated 30-year electric revenue bonds, and (b) the project sponsor borrowing in the tax-exempt market at that rate, while the State invests the same amount in 30-year U.S. Treasury bonds at 11.88 percent.

5. 15-year prime G.O. bonds at 8.60 percent, amortized over 15 years, vs. 30-year prime G.O. bonds at 9.40 percent, amortized over 30 years.

6. AA-rated 30-year taxable utility bonds at 14.50 percent vs. AA-rated tax-exempt electric revenue bonds at 10.00 percent.

Planning, design, and construction variables

7. Plant is designed to reach optimum load factor after 10 years of operation at 3 percent annual load growth. At 6 percent annual growth the capacity constraint is reached in the third year of operation (year 6) The cost of supplementary thermal power generation through the tenth year of operation (year 15) is added to the total cost figure in determining life-cycle average cost.

8. Self-explanatory.

9. Construction outlays and operation are both delayed 3 years. Term of financing and life of project are unchanged. Additional cost is the difference between the cost of an added 3 years of thermal power generation and the unit cost of power from the project in question.

10. "Derating" is inability to attain design-capacity operation. Plant is designed to reach optimum load factor after 10 years of operation, at 3 percent annual load growth. With 25-percent derating, the capacity constraint is reached in the first year of operation (year 6). Power shortfall for ten years is made up by thermal power generation.

11. Equal annual construction outlays are stretched out from 5 to 8 years but total is unchanged; amortization is reduced from 25 to 22 years. The cost of 3 years of thermal power generation is added to total costs in determining average costs.

12. Self-explanatory.

13. Plant is designed to reach optimum load factor after 10 years of operation, at 6 percent annual load growth. The higher unit cost reflects lower utilization rates caused by growth at only 3 percent.

14. Project is completed on schedule, but actual startup is delayed 3 years because of technical or licensing problems; amortization is reduced from 25 to 22 years. The cost of 3 years of thermal power generation is added.

15. Plant is designed to reach optimum load factor after 10 years of operation, at 6 percent annual load growth. Additional unit costs reflect lower utilization rates caused by lack of load growth.

16. Plant is completed but fails to operate or receive operating license. Demand must be met by thermal power generation.

17. Self-explanatory. [1.485 x 1.5 x 1.545 = 4.61]

MUNICIPAL BONDS

YIELDS	1/8/81 Price	1/8/81 Yld.	Change for Wk. Price	Change for Wk. Yld.	Yld. Change vs. 1979-80 High	Last 12 Months High	Last 12 Months Low
New Issue Scales (SB est.): Prime G.O. 1 Yr.	100	(7.00)	+ ½	-50	-125	8.25%	4.70%
5 Yr.	100	(7.40)	+ ⅜	-10	- 85	8.25	5.20
10 Yr.	100	(8.00)	0	0	- 50	8.50	5.70
15 Yr.	100	(8.60)	0	0	- 60	9.20	6.25
20 Yr.	100	(9.10)	0	0	- 65	9.75	6.40
30 Yr.	100	(9.40)	0	0	- 60	10.00	6.75
Med. Grade G.O. 30 Yr.	100	(10.20)	0	0	- 55	10.75	7.25
AA Electric Revenue 30 Yr.	100	(10.00)	+2⅜	-25	- 70	10.70	7.40
A Electric Revenue 30 Yr.	100	(10.25)	+2¼	-25	- 75	11.00	7.60
Seasoned Issues							
'20 Bond' — Bond Buyer Index	100	(9.49)	+2⅜	-27	-107	10.56	7.11
Long Revs. (S.B. Avg.): AAA Elec. (6⅛)	69½	(10.18)	+1⅞	-26	- 91	11.09	7.88
AA H.F.A. (6⅜)	65⅜	(10.20)	+1¼	-20	-105	11.25	8.13
A Elec. (8⅛)	81½	(10.06)	+2⅛	-28	—	—	—
A Toll (6⅝)	66½	(10.01)	+3½	-54	- 74	10.75	7.50

YIELD SPREADS (Basis Points)	1/8/81	Last 12 Months Max.	Avg.	Min.		1/8/81	Last 12 Months Max.	Avg.	Min.
New 30 Yr.: Med. Gr. vs. Prime GO	+ 80	+130	+76	+50	Prime Yield Curve (b.p.)				
A Rev. vs. Med. Gr. GO	+ 5	+60	+24	-10	1 Yr. vs. 6 mos. notes	- 15	+ 95	+ 10	- 75
A vs. AA Rev.	+ 25	+40	+25	+20	10 vs. 1 Year	+100	+150	+ 70	- 25
Prime as % Long Govt. (B.T.)	78%	80%	72%	63%	15 vs. 10 Year	+ 60	+ 90	+ 57	+ 25
Prime as % New Aa Util. (B.T.)	67%	67%	63%	55%	30 vs. 15 Year	+ 80	+100	+ 78	+ 50
Seasoned-A Elec. Rev. vs. 20 Bond Buyer	+ 57	+113	+72	+31	30 vs. 1 Year	+240	+315	+201	+ 60

ACTIVELY TRADED REVENUE ISSUES

Date Issued		Amt. (Mil.)	Issue		Call Price	Issue Price		1/9/81 Quote	Yield	Px Chg. for Wk.
6/79	AAA	70	Washington PPSS	6.80-17	NC89-103	100	- 6.80%	66¼- 8¼	10.10%	+2¼
10/78	A1	250	Kentucky Turnpike	6⅝ -08	NC88-103	100	- 6.625	67½- 8½	10.01	+4½
4/78	A	243	New York State Pwr.	6¾ -12	NC88-103	100	- 6.75	69 - 72	9.59	0
7/77	A1	135	Nebraska Pwr.	6⅛ -17	NC87-103	100	- 6.125	60⅛- 1⅛	10.21	+2⅛
6/77	AA	350	Valdez, Alaska (Rev.)	6 -07	NC87-103	100	- 6.00	65½- 6½	9.47	+2½

NEW ISSUE CALENDAR (Millions of Dollars)

	Next Week	Next 4 Wks.	Feb.	Jan.	Dec.	Nov.	Mo. Avg. 1980*	Mo. Avg. 1979	Unsold Supply**
Governments‡	625	—	—	—	13,832E	9,170	7,640	3,095	—
Fed. Credit Agencies•	1,373•	1,373•	1,500•	2,373	1,604	2,471	3,046	2,447	—
Corporate - Total	350	1,206	682	2,033	1,684	1,259	3,192	1,972	135
Straight - Total	305	849	682	1,676	1,458	905	2,834	1,914	—
Util.	130	380	650	580	723	440	1,096	763	—
Other	175	469	32	1,096	735	465	1,738	1,151	—
Cvts.	45	357	0	357	226	354	358	58	—
Med. Term (Incl)	40	115	0	515	883	634	1,243	507	—
Foreign	150	150	0	150	200	104	226	318	—
Municipals - Bonds	426	1,700	0	2,100	2,869	2,950	3,857	3,491	606†
Notes	401	1,500	0	2,000	1,327	2,197	2,204	1,791	—

*12 Months; †Bond Buyer **Corp.-est. Undistributed New Bds. Muni-Blue List
•Potential amount based on maturing coupon issues; ‡Total net new cash based on settlement date.
•Over 1 year, offering date basis.

NEW NOTES AND BONDS COMING NEXT WEEK (Millions of Dollars)

GOVERNMENT AND AGENCIES

1/14	735	FFCB Bds. due Mar. 4, 1985
1/14	638	FFCB Bds. due Jan. 1, 1989

CORPORATES-In Registration on Behalf of Issuer-Prospectus on Request

Wk. 1/12	30	Empire Inc. Cvt. Sub. Debs. 2005
Wk. 1/12	100	Nat'l. Rural Utils. Coll. Tr. Bds. 2011
1/13	15	Scotty's Inc. Cvt. Sub. Debs. 2005
1/13	40	Cincinnati Bell Debs. 1991
1/14	150	Canadian Nat'l. R'way Debs. 2006
1/14	50	N.Y. State E&G 1st Mtg. Bds. 2011
1/14	75	Union Tank Car Eq. Tr. 2001
1/15	40	Washington Wtr. Pwr. 1st Mtg. Bds.

MUNICIPALS ($11 million or more)

Wk. 1/12	18	California Ed. Fac. Auth
Wk. 1/12	50	Jefferson Parish Home Mtg. Auth., La.
Wk. 1/12	50	Lafayette Pub. Tr. Fin. Auth. La.
Wk. 1/12	75	Muni. Elec. Auth. of Georgia
W 1/12	100	State of Wisc. (Student Loan Rev.)
1/13	51	Michigan State Hosp. Fin. Auth
1/13	17	Florida Jul. 82-00
1/13	20	Manchester, New Hampshire TAN's
1/13	25	California H.F.A. BAN's
1/14	20	Ft. Worth Ind. Sch. Dist., Texas
1/14	140	Chicago, Illinois TAN's
1/14	185	Massachusetts G.O.'s
1/14	21	Massachusetts H.F.A. CLN's
1/15	21	Jacksonville Port Auth., Fla. RAN's
1/15	14	Illinois Health Fac. Auth

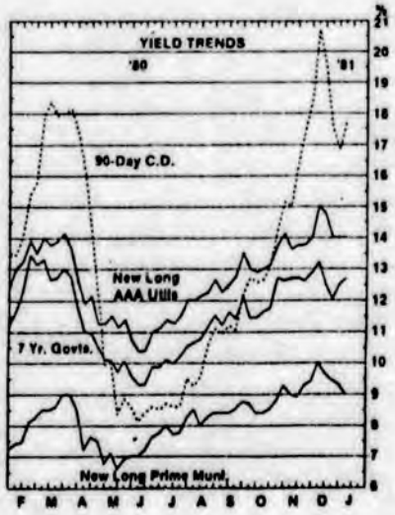
CORPORATE BON

YIELDS	1/9/81 Yld.	Chg.on Week	Last 12 Mos. Highs	Last 12 Mos. Lows
New Issue-Util.(SB Est.)				
Medium Term AAA	13.25%	+ 25B.P.	14.38%	9.75%
AA	13.63	+ 25	14.75	10.00
A	14.13	+ 38	15.25	10.50
Long-Term AAA	14.00	0	15.00	10.38
AA	14.50	0	15.50	10.88
A	15.00	0	16.25	11.38
BBB	16.00	0	17.50	12.25
Seas.Utilities(SB Avg.)	1/8/81			
Medium Term(4-10yrs.)				
14½% AA	13.25	- 25	14.10	10.75
YTC A	13.35	- 25	14.50	11.28
9¼% AA	13.25	- 18	14.80	10.00
A	13.20	- 8	15.30	10.00
4¾% AAA	11.31	- 12	12.49	8.74
AA	12.21	- 30	13.18	9.74
Long-Term				
12⅛% AAA	12.93	- 11	14.19	10.96
AA	13.55	- 7	14.72	11.51
A	13.95	- 13	15.10	11.84
10% A	13.33	- 20	14.38	10.78
BBB	14.60	+ 7	15.25	11.40
9⅛% AAA	12.33	- 20	13.57	10.95
AA	13.07	- 20	14.15	10.50
8¾% AAA	12.32	- 21	13.70	10.12
AA	12.96	- 20	13.93	10.70
A	13.38	- 20	14.18	10.76
7⅜% AAA	12.10	- 35	13.35	9.90
4⅜% AAA	12.00	- 18	13.18	9.48
AA	12.37	- 17	13.44	9.97
A	13.50	+ 10	14.00	10.83
World Bank				
1 yr.	14.75	-150	17.50	8.50
5 yr.	12.81	- 40	14.31	9.96
20 yr.	12.78	- 14	14.00	10.22
Yankee-Sup. Nat.				
2 yr.	13.75	- 50	16.00	9.18
4 yr.	12.94	- 33	14.53	9.77
17 yr.	12.77	- 9	14.11	10.59
EuroS-Sup. Nat.				
(semi-ann. eq.) 2 yr.	13.74	- 13	15.52	9.71
7 yr.	12.41	- 33	14.16	10.19

YIELDS	1/8/81 Yld.	Chg.on Week	Last 12 Mos. Highs	Last 12 Mos. Lows
New Issue-Ind.(SB Est.)				
Medium Term AAA	12.75%	+ 12B.P.	13.75%	9.50%
AA	13.13	+ 12	14.13	9.88
A	13.50	+ 12	14.63	10.25
Long-Term AAA	12.50	- 12	13.63	9.75
AA	13.13	+ 12	14.13	10.00
A	13.75	+ 25	14.75	10.50
BBB	14.75	+ 25	16.00	11.75
Seas. Ind. (SB Avg.)	1/8/81			
Medium Term(6-9yrs.)				
8⅛% Ind. AAA	12.44	+ 5	14.08	9.19
AA	12.62	0	14.22	9.40
A	12.87	- 8	14.50	9.70
8½% Fin. AAA	12.90	- 5	14.45	9.83
AA	13.30	+ 20	14.63	9.93
8% Bank AAA	13.20	+ 10	15.08	10.05
Long-Term				
12⅜% Ind. A	13.45	- 5	14.60	11.53
9¼% Ind. AA	12.31	0	13.46	10.07
8¼% Ind. AAA	12.15	- 8	13.35	9.75
Oil AAA	12.18	0	13.38	9.72
Banks AAA	12.63	- 8	13.86	10.23
Ind. AA	12.38	- 3	13.49	9.89
7¼% Ind. AAA	11.98	0	13.13	9.71
Oil AAA	12.09	- 7	13.26	9.59
Ind. AA	12.19	- 3	13.21	9.81
Fin. AA	12.53	- 10	13.55	10.00
A	12.92	- 8	13.93	10.63
5.30% Ind. SF AA	11.10	- 13	11.58	8.80
Canadian-Seas.US$ Avg.				
Long-Ont. 8¾%	12.67	- 6	13.63	10.26
AA Prov. 8⅝%	12.70	- 8	13.83	10.40
Quebec 10%	13.25	- 8	14.25	10.68
Mortgage-Bond Yld. 12 Yr. Life				
GNMA Pass Thru 8%	12.71	- 45	14.63	9.85
11⅛%	13.55	- 13	14.81	11.07
FHLMC-PC 10%	13.65	- 16	15.18	10.57
12⅛%	13.82	- 20	15.12	11.59
Conv. Pass Thru 9⅛%	14.05	- 19	15.70	10.87
Mtge. Backed S&L 6 Yr.	12.81	- 5	14.93	10.13

YIELD SPREADS

(in basis points)	This Wk.	Chge. For Wk.	Chge. For 4 Wks.	Last 12 Months Max.	Last 12 Months Avg.	Last 12 Months Min.
Maturity-Long vs. Med.						
New AAA Util.	+ 75	- 25	- 37	+113	+ 52	-38
Seas. 8-¼% AAA Ind.	- 29	- 13	+ 35	+ 75	- 11	-136
Quality: A vs. AAA						
Med. Term. Seas. 8⅛% Ind.	+ 43	- 13	- 8	+ 78	+ 42	+11
Long Term-New Util.	+100	0	- 25	+162	+109	+87
New Ind.	+125	+ 37	+ 12	+150	+102	+50
Seas. 8¼% Util.	+106	+ 1	+ 58	+121	+ 81	+46
AAA Corp. vs. Govt.						
Seas. 7yr. 8⅛% Ind.	+ 2	+ 10	- 55	+120	+ 27	-23
Seas. Long 8¼% Ind.	+ 13	- 14	- 1	+ 52	+ 16	- 8
New Long Util.	+198	- 6	+ 19	+214	+122	+59
Cpns.-Lg.:9½vs.7⅜ AAA Util.	+ 23	+ 15	+ 1	+ 46	+ 22	+ 8
9¼vs.7¾AA Ind.	+ 12	- 3	- 13	+ 41	+ 25	+ 7
Util.vs.Ind.-A-Lg.Sea.12¼%	+ 50	- 8	0	+ 95	+ 48	0
AAA-Lg.Sea.8¾%	+ 17	- 13	- 18	+ 69	+ 32	+ 8
Canadian-Seas.Que.vs.Ont.	+ 58	- 2	+ 16	+ 83	+ 54	+35
Ont.vs.8¾%AAA Util.	+ 35	+ 15	+ 22	+ 52	+ 29	+11
Yankee-Sup. Nat.						
4 yr. vs. Treas.	+ 20	- 39	- 9	+149	+ 76	+17
4 yr. vs. 5 yr. WB	+ 13	+ 7	- 3	+ 61	+ 19	-21
4 yr. vs. 7 yr. Euro.	+ 53	0	- 55	+118	+ 15	-51
17 yr.-Seas. 8¾% AA Util.	- 19	+ 11	- 13	+ 51	- 13	-68
12½ FHLMC vs. 11½ GNMA	+ 27	- 7	- 4	+ 78	+ 30	-16
11½% GNMA vs.10 yr.Govts.	+125	0	+ 1	+198	+153	+61



MUNICIPAL BONDS

YIELDS	1/8/81 Price	1/8/81 Yld.	Change for Wk Price	Change for Wk Yld	Yld. Change vs. 1979 High	Yld. Change vs. 1979 Low
New Issue Scales (SB est.): Prime G.O. 1 Yr.	100	(7.00)	+ ½	-50	-125	6.25%
5 Yr.	100	(7.40)	+ ⅜	-10	- 85	6.25
10 Yr.	100	(8.00)	0	0	- 50	6.50
15 Yr.	100	(8.60)	0	0	- 60	6.20
20 Yr.	100	(9.10)	0	0	- 65	6.75
30 Yr.	100	(9.40)	0	0	- 60	6.75
Med. Grade G.O. 30 Yr.	100	(10.20)	0	0	- 55	10.75
AA Electric Revenue 30 Yr.	100	(10.00)	+2⅜	-25	- 70	10.70
A Electric Revenue 30 Yr.	100	(10.25)	+2¼	-25	- 75	11.00
Seasoned Issues						
"20 Bond" — Bond Buyer Index	100	(9.49)	+2⅜	-27	-107	10.56
Long Rev. (S.B. Avg.): AAA Elec. (6⅛)	69½	(10.18)	+1⅞	-26	- 91	11.09
AA H.F.A. (6⅝)	65⅝	(10.20)	+1¼	-20	-105	11.25
A Elec. (8½)	81½	(10.06)	+2⅛	-28	—	—
A Toll (6¾)	68½	(10.01)	+3½	-54	- 74	10.75

YIELD SPREADS (Basis Points)	1/8/81	Last 12 Months Max.	Avg.	Min.		1/8/81	Last 12 Mo Max.	Avg.	M
New 30 Yr.: Med. Gr. vs. Prime GO	+ 80	+130	+76	+50	Prime Yield Curve (b.p.)				
A Rev. vs. Med. Gr. GO	+ 5	+60	+24	-10	1 Yr. vs. 6 mos. notes	- 15	+ 95	+ 10	-
A vs. AA Rev.	+ 25	+40	+25	+20	10 vs. 1 Year	+100	+150	+ 70	-
Prime as % Long Govt. (B.T.)	78%	80½	72%	63%	15 vs. 10 Year	+ 60	+ 90	+ 57	+
Prime as % New Aa Util. (B.T.)	67%	67½	63%	55%	30 vs. 15 Year	+ 80	+100	+ 78	+
Seasoned-A Elec. Rev. vs. 20 Bond Buyer	+ 57	+113	+72	+31	30 vs. 1 Year	+240	+315	+201	+

ACTIVELY TRADED REVENUE ISSUES

Date Issued		Amt. (Mil.)	Issue		Call Price	Issue Price		1/9/81 Quote		Yield	Pct. for
6/79	AAA	70	Washington PPSS	6.80-17	NC89-103	100	- 6.80%	66¼-	8¼	10.10%	+2
10/78	A1	250	Kentucky Turnpike	6⅝ -08	NC88-103	100	- 6.625	67½-	8½	10.01	+4
4/78	A	243	New York State Pwr.	6¾ -12	NC88-103	100	- 6.75	69 -	72	9.59	0
7/77	A1	135	Nebraska Pwr.	6¼ -17	NC87-103	100	- 6.125	60¼-	1¼	10.21	+2
6/77	AA	350	Valdez, Alaska (Rev.)	6 -07	NC87-103	100	- 6.00	65½-	6½	9.47	+2

NEW ISSUE CALENDAR (Millions of Dollars)

	Next Week	Next 4 Wks.	Feb.	Jan.	Dec.	Nov.	Mo. Avg. 1980*	Mo. Avg. 1979	Unsold Supply
Governments‡	625	—	—	—	13,832E	9,170	7,640	3,095	—
Fed. Credit Agencies•	1,375•	1,373•	1,500•	2,373	1,604	2,471	3,046	2,447	—
Corporate - Total	350	1,206	682	2,033	1,684	1,259	3,192	1,972	135
Straight - Total	305	849	682	1,676	1,458	905	2,834	1,914	—
Util.	130	380	650	580	723	440	1,096	763	—
Other	175	469	32	1,096	735	465	1,738	1,151	—
Cvts.	45	357	0	357	226	354	358	58	—
Med. Term (Incl)	40	115	0	515	883	634	1,243	507	—
Foreign	150	150	0	150	200	104	226	318	—
Municipals - Bonds	426	1,700	0	2,100	2,869	2,950	3,857	3,491	606†
Notes	401	1,500	0	2,000	1,327	2,197	2,204	1,791	—

*12 Months; †Bond Buyer **Corp.-est. Undistributed New Bds. Muni-Blue List
•Potential amount based on maturing coupon issues; ‡Total net new cash based on settlement date.
•Over 1 year, offering date basis.

NEW NOTES AND BONDS COMING NEXT WEEK (Millions of Dollars)

GOVERNMENT AND AGENCIES

1/14	735	FFCB Bds. due Mar. 4, 1985
1/14	638	FFCB Bds. due Jan. 1, 1989

CORPORATES-In Registration on Behalf of Issuer-Prospectus on Request

Wk. 1/12	30	Empire Inc. Cvt. Sub. Debs. 2005
Wk. 1/12	100	Nat'l. Rural Utils. Coll. Tr. Bds. 2011
1/13	15	Scotty's Inc. Cvt. Sub. Debs. 2005
1/13	40	Cincinnati Bell Debs. 1991
1/14	150	Canadian Nat'l. R'way Debs. 2006
1/14	50	N.Y. State E&G 1st Mtg. Bds. 2011
1/14	75	Union Tank Car Eq. Tr. 2001
1/15	40	Washington Wtr. Pwr. 1st Mtg. Bds.

MUNICI... ($1 million or more)

Wk. 1/1		California Ed. Fac. Auth
Wk. 1/12	50	Jefferson Parish Home Mtg. Auth.
Wk. 1/12	50	Lafayette Pub. Tr. Fin. Auth. La.
Wk. 1/12	75	Muni. Elec. Auth. of Georgia
Wk. 1/12	100	State of Wisc. (Student Loan Rev.)
1/13	51	Michigan State Hosp. Fin. Auth.
1/13	17	Florida Jul. 82-00
1/13	20	Manchester, New Hampshire TAN
1/13	25	California H.F.A. BAN's
1/14	20	Ft. Worth Ind. Sch. Dist., Texas
1/14	140	Chicago, Illinois TAN's
1/14	185	Massachusetts G.O.'s
1/14	21	Massachusetts H.F.A. CLN's
1/15	21	Jacksonville Port Auth., Fla. RAN's
1/15	14	Illinois Health Fac. Auth

JR13/CC
- EEW:am 1/14/81

DRAFT LEGISLATION FOR THE ALASKA POWER AUTHORITY ESTABLISHING A POWER DEVELOPMENT FUND.

Legislative Bill Number 1

(a) There is established as a separate fund to be held by the Authority a Power Development Fund which shall consist of moneys derived from the sources provided in this section and be used for the purposes provided in this section. Amounts appropriated to the Fund shall be paid over to the fund on the effective date of the appropriation. Loans made and obligations purchased with amounts in the Fund and the income and interest earned on the loans and obligations shall be a part of the Fund.

(b) The Power Development Fund shall consist of:

(1) amounts appropriated by law;

(2) repayments of principal and interest on all loans made by the Authority with amounts appropriated by law to the fund and on all loans made with amounts in the Power Project Fund (AS 44.83.170); and

(3) any other amounts determined by the Authority.

(c) The Power Development Fund shall be used:

(1) to make loans to pay not to exceed 50 percent of the estimated costs of power projects which have been approved by law;

(2) to make deposits in a capital reserve fund under AS 44.83.110(c) of amounts equal to the capital reserve requirement; and

(3) for any other authorized purpose of the Authority.

(d) Amounts loaned from the fund to pay the estimated costs of power projects shall bear interest at a rate or rates which shall be fixed initially by percentage or formula and adjusted as may be necessary so that the average rate is equal to the average rate of return on fixed income investments of the Alaska permanent fund for the most recent annual reporting periods not in excess of five years of the Alaska permanent fund reported before the loan of the Authority.

(e) The interest on loans made by the Fund to pay the estimated costs of power projects shall become payable during the first year of operation of the project at the rate of one-half of one percent of the amount

loaned and in each subsequent year of operation of the project at additional increments of not less than one-half of one percent or more than two percent per year until the rate of payment equals the average rate of interest fixed in paragraph (d). Unpaid interest and interest on unpaid interest accruing at the said rate shall be added to the principal of the loan. After the retirement of any other debt borrowed for the project, the principal of the loan together with interest at the rate fixed in paragraph (d) shall be retired on a substantially level debt service basis within a period not to exceed 60 years from the date of the loan. The determination of the amount of the increment between one-half of one percent and two percent shall be based on the Authority's determination of the time when the project will attain full capacity. The amounts loaned from the Fund may be prepaid in whole or in part without penalty by any borrower at any time.

(f) Amounts loaned from the Fund to pay the estimated costs of power projects may be subordinate as to security and terms of repayment to other debt borrowed by the Authority or any other debt of the borrowing entity.

(g) The Authority may enter into covenants with bondholders as to amounts to be maintained in the fund but no amount in the fund may be pledged to pay principal or interest on bonds of the Authority. Pending application to the purposes authorized by this section, amounts in the fund may be invested by the Authority in investments authorized for the general fund of the State (AS 37.10.07). The Authority may enter into agreements as to the use and investment of moneys in the fund, including, without limitation, trust or custody arrangements with banks or trust companies.

Legislative Bill Number 2

The sum of $300,000,000 is appropriated from the general fund to the Power Development Fund.

EW:lw 1/14/81

POWER DEVELOPMENT FUND LEGISLATION

The proposed legislation establishes a Power Development Fund ("PDF") within the Alaska Power Authority and capitalizes that fund in the amount of $300,000,000, an amount projected to fund 50% of the costs of construction of projects being developed during the next four years and to provide for the credit enhancement of those project financings. The State would be segregating a portion of its non-renewable oil revenues for investment in renewable energy projects approved by the Legislature and signed into law by the Governor.

The proposed legislation requires the Authority to use the monies in the PDF to make long term, market interest rate loans in an amount not to exceed 50% of the estimated project costs of construction.

The funds in the PDF can be invested in U. S. Government securities at an unrestricted yield, and the interest earnings would accumulate in the PDF for support of power projects that may be approved in the future. In addition, funds in the PDF could be used to pay debt service on Authority revenue bonds, although the Authority could not pledge the fund for that purpose.

State loans made from the fund will be structured to mitigate the adverse effects on consumers of excess capacity during the early years of a project. A State loan will be made at a market rate of interest, however, such interest will be payable in reduced amounts in earlier years of project operation. Full payment of market interest is required when the project can afford it

at full utilization. Accrued and unpaid interest from early years must be paid when the revenue bond financing for the project has been retired.

Seven major objectives are accomplished by the proposed legislation:

(1) Non-renewable oil revenues are invested in renewable energy projects that will significantly enhance the future economic development potential of Alaska;

(2) The energy needs of Alaska are addressed by significantly reducing the cost of power during the early excess capacity years of the project and reducing reliance on fossil fuels;

(3) The credit of all project financings will be significantly enhanced, thus resulting in a lower interest rate for that portion of each project which is financed through conventional tax exempt revenue bonds;

(4) Control of individual project development is maintained in the Legislature and the Governor;

(5) State assistance is given to projects on a matching basis - for each dollar of State assistance the project must obtain a dollar from conventional capital markets;

(6) The State is earning a market rate of return on its investments in power projects;

(7) The independent test of raising 50% of project costs from conventional capital markets will serve as a safeguard to prohibit development of economically inefficient projects.

DRAFT LEGISLATION FOR THE ALASKA POWER AUTHORITY
ESTABLISHING A POWER DEVELOPMENT FUND

(Tussing revisions [1/22/81] of Wohlforth draft [1/14/81])

Legislative Bill Number 1

(a) There is established as a separate fund to be held by the Authority a Power Development Fund [hereinafter referred to as the Fund] that shall consist of moneys derived from the sources provided in this section and be used for the purposes provided in this section. Amounts to be appropriated to the Fund shall be paid over to the Fund on the effective date of the appropriation. Loans made and obligations purchased with amounts in the Fund and the income and interest on the loans and obligations shall be a part of the Fund.

(b) The Power Development Fund shall consist of:

(1) amounts appropriated by law;

(2) repayments of principal and interest on all loans made by the Authority with amounts appropriated by law to the Fund and on all loans made with amounts in the Power Project Fund (AS 44.83.170); and

(3) any other amounts determined by the Authority.

(c) The Power Development Fund shall be used:

(1) to make loans to pay not to exceed 50 percent of the estimated costs of power projects that have been approved by law;

(2) to make deposits in a capital reserve fund under AS 44.83.110(c) of amounts equal to the capital reserve requirement; and

(3) for any other expressly authorized purpose of the Authority.

(d) Amounts lent from the Fund to pay the estimated costs of power projects shall bear interest at a rate or rates that:

(1) shall be fixed either (i) by percentage for the duration of the loan, or (ii) by a formula that provides for periodic adjustment based on current bond market conditions;

(2) the Authority determines will compensate the State for (i) the opportunity cost of the moneys lent from the fund, and (ii) the financial risks to the State caused by the subordinated position and deferred debt-service of the loan; and

(3) shall not be less than the greater of (i) the average rate of interest on that part of the power project debt not provided by the Fund, plus two percent, and (ii) the average rate of return on fixed-income investments purchased by the Alaska Permanent Fund during the most recent annual reporting period prior to the loan from the Fund.

(e) Debt service payments on loans made by the Fund to pay part of the estimated costs of power projects shall commence during the second year of project operation, and shall increase annually at a rate or according to a formula the Authority shall establish prior to the loan such that:

(1) the payments so scheduled will retire the principal and interest of the loan, including interest on interest, within the same period as that of the project's other debt, and

(2) the rate of annual increases scheduled in the project's total debt-service payments, including payments to service debt other than loans from the Fund, shall not exceed three-fourths of the anticipated combined rate of inflation and growth in utilization of project capacity as projected by the Authority.

(f) The amounts lent from the Fund to pay part of the estimated costs of power projects may be prepaid in whole or in part without penalty by any borrower at any time.

(g) The amounts lent from the Fund to pay part of the estimated costs of power projects may be subordinate as to security and terms of repayment to other debt borrowed by the Authority or any other debt of the borrowing entity.

(h) The Authority may enter into covenants with bondholders as to amounts to be maintained in the Fund, or the terms of loans from the Fund and debt service on those loans, but no amount in the Fund may be pledged to pay principal or interest on bonds of the Authority.

(i) The Authority, in cooperation with the Alaska Industrial Development Authority, shall establish a program under which small power producers, off-utility power producers, and cogenerators may obtain loans for power generation or cogeneration projects from the Fund under the terms of this section.

(j) The amounts lent by the Fund to pay part of the estimated costs of any power project shall be the whole of any financial assistance from the Authority to that project, and shall be in lieu of any other financial assistance, and not in addition to such assistance.

(k) Pending use for the purposes authorized by this section, the Authority may invest amounts in the fund in investments authorized for the general fund of the State. The Authority may enter into agreements as to the use and investment of moneys in the Fund, including, without limitation, trust or custody arrangements with banks or trust companies.

Legislative Bill Number 2

The sum of $300,000,00 is appropriated from the general fund to the Power Development Fund.

PLEASE NOTE: THE PRECEDING PAGES WERE TREATED AS A UNIT IN THE ORIGINAL DOCUMENT.

STATE
of ALASKA

MEMORANDUM

TO: Jay S. Hammond, Governor
State of Alaska

DATE: January 21, 1981

FILE NO:

THRU: Fran Ulmer, Director
Division of Policy Development & Planning

TELEPHONE NO:

Ronald D. Lehr, Director
Division of Budget and Management

SUBJECT: Power Project Financing

FROM: Tom Singer, Policy & Program Specialist
Division of Policy Development and Planning

George Matz, Program Analyst
Division of Budget and Management

As you requested, the Divisions of Policy Development and Planning and Budget and Management are developing an alternative plan for financing power projects. A review of existing power project financing practices and fiscal policy have revealed several ambiguities. Since the direction of a financial plan is dependent on fiscal policy, these ambiguities need to be clarified. The purpose of this memo, therefore, is to discuss the issues which need clarification and to propose policies which we think are most consistent with your prior policies. The proposed policies suggest general direction regarding an issue, recognizing that there may be exceptions. Rationale are presented which support each proposed policy. Other considerations, or opposing arguments to each proposed policy, are also presented.

Seven issues are discussed. None of these seven issues is distinctly separate from the others. However, the central issue with power project financing is addressed first: whether the principal objective of power development, particularly hydropower, is to provide the consumer with the lowest reasonable cost of power or to provide a public works project which would have substantial short term economic benefits and potential long term incentives for economic growth. The reason for this distinction is that the project which best meets one objective is not always the best for the other objective. The other six issues also address this question but in terms specific to some aspect of a finance plan.

This memo frequently uses two terms which require brief explanation. These terms are lowest cost and financial assistance.

In this memo, lowest costs refers to the power production system which generates sufficient electrical power to meet probable demand at the lowest reasonable cost to the consumer. Probable demand is one of the more critical factors in determining which alternative for increasing power generation will provide the consumer with the lowest cost power. Generally, the closest match between supply and demand for the least cost alternative results in power having the lowest actual unit (kwh) costs. To realize such a match requires demand projections which accurately forecast future

conditions. Demand projections which are too low may result in under-capacity resulting in increased costs due to power outages and inefficient operation of the power system (e.g., peaking power being used for base load). Demand projections which are too high may result in overcapacity and capital intensive projects which are idle, thereby, failing to generate revenues needed to pay for capital costs, or resulting in a high unit cost to existing users.

The definition of costs is subject to interpretation. For instance, some may interpret lowest costs to the consumer as not including externalities or subsidies provided by the State. Others may interpret lowest costs as being actual costs, which can be attributed tc the project, whether or not they are borne by the consumer or some other party such as the State. The latter definition will be used in this memo.

State financial assistance for development of power projects is usually provided through the Alaska Power Authority (APA). Low interest and/or subordinated loans are made by the APA for reconnaissance and feasibility studies, engineering and design and construction. A subordinated loan means that the obligation to repay other debt takes precedence over re-paying subordinated debt. In most cases, repayment of APA subordinated loans is deferred without a corresponding increase in interest rates for the time value of money resulting in an actual interest rate which is lower than the stated interest rate. The APA can also incur revenue bond in-debtedness for power projects providing the Legislature has passed a joint resolution approving the project and the indebtedness.

In general, the proposed policies do not encourage the use of subsidies. However, it is our understanding that the administration's position on subsidies is that in specific cases these may represent appropriate public policy, providing that they are explicit and equitable.

I. Issue: Should State financial assistance for power development favor projects which have the lowest actual unit costs to the consumer given most probable demand projections or projects which might provide excess capacity as an incentive for economic growth?

Proposed Policy: Power projects resulting in the lowest actual costs to consumers are more likely to pay their own way and provide the most rational and equitable approach to power development. If circumstances indicate that a higher cost project may offer additional indirect benefits, the value of these benefits should be measured against the direct benefits of the least cost approach.

Rationale:

a. Lowest cost is essentially a quantitative approach which measures the cost-effectiveness of various options. This is frequently expressed as a comparison between the present value costs (costs expressed in today's dollars rather than inflated future dollars) of the existing power generation system and an alternative project. If the cost ratio for a project is unfavorable (less than 1.0), the alternative which it is being compared with is more cost-effective.

b. The Alaska Power Authority Act (AS 44.56.010) states that the development of power projects should provide the consumer with the lowest reasonable cost of power. The availability of low cost power is consistent with "beneficial long-term economic growth" to which the act also makes reference.

c. Under revised regulations for reconnaissance and feasibility studies, the Alaska Power Authority will determine which potential project has the lowest reasonable cost. This determination will compare the cost of the base (existing) system, which is often diesel generation, with alternatives such as hydropower projects.

d. The FY 82 goal for the Energy Development Program is "to achieve Alaska's energy self-sufficiency in such a manner that strengthens and diversifies the economy by providing needed energy and power at the lowest reasonable economic, social and environmental costs with emphasis on supply from renewable and local resources."

e. Under normal circumstances, the most economic project would receive State financial support (e.g. revenue bond financing). However, substantial current revenues in excess of operating expenditures (i.e. the oil revenue windfall) have resulted in demands for power projects to be funded as public works projects. In these circumstances, projects which are not economically feasible could be pursued with a view toward secondary economic benefits rather than cost-effective energy development. Such projects frequently have significant excess generating capacity, requiring substantial subsidy, particularly if rate increases are

to be avoided. Since load demand is not now increasing at the same predictable rate which it has for several decades, there is some risk that excess capacity will not eventually be utilized. This could create a shortfall in revenues needed to meet debt service for the State's investment.

f. There may be circumstances in which the future need for excess capacity is rational and predictable. Such projects would be selected since they would have the lowest unit cost based upon most probable demand.

g. If the emphasis is not on the lowest unit cost, the only effective lid on power project costs is the availability of State revenues. Due to the capital-intensive nature of most power projects, especially hydroprojects, expenditures for such projects could divert a substantial amount of State revenues to power development at the expense of other energy needs (electricity provides about 23% of the Railbelt's total energy demand) or other programs which benefit State residents.

Other Considerations:

a. Even though some hydroprojects are not cost-effective, hydropower does provide an attractive source of energy for Alaska's future, because the availability of hydropower can not be interrupted by international events and generating costs are relatively stable (i.e., insulated from rising fossil fuel prices). Financial assistance for projects which are uneconomic because of excess capacity is considered by some as an investment in future security rather than a present day subsidy.

b. Power projects, particularly hydropower, provide a very visible infusion of construction jobs for a few years.

c. Stable electric rates can benefit existing businesses and may provide an incentive for industrial expansion. Although the cost of energy is not as significant as many other factors, it is one of the parameters considered by industry for expanding or siting new facilities.

d. As the cost of oil continues to rise, substitution of electricity for fuel oil for space heating becomes more economically feasible. This could significantly increase electrical demand. How much demand will increase is uncertain since conservation practices and emerging technologies should reduce the net energy needed to provide an adequate amount of heat.

II. Issue: Should State financial assistance for the construction of power projects be in the form of a loan, equity participation or a grant?

Proposed Policy: State financial assistance for power projects should be considered investments. Therefore, the assistance should be in the form of a loan rather than a grant. In certain circumstances, the State's investment may take the form of equity rather than a loan. (This is discussed further under Issue V).

Rationale:

a. Power projects generate revenues through the sale of a marketable commodity providing a means for repayment of loan principal and interest.

b. Loans, rather than grants, will provide the State with a source of revenue decades from now when the abundance of oil revenues will have diminished.

c. Loans encourage greater fiscal reponsibility and more careful financial analysis particularly for capital-intensive projects.

d. Alternative energy demonstration projects should be exempt from this proposed policy since the principal purpose of the project is to produce performance information rather than revenues.

Other Considerations:

a. Project advocates have favored grants rather than loans for power project reconnaissance and feasibility studies and, in some cases, project construction.

b. Adequate reconnaissance and feasibility studies are expensive. Small utilities may have cash flow characteristics which result in sparse resources for such studies. Grants provide greater flexibility to investigate potentials for alternative sources of energy. These difficulties are at least partially offset since existing statutes already allow conversion of loans to grants if no revenue producing project results from the studies.

c. Subsidized financing for power projects usually results in lower cost power to its consumers but does not necessarily reduce the actual cost of the project.

III. Issue: Should loans for power projects include a subsidy (i.e., below market interest rates) when revenue bond debt service and payments for nonsubsidized loans exceed projected revenues?

Proposed Policy: Those who receive the benefit should be those who pay the costs. If a power project is determined to be economically feasible, it will generate sufficient revenues to meet debt service over the life of the project. However, if it is felt to be appropriate public policy to provide subsidies, then these subsidies should be explicit and equitable.

Rationale:

a. Subsidized loans are in effect "selling" the State's capital at less than market value to reduce the price of electricity. This is no different than selling our royalty oil or gas at below market value to reduce the price of refined products such as fuel oil or gasoline for the benefit of a select portion of the States residents.

b. Development of the project which is not most cost-effective can lead to the need for a subsidy. Previous feasibility studies have not always selected the project having the least cost to the consumer. However, the revised regulations required by SB 438 should correct this situation.

c. A principle objective of a finanical plan is to provide a means for overcoming financial problems without subsidy. For instance, if the life cycle costs for a project indicate that it is economically feasible, but that the initial years of operation will substantially increase electric rates, State assistance could restructure debt so that a portion of the payments are deferred to later years. This may increase the overall debt service, but with inflation and more customers, higher payments in later years would not be as burdensome as higher payments during initial years. This approach is similar to changes recently made in bank held mortgage programs which graduate mortgage payments.

Other Considerations:

a. The APA power project finance plans tend to price power at some level which is acceptable to the cost-causer by using subsidies such as low interest and/or subordinated loans. This is usually a rate which is at or near existing rates. The cost-causers (those who will benefit) can be expected to support this approach.

IV. Issue: When the preferred power project will result in substantial excess capacity should State financial assistance require a risk premium?

Proposed Policy: Financial assistance should be based on acheiving the most economic power system. If substantial excess capacity is preferred by power consumers, a risk premium should be required. A risk premium is an additional payment set at a level to compensate for additional risk that the capacity will never be fully utilized and that, subsequently, revenues will be lower than expected and fail to meet debt obligations.

Rationale:

a. Current use of low interest and subordinated loans tends to shift the cost of excess capacity from the cost-causer to the general public. When this occurs, the incentive is to build the largest project which is politically achievable, not necessarily the project having the lowest actual unit cost. Since the risk premium shifts the cost of speculation back to the cost-causer, it should provide a mechanism which discourages unsubstantiated excess capacity yet still allows for greater capacity for future demand under terms more acceptable than what the bond market may allow.

b. Feasibility studies and financial plans done under the revised regulations should provide the information needed to determine the risk, if any, of excess capacity of a project.

c. Building new capacity on a scale which is closest to most probable demand, reduces capital requirements, thereby reducing revenues needed to meet debt service.

Other Considerations:

a. Many communities feel that it should be State policy to financially support marginal projects without any risk premium. A financial plan which differentiates between lowest cost power vs. power for economic development could clarify tradeoffs.

b. Substantial excess capacity postpones the need for future investment in new power projects.

c. Some have argued that the cost of construction of power generation facilities will be higher in the future, so that it is wise to build excess capacity now. However, higher costs in the future may be partially offset by any of the following factors: expressing the numbers in real (inflation adjusted) terms; the potential for more cost-effective emerging technologies; reduced risk regarding future demand and improved timing with financial market conditions. These tradeoffs are complex and should be evaluated on a case by case basis.

V. Issue: Should the State provide equity capital to assist in financing power projects?

Proposed Policy: Power project financing usually requires some form of equity capital or guarantee. It may be possible to structure State financial assistance to provide an equity contribution or limited third party guarantee without subsidy.

Rationale:

a. The conditions under which project financing (100% revenue bond debt) is feasible are when debt is secured either by the market (take-or-pay contracts) or by a third party guarantor. Without this security, some equity is required by other lenders to cushion the risk exposure of revenue bond debt. Presently, this cushion is provided through subordinated loans which receive a lower rate of return than might be the case with equity.

b. The thrust of such an alternative financing plan would be to lower revenue bond interest rate or defer debt service payments using either equity capital or a limited third party guarantee. Since this financial assistance will have a rate of return which is comparable to other investments, it will not damage the linkage between the economic feasibility and ability to finance a project, as do low interest or subordinated loans.

C. The alternative financing plan must be in compliance with IRS arbitrage regulations. This eliminates some options for consideration such as a guarantee fund which has the principal of the fund and interest earned from fund investment at market rates being pledged to the repayment of revenue bonds.

Other Considerations:

a. Some have suggested that hydropower projects should be project financed (100% revenue bond debt) which has considerable appeal. State loans, as a substitute for utility equity that is required by the bond market, have been preferred by project advocates because it lowers costs to power consumers of that project at the expense of other State residents.

VI. Issue: Should the State assume ownership of new power projects and sell wholesale power to utilities, or should the utilities assume the responsibility for power generation?

Proposed Policy: To encourage local control and development of the private sector (considering utilities closer to the private sector than the APA), the responsiblity of project ownership should lie with the utilities.

Rationale:

a. As long as the State has revenue surpluses, it may be difficult for the State to charge actual costs for its power. Local utilities would not face such pressure.

b. The ability of the APUC to protect the consumer would be uncertain if the State controlled power generation. AS 44.56. 090 (b) states that the "(Alaska Power) Authority is not subject to the jurisdiction of the Alaska Public Utilities Commission".

Other Considerations:

a. Expansion of power generation capacity often creates financial problems for utilities. Consequently, some of the State's utilities may prefer a middleman or retailing role with the State assuming the responsibility for expanded power generation.

b. Certain Alaskan utilities may not have the critical mass needed for efficient management of power generation.

VII. Issue: Should State financial assistance for power projects be distributed on the basis of equal sharing or equal electric rates? Equal sharing of State assistance refers to the allocation of benefits which have an equal dollar value to each person, regardless of residence, income, etc. Equal electric rates refer to the use of State assistance to equalize electric rates throughout the State.

Proposed Policy: Availability of State financial assistance will be primarily based on equal sharing. Due to wide variances in Alaska in the cost of power, equal sharing does not always result in equal rates.

Rationale:

a. If Alaskans were virtually guaranteed equal electric rates by the State, there would be little incentive to seek the most economically efficient power generation option. In fact, this might create an incentive for speculation: that is, since the cost-causer would realize the benefits and not excessive costs, there could be a tendency to oversize new power projects to stimulate local development. Distribution of wealth based on equal sharing (with some adjustments for extreme situations) could avoid such speculation.

b. State financial assistance for power generation should be available for self-reliant (non-utility) as well as centralized (utility) power systems. This would provide equal accessability and terms for all types of alternative energy systems.

c. The use of low interest and/or subordinated loans to adjust rates for hydroprojects is essentially an equal rates, rather than an equal sharing approach. This has resulted in unequal subsidies for power projects.

d. In order to provide assistance in extreme cases, programs such as a modified Power Production Assistance Program or other approaches could be used, rather than trying to achieve rate relief solely through project financing schemes.

Other Considerations:

a. Due to economies-of-scale, remoteness, etc., the cost of power in rural areas is generally greater than the cost of power in the larger urban areas. One response to this situation has been the establishment of the Power Production Assistance Program which is an equal rates approach.

b. A precedent has been established for using low interest and/or subordinated loans to stabilize rates for new hydropower projects.

POWER PROJECT FINANCING EXAMPLE
Swan Lake

The purpose of this example to the power project financing memo is to relate the seven fiscal policy issues to an actual situation. The intent is to clarify the issues but not to judge how well the example complies with the fiscal policies being proposed.

The Swan Lake hydroproject near Ketchikan was selected for the example since it has received state financial assistance, there exists a fair amount of information on the project, and the project has received a FERC license. The residents of Ketchikan have recently approved a $120,000,000 revenue bond for the project. Project construction is now dependent on reaching a satisfactory financing arrangement. The total project capital requirements are estimated at $85,690,000 (1978) including direct construction costs, contingencies, engineering/administrative costs, interest during construction and construction cost escalation.

I. Issue: Should state financial assistance for power development favor projects which have the lowest actual unit costs to the consumer given most probable demand projections or projects which might provide excess capacity as an incentive for economic growth?

The amount of excess capacity that may occur with the development of a power project can generally be used as the basis for differentiating between a project which should result in the lowest unit costs or one which could accomodate expectations about economic development. A project having the lowest unit costs would have sufficient excess capacity (or reserve margin) to meet probable demand and outages, (with large utilities, a system reserve margin of 15-20% is often most economic). A project which is expected to stimulate economic growth tends to have substantially more excess capacity. As discussed in the memo, the significance of excess capacity is the risk that project revenues may not be able to meet debt service.

Excess capacity for the Swan Lake project can be estimated by comparing the project to the present power generation system. Table I compares the present system for Ketchikan Public Utilities (KPU) with the Swan Lake project. Table II presents this information in terms of excess capacity.

Table I
KETCHIKAN PUBLIC UTILITIES
Present System

	Diesel	Hydro	Total	Swan Lake
Installed Capacity (kw)	18,320	11,300	29,620	22,000
Dependable Capacity (kw)	17,320	8,550	25,870	18,000
Average Annual Energy (million kwh)	77.9	62.7	140.6	85.4
Firm Annual Energy (million kwh)				66.7

Table II

System	Demand	System Capacity	Excess Capacity
Present System (1980)	18,000kw	25,870kw*	43.7%
Present System with Swan Lake (1984 projections)	19,600kw	43,870kw*	123.8%
Present System (1980)	72.2 mil. kwh	140.6 million kwh**	94.7%
Present System with Swan Lake (1984 projections)	112.0 mil. kwh	226.0 million kwh**	101.7%

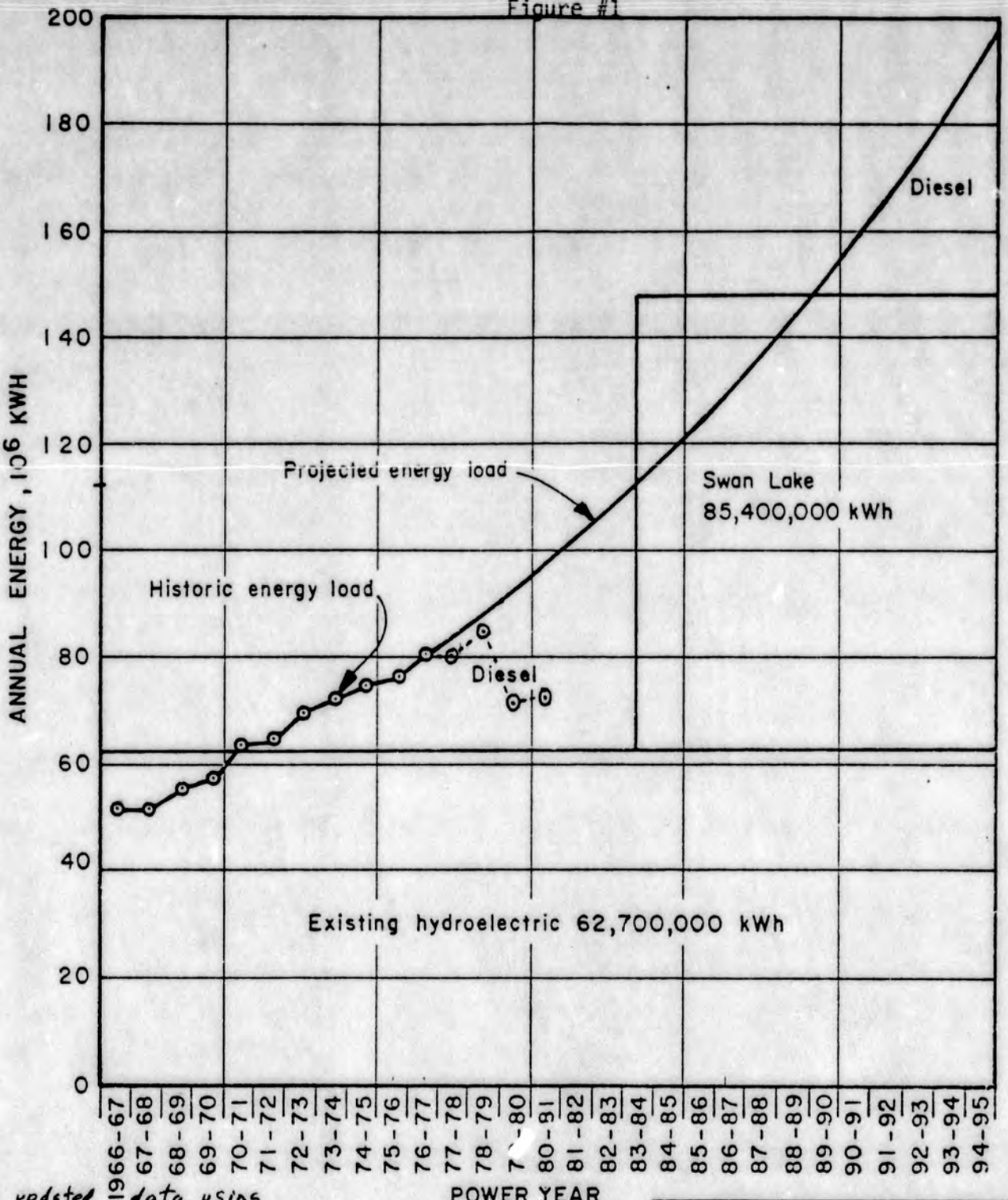
* Dependable capacity
** Average annual energy

As previously stated, some excess capacity is needed to meet probable increases in demand. Figure I and II, taken from the Swan Lake FERC license application, gives the projected demand for the KPU service area. Each figure is updated (dotted lines) with more recent information obtained from KPU and a publication, "Ketchikan Area Power Market Analysis", from the U.S. Alaska Power Administration. The data added to the figures is given below.

Table III

Year	Peak Demand in kw	Energy Demand in million kwh
1976	14,000	79.3
1977	16,300	80.5
1978	15,000	84.7
1979	16,100	71.1
1980 (estimate)	18,000	72.2

Figure #1



--- is updated data using information from KPU

NOTES

1. Hydroelectric plant energy is average annual delivered at load center.
2. Plant capacities are dependable delivered at load center.
3. Power years extend from July 1 through June 30.
4. ⊙ indicates actual historic data.
5. Growth rate 5% for projected peak loads and energy requirements.

ENERGY REQUIREMENTS AT LOAD CENTER

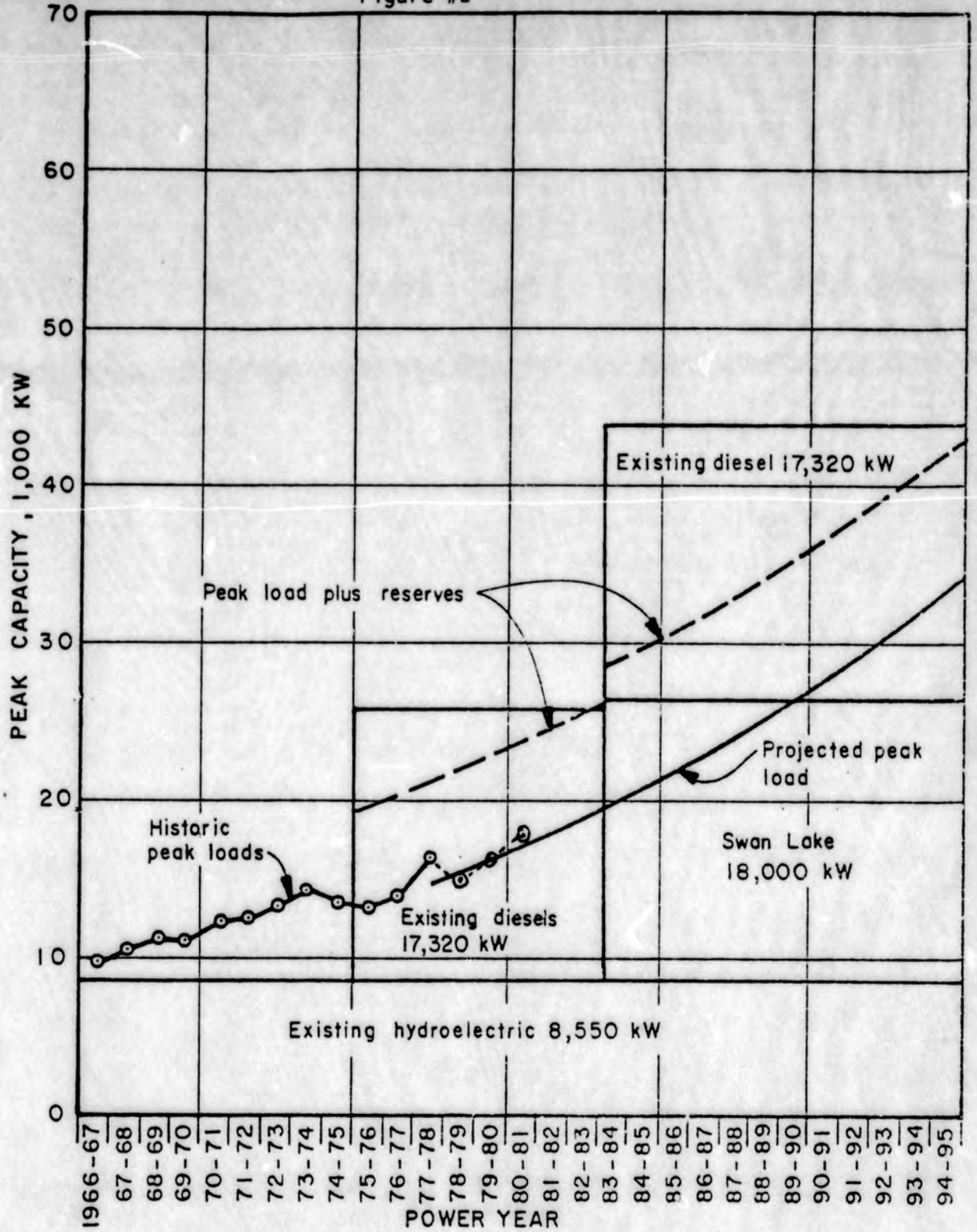
R. W. BECK and ASSOCIATES
ENGINEERS AND CONSULTANTS
Seattle, Washington
Columbus, Nebraska · Denver, Colorado · Orlando, Florida
Indianapolis, Indiana · Phoenix, Arizona · Wellesley, Massachusetts

KETCHIKAN PUBLIC UTILITIES
KETCHIKAN, ALASKA
SWAN LAKE PROJECT

KPU SYSTEM
LOADS AND RESOURCES

DRAWN:	APPROVED:	FIG:
BBB	DEB	2

Figure #2



--- is updated data using information provided by KPU

PEAK LOADS AT LOAD CENTER

NOTES

1. Hydroelectric plant energy is average annual delivered at load center.
2. Plant capacities are dependable delivered at load center.
3. Power years extend from July 1 through June 30.
4. o indicates actual historic data.
5. Growth rate 5% for projected peak loads and energy requirements.

The projected load demand growth rate for KPU is 5%. According to U.S. Alaska Power Administration information, the average energy growth rate from 1965 through 1978 was 4.5%. However, during the past four years (1976-1980) the average annual energy demand has decreased by -2.4% but the average annual peak demand has increased by 6.5%. KPU believes that an increase in electric space heating accounts for most of this recent increase in peak demand. When Swan Lake is scheduled to come on-line (1984), the energy load is projected to be about 112.0 million kwh and the peak demand about 19,600 kw. Compared to 1980, this represents an average annual growth rate of about 11.6% for energy demand and about 2.2% for peak demand.

Recent developments in Ketchikan, such as a new hotel, pioneers' home, new church, cannery, ferry maintenance facility and a waste water treatment plant are expected to contribute to KPU's load demand. The Swan Lake financial plan also mentions a possible sale of five million to 25 million kwh to Louisiana Pacific Corporation which now generates its own power using woodwaste and fuel oil. This 2,000 kw system can create 5 million kwh annually and is now intertied to the KPU system. The financial plan states that the differential between the cost of self-generated power and the price of KPU power will determine how much power, if any, may be purchased by Louisiana Pacific Corp. Presumably, lower electric rates due to state financial assistance will influence this decision.

Conversion from oil heat to electric heat by residential customers could significantly increase demand for electricity. Assuming that half of KPU's 4,359 residential customers have electric heat and that the average annual consumption for electric heat was 33,800 kwh per customer, the energy demand would increase by 73.7 million kwh. If each customer having electric heat used a heat pump, the increase in electric consumption would be less than half that estimated above or about 35 million kwh. In either case a substantial portion of the excess capacity of the Swan Lake project would be reduced and revenues increased. However, the economic feasibility of electric heat is uncertain and therefore so is this potential source of increased demand.

Assuming that oil costs $1.25 per gallon (current Ketchikan price is $1.10 per gallon) and that electricity costs 6.7 ¢/kwh, KPU estimates that for the average Ketchikan home, oil heat costs $1,500 per year, electric heat costs $2,254 per year and electric heat with a heat pump and improved insulation costs $1,027 per year. These costs do not amoritize the heat pump or insulation which are estimated to be about $5,500 for an existing home. The duct work needed for a heat pump could not be installed in all existing homes. An electric heating system with heat pump is expected to cost between $3,000 and $3,500 for a new home.

The economic feasibility of electric heat is complicated by two factors which are:

1. The future price of oil is expected to increase faster than inflation but so may the cost of KPU electricity. If diesel generators are used to meet additional electric power demand, the cost of electric heat may rise faster than oil heat since the net efficiency is less. If Swan Lake is used to meet additional demand, the cost of power may rise sharply but then

stabilize. Using the rates presented in Table VI of this example, in 1985 the cost of 33,800 kwh will be $4,935 without state financial assistance for the Swan Lake project and $4,259 based on a $18,000,000 State subordinated loan with 7% interest. The cost of oil heat would be $3,030 in 1985 assuming an annual escalation of 15.12% which was obtained from Data Resource Inc. "Long Term Review: Fall, 1980." After 1985, the cost differential between electric heat and oil heat will probably decrease but conditions are too uncertain to predict when the costs would be comparable.

2. The 1980 demand data indicates that conversion to electric heat by Ketchikan users may increase KPU's peak demand at a greater rate than energy demand. If so, this will reduce KPU's load factor (average annual load divided by peak load) which is a measure of how efficiently a power supply system uses its investment in generating capacity. A lower load factor tends to be less economically efficient. Efficiency can be improved by shaving peak loads or by using less capital-intensive generating capacity for peak demand. Because of much lower costs per kw, diesel generators may be more cost-effective than hydropower for meeting peak demand created by electric heat, even with escalating fuel costs. However, use of diesel generation for meeting peak demand contradicts some of the rational for electric heat (i.e., use of a renewable source of energy). To accurately determine the economic feasibility of electric heat requires an analysis of electric heat load shapes compared to the marginal costs of potential sources of power.

Information needed to have a better understanding of the economic feasibility of electric heat for Ketchikan may come from a heat pump study which has been recently initiated by KPU and the U.S. Alaska Power Administration.

The potential of excess capacity with the Swan Lake project raises the question of alternatives. Two alternative hydropower projects which have received some evaluation are:

1. An intertie with the Lake Tyee project near Petersburg.

2. The Mahoney Lake site which is eight miles northwest of Ketchikan.

Neither alternatives received thorough evaluation during the Swan Lake feasibility study. However, the U.S. Alaska Power Administration has done some preliminary studies of the Mahoney Lake site and estimates that it could have an installed capacity of 14,400 kw and be able to deliver 54.9 million kwh of energy to the power market annually. This would result in less excess capacity during the initial years of operation but may require further power expansion if the demand projections are realized. Its cost is estimated at $26,715,000 (1978) or $1,869/kw. By comparison, Swan Lake costs are equivalent to $4,761/kw.

The information presented under this issue illustrates some of the complexities that typically occur when planning power expansion and the importance of demand projects in determining the lowest cost alternatives.

II. Issue: Should the State's financial assistance for the construction of power projects be in the form of a loan, equity participation, or a grant?

State financial assistance to the Swan Lake projects has been in the form of loans which total $22,270,000. The loan history is:

Table IV

Date	Source	Principal	Interest	Maturity	Other Terms
12/7/77	Water Resources	$420,000	5%	30 yrs.	Interest - $21,000 annually. Principal - at completion of construction or 11/1/87, whichever comes first.
11/17/78	Power Project Fund	$335,000	5%	30 yrs.	Principal and interest commence in 10 years or date project is on-line.
7/9/79	Power Project Fund	$3,115,000	5%	20 yrs.	Same as above.
6/2/80	Power Project Fund	$400,000	5%	Short-term Note	$402,734 paid back.
6/30/80	Power Project Fund	$18,000,000	5%	35 yrs.	Principal and interest commence on first year of operation or within 10 years, whichever comes first. Escalating principal payments on $6 million to year 35 with $12 million balloon payment. Can defer up to 40% of interest payment unit demand is 66 million kwh or January, 1995.

According to AS 44.56.170(f) "Power projects for which loans are outstanding from the water resources revolving loan fund (AS 45.86) on July 13, 1978 may receive additional financing from the power project fund; the additional financing, if granted, shall be granted at an interest rate of not less than three or more than five percent a year on the unpaid balance."

III. Issue: Should loans for power projects involve a subsidy (i.e., below market interest rates) when revenue bond debt service and payments for non-subsidized loans exceed projects revenues?

The actual value of the revenue stream (repayment of principal and interest) of a loan can be determined by present value analysis, which was done for the $18,000,000 subordinated loan. There is also $4,270,000 worth of other Swan Lake loans which have not been included in the analysis. Because of the terms, there are several possible payment schedules for this loan. Rather than doing a present value analysis for each possible set of terms, only the best and worst cases (from the State's perspective) were calculated.

Table V
PRESENT VALUE (PV) OF LOAN USING BEST AND WORST REVENUE STREAM

	PV at 5% Discount Rate	PV at 11.3% Discount Rate
Best Case	$16,143,000	$6,153,000
Worst Case	$13,505,000	$3,627,000

Best Case - Interest accrues as of July 1980. Project comes on line as expected (1984) and principal and interest payments begin one year later. The interest rate is 5%. A defferal of 40% of the interest payments occurs until January 1987 projected demand for the project exceeds 66 million kwhs per year. The present value of the $18,000,000 loand at a 5% discount rate is about $16,143,000. This indicates that due to the terms of the loan, about $1,857,000 of principal is not recovered. The present value of $18,000,000 using 11.3% as the discount rate (FY 80 Permanent Fund rate of return), is $6,153,000. In other words, an investment of $6,153,000 at 11.3% could yield the same revenue stream that the $18,000,000 loan yields using the best existing terms. Another way to look at this is that the State opportunity cost for this loan is about $11,847,000 ($18,000,000 - $6,153,000) = $11,847,000). This opportunity cost can be considered a subsidy.

Worst case - Interest accrues as of July 1980. Project comes on line in 1990 or later with principal and interest payments starting in 1990. A deferral of 40% of the interest occurs until January 1995. The present value of the $18,000,000 loan at a 5% discount rate is almost $11,000,000. As with the best case, this indicates that $4,495,000 of principal is not recovered at the prevailing interest due to the terms of the loan. The present value using 11.3% (FY 80 Permanent Fund rate of return) is $3,627,000. The opportunity cost to the State, under the worst terms, is $14,373,000.

Since the Permanent Fund is an investment, its rate of return provides a basis of comparison of opportunity costs. Although current Permanent Fund investments tend to be short term, its rate of return is actually conservative when compared to long term opportunities that existed last

summer, at the time the loan was made. For instance, 40 year corporate bonds were yielding 14 - 15% interest at that time.

The purpose of these subsidizies is to reduce the cost of Swan Lake power so that the resulting rates are comparable to the existing Ketchikan Public Utilties rate schedule. The present residential rate schedule is:

0-20 kwh - $7.00

21 and up kwh - 4.0¢/kwh

Fuel surcharges averaged 2.6¢/kwh in 1979. Consequently the average cost of electricity was 6.6¢/kwh.

The chart below, taken from the Swan Lake Plan of Finance, illustrates how the size of the State subordinated loan will affect electric rates. Because the subordinated loans are subsidized at less than market interest rates, larger loans results in cheaper electric rates. Interest at 7% rather than 5%, is assumed in these calculations.

Table VI

		Estimated Average Cost per KWH			
		(1985)	(1986)	(1991)	(1996)
1.	No State Subordinated Loan*	14.6¢	15.1¢	14.8¢	16.2¢
2.	$10,000,000 State Subordinated Loan 7%	13.5¢	13.9¢	14.1¢	14.4¢
3.	$18,000,000 State Subordinated Loan 7%	12.6¢	12.9¢	13.5¢	13.9¢
4.	$25,000,000 State Subordinated Loan 7%	11.8¢	12.1¢	13.0¢	13.6¢

* Without a State loan, the actual interest rate would probably be higher than the assumed rate, thus resulting in electric costs higher than the estimates set forth here.

IV. Issue: When the preferred power project will result in substantial excess capacity, should State financial assistance require a risk premium?

The Swan Lake financial plan states "The most critical concern in terms of ability to finance the projects in the tax-exempt bond market is the substantial excess capacity that may exist in the early years of project operation and its adverse effects on electric cost in the short run." The risk associated with excess capacity is partially shifted to the State as explained further on. "The second factor which amelioriates the adverse cost effects of excess capacity is a loan for the State." (The first factor mentioned is the possible sale of a block of power to Louisiana Pulp Corporation.) In essence, the terms of the loan, such as the deferral of interest payments, reduce the financial risk to the bond market and eliminates the risk of early year high rates to the consumer. The plan of Finance recognizes that a third party needs to assume this risk as exemplified by the statement, "Although high electric rates are certainly undesireable from the personal financial standpoint of the Ketchikan consumer, they also increase the bond market's perceived risk of an obligation in that economic growth in the area may be retarded." However, the State is not receiving a permium for this risk.

V. Issue: Should the State provide equity capital to assist in the financing of power projects?

The $18 million subordinated loan for the Swan Lake project serves the function of equity capital for the project. This function includes both funds for studies and other pre-debt financing expenditures and a cushion to reduce the total amount of debt required and the revenue required to service debt. Debt is senior to equity in repayment. Typical electric power industry returns on equity now average about 11-14%.

VI. Issue: Should the State assume ownership of new power projects and sell wholesale power to utilities, or should the utilties assume the responsibility for power generation?

According to the Swan Lake Plan of Finance, the "Alaska Power Authority would nominally own the Project, KPU will control its output and would obtain title to the Project through a bargain option to purchase after all obligations have been repaid."

VII Issue: Should State financial assistance for power projects be distributed on the basis of equal sharing or equal rates?

The State has appropriated four loans for construction or major power projects. All of these are for hydroprojects

and with the possible exception of Lake Elva (which is restricted), all are subordinated. In chronological order (note trend towards increase):

Table VII

Project	Community	Population	Loans	$/Capita
Green Lake	Sitka Borough	8,800	7,000,000	795
Swan Lake	Ketchikan Borough	13,000	18,000,000	1,384
Lake Tyee	Petersburg, Wrangell	6,400	15,000,000	2,343
Lake Elva	Dillingham	1,400	4,000,000	2,857

The Power Production Assistance Program offers another form of subsidy for comparison. Assuming a client population of 65,000 (which eliminates the population base of all boroughs except Kodiak and the North Slope Boroughs), the subsidy amounts to $21/capita. This cannot be directly compared to project subordinated loans since Power Production Assistance is clearly a grant and expected to receive yearly appropriations, perhaps on a declining basis.

SENATOR ED DANKWORTH
Senate Finance Committee
Pouch V
Juneau, Alaska 99811
Phone: (907) 465-3753

FOR IMMEDIATE RELEASE

Monday, February 2, 1981

SENATE FINANCE TO DISCUSS HYDRO-ELECTRIC FUNDING

The Senate Finance Committee will meet Thursday, February 5, 1981, to discuss financing alternatives for the various hydro-electric projects throughout the State, according to committee Co-chairman, Ed Dankworth, (R-Anch.). The committee has invited discussion from specialists connected with the Susitna, Swan Lake, Terror Lake, Tyee Lake and Bradley Lake hydro-electric development projects. In addition, the committee will hear an overview of hydro-electric development throughout the State from Eric Yould, Executive Director of the Alaska Power Authority.

One highlight of the meeting will be a presentation from Ron Lehr, Director of the Division of Budget and Management, who will unveil the Administration's proposal for financing hydro-electric development.

"It is our intention," said Senator Dankworth, "to discuss financing options available to the State and to formulate a sound funding policy for hydro-electric development throughout Alaska so that these projects can get underway as soon as possible."

The meeting will begin at 1:30 pm, and if necessary carry on into an evening session to provide everyone an opportunity to speak to the committee. Interested persons should call the Senate Finance Committee at 465-3753, for further information.

-30-

Contact: Max Gifford
465-3753

ARLON R. TUSSING & ASSOCIATES / 880 H St., Suite No. 210, Anchorage, Alaska 99501

10 November, 1980

MEMORANDUM

To: Governor Jay Hammond
Via: Frances Ulmer
From: Arlon R. Tussing

Re: A NEW APPROACH TO ELECTRIC POWER PROJECT FINANCING

SUMMARY

This memorandum presents certain problems and a proposed solution in terms of electric-utility central-station power projects. The same problems exist, however, and the same financing principles can be applied, to decentralized power facilities like small hydro or windpower for small communities and isolated settlements. I hope to offer another memorandum dealing especially with financing decentralized power facilities.

The Problems:

1. Upward price distortion. Customary financing and ratemaking principles cause unreasonably high consumer prices for power from hydroelectric and other capital-intensive generating plants during the early years of their operation.

> This memorandum presents two illustrative cases of Alaska hydroelectric projects where customary debt-service and ratemaking rules could produce first-year prices as high as 22 and 56 cents per kilowatt-hour --- despite the fact that the average "real" cost of power [the cost in inflation-adjusted dollars] over 25 years would be only about 6 and 8-1/2 cents per kilowatt-hour respectively.

1220 19th Ave. N.W., Suite No. 201, Washington D.C. 20036 / 2720 Rainier Bank Tower, Seattle, Washington 98101 (206) 447-0321

2. Wrong choices. Customary utility financing and ratemaking principles thus obscure the true cost of power from different kinds of generating facilities, and induce utilities and consumers to make wrong investment decisions.

The cost of fuel oil alone for diesel or turbine generators in Alaska ranges from 10 to 20 cents (and more) per kilowatt-hour, and will surely continue to rise. Yet faced with much the higher initial costs of hydropower (as much as 22 to 56 cents in our illustration), consumers will tend to prefer the status quo, despite hydro's immense long-term advantage.

3. Conventional remedies create new distortions. Existing State programs (under the Power Production Assistance Act), and the proposals being advanced by the utilities, the Power Authority, the Southeast Conference, and hydropower enthusiasts generally, simply provide for the State Treasury to make up the difference between conventionally-measured power costs and prices that are politically accceptable. Whether this State subsidy is in the form of direct operating grants under PPAA, equity grants, or low-interest subordinated loans it produces consumer prices that have no relation whatsoever to the true cost of power.

4. Wrong choices once more. Power Production Cost Assistance Act grants, equity grants, and low-interest subordinated loans all tend to insulate the individual utilities, the lenders, and the utilities' ratepayers from the consequences of wrong choices, poor planning, or incompetent management. The burden is thus shifted to other Alaskans, present or future.

A State subsidy that makes good any difference that may exist between actual power costs and politically-acceptable rates leaves nothing to discourage the utilities, the Power Authority, and local communities from pushing for oversized projects on the basis of wishful and unrealistic growth projections, or projects chosen more for the short-term constuction jobs they offer than as long-term investments in low-cost power.

Objectives:

1. Levelized real power costs. The goal of the alternative policy proposed here is to allow Alaska consumers to benefit from the low long-term costs of renewable energy (or conceivably, capital intensive but economical fossil-fuel power) as soon as a new project goes on stream.

Specifically, the State's goal would be to establish debt-service schedules and ratemaking principles that make the first-year consumer price of power from new projects equal or nearly equal to the average real [inflation-adjusted] cost of power from the project over the term of its long-term debt (20-50) years. This goal would be accomplished by ---

(1) eliminating or greatly reducing excess debt-service "coverage" requirements [Revenue-bond buyers usually require municipal utilities and government power agencies to establish rates and collect revenues in excess of their scheduled debt-service requirements, by 25 to 100 percent.] and

(2) adjusting the actual debt-service schedule to reflect expected inflation and demand-growth over the financing term.

2. Recognition of, and responsibility for, financial risk. To accomplish the first objective, a State entity will have to buy or guarantee utility revenue bonds that do not contain the usual "excess-coverage indenture covenant" [an agreement that the utility will bill its customers subtantially more than it needs for debt service], and that have an unorthodox schedule for amortizing [repaying] the debt principal. The State thereby will take on certain financial risks that private lenders are unwilling to bear. These risks are part of the true cost of power, and should be expressed in consumer prices through an interest premium or guarantee fee charged to the utility.

3. Right decisions. Alaskans would thus face the true long-term cost of power from various generation alternatives, as opposed to the distorted prices that customary financing and ratemaking rules create, or the distorted prices and cost-shifting that most kinds of State subsidy would create. With more accurate price signals, the citizens as consumers and as voters will tend to make rational choices among the alternatives.

Consumers will generally support utility investment in renewable energy, because it will usually be cheaper in the long run than continuing to depend on fossil fuel. They will also tend to support the right-sized projects, because the cost of underutilization on oversized projects, and the higher risk premiums the State will demand in order to buy or guarantee their bonds, will be borne by the ratepayers.

IF a community wants to gamble on an optimistic growth strategy, or build a bigger project in order to buy more construction jobs now, the added cost and risk, and the responsibility for the decision, will all fall on the same shoulders.

Method:

1. Revenue bond guarantees. An entity of the State will guarantee Alaska utility or Power Authority revenue bonds that meet certain standards, for the purpose of removing or reducing the utilities' excess-coverge requirements and for the purpose of allowing unorthodox debt-amortization schedules.

Levelizing electric rates in real terms over the life of the project financing will mean that project revenues will not be sufficient to pay the interest bill in the project's early years, much less to amortize any of its debt. Thus, the State will have to agree in advance to guarantee any additional borrowing the utility will need in order to pay the balance of the interest on its outstanding debt --- until the utility's revenues [increasing geometrically as a result of both inflation and load growth] finally catch up with and outstrip its interest bill.

2. Guarantee Fund. The State-guaranteed bonds will not become general obligation bonds [which might not, in fact, be sufficient to make them marketable at an acceptable interest rate], but will be secured by only by balances in a special Guarantee Fund.

These balances would be invested in taxable securities [U.S. Government bonds and high grade industrial bonds] of the same maturities as the bonds guaranteed by the Fund. Thus, the money in the Fund will earn more than the interest cost of the tax-exempt revenue bonds that the fund guarantees, rather than less, as would be the case if the State made subordinated loans to the utilities. As a result, the Fund's earnings will always exceed the debt-service obligations on the loans it has guaranteed.

3. Risk premium or guarantee fee Before guaranteeing the bonds of any power project, the administrators of the Guarantee Fund would conduct a formal risk analysis of the project and its financing, and impose a risk premium or guarantee fee equal to the Fund's expected loss [the weighted average of the probabilty of loss, times the amount of the loss] as a result of guaranteeing the bonds.

4. Appraising risk. In order to assure the objectivity of project risk analyses, they probably should be conducted by an independent contractor on the basis of rigorously-prescribed standards.

Risk factors to be taken into account include the past record of the design engineers and prime construction contractors, and of major engineering projects in Alaska, with respect to cost overruns, delays, and change orders; past records of licensing and permitting agencies with respect to delays and required changes in design; any special design or environmental features of the project; future deviations of the inflation rate from the rate that is implicit in the current term-structure of interest rates; uncertainty regarding load growth and characteristics; natural disasters, etc.

DETAILED ANALYSIS

Background. Conventional methods of financing electrical generating plants result in extremely high prices for power in the early years of plant operation. The customers of large utility systems in the Lower 48 can usually tolerate this situation, because the high cost of power from new plants is often shared by several utilities, and can almost always be blended with lower costs for electricity from existing plants built earlier at lower costs, financed at lower interest rates, and already largely depreciated.

In Alaska, however, utility systems are isolated and relatively small --- this is true even for the Railbelt area and would still be true even if all the utilities of the Railbelt were operated as a single interconnected system. Moreover, most of the new hydroelectric plants being considered in the State, including the Sustina project, will make economic sense only if they can serve all or most of the electricity demand in their service area and can, in effect, replace existing oil- or gas-fired generating plants. In such circumstances, high prices for electricity from new plants mean high and probably unacceptable prices for electricity consumers.

Illustrative Hydropower Plant. Consider a representative hydroelectric project having an initial construction cost of $5,000 per kilowatt of prime (firm) generating capacity,[1] financed entirely by borrowing at 10 percent interest on a 25-year amortization (debt-retirement) schedule. Suppose that this plant is designed to meet the entire electric power demand of its service area for at least 20 years, when it would reach an annual "plant factor" (the ratio between the total power actually generated and sold, and the plant's generating capacity) of 65 percent.

Such a plant, if it were built to accommodate 20 years of expected demand growth at 2 percent per year, would produce power at an average "real" (inflation-adjusted) cost[2] of 6.1 cents per kilowatt-hour (kwh) over the 25-year term of the bonds used to finance the plant. Even if the plant were built to accommodate 20 years of demand growth at 7 percent per year --- thus beginning its operation at an extremely low plant factor (18 percent) --- the average cost of power would be only 8.4 cents per kwh.

Comparison with the Cost of Oil-Fired Power. While these prices are higher than the current (and unsustainable) prices of natural-gas-fired power in the Anchorage area, they are substantially lower than the cost of oil-fired generation anywhere else in the state. At 90 cents per gallon, and a better-than-average "heat rate" (generating efficiency) of 15,000 BTU per kilowatt-hour, the cost of No. 2 fuel oil used in diesel or turbine generators would be 10.3 cents per kwh. If the oil price were to escalate at a rate 2 percent per year above the general inflation rate, the average inflation-adjusted cost of fuel over the next 25 years would be 15.8 and 25.4 cents per kwh, in the 2 percent and 7 percent growth cases.

Remote communities where fuel oil prices are higher would, of course, have even greater costs. In a village where diesel oil now costs $1.50 per gallon, the cost of fuel for electrical generation is already about 17.2 cents per kwh. These figures, moreover, do not include any allowance for the original capital costs of the diesel or turbine plants,[3] or for their maintenance and replacement.

Table 1: COMPARISON OF LONG-TERM FUEL COSTS FOR OIL-FIRED ELECTRICAL GENERATION WITH HYDROPOWER COSTS AT $5000 PER KILOWATT OF CAPACITY.

Growth rate of demand:	(year-1 cents per kwh) 2 percent	7 percent
No. 2 fuel oil cost:		
At 90 cents per gallon, plus annual increase ---		
At general inflation rate (8%)	10.3	10.3
2% above general inflation	15.8	24.8
At $1.50 per gallon, plus annual increase ---		
At general inflation rate (8%)	17.2	17.2
2% above general inflation	26.3	42.3
Hydropower cost @$5000/kw (25-year life, 10% interest):		
Long-term average real cost	6.1	8.4
First-year price with conventional financing and ratemaking	22.4	55.6

Price Distortions Lead to Wrong Investment Decisions. A hydroelectric plant with generating costs of 6.1 and 8.4 cents per kwh, depending on the rate of load growth, would therefore seem to be an excellent choice to replace oil-fired generation under most reasonable assumptions, almost anywhere in Alaska. Yet Table 1 shows that customary financing and ratemaking methods would actually result in first-year electricity prices --- from the same plant --- of 22.4 cents per kwh in the case of 2 percent demand growth, and 55.5 cents per kwh in the case of 7 percent demand growth.

Less capital-intensive projects, projects that would supplement rather than totally replace existing generating facilities, and projects designed with a shorter time horizon, would all have somewhat lower first-year power costs than in our illustration. But for the great majority of hydroelectric (or tidal, or coal-fired) projects contemplated in Alaska, customary financing and ratemaking methods will make the electricity they generate more,

rather than less, expensive to consumers than the rates they now pay for thermally-generated power, for at least the first five to ten years.

Alaskans are likely to react to this situation in one of two ways. Unless State funds are available to mitigate the high front-end costs of capital-intensive generating plants, knowledgeable ratepayers and the utilities that serve them may reject the most efficient and cost-effective generation alternatives because of their effect on electric rates in the short term.

State Financial Assistance. With Alaska's large general-fund and permanent-fund balances, however, State money can (and undoubtedly will) be used to make up the difference between politically-acceptable electric rates and the actual cost of power from new projects. Such assistance can take the forms of equity grants, subordinated loans at lower-than-market interest rates or on easier-than-market repayment terms, guarantees for otherwise unmarketable bonds, or direct operating subsidies.

We believe that State funds should be used to facilitate construction of those Alaska power projects which are most cost-effective and environmentally acceptable in the long run. We also believe, however, that electric power is an ordinary commodity whose consumers --- residential, commercial, and industrial --- ought to bear its real costs, other than in exceptional hardship situations. Breaking the link between the actual cost of electricity from a project and the prices consumers pay has several objectionable consequences.

Properly-designed State grants, loans, or loan guarantees can be used to eliminate or mitigate distortions in energy prices. Other forms of subsidies and guarantees,

however, simply replace one distortion with another. They can easily remove or dilute the financial compulsions that now exist for the utilities and the Alaska Power Authority to plan wisely --- to choose the lowest-cost generation alternatives, and the scale of plant appropriate to anticipated demand in each service area. Subordinated loans or state guarantees can also remove or dilute the incentives lenders normally have to carefully scrutinize demand forecasts and project engineering, and to insist on competent construction and operating management.

Subsidies Encourage Financial Irresponsibility. In the absence of other economic incentives, therefore, a commitment by the State to make up the difference between actual power costs and the rates consumers are willing to accept, simply encourages and accomodates the natural desires of utilities and public power authorities to maximize their own growth. It also encourages and accomodates the natural tendency of local interests to make plans on the basis of over-optimistic growth projections, to forget that under-utilized generating capacity is worthless capacity, and to push for oversized facilities intended more as public works projects than as investments in low-cost power. Such a State commitment also removes the reasons ratepayers normally have to resist pressures for wasteful over-investment.

If State backing shelters the utilities, electricity consumers, and private lenders alike from the consequences of over-optimism, poor planning, and poor management, State involvement in electrical facilities financing is almost certain to cause the waste of hundreds of millions of dollars of the people's wealth, and government backstopping of oversized or poorly-chosen projects may well put additional billions of dollars in jeopardy.

We do not believe that state subsidies are really necessary or that general fund or permanent fund balances need to be placed at an unreasonable risk, in order to achieve acceptable and realistic rates for power from technically and economically sound hydoelectric projects. What Alaskans need is financing mechanisms and rate-design standards that can take advantage of the state's fiscal surplus to correct the distortions that customary financing methods impart to electricity prices, and which will therefor allow consumers to enjoy lower long-term costs of hydroelectric and other capital-intensive energy facilities, as soon as those facilities go on line.

A State Policy for Financing of Major Power Projects.

*** 1. Objective. The objective of state financial aid to major utility power projects should be to structure financing in such a way that rates to consumers reflect the true long-term cost of power from the very beginning.

Specifically, State intervention in financing could be designed to produce an inflation-adjusted price per kilowatt-hour that is about the same in the first year as in every subsequent year of the project's long-term debt (say, 20-30 years). In the previous examples, the aid we envision would produce an actual first-year price to consumers only slightly greater than the long-term real cost of 6.1 cents per kwh (or 8.4 cents, depending on anticipated load - growth), in contrast to the 22.4 (or 55.5) cents per kwh that would result from customary financing techniques.

*** 2. Loan guarantees and loan-guarantee fees. State financial assistance to power project financing will take the form of revenue bond guarantees, and will be coupled

with a guarantee fee that fully reflects any additional financial risk to the state as lender or guarantor, created by the special repayment terms.

The high front-end costs of electricity under conventional public-utility financing arrangements flow mainly from the riskiness of revenue-bond debt --- debt, that is, whose only security is project revenue. This riskiness is in turn caused by uncertainty about such things as future demand growth, utility management competence and regulatory policy, and future rates of interest and inflation: These risks normally compel lenders to insist (1) that utility rates more than cover their expected operating costs and debt service, and (2) that the debt principal be retired rapidly.

For example, if the State relieves lenders of all or part of the usual financial risks in order to reduce debt-service coverage requirements, or to prolong the repayment of principal, the resulting cost to the State can be measured or at least estimated. This cost incurred by the State is a part of the true cost of power from the new project and ought to be borne by consumers through a guarantee fee added to bond interest rates.

Under the arrangement proposed here, a community that wanted to gamble on an overly optimistic growth strategy or a larger-than-optimum-scale project that would generate more construction jobs in the short run, would itself have to bear any added costs of both under-utilized generating capacity and any added financial risk. The community's consumers, in other words, would themselves bear the costs of their own choices, rather than being able to shift them to other Alaskans, present or future.

*** 3. An independent financing authority. The State entity that appraises project risks and grants these subordinated loans and guarantees will be a new, independent "permanent fund" administered by an agency that is charged primarily with responsible management of the funds committed to it (rather than with the promotion of electric power projects). This fund's portfolio, its contingent liabilities, and its financial performance generally will be assessed and audited annually by an independent outside auditor.

The Causes of Electricity-Price Distortion.

The remainder of this memorandum explains how conventional financing and ratemaking procedures can cause unacceptably high first-year prices for electricity from new capital-intensive projects, and how a state power-financing entity can restructure debt-service schedules in such a way that the prices faced by consumers reflect real costs.

Four factors conspire to raise the initial price of electricity far above its long-term real cost: (1) straight-line depreciation; (2) excess debt-service coverage requirements; (3) advance payments for future inflation; and (4) the under-utilization of generating capacity in the early years of a project's life. Table 2 shows the effect of each of these factors on the first-year price of power from our hypothetical hydroelectric plant.

Table 2: ELECTRICITY-PRICE DISTORTION CAUSED BY CUSTOMARY FINANCING AND RATEMAKING ARRANGEMENTS

Growth rate of demand:	(year-1 cents per kwh) 2 percent	7 percent
First-year price (Straight-line amortization and 1.25 debt-service coverage)	22.4	55.6
Less effects of:		
Straight-line depreciation	-4.8	-11.9
Excess debt-service coverage	-3.5	-8.7
Advance payment for future inflation	-6.9	-17.7
Initial capacity under-utilization	-0.9	-8.9
Long-term real cost	6.1	8.4

Table 3 shows how the first line in Table 2, and electricity prices for various years, are calculated. The first-year price reflects amortization (repayment) of one twenty-fifth of the debt principal [$200], plus 10-percent interest for one year on the entire debt [$500], plus an excess "coverage" or safety margin equal to 25 percent of the sum of the year's principal repayment and interest [$175]. The total of amortization, interest, and excess coverage [$875 per kilowatt of capacity], is divided by the number of kilowatts actually generated and sold during the year from each kilowatt of generating capacity [3911 or 1575 hours], in order to obtain the first-year price per kilowatt-hour [22.4 or 55.6 cents].

Table 3: CALCULATION OF ELECTRICITY PRICES: STRAIGHT-LINE DEPRECIATION WITH 1.25 DEBT-SERVICE COVERAGE REQUIREMENT
(Original debt $5000/kw, interest 10 percent @ 25 years)

(t)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Year	Remaining Debt	Repayment of Principal	Interest	Total Debt Service	Excess Coverage Required	Total Revenue Required	Power Produced & Sold (kwh/yr)	Electricity Price (¢/kwh) Current	Constant (year-1 $)
	(thousands of dollars)								
2 percent load growth:									
1	5000	200	500	700	175	875	3911	22.4	22.4
5	4200	200	420	620	155	775	4234	18.2	13.3
10	3200	200	320	520	130	650	4674	13.9	6.9
15	2200	200	220	420	105	525	5160	10.1	3.5
20	1200	200	120	320	80	400	5698	7.0	1.6
25	200	200	20	220	55	375	6291	4.4	.8
7 percent load growth:									
1	5000	200	500	700	175	875	1575	55.5	55.5
5	4200	200	420	620	155	775	2965	32.7	24.0
10	3200	200	320	520	130	650	2897	22.4	9.3
15	2200	200	220	420	105	525	4063	13.0	4.4
20	1200	200	120	320	80	400	5698	7.0	1.6
25	200	200	20	220	55	375	7992	3.5	.5
explanation:									
	$(1)_{t-1}$ minus $(2)_{t-1}$	5000 divided by 25 years	.10 times (1)	(2) plus (3)	.25 times (4)	(4) plus (5)	5698 times $(1+g)^{t-20}$	(6) divided by (7)	(7) x 1.08^{1-t}

Column (2) of Table 3, repayment of principal, could just as well have been labeled "depreciation", which refers to that portion of the electricity price which is intended to recover the original cost of the utility's plant and equipment over its useful life. The depreciation of utility plant and equipment for rate-making purposes is normally carried out on the same schedule as the amortization (repayment of principal) on the bonds the utility sold in order to finance plant construction. In the present instance, we have assumed for simplicity that the entire project cost is financed by borrowing; as a result depreciation of original cost is just equal to amortization of debt.

Straight-line depreciation. The most common depreciation schedule for purposes of ratemaking and amortization of debt is straight-line depreciation. In Table 3, a project costing $5000 per kilowatt of capacity, financed by an bond issue of the same size over an expected life of 25 years, would thus be paid for in equal annual installments of $200 per kilowatt. In addition to this annual allowance for depreciation or amortization, the utility must also collect enough revenue to pay interest on the outstanding, unamortized debt. Thus, the "debt-service" [amortization plus interest] or "fixed-cost" [depreciation plus interest] component of the electric rate, shown in column (4) of Table 3, is largest in the first year when the entire debt is still outstanding, and falls over time --- eventually to zero --- because the annual interest charge declines as the debt principal is paid off.

Lenders almost always insist on a straight-line amortization schedule for the revenue bonds of project-financed (off-balance-sheet) utility investments --- bonds, that is, whose only security is revenue from the specific facilities they finance. Regulatory utility commissions, including the Federal Energy Regulatory Commission [FERC], and the Alaska Public Utility Commission [APUC], likewise generally require utilities to use straight-line depreciation in setting rates, regardless of their actual schedule of debt amortization (or their depreciation schedule for tax purposes).

Levelizing the debt-service schedule. The first step toward making the price of electricity from new projects equal to its long-term cost is to "levelize" the debt-service burden. Just as in the case of a conventional home mortgage or installment loan, the early payments would be mostly interest, but the monthly or annual interest

burden would decline as the principal was reduced, so that an increasing proportion of each payment would be devoted to amortizing the principal itself. The second line of Table 2 shows that the effect of levelizing the debt-service schedule would be to reduce our representative hydroelectric project's first-year prices from 22.4 and 43.7 cents per kwh, to 17.6 and 43.7 cents respectively.

Table 3: CALCULATION OF ELECTRICITY PRICES: LEVELIZED DEBT-SERVICE WITH 1.25 DEBT-SERVICE COVERAGE REQUIREMENT
(Original debt $5000/kw, interest 10 percent @ 25 years)

(t)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Year	Remaining Debt	Repayment of Principal	Interest	Total Debt Service	Excess Coverage Required	Total Revenue Required	Power Produced & Sold (kwh/yr)	Electricity Price (¢/kwh) Current	Electricity Price (¢/kwh) Constant (year-1 $)
	(thousands of dollars)								
2 percent load growth:									
1	5000	51	500	550	138	688	3911	17.6	17.6
5	4764	74	476	550	138	688	4234	16.2	11.9
10	4309	120	431	550	138	688	4674	14.7	7.4
15	3577	193	358	550	138	688	5160	13.3	4.5
20	2399	311	239	550	138	688	5698	12.1	2.8
25	500	500	50	550	138	688	6291	10.9	1.7
7 percent load growth:									
1	5000	51	500	550	138	688	1575	43.7	43.7
5	4764	74	476	550	138	638	2065	33.3	24.4
10	4309	120	431	550	138	688	2897	23.7	11.8
15	3577	193	358	550	138	688	4063	16.9	5.8
20	2399	311	239	550	138	688	5698	12.1	2.8
25	500	500	50	550	138	688	7992	8.6	1.4

explanation:

(1)$_{t-1}$	(4)	.10	5000	.25	(4)	5698	(6)	(7)
minus	minus	times	times	times	plus	times	divided by	times
(2)$_{t-1}$	(3)	(1)	K	(4)	(5)	$(1+g)^{t-20}$	(7)	$(1+r)^{1-t}$

where —— t is the year and n is the number of years; and i is the interest rate, g is the annual load growth rate, and r is the annual inflation rate, all as decimal fractions; and $K = i/[1-(1+i)^{-n}]$

Excess debt-service coverage requirements. Revenue bond issues with levelized-amortization schedules can indeed be marketed --- but only by established utilities that have an accumulated surplus, and thus do not have to borrow 100 percent of their investment needs, or which generate enough revenues on their pre-existing facilities. The payment schedule for the Anchorage Municipal Utility's 1977 revenue bond issue, for example, is approximately level over the life of the debt, but an "indenture covenant" (a contract between lenders and the borrower) provides ---

> That the Municipality covenants to establish, maintain, and collect rates and charges for electric service that will make available each calendar year thereafter for the payment of principal and interest on all outstanding bonds payable out of the Bond Fund and the parity bonds to be issued as the same shall become due, after payment of maintenance and operation expenses but before depreciation, an amount equal to at least 1.25 times the amount required each such year to pay all such principal and interest.

Lenders will regard revenue-bond issues with levelized amortization schedules as too risky unless they are backed by strict coverage requirements or third-party guarantees. For a new, 100-percent debt-financed project that is intended to supply all or most of the electricity consumed in its service area, the required coverage ratio is likely to be higher that the 1.25 assumed in our example. One function of the state fund suggested in this memorandum could be to guarantee the levelized-repayment revenue bonds of Alaska utilitites, so that they can be sold in Outside capital markets, nothwithstanding the absence of an excess-coverage covenant.

By guaranteeing these securities, the state would voluntarily accept financial risks that private lenders are unwilling to bear. Table 1 suggests that elimination of

Table 4: CALCULATION OF ELECTRICITY PRICES:
LEVELIZED DEBT-SERVICE WITHOUT EXCESS COVERAGE REQUIREMENT
(Original debt $5000/kw, interest 10 percent @ 25 years)

(t)	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Year	Remaining Debt	Repayment of Principal	Interest	Total Debt Service	Power Produced & Sold	Electricity Price (¢/kwh) Current	Constant (year-1 $)
	(thousands of dollars)						
7 percent load growth:							
1	5000	51	500	550	3911	14.1	14.1
5	4764	74	476	550	4234	13.0	9.5
10	4309	120	431	550	4674	11.8	5.9
15	3577	193	358	550	5160	10.6	3.6
20	2399	311	239	550	5698	9.7	2.2
25	500	500	50	550	6291	8.7	1.4
7 percent load growth:							
1	5000	51	500	550	1575	35.0	35.0
5	4764	74	476	550	2065	26.6	19.5
10	4309	120	431	550	2897	19.0	9.4
15	3577	193	358	550	4063	13.5	4.6
20	2399	311	239	550	5698	9.7	2.2
25	500	500	50	550	7992	6.9	1.1
explanation:	$(1)_{t-1}$ minus $(2)_{t-1}$	(4) minus (3)	.10 times (1)	5000 times K	5698 times $(1+g)^{t-20}$	(6) / (7)	(7) times $(1+r)^{1-t}$

where — t is the year and n is the number of year periods; i is the interest rate, g is the annual load growth rate, and r is the annual inflation rate, all as decimal fractions; and $K = i/[1-(1+i)^{-n}]$.

the excess-coverage requirement would reduce the consumer price of electricity by 20 percent in the first year (and every subsequent year), from what it would otherwise be, even with a levelized debt-service schedule. Table 4 shows how the new prices of 14.1 and 35.0 cents were calculated.

Table 4 somewhat understates the full cost of electricity, because it assumes that the interest rate would be the same without an excess-coverage margin as with such a margin. A State waiver of the excess-coverage covenant that private lenders would ordinarily require, or a State guarantee of revenue bonds that have no excess-coverage covenant, would mean the State was assuming some added financial risk, which ought to be compensated by a risk premium or guarantee fee added to the interest rate.

In our example, 10 percent interest with a debt-service coverage ratio of 1.25 would be just as expensive to consumers as 13.1 percent interest and no excess coverage. [Both require the same revenues --- $687.50 per year for each $5000 of original cost.] It is very unlikely that the risk assumed by the State in waiving the excess coverage requirement would deserve anything like an added 310 basis points (3.1 percentage points) in interest costs. In our judgment, therefore, State action to relieve the utility of an excess-coverage requirement would be a bargain to consumers, even if the added financial risk to the State were fully compensated.

Advance payment for future inflation. While the debt-service schedules in Tables 3 and 4 have been levelized, they still show real prices for electricity that are unacceptably high in the early years of project operation, and unrealistically low later. The main reason for this steep front-end tilt is the fact that even a levelized debt-service schedule compels consumers to pay for future inflation in advance --- today, that is, in today's valuable dollars rather than later, in less valuable future dollars.

The way in which consumers prepay future price increases is through inflated interest rates. The greater part of the nominal interest charge on a bond sold today is not really interest but is, instead, compensation for the

fact that lenders will be repaid in degraded future dollars. In past periods when inflation was negligible, the interest rate on high-grade utility bonds was on the order of 2 percent or less. The "real", or inflation-adjusted interest rate on high-grade utility bonds is still about 2 percent; a current market interest rate of 10 percent on long-term bonds would thus mean that lenders expect the long-term rate of inflation to average about 8 percent per year.

The prices of electricity from a capital-intensive project are very sensitive to nominal interest rates, because interest makes up the bulk of its initial debt-service requirement. In the illustration of Table 4, interest is 91 percent of the first-year's electricity cost [$500/$5500]. The first-year difference between interest on $5000 calculated at the inflated, 10 percent market rate [$500], and interest calculated at the "real", inflation-adjusted rate of less than 2 percent [1.10/1.08 - 1 = 1.85 percent] is 6.9 and 17.7 cents per kilowatt-hour, in the 2- and 7-percent load-growth examples. These, therefore, are the prices that consumers must pay in advance for the inflation that lenders and borrowers expect to occur in the future.

Adjusting for inflation. Just as a schedule of debt service can be levelized in nominal, current dollars, it can be levelized in "real", inflation-adjusted dollars. Table 5 shows such an inflation-adjusted payment schedule, and the resulting prices of electricity. Because we can not predict the average long-term inflation rate perfectly, no predetermined schedule of payments intended to remove the effect of future inflation from current electric rates will hit its goal precisely, except by accident. The illustra-

tion does show, however, that a debt-service payment of $272, escalated at 8 percent per year, will pay off a $5000 loan at 10 percent interest over 25 years. This inflation-adjusted payment schedule cuts first-year electricity prices just about in half, relative to Table 4.

Table 5: CALCULATION OF ELECTRICITY PRICES: ADJUSTED FOR FUTURE INFLATION (LEVELIZED IN CONSTANT DOLLARS)

(Original debt $5000/kw, interest 10 percent @ 25 years)

(t)	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Year	Remaining Debt	Repayment of Principal	Interest	Total Debt Service	Power Produced & Sold	Electricity Price (¢/kwh) Current	Constant
	(thousands of dollars)				(kwh/year)		(year-1 $)
2 percent load growth:							
1	5000	-228	500	272	3911	7.0	7.0
5	5912	-221	591	370	4234	8.7	6.4
10	6912	-149	691	543	4674	11.7	5.9
15	7296	69	730	798	5160	15.5	5.3
20	6115	562	612	1173	5698	19.5	4.8
25	1567	1567	157	1724	6291	27.4	4.4
7 percent load growth:							
1	5000	-228	500	272	1575	17.3	17.3
5	5912	-221	591	370	2065	17.9	13.1
10	6912	-149	691	543	2897	18.7	9.4
15	7296	69	730	798	4063	19.6	6.7
20	6115	562	612	1173	5698	19.5	4.8
25	1567	1567	157	1724	7992	21.5	3.4
explanation:	$(1)_{t-1}$ minus $(2)_{t-1}$	(4) minus (3)	.10 times (1)	$5000x_t(1+r)^t$ L	5698 x times $(1+g)^{t-20}$	(6) / (7)	(7) times $(1+r)^{1-t}$

where — t is the year and n is the number of year periods; i is the interest rate, g is the annual load growth rate, and r is the annual inflation rate, all as decimal fractions; and $L = (i-r)/(1+r)(1-[(1+i)/(1+r)]^{-n})$. This latter expression, in effect, substitutes the real interest rate $[1-(1+i)/(1+r)]$ for the nominal interest rate [i] used to levelize annual debt service charges in nominal dollars in Table 4.

The secret of Table 5's repayment schedule can be seen in column (2), which shows negative figures for "repayment of principal" in years 1, 5, and 10. The negative amortization in these years is caused by a level of "real" inflation-adjusted debt-service payments that is just sufficient to amortize the whole debt over a period of 25 years, but which is not, however, sufficient to cover the early years' interest charges at the inflated (unadjusted) current rate of 10 percent. As a result, the outstanding debt continues to grow in current dollars (but not in constant dollars) for about 13 years, until the annual debt-service payments, escalating at the rate of general inflation, overtake it.

Underutilization of capacity. Adjusting the debt-service schedule to reflect inflation will not completely levelize the real price of electricity per kilowatt hour over the term of the project's long-term financing. Even Table 5 shows a forward tilt in inflation-adjusted prices --- a moderate tilt in the 2-percent demand-growth case, and a rather steep tilt in the 7-percent demand-growth case. The remaining difference between first-year prices and the long-term averages results from the increasingly intensive utilization of the new plant's capacity over time.

If demand is growing at an annual rate of 2 percent, and a new generating facility is designed to meet all the needs of its service area for 20 years, at which time it would operate at an average load factor of 65 percent, its first-year load factor would be 44.6 percent, and each kilowatt of capacity would produce an average of 3911 kilowatt-hours in that year. If demand is growing at a 7-percent rate, a facility designed to operate with a load factor of 65 percent or less for 20 years would have a first-year load factor of only 18.0 percent, and produce 1575 kilowatt-hours per kilowatt of capacity.

Adjusting for increasing load-factors. Table 6 shows the schedules of debt-service payments and electricity prices that would fully compensate for 8-percent annual inflation and 2-percent or 7-percent annual growth in demand. In the case of 2-percent load-growth --- first year prices fall 13 percent, from 7.0 to 6.1 cents per kilowatt-hour. Where a community plans a substantially oversized facility in order to provide for many years of rapid growth, this last adjustment can make a significant difference:

Table 6: CALCULATION OF ELECTRICITY PRICES:
ADJUSTED FOR FUTURE INFLATION AND LOAD GROWTH
(Original debt $5000/kw, interest 10 percent @ 25 years)

(t)	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Year	Remaining Debt	Repayment of Principal	Interest	Total Debt Service	Power Produced & Sold	Electricity Price (¢/kwh) Current	Constant
	(thousands of dollars)				(kwh/year)		(year-1 $)
2 percent load growth:							
1	5000	-284	500	216	3911	6.1	6.1
5	6167	-298	617	318	4234	8.3	6.1
10	7595	-243	760	516	4674	12.2	6.1
15	8440	-6	844	838	5160	17.9	6.1
20	7441	615	744	1359	5698	26.3	6.1
25	2005	2005	200	2205	6291	38.6	6.1
7 percent load growth:							
1	5000	-385	500	132	1576	8.4	8.4
5	6664	-462	666	236	2065	11.4	8.4
10	9080	-488	908	486	2897	16.8	8.4
15	11220	-256	1122	1001	4063	24.6	8.4
20	11053	680	1105	2063	5698	36.2	8.4
25	3344	3344	334	4252	7992	53.2	8.4
explanation:	$(1)_{t-1}$	(4)	.10	5000	5698	(6)	(7)
	minus	minus	times	times	times	/	times
	$(2)_{t-1}$	(3)	(1)	M	$(1+g)^{t-20}$	(7)	$(1+r)^{1-t}$

where — t is the year and n is the number of year periods; i is the interest rate, g is the annual load growth rate, and r is the annual inflation rate, all as decimal fractions; and M = $[(1+r)(1+g)]^{t+1}$ $[1-([i-r][1+g])^{n}]/[1-(1+i)/(1+g)(1+r)]$. The last expression is equivalent substitution of the real interest rate, reduced by the rate of load growth $[1-(1+i)/(1+r)(1+g)]$ for the nominal, unadjusted interest rate [i] used to levelize annual debt service payments in nominal dollars in Tables 3 and 4.

With 7-percent annual growth in demand, fully levelizing the price per kilowatt-hour reduces first-year charges 21 percent, from 17.3 to 18.4 cents per kilowatt-hour.

FOOTNOTES

1. Every hydroelectric facility in unique, and no single cost figure is truly representative of hydroelectric projects as a group. Capital cost estimates for individual Alaska projects published in ISER's 1976 study were typically in the range of $1000-$3000 per "installed" kilowatt of capacity [the maximum number of kilowatts the plant could produce at any given instance]. Converting these figures to 1980 dollars and to cost per kilowatt [the average number of kilowatts the plant could produce on a sustained basis in a low year], adding construction interest costs, will bring the range of costs to about $1,500-$7,500 per kilowatt. Thus, our figures of $5,000 per prime kilowatt is well within the range of plausible Alaska project costs.

2. Real cost figures are in constant dollars of the first year of plant operation, assuming an 8-percent annual inflation rate.

3. For an oil-fired plant with an original cost of $500 per kilowatt of capacity, 100-percent debt-financed over a 15-year life at 10 percent interest, and operated at an average load factor of 50 percent, the average fixed cost would be about 0.9 cents per kwh in year-1 dollars.

Draft

MEMORANDUM

17 January, 1981

To: Governor Hammond
From: Arlon R. Tussing

Re: POWER PROJECT FINANCING ALTERNATIVES

1. State guarantees vs. subordinated loans.

Last December, I proposed a State loan-guarantee program almost identical to the one Ron Lehr now advocates. Discussions with Power Authority and Bank of America people, Eric Wohlforth, Sterling Gallagher, and others, convinced me, however, that the guarantee approach carries unacceptable risks and may not even be workable.

The alternative proposal, to use subordinated loans, is essentially a modification of the approach that the Power Authority has already implemented successfully for Sitka's Green Lake project. Its specific features reflect suggestions by Terry McGuire of the Power Authority, Eric Wohlforth, and me. In my judgment, this approach is far superior to using general obligation (GO) bonds or any other form of State loan guarantee.

The two methods of State assistance have precisely the same purposes and economic effects, and either method can be structured to yield any desired level of initial electric rates, and any desired allocation of costs and risks between the ratepayers and the State treasury. Either is compatible with a project-by-project vote of the people, or with an overall once-and-for all appriation. There are some significant practical differences, however.

a. Interest costs. Theoretically, the use of tax-exempt GO obonds should result in somewhat lower interest costs, because the State funds that otherwise would be committed to a direct loan could be invested in taxable securities at a higher rate of return.

This seems to be the principal, if not the only reason, Ron prefers a State guarantee to a direct loan. Eric Wohlforth and the Power Authority are convinced that the loan-guarantee approach would not in fact produce lower interest costs. I believe that Ron is probably right, at least in principle, but there is no way in which the two methods could affect actual electric rates by more than five or six percent. In any case, the interest-cost differential --- if there is one --- is overshadowed by several practical considerations:

b. Arbitrage. The Internal Revenue Service may determine that the GO bonds required by Ron's plan are illegal "arbitrage" bonds, but there is no way of knowing in advance of an IRS ruling on a specific bond offering.

c. Marketability. Thirty- and 40-year electric revenue bonds are commonplace, but GO bonds with a maturity of more than 20 years may not be marketable. Reducing the term of debt-amortization from 30 years to 20 years would in itself offset any interest-cost advantage from the guaranteed-loan approach.

d. Bond-ratings. Alaska's GO-bond rating is sensitive to the volume of GO bonds outstanding. While an additional (say) $300 million in general obligation debt to finance power projects in Alaska would probably have no effect on the State's rating, equal treatment could not be provided for Susitna bonds, because the amount of debt required could conceivably have a big effect on Alaska's bond rating. This development would also wipe out any interest-cost advantage of the guarantee approach, and once more, the danger can not be measured with any confidence until it is too late.

e. Timing of risk. Subordinated loans risk only the loss of principal and/or earings on today's funds, which are currently in surplus. If pojects financed by GO bonds should default, however,

the cause would most likely be a generally distressed Alaska economy. In this case, the need to make good on the defaulted bonds would only compound the economic and fiscal distress.

f. Simplicity. The subordinated loan scheme that the Power Authority, Eric Wohlforth, and I endorse is simple. It requires only two tiers of debt: conventional revenue bonds for at least 50 percent of the capital cost, and direct loans from the State for up to 50 percent. The debt-service schedule for the subordinated loan can be designed to provide for any desired time-profile of electric rates.

The guarantee plan, in contrast, requires three tiers: (1) revenue bonds for at least 50 percent of the capital cost, (2) GO bonds for up to 50 percent; and additionally (3) a series of direct loans from the State at one-year intervals for five to fifteen years, to make up the difference between the project's revenues from electric rates and the scheduled debt-service on its conventional revenue and GO bonds. This apparatus is much harder to design, harder to administer, and harder to explain to legislators, lenders, or the public.

2. Popular vote.

GO bonds require a vote of the people, but there is nothing to prevent legislation authorizing or appropriating funds for subordinated loans from providing for a referendum for either the program as a whole or for each project. Which kind of vote to require, however, is a real dilemma: a referendum on each project raises a danger that people in each part of Alaska will vote only for the projects that benefit them, while a referendum on theprogram as a whole is certain to carry and will provide a cover for undesirable as well as deserving projects. I do not have a firm opinion on this issue.

3. Subsidies. I like Ron Lehr's suggestion of a once-and-for all capital subsidy of $1,000 per capita, but I will deal with it at in another memorandum instead

for nonrevenue bonds - invested (future seed $), interest for current costs

Distribution

January 12, 1981

DRAFT

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

Ron Lehr, Director
Division of Budget and
Management

Power Project Financing

This memo serves to present an approach to power project financing developed by the Governor's Office based on consulting advice. An approach represents a balance between the concept advanced by the Bank of America which relies on 100% full faith and credit guarantees and the concept advanced by the Alaska Power Authority which relies on direct State investment in projects.

OBJECTIVES

There are five major objectives which any power project financing plan should strive to achieve. It should be noted that there are some tradeoffs among these objectives, and that the relative importance of each objective depends on the perspective which one brings to this problem.

1. Market Test - The financial tools provided to the Alaska Power Authority should retain a market test on the financing of projects. That is, State assistance should preserve the normal incentives for lenders to look to the revenue-generating strength of a project in making their financing decision. Such outside scrutiny provides a necessary check that projects are both economically and financially feasible.

2. Lower Borrowing Costs - With capital intensive projects, high interest rates can add greatly to the total cost of a project. State assistance should serve to lower revenue bond harrowing costs as much as possible in balance with other objectives.

3. Lower Front-end Costs to Consumers - With capital intensive projects, early-year rates can be quite burdensome if a project is not fully utilized. By deferring returns on any State financial assistance to later years of a project's life, the State can help lower early-year rates without direct monetary subsidies.

4. Market Interest Rates on State Assistance - Any direct State financial assistance to power projects should earn a market rate of return.

5. Budgetary Control - The financial tools employed by the APA must be compatible with the State's budget process and be understandable and controlable by elected officials.

PLAN OUTLINE

The Governor's Office approach has attempted to combine the best features of guarantees and direct State investment with respect to the above objectives. All projects would be 100% debt financed on the revenue bond market[1] except for such front-end costs as feasibility studies, engineering and design, and licensing. State loans for these purposes would be refinanced with bond proceeds. A major portion of total project costs would be packaged in a separate revenue bond issue which would be marketable without State backing, i.e., based on the soundness and revenue potential of the project itself. To reduce interest costs[2] a

1. Revenue bond financing provides an effective market test (Objective 1).

2. A State full faith and credit guarantee extends the State's credit rating to that portion of the bond financing which is guaranteed (Objective 2).

minor portion would be packaged as a separate revenue bond issue eligible for a State full faith and credit (G.O.) guarantee. The size of the portions would be set by the amount of State backing necessary to allow the stand-alone bond issue to be marketed on reasonable terms.

The mechanics for extending a guarantee are still some-what unclear. At this point, we expect that a State-wide ballot proposition would be necessary authorizing on a regional basis a ceiling on the amount of power project bonds which could be guaranteed. The decision-making process for determining what portion of a project should be guaranteed and for extending the guarantee have not been discussed. The concept of charging a risk premium to compensate the State for its risk exposure under the guarantee also needs further discussion.

To reduce front-end consumer costs, the other principal feature of our approach is a Rate Relief Fund much like the Bank of America's proposed Energy Development Fund. This fund would be used to lower front-end costs to consumers. Appropriations would be made into the fund on a project by project basis. The size of the appropriation would be established to provide an earnings stream from investment match that portion of the debt service the State would cover through loans to the utility to lower consumer rates to some acceptable level. Again, the administration of this fund and the decision-making process for determing the level of State assistance in lowering rates has not been clarified. Neverless, cash would flow from this fund to the utility (as a loan to be repaid on a deferred basis) to share debt service until utility revenues from the project are sufficient not only to meet revenue bond debt service, but also to repay the State's contributions. Rates in late years would be maintained at levels sufficient to both retire revenue bond debt and to provide a market return on the State's early-year cash outflows from the fund[3].

3. State loans to assist debt service in the early-years provide rate relief (Objective 3), which can be repaid at market rates by consumers in late-years (Objective 4).

- The Rate Relief Fund might also provide a source of funds for meeting the State's guarantee obligation in case of default without violating IRS arbitrage rules. More analysis on this potential is necessary.

Several quantitative issues sould be addressed before any final decision can be made. The most important include:

1. Relative impact on revenue bond interest rates of 100% guarantees, partial guarantees, and partial direct State financing, and how resulting interest rates impact electric rates;

2. Cash flow out and into Rate Relief Fund over project life and impact of various rates of return on State loans on late year consumer electric rates; and

3. Earnings build-up of Rate Relief Fund and use of principal and/or interest to cover defaults under a guarantee.

Also, more technical details about bond indentures, rate making, and guarantee mechanics would be useful in understanding the institutional options for implementing this plan.

In conclusion, the combination of the following features make this approach plan seem best:

1. 100% debt financing assures strong market scrutiny of projects;

2. Partial guarantees limit State exposure, preserve the market test, and still provide lower interest cost financing; and

3. A minimum amount of State funds are committed, minimizing opportunity losses on investment.

A more through evaluation of how each plan meets our objectives follows.

Attachment

FAU/RL/TS/dg

PLAN PERFORMANCE ON OBJECTIVES

	B of A	APA	Lehr
1. Market Test	weak	stronger	strongest
	- 100% guarantee replaces project credit with State's	- Part financed in bond market receives market test	- 100% bond financing with partial guarantee
2. Lower Interest Cost	strongest	weak	stronger
	- But value of guarantee under certain circumstances	- If State changes market return on its portion this plan has highest interest cost	- Partial guarantee lowers interest cost on guaranteed portion
3. Lower Front-end Cost	strong	strong	strong
	- Use and impact of Rate Relief Fund flexible	- Use and impact of deferred return on State's portion flexible	- Use and impact Rate Relief Fund flexible
4. Market Return on Investment	weak	weak	stronger
	- State fully exposed to risk of default	- No guarantee exposure	- State's risk exposure on guarantee less
	- risk premium controversial	- Return on investment uncertain	- Return on RRF uncertain
	- Return on RRF uncertain	- Opportunity loss on invested funds	- Visit premium controversial
5. Budgetary Control	weak	weak	weak
	- Decisions about guarantees outside budget process (but subject to popular vote)	- Administration of direct State investments difficult to track	- Decisions about guarantees outside budget process (but subject to popular vote)
	- RRF subject to budget process		- RRF subject to budget process

SUPERSEDED

ARLON R. TUSSING & ASSOCIATES / 880 H St., Suite No. 210, Anchorage, Alaska 99501

21 January, 1981

To: Governor Hammond
Via: Frances Ulmer
From: Arlon R. Tussing

Re: POWER PROJECT FINANCING ALTERNATIVES: SUMMARY

1. State guarantees vs. subordinated loans. In a November 19 memorandum to you, I proposed a State loan-guarantee program to lower initial rates on hydroelectric projects that is almost identical to the one Ron Lehr presented last week. I am now convinced, however, that the guarantee approach carries unacceptable risks and may not even be workable.

a. Interest costs. The chief argument for guaranteed loans and a rate relief fund over direct loans from the State is the interest-cost savings. The actual difference in electric cost or in the State's earnings would only tend to be on the order of five or six percent, however. [See appendix A.] In my judgment, this savings is overshadowed by other considerations:

b. Arbitrage. The IRS may determine that State-guaranteed bonds coupled with a rate relief fund is an illegal "arbitrage" scheme. We have no way of knowing how the IRS would actually rule, except after authorizing and preparing a specific bond offering.

c. Marketability. G.O. bonds with a maturity of more than 20 years may not be marketable in today's markets. Having to amortize the project debt in (say) 20 years instead of 30 would itself offset any interest-cost advantage from the guaranteed-loan approach.

d. Bond ratings. If general-fund guarantees and a rate-relief fund are chosen now to finance smaller projects, it may be difficult to deny the same treatment to the Susitna project debt may be large enough to affect all of Alaska's bond ratings. This development could of course wipe out any interest-cost advantage from using the guarantee approach.

e. Simplicity. The direct loan approach is easier to design, easier to administer, and easier to explain to legislators, the public, and (most importantly) investors.

2. Capital subsidies. If the State cannot avoid granting new subsidies, Ron Lehr's suggestion of a once-and-for-all capital subsidy of $1,000 per capita is one of the most elegant ideas around.

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The alternative proposal using direct State loans is essentially a modification of an approach that the Power Authority has already implemented successfully for Sitka's Green Lake project. Its specifics reflect suggestions by Terry McGuire of the Power Authority, Eric Wohlforth, and me. In my judgment, this approach is superior to using State loan guarantees plus a rate-relief fund.

The two methods of State assistance have precisely the same purposes and economic effects, and either method can be structured to yield any desired level of initial electric rates, and any desired allocation of costs and risks between the ratepayers and the State treasury. Either is compatible with a project-by-project vote of the people, or with an overall program authorization. The differences are significant, however:

a. Interest costs. Theoretically, the use of tax-exempt G.O. bonds should result in lower net interest costs, mainly because the State funds that would otherwise be committed to a direct loan could be invested in taxable securities at a higher rate of return. This is Ron Lehr's chief argument for preferring guaranteed loans and a rate relief fund over direct loans from the State.

Eric Wohlforth and the Power Authority argued last week that the loan-guarantee approach would not result in lower net interest costs (or, what is the same thing, higher net earnings for State funds). I believe that Ron Lehr is probably right in principle, provided his scheme is feasible at all. Even so, the actual difference in electric cost or in the State's earnings would only tend to be on the order of five or six percent. [See appendix A.] In my judgment, this savings is overshadowed by other considerations:

b. Arbitrage. The Internal Revenue Service may determine that State-guaranteed bonds coupled with a rate relief fund as provided in Ron Lehr's plan is an illegal "arbitrage" scheme --- a device to borrow money in tax-exempt bond markets and invest it in taxable securities in order to "profit at the expense of the U.S. Treasury."

The experts we have heard disagree about how likely it is the IRS would actually condemn this plan, but arbitrage is in fact its chief purpose and its chief merit. What is clear is that we have no way of knowing how the IRS would actually rule, except after authorizing and preparing a specific bond offering.

c. Marketability. Thirty and 40-year electric revenue bonds are commonplace, but G.O. bonds with a maturity of more than 20 years may not be marketable in today's markets. Having to amortize the project debt in (say) 20 years instead of 30 would itself offset any interest-cost advantage from the guaranteed-loan approach.

On first impression it seems incredible that a bond with two sources of repayment should be harder to market than a bond with only one, but specialists from several investment houses have told me that this is indeed the case. See appendix B for an explanation.

d. Bond ratings. The State's G.O.-bond rating is sensitive to the volume of Alaska State and local G.O. bonds outstanding. Three hundred million or so dollars in general obligation debt to finance power projects in Alaska would not be likley to have any effect on the State's rating. But if general fund guarantees and a rate relief fund are chosen now to finance smaller projects, it may be difficult to deny the same treatment to the Susitna project, whose debt may be large enough to affect all of Alaska's bond ratings. This development could of course wipe out any interest-cost advantage from using the guarantee approach.

Just as with the marketability risk, it seems preposterous that using the kind of "double-barreled" bond guarantee proposed by Ron can not get around the danger of lowered ratings. Illogical or not, however, the problem is a real one. [See appendix B for an explanation.] And just as we found with respect to the "arbitrage" problem, experts differ on how much risk there actually is to the State's ratings, but once again the danger cannot be measured with any confidence until it is too late.

e. Simplicity. The subordinated loan scheme that the Power Authority and I endorse is simple: It requires only two kinds of debt to provide any desired time-profile of electric rates. Appendix A illustrates a financing that consists of $8.8 million in conventional revenue bonds at 10 percent interest, and an $8.8 million subordinated loan from the State at about 12 percent. Deferring debt-service on the State loan reduces the first-year fixed cost of electricity by half.

The guarantee plan, in contrast, requires three tiers of debt in order to obtain the same electric rate profile. Financing would consist of (a) $8.8 million in conventional revenue bonds, (b) $8.8 in collateralized revenue bonds or G.O. bonds, and (c) nine annual loans of $.09 to $1.0 million each from the rate relief fund to make up the difference between the utility's revenues and scheduled debt service on the revenue and G.O. bonds. The rate relief fund would need an initial capital appropriation of at least $3.47 million in order to provide these annual loans out of interest and retirement of its investments.

In contrast to the guarantee approach, the simplicity of direct loans would permit an exactly parallel scheme to be adopted for non-utility power projects. (I still owe you a proposal for such a program, which would probably be in AIDA rather than in the Power Authority.)

The direct loan approach is easier to design, easier to administer, and easier to explain to legislators, the public, and (most importantly) investors.

2. Capital subsidies. Either direct State loans or loan guarantees plus a rate relief fund can serve as an alternative to subsidies, because either one of them can bring the initial cost of electricity from capital-intensive generating projects down to acceptable levels. I personally see no more reason for the State to subsidize electricity as such than to subsidize beer, oranges, or shotguns.

If the State cannot avoid granting new subsidies, however --- perhaps because direct appropriations and interest-rate subsidies have already been granted to some communities --- Ron Lehr's suggestion of a once-and-for-all capital subsidy of $1,000 per capita is one of the most elegant ideas around.

This per-capita subsidy plan is one way of transferring oil wealth to the people in a very broad, egalitarian manner. It doesn't seem to confront any State or Federal Constitutional issues, and the benefits are not taxable. Restricting the grant to capital projects and to renewable energy, however, would deny its benefits to exactly those people who need State relief most desperately --- residents of isolated bush communities who have no alternative to diesel power for the forseeable future.

The grant principal should, rather, be eligible for use on new capital investments either on hydro and other renewable energy or on conservation. Utilities, communities, or isolated groups that had no immediate prospect for such investments, however, could be allowed to invest their grant money, and to use only its earnings for fuel or other operating costs.

The earnings on the subsidy, whether invested in generating equipment or securities, should not be used to reduce rates per kilowatt-hour --- particularly in thermal-powered systems. Such a unit-price subsidy encourages people to consume more electricity than they otherwise would because they don't have pay its full cost. Rather, utilities should be required to distribute the subsidy benefits in the form of a flat monthly credit per customer. (Say, $10 per month less on each bill, rather than 4 cents less per kilowatt-hour.)

3. Popular vote. According to Alaska's Constitution, a general obligation bond issue requires a vote of the people, but any legislation authorizing or appropriating funds for direct State loans could easily provide for a referendum, either for the program as a whole or for each project.

You have made a strong case for a popular vote where the wealth of all Alaskans would be used to subsidize power projects that benefit only a part of the population. If the State's power financing program is designed (as we have proposed) so that the ratepayers reimburse the State at market rates for any money it lends, and for any financial risks it bears, the case for a vote is less compelling.

Which kind of vote to require, however, is a real dilemma under either type of program: a project-by-project referendum invites citizens to vote only for the projects in their own region, and against all the others. A referendum that encompasses projects in all part of the State, is almost certain to pass and to carry along with it poorly-selected as well as deserving projects. I don't know the way out of this dilemma.

APPENDIX A

Cash-flow comparison of loan-guarantee plus rate relief fund and State subordinated loans.

Explanation of table. The table on page 8 compares otherwise equivalent plans for reducing initial electricity rates from a new hydroelectric project. For simplicity, only post-construction debt is considered. The initial debt figure of $18.154 million was chosen because it results in a levelized annual debt service of $2 million over 25 years at 10 percent.

Guaranteed loans plus rate relief fund. In the financing plan that uses a guaranteed loan plus a rate relief fund, the utility sells $18.154 million in level debt-service 25-year serial bonds at an effective rate of 10 percent. [The January 8, 1981 yield on 30-year AA electric revenue bonds wasa 10.00 percent; the yield on medium-grade 30-year G.O. bonds was 10.20 percent, and on prime 30-year G.O. bonds 9.40 percent.]

The rate relief fund lends the utility just enough to cover the revenue deficiency shown in column 3 for years 1 through 9. The fund then recovers these loans plus 12-percent interest [reflecting the greater financial risk of these loans compared to the senior bonds] from the utility's surplus revenues in years 10 through 25.

Starting with a $1 million first-year debt-service requirement, rather than $2 million, load growth and inflation together will safely support a revenue increase at 8.522 percent per year without increases in real rates per kilowatt-hour. This is the rate of escalation needed to pay off the same $18.154 million debt in just 25 years with the assistance of the rate relief fund.

A rate relief fund of $3.467 million, invested in U.S. Treasury issues of the maturities shown in column 5, and the [January 8] yields shown in column 6, would allow the interest earnings and retirement of bonds at maturity to cover the revenue deficits shown in column 3. The rate relief fund would earn a discounted cash-flow (DCF) rate of return on its investments in U.S. Treasury certificates of 12.69 percent, and the combination of these investments and the loan to the State would yield a DCF return of 12.13 percent on the original $3.647 million over the 25-year term of the loan.

Direct State loans. In the alternative financing plan, conventional level debt-service revenue bonds at 10 percent provide $9.077 million, half of the total (post-construction) capital at 10 percent interest, requiring $1 million in annual revenues for 25 years. The other $9.077 is a subordinated loan from the State.

The revenue and rate profiles are shown in column (1) --- the same as for the guaranteed loan and rate relief fund. The State thus receives debt service on the schedule shown in column 8. Because this example was designed to result in the same electric rates as in the first example, the DCF rate of return to the State on its loan is somewhat less, 10.93 percent, than the 12.13 percent it would earn on the smaller appropriation to the rate relief fund.

Interest cost comparison. There is no unambiguous measure of the relative cost to the State (or, under other assumptions, the ratepayers) from investing $3.467 million in the rate relief fund at an effective rate of 12.69 percent and relending the proceeds to a utility at 12 percent for an overall yield of 12.13 percent, and lending $9.077 million directly to the utility at a return of 10.93 percent.

The annual difference between the State's year-10 to 25 debt-service receipts in column 3 and the year-1 to 25 debt-service receipts in column 8, has a year-0 present value of $1.06 million at a discount rate of $12.13 percent. This $1.06 million is 5.9 percent of the $18.2 million project cost, and 4.9 percent of the $21.6 total debt under the guarantee plan. If fully passed through to the ratepayers in equal percentage rate reductions over the life of the project, the additional earnings would reduce electricity costs by only 4.7 percent.

The loss of arbitrage earnings with a present value of $1.06 is more impressive, however, if it is measured against the value of a $9.077 million subordinated loan. By one way of reckoning, at least, the State would lose 11.7 percent of the value of its investment by passing up the opportunity to invest its funds in one, high-interest securities market and to borrow in another, lower-interest market. Even so, I do not believe that the potential gain is worth the added complexity and the risks described elsewhere in this paper.

Beating the market? At least one staff member of the Governor's staff has argued that calculations like the foregoing are misleading, because the State can invest the rate relief fund and its general fund balances in taxable industrial bonds, for example, at considerably better yields than for U.S. Treasury bonds.

On first impression this is the case. While 20-year U.S. bonds earned 12.20 percent during the first week of January, and 30-year bonds 11.88 percent, long-term AAA utility bonds had yields from 11.31 to 14.00 percent, and long-term A utilities earned 13.33 to 15.00. Yields on long term AAA industrial bonds were 11.98 to 12.50 percent, and A industrials earned 12.87 to 13.50 percent.

These interest rate spreads are not in fact terribly impressive. It is a truism, however, that the State can always find higher-interest rate investments than government bonds. It does not follow, however, that the State can actually expect to earn a higher rate of return over the long run than the rate on government bonds. That supposition ignores the reason that industrial and private utility bonds have higher market rates of interest than U.S. governments.

The spread in rates between different securities of the same term reflects the consensus of investors regarding the risk of loss. In principle the interest premiums for private utility and industrial bonds over risk-free investments like U.S. Treasury debt should, over the long run and given a sufficiently diversified portfolio, just offset the inevitable losses of interest and/or principal. Just consider, what were the ratings of Chrysler, Penn Central, Equity Funding, and the City of New York, ten years ago? How has their fate affected the earnings of diversified investment portfolios over that period?

COMPARISON OF

LOAN GUARANTEE PLUS RATE RELIEF FUND (Lehr)

vs.

STATE SUBORDINATED LOANS (APA-Tussing)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
		GUARANTEED LOANS PLUS RATE RELIEF FUND					DIRECT STATE LOANS	
		Debt		Rate Relief Fund ($3.467 m, 12%)			Debt	Debt
Year	Utility Revenue (Increases 8.52% p.a.)	Service, $18.154m 10% Revenue Bonds (10%)	Revenue Deficit (Surplus) (2)-(1)	Interest on U.S. Securities	Maturing Securities Amount (3)-(4)	Yield (%)	Service $9.077m 10% Revenue Bonds	Service $9.077m State 12% Loan (1)-(7)
1	1.00	2.00	1.00	.45	.55	13.95%	1.00	.00
2	1.09	2.00	.91	.37	.54	13.06	1.00	.09
3	1.18	2.00	.82	.30	.53	12.82	1.00	.18
4	1.28	2.00	.72	.23	.49	12.71	1.00	.28
5	1.39	2.00	.61	.17	.44	12.60	1.00	.39
6	1.51	2.00	.49	.12	.37	12.51	1.00	.51
7	1.63	2.00	.37	.07	.30	12.48	1.00	.63
8	1.77	2.00	.23	.03	.20	12.39	1.00	.77
9	1.92	2.00	.08	.01	.07	12.36	1.00	.92
10	2.09	2.00	(.09)				1.00	1.09
11	2.27	2.00	(.27)				1.00	1.27
12	2.46	2.00	(.46)				1.00	1.46
13	2.67	2.00	(.67)				1.00	1.67
14	2.90	2.00	(.90)				1.00	1.90
15	3.14	2.00	(1.14)				1.00	2.14
16	3.41	2.00	(1.41)				1.00	2.41
17	3.70	2.00	(1.70)				1.00	2.70
18	4.02	2.00	(2.02)				1.00	3.02
19	4.36	2.00	(2.36)				1.00	3.36
20	4.73	2.00	(2.73)				1.00	3.73
21	5.13	2.00	(3.13)				1.00	4.13
22	5.57	2.00	(3.57)				1.00	4.57
23	6.04	2.00	(4.04)				1.00	5.04
24	6.56	2.00	(4.56)				1.00	5.56
25	7.12	2.00	(5.12)				1.00	6.12
Net earnings (DCF)			12.13%			12.69%		10.93%

APPENDIX B

Why bonds with a double guarantee may be hard to market.

My November financing proposal and Ron Lehr's January proposal both contemplated bonds with "double-barreled security --- "revenue bonds" whose primary source of repayment is project revenue, backstopped by some kind of State loan guarantee. One purpose of the guarantee would be as a substitute for the excess-coverage indenture covenant that is customarily attached to revenue bonds. Under the financing philosophy shared by both approaches discussed in this memorandum, guarantees would be necessary only in the early years of a project's life, before inflation and load growth raised the acceptable level of utility revenues enough that it would easily cover conventionally-scheduled debt-service. The guarantee would thus be irrelevant in the the project's later years.

That, anyway, is the logic of the plan. Why, therefore, should the market treat these bonds strictly as general obligation bonds, ignoring their first source of repayment, just because the "full faith and credit of" State is pledged to them --- even in those circumstances where G.O. bonds are regarded as more risky than comparable revenue bonds? [There is practically no difference in yield between medium-grade revenue and G.O. bonds, but a sound utility is always a better risk than a fiscally unsound government.]

Why, moreover, should the double-barreled bond be considered a G.O. bond, and thus harder to market than revenue bonds, particularly for terms longer than 20 years, when it is in the long-term in which project revenues are most secure?

Nine sober men. The seemingly irrational propositions described here do in fact control the capital market, as far as I can determine. I have conferred on this matter recently with investment specialists at Bank of America, Bache Halsey, Goldman Sachs, Metropolitan Life, Sun Life, and Salomon Brothers, and two bond counselors who do not wish to be identified (perhaps so their colleagues or clients won't find out they are giving free advice). Their response was nearly unanimous in general outline, and unanimously dogmatic:

For example, a revenue bond is a revenue bond is a revenue bond, I was told forcefully, and a G.O. bond is a G.O. bond is a G.O. bond, and there is nothing in between. A supplementary source of debt service for a revenue bond is, I am told forcefully, disregarded unless that source of income is the full faith and credit of the sponsor, and then it is a G.O. bond; any other revenue source is disregarded.

None of my individual conferees could give a coherent explanation of these apparently irrational traits. In my judgment, this situation called for employment of the "nine sober men" test: There is a Russian proverb that says, "When nine sober men say you are drunk, you better lie down." Near-unanimity must have a reason. While none of my informants had a clear, coherent explanation, I have inferred the market's ruling principles from the group as a whole.

The capital market abhors innovation. The most important investment features of industrial, municipal, and other bonds include their easily ascertainable market value at all times, their marketability, and hence their liquidity. Investors, trustees, auditors, readers of annual statements, and the like want to know whether a bond is non-recourse (revenue) or fully backed by its sponsor (general obligation), its coupon and term, and its rating by Moodys and/or Standard & Poor's. Most buyers or holders don't need or want to know anything more.

Investors don't want personally to read through official statements, or pay their own lawyers to interpret indentures. They don't want to establish new categories in their portfolio schedules, or new chapters in the Bond Buyers Handbook Even more importantly, they know that the next buyer probably doesn't want any of these things either: The liquidity and efficiency of the market for debt depends upon standardization, and they typical investor is not necessarily being irrational to shun bond issues with gimmicks, fine print and footnotes. One corollary of the market's abhorrence of innovation is ---

Revenue bonds are revenue bonds, G.O. bonds are G.O. bonds, and never the twain shall meet. If a bond has two sources of payment, the market will probably take it for granted that the first is significantly less reliable than the other. If Alaska guarantees its revenue bonds, people will assume that the bonds are backstopped only because project revenue can't be counted on.

We may be aware that Alaska's government is exceptionally creditworthy for at least ten years, while the proposed hydro projects get financially sounder as time goes on. But most institutional investors won't understand it --- they may well shun 30-year Alaska G.O. bonds, because who knows what's going to happen to the State's economy after 1987. Ironcially, the same investors might readily buy exactly the same securities on longer terms and at comparable repayment schedules, if they were repackaged as non-recourse (revenue) debt.

GOVERNOR'S PROPOSAL

for

FINANCING

of

POWER PROJECTS

2-5-81

I. Introduction

This paper provides a brief overview of a proposed method for financing power projects. The approach consists of three separate but interrelated parts. The entire program is based upon the premise that the State of Alaska will act to encourage power development, particularly that based on renewable power sources; and, that the purpose of this involvement is to provide lower power costs to the final consumers. The two underlying assumptions that form the foundation for this approach are:

(1) that State subsidies for power projects should be explicit and equitable; and

(2) that for the portion of power projects that are to be financed with revenue bonds, the State's involvement should be designed to minimize the cost of this source of financing, both to the State and to the project.

The three parts of the financing proposal are: a state funded equity grant; a state loan to restructure debt service; and a state funded project contingency completion fund. These are each explained briefly below.

II. State Equity Grant

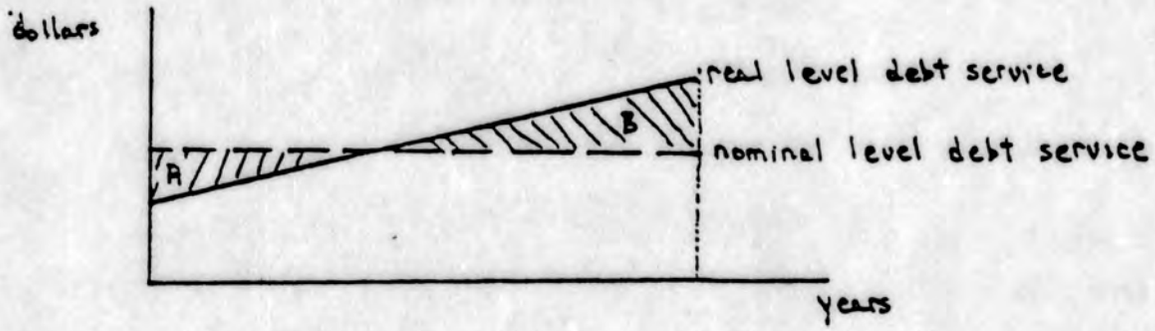
The intent of the State Equity Grant is to provide an equitable subsidy, in the form of an equity grant, to help finance power projects, and thus to provide lower cost power. The grant is based upon a fixed amount per capita for the entire population of the service area of the project. The grant would be of a one-time only nature, in that once an area had utilized its total entitlement under this program, it would not be eligible for future equity grants. In the case of projects which provide power for more than one service area, the amount of the grant would be prorated, based on the power allocation and the populations of the areas involved. The Governor and the Legislature would be the final arbiters of the proper proration formula.

The amount of the grant would be $2,000.00 per capita in 1981 dollars, with the nominal value increasing at the rate of the Alaska consumer price index increase. An appropriation would be made to capitalize this grant fund, and the grant appropriations for specific projects would be made by the Legislature from this fund. Although this grant would be used by a utility (or the Alaska Power Authority) as one source of fundes for financing power projects, it would not become part of the utility's rate base.

III. Debt Restructuring Program

The intent of the Debt Restructuring Program is to approximately levelize revenue bond debt in real (constant dollar) terms, rather than in nominal terms. This restructuring should: (1) help increase the financial viability of power projects by lowering revenue requirements in the early years of the project; and (2) more equitably spread out the repayment burden by requiring future consumers of power to pay a more equal share, in real terms, relative to present rate payers.

This debt restructuring would be accomplished by providing a state loan for the project that could be used to pay for a portion of the revenue bond debt service in the early years of the project. This loan would be repaid in future years, when the project is more capable of generating additional revenues. This loan has the effect of 'tilting' the amount that the project must pay, lowering the required amount at first, and increasing it later, as is shown in the figure below.



The dashed line shows a level debt service in nominal terms - that is, a constant payment amount each year, such as on State G.O. Bonds. The solid line shows the 'tilting' affect of debt service in real terms - i.e., when inflation is taken into account. Under this debt restructuring program, the project would issue revenue bonds according to the dashed line (since this is the conventional method), however the State loan would pay the amount of debt service shown in area A (and be repaid in area B). Hence, from the viewpoint of the project, its true debt service requirements are shown by the solid line, not the dashed line.

Although there are additional technical details that will not be addressed in this paper, two specific details are pertinent to this discussion. First, the rate of interest on the State loan would be the same as the revenue bond rate. And second, although the figure shows the state loan to be paid off at the same time as the revenue bonds, there is no requirement for this to be the case. The State loan could be extended past the completion date of the revenue bonds, if that was appropriate.

IV. Power Project Completion Fund

The intent of this fund is to provide an immediate source of funds to: (1) complete eligible power projects that are under construction, and (2) make debt service payments for eligible projects that are unable to make payments because of a natural disaster.

Even though power project financing inevitably includes contingencies for possible cost overruns, it is still possible that unforseen circumstances could create a situation where these contingency funds are exhausted and the project does not have enough funds for completion. The project then needs an immediate source of funds, but is in rather undersirable circumstances to utilize conventional financing mechanisms, such as the revenue bond market.

To deal with this potential need, a Power Project Completion Fund would be established and capitalized by an appropriation from the general fund. This fund would be created in the Alaska Power Authority and the non-loaned balance would be managed by the Department of Revenue. If a power project had an overrun such that it needed additional funds, it could apply to the A.P.A. for a loan from this fund. If the A.P.A. found that the project was elgible for a loan, then, with the Governor's approval, a loan, not to exceed 20% of the original estimate of the construction cost, could be made. The rate of interest on this loan would be equal to the revenue bond rate for the project.

Within five years of the date of the loan, the A.P.A. would issue revenue bonds for the amount of the loan, and these bonds would become additional revenue bond debt of the project. This new revenue bond debt would be eligible for debt restructuring, as explained in III above.

POWER PROJECT

FINANCING

Additional Detail

2-5-81

I. Power Project Equity Fund

A. Purpose

The purpose of the Power Project Equity Fund (PPEF) is to lower the cost of power to consumers. This is accomplished by providing a state grant for eligible projects that may be used as a equity share of the project.

B. Establishment and Management

The Power Project Equity Fund would be established in the APA. The fund would be capitalized by an appropriation from the general fund and could be added to by additional general fund appropriations. The fund would be managed by the Department of Revenue. Interest on investments of the fund would return to the fund.

C. Calculations

The PPEF is intended to provide an equity grant of $2,000.00 per capita in 1981 dollars to eligible projects. The equity grant is to be of a "one time" only nature in that once an area's population has utilized all of their per capita allocation, they would not be eligible for future grants under this program. The amount of the grant is calculated as $2,000.00 per capita in 1981 dollars for the population of the service area of the project . The population figure is based upon the latest available U.S. census figures. Each year the amount of the per capita grant will escalate at the rate of the Alaska Consumer price index increase. In the case of projects where the power production of the project will be utilized in more than one service area, the amount of the per capita subsidy is to be prorated according the estimated amount of the population of each service area to be served by the project. That is, assume a project is built by utility A, but a portion

of the power is sold to utility B. If the power from this project will provide 50% of the power for the service area of utility B, then 50% of the per capita subsidy for service area B may be applied in calculating the grant to be made for the project from the PPEF. The APA is to work with local governments and utilities to determine the proper proration formula for intertied projects. The final arbiters of all disputes will be the Governor and the Legislature, as evidenced by the size of the appropriation from the PPEF.

D. Appropriations

As part of a project's plan of finance, the APA will calculate the amount of the equity grant from the PPEF. This appropriation request will be submitted along with any other requests for the project in the APA's capital budget request. If approved by the Governor and Legislature, the amount of the equity grant will be appropriated from the PPEF to the APA for use for that project.

E. Uses

The equity grant can be used as one source of financing for construction of power projects. These funds are to be a grant to the utility via the APA, and the amount of the grant would not become part of the utility's rate base.

II. Debt Restructuring Program

A. Purpose

The purpose of the Debt Restructuring Program is to approximately levelize revenue bond debt in real (constant dollar) terms, rather than in nominal terms. This restructuring should:

1. help increase the financial viability of power projects by lowering revenue requirements in the early years of the project,

2. more equitably spread out the repayment burden by requiring future users to pay a more equal real share, as opposed to requiring present rate payers to fund a disproportionate share of the project.

B. Eligibility

Certain projects may qualify for the debt restructuring program. To be eligible, a project:

1. must issue a revenue bond through the APA,

2. must be based on a renewable power source (e.g. hydro, wind, geothermal), unless there is no viable renewable power source available, in which case thermal generation projects would qualify.

C. Plan of Finance

While preparing a feasibility study and plan of finance for a power project, the APA will determine if a project is eligible for the debt restructuring program. If a project is eligible, then as part of the plan of finance, the APA will calculate the amount of appropriation needed to restructure the revenue bond

debt of the project by the method in D. (below), and further will calculate the terms of the loan made by the state to restructure the revenue bond debt.

D. Debt Restructuring Appropriation (D.R.A.)

The Debt Restructuring Appropriation (D.R.A.) is the mechanism that attempts to approximately levelize revenue bond debt in real (constant dollar) terms, rather than in nominal terms. The amount of the D.R.A. is dependent upon the size of the revenue bond, the rate of interest charged by the state, the assumed long run rate of inflation, and the length of the loan. To calculate the D.R.A., the APA must:

1. estimate the size of the revenue bond issue,

2. estimate what the rate of interest will be on the revenue bond issue - this is the rate of interest the state will charge on its loan,

3. obtain from the Division of Budget and Management the estimated long run rate of inflation for the period to be covered by the revenue bond issue (here assumed to be 5%),

4. assume for calculation of the D.R.A. only that the length of the state restructuring loan is the same length as that of the revenue bond issue (the actual loan may have a different length).

From the above factors, a preliminary value of the D.R.A. can be calculated. However, since many of these factors are estimates, which may change by the time of the actual bond issue, a contingency factor may be added to the D.R.A. To estimate this contingency factor, the APA would utilize the same factors as above, except that the calculation would involve using larger

estimated rate of interest on the revenue bond rate. This larger estimated bond rate will be provided by the Division of Budget and Management. With the inclusion of this contingency factor, the estimate of the D.R.A. is complete. This is the figure which the APA would submit in their Capital Budget as the amount needed to restructure the revenue bond debt for the specific project. If this amount (and other necessary authorizations) are approved by the Governor and the Legislature, then the entire D.R.A. would be restricted, pending the results of the revenue bond sale. Once the bonds are sold and the actual amount that is needed is determined, then this required amount would be made available to the APA. The remainder (if any) of the D.R.A. would lapse into the general fund.

E. State Loan

The amount and terms of the D.R.A. are calculated by the formula in D. (above). The actual terms of the state loan represented by the D.R.A. may differ if the APA feels other loan terms may be more conducive to the project's viability. However, the present value of the loans repayment (using the rate of interest on the revenue bond as the discount rate) under alternative loan terms must be the same as the D.R.A. The APA should consult with the Division of Budget and Management if it wishes to adopt loan terms different from those of the D.R.A. calculations. Repayment of the state's restructuring loan is to be subordinate to repayment of the revenue bonds.

III Power Project Completion Fund

A. Purpose

The purpose of the fund is to provide an immediate source of funds to:

1. complete eligible power projects that ~~are under construc-~~ tion which have exhausted all contingency funds

2. make debt service payments for eligible projects that are unable to make payments because of a natural disaster.

B. Establishment and Management

A power project completion fund (PPCF) would be established in the APA. The fund would initially be capitalized by an appropriation from the general fund, and could be added to by additional general fund appropriations. The account would be managed by the Department of Revenue and all interest earned would be deposited in the general fund.

C. Mechanics

If an eligible power project were in need of funds due to the reasons listed in A. (above), then it could apply to the APA for a loan of the required amount. The APA would specify by regulation what information would be required in the loan application. If the APA determines that the project is eligible for a loan from the PPCF, then the APA would provide this request to the Governor, along with backup information detailing the basis for the APA recommendation. If the Governor approves, the APA would make the loan to the project. The terms of the loan are:

1. The amount of the loan may not be more than 20% than the original estimate of the project cost.

2. The rate of interest on the loan shall be the same rate as the rate of the APA issued revenue bond rates for the project.

3. If the project was not financed with APA issued revenue bonds, then the rate of interest charged would be that rate which the APA estimates would have been the revenue bond rate for that project.

4. Within five years of the issuance of the loan, the APA must sell a revenue bond issue for the amount of the loan. The proceeds of the bond issue would be redeposited in the PPCF. The new debt of the power project (if eligible) could be financed according to the same terms as it was financed under the Debt Restructuring Program. If the project was not originally financed under the Debt Restructuring Program, but is eligible, then this new debt may be financed under that program.

1/16/81 ATassig PP Financing

Re: hydro financing problems

lending - at market rates
full recovery

Greenlake - subordinated loan + rev. bonds

APA agrees - no subsidy - state $ should be repaid - risks paid for
market principle simulation provides defenses
against overbuilding, etc.
Decision moved to community, ratepayers, etc on size

(Bush - welfare, not utility problem)

50% maximum on state assistance - guarantees or loans - should apply to budgeted capital costs and not overruns

problems with full guarantee coverage - no incentive to hold down costs
predatory (e.g. unions, poor management, etc.

Bank of Am wanted GO bonds - lower interest rates
but avg diff. between is virtually nil
real reason - Comm. banks can only underwrite GO or not revenue

E Wahlfeld will draft legislation

Conclusion - B. of Am resurrected old scheme

are the people of the community willing to pay more for power to have a large public works project?

State will allow deferment
to have rates be as low as possible

Mun. utilities - have flexibility
PUC - reasonable cost

Great danger in putting future income at risk -
uncertainty of economy

Cash sink - sub. loans put income back

PF - consent that PF should not be used
diversification

AT mean / HL mean

Energy policy 1/23 Henry Lee

Thorndike Sound Stage

Dir of Mass state energy office, Harvard

Intern program - for graduate students "project intern program"

most master's candidates

some JD, PhD candidates

work on specific project over summer, ret. to school in the fall

signed contracts to provide finished product

fails if sponsor doesn't know what they want

⇒ Energy Center?

School can get overly theoretical

projects are policy-orientated

What should they work on from the national perspective

Ratepayers or taxpayers

pay for oversizing of hydro projects

(eg low load factor) (eg Quebec desperate to export power)

---

emerging technologies - low BTU coal gasification - for Energy center

ngas-based fuel cells

very efficient use of gas

Gas Research Institute - Chicago

EPRI

Palo Alto

Jim Ornery

TVA - Freeman

United Techn.

Distributive benefits

PUC's
Siting Commission

utilities submit long-term plan
various state agencies + localities intervene

forces planned projects + justifications into public forum

SB 25,26,41

Introduced: 3/10/81
Referred: Resources and Finance

IN THE HOUSE

BY THE RULES COMMITTEE BY REQUEST OF THE GOVERNOR

HOUSE BILL NO. 310

IN THE LEGISLATURE OF THE STATE OF ALASKA

TWELFTH LEGISLATURE - FIRST SESSION

A BILL

For an Act entitled: "An Act relating to power development financing."

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

* Section 1. AS 44.83 is amended by adding new sections to read:

Sec. 44.83.172. POWER PROJECT EQUITY FUND. (a) There is established in the general fund the power project equity fund which is separate from any other money or funds.

(b) The equity fund consists of money appropriated by the legislature and interest earned from investment of money in the equity fund. The commissioner of revenue shall invest any surplus in the equity fund in the manner specified in AS 37.10.070.

(c) If the legislature approves a project as provided in AS 44.-83.185 and makes an appropriation from the equity fund for the project, the authority shall make a grant to a qualified utility. A qualified utility may receive more than one grant under this section. However, all grants received by a qualified utility under this section may not exceed $2,500 for each person residing in the service area of the project. The authority shall determine the population of the service area of a project based on the latest census prepared by the United States Census Bureau. If the power produced by a project will be sold to more than one qualified utility, the authority shall prorate the amount of a grant according to the percentage of use of the power by each qualified utility served by the project. The authority shall consult with the appropriate municipalities and utilities before it prorates a grant under this subsection if projects are interconnected.

(d) A qualified utility may only use a grant under this section to finance capital improvements for power generation or distribution systems. A grant under this section may not be used to pay the cost of operating, maintaining, or purchasing fuel for a project. A grant under this section may not be included in the rate base for a qualified utility regulated under AS 42.05. A utility which is not regulated under AS 42.05 must set rates under procedures and by standards established by contract between the authority and the owner of the project. The rates established by an unregulated utility must be reasonable and include adequate consideration of the state assistance provided under this chapter.

(e) In this section,

(1) "project" means a plant, facility, works, or system which produces power from renewable sources or fossil fuels if the feasibility study establishes that a renewable source for the production of power is not economically feasible;

(2) "qualified utility" means

(A) a utility as defined in AS 42.05.701(2)(A) including a utility exempted under AS 42.05.711;

(B) a nonprofit organization determined by the authority to be capable of operating and maintaining a project of the size and type for the community or region served by the project;

(C) the authority if it owns the project; and

(3) "service area" means

(A) the area to which electric power can reasonably be distributed to customers;

(B) if no distribution system exists, the area of the municipality served by the electric power;

(C) if the project will not provide electric power to a

municipality, the area which can be economically served by the project.

(f) The dollar amount in (c) of this section changes, according to annual changes in the consumer price index for the state compiled by the Bureau of Labor Statistics, United States Department of Labor. The index for November 1980 is the reference base index. If the index is revised, the change is calculated on the basis of the revised index. The change takes effect 30 days after the index for November of each year is published

(g) Before a project which produces 1.5 megawatts of power or less may receive a grant under this section:

(1) the authority shall make a feasibility study which includes the information required by AS 44.83.181(b)(1) -- (3) to determine if the project is economically feasible; and

(2) the division of budget and management, Office of the Governor, shall review the feasibility study for compliance with (1) of this subsection and submit a report of its findings to the governor.

Sec. 44.83.174. DEBT ASSISTANCE. (a) In the plan of finance required by AS 44.83.181, the authority shall

(1) estimate the annual debt service of bonds to be issued for the project, including an estimate of the amount financed, interest rate, and term of bonds;

(2) obtain an estimate from the division of budget and management, Office of the Governor, of the long-term rate of inflation during the term of the bonds; and

(3) using (1) and (2) of this subsection, the authority shall estimate the amount of money needed by the owner of a project to pay the difference between the debt service which would be paid to bond holders and that debt service adjusted according to constant dollar terms.

(b) If requested by the division of budget and management, Office of the Governor, the authority shall prepare an alternate to the estimate of the amount determined in (a)(3) of this section. The estimate must be based on the annual debt service of the project calculated on the basis of a rate of interest provided by the division of budget and management.

Sec. 44.83.175. DEBT ASSISTANCE LOANS. (a) The authority shall establish a separate account for each project for which an appropriation is made by the legislature for a debt assistance loan. The authority shall make loans from the account to the owner of a project so that the payment of debt service made by the owner of the project on bonds is level in constant dollar terms. The authority may increase or decrease the amount of the loan to reflect the terms established at the sale of bonds if those terms are different from those used to make the estimates required in AS 44.83.174(a). If the appropriation made for debt assistance for a project exceeds the payments made under this subsection, the excess lapses into the general fund.

(b) The authority shall set the terms for repayment of the loan after consulting with the division of budget and management, Office of the Governor. The rate of interest set for repayment of the loan is the same as the rate of interest set for the bonds issued for the project.

(c) The authority shall pay any money received in repayment of a loan under this section to the commissioner of revenue for deposit in the general fund.

Sec. 44.83.176. POWER PROJECT COMPLETION LOAN FUND. (a) There is established the power project completion loan fund. This loan fund consists of appropriations from the legislature and payments of principal and interest on loans made from the loan fund. The commissioner of

revenue may invest any surplus in the loan fund. Interest earned on investments made by the commissioner of revenue shall be deposited in the general fund.

(b) The purpose of the loan fund is to provide financing for a project if

(1) the cost of completing the project exceeds the money available for the project for a reason established by regulations adopted by the authority under (f) of this section; or

(2) the project is unable to pay the cost of redeeming bonds issued for the project because of a natural disaster which impairs the ability of the project to earn enough revenue to redeem the bonds as they become due.

(c) Subject to appropriations for this purpose, the authority shall determine the amount to be loaned for a project and, if the governor approves, may make a loan from the loan fund.

(d) The terms for a loan under (b)(1) of this section are as follows:

(1) the rate of interest is the same rate set for the bonds of the authority issued for the project;

(2) for a project which is not financed by bonds of the authority, the rate of interest is the average weekly rate of interest reported in the Weekly Bond Buyer for municipal revenue bonds for the 12 months preceding the loan application;

(3) the amount loaned may not exceed more than 20 percent of the original estimate of the cost of constructing the project other than the cost of debt service to redeem the bonds first issued for the project; and

(4) the owner of the project shall agree to repay a loan made under this section by the issuance of additional bonds or another

method of financing within five years after the loan is made.

(e) The terms for a loan under (b)(2) of this section are as follows:

(1) the amount loaned may not exceed the debt service on bonds issued for the project for one year after the natural disaster and other expenses of the project which are determined necessary by the authority; and

(2) the rate of interest on the loan is the same rate set for the bonds issued to finance the project.

(f) The authority shall adopt regulations under AS 44.62 which prescribe the circumstances under which a project qualifies for a project completion loan under (b)(1) of this section. These regulations shall establish procedures for

(1) determining the costs of a project for which a loan may be made under this section; and

(2) audits which will avoid unexpected costs.

(g) The owner of a project for which bonds of the authority are issued for a purpose set out in (b) of this section is eligible for a debt assistance loan under AS 44.83.174.

* Sec. 2. AS 44.83.181(c)(3) is amended to read:

(3) an appropriation from the <u>power project equity</u> [GENERAL] fund

[(A) TO PAY DEBT SERVICE ON BONDS OR FOR OTHER PROJECT PURPOSES; OR

(B)] to reduce the amount of debt financing for the project;

* Sec. 3. AS 44.83.181(c)(4) is amended to read:

(4) a <u>debt assistance</u> loan <u>under AS 44.83.175</u> [FROM THE GENERAL FUND];

* Sec. 4. AS 44.83.181(c)(7) is amended to read:

(7) a loan from [THE POWER PROJECT FUND (AS 44.83.170(a)), OR FROM] the renewable resources investment fund (AS 37.11.050); or

* Sec. 5. AS 44.83.185(a) is amended to read:

(a) The authority shall submit a feasibility study and plan of finance for a proposed new project to the legislature. When the report of the division of budget and management [EXAMINING THE FEASIBILITY STUDY AND PLAN OF FINANCE] is completed as required by AS 44.83.183 or 44.83.172(g), it shall be submitted to the legislature.

* Sec. 6. AS 44.83.185(c) is amended to read:

(c) Before a project may be constructed, the [THE] legislature shall consider and must approve the [ALL] proposed new project. However, approval by the legislature is not required if the new project is exempt under AS 44.83.187 and the owner of the project has not applied for an equity grant under AS 44.83.172 [PROJECTS EXCEPT PROPOSED NEW PROJECTS THAT ARE EXEMPT UNDER AS 44.83.187]. The legislature may approve a proposed new project only by making an appropriation for [ENACTING LAW AUTHORIZING] that project.

* Sec. 7. AS 44.83.187(a)(1) is amended to read:

(1) requires an appropriation from the state general fund, from the power project equity fund, or from the renewable resources funds; or

* Sec. 8. (a) A qualified utility which receives a power project equity grant under AS 44.83.172 contained in sec. 1 of this Act for a project which is financed by a loan set out in (b) of this section shall first apply the power project equity grant to repay the unpaid principal and accrued interest on the loans set out in (b) of this section. However, for the purposes of this section, the unpaid principal and interest on loans set out in (b) of this section do not include the cost of a reconnaissance study financed

by ch. 54 SLA 1980. The cost of those reconnaissance studies are considered a grant from the state. If a balance remains on a loan set out in (b) of this section after a power project equity grant is applied to the loan, the qualified utility may include the debt service on the remaining balance of the loan to determine the amount of a debt assistance loan under AS 44.83.175 contained in sec. 1 of this Act. The rate of interest on the debt assistance loan under this section is the same rate set for the appropriate water resources or power project loan to which the debt assistance loan applies.

(b) This section applies to the following qualified utilities for the projects and loans set out after each:

(1) loans from the water resources revolving loan fund:

Qualified Utility	Project	Beginning Balance
Sitka	Green Lake	$ 450,000
Petersburg	Lake Tyee	910,000
Kodiak Electric	Terror Lake	420,000
Ketchikan Public Utilities	Swan Lake	420,000
Alaska Power Authority	Lake Tyee	300,000

(2) loans from the power project fund:

Qualified Utility	Project	Beginning Balance
Alaska Electric Light & Power	Annex Creek	$ 500,000
Kodiak Electric	Terror Lake	100,000
Ketchikan Public Utility	Swan Lake	200,000
Ketchikan Public Utility	Swan Lake	135,000
Alaska Power Authority	Lake Tyee	120,000
Ketchikan Public Utility	Swan Lake	3,115,000
Kodiak Electric	Terror Lake	2,000,000
Kodiak Electric	Mennonite Creek	90,000
Alaska Power Authority	Lake Tyee	60,000
Wrangell	Small hydro project	45,000

Port Lyons	Small hydro project	200,000
Kodiak Electric	Terror Lake	1,050,000
Ketchikan Public Utility	Swan Lake	18,000,000
City of King Cove	Diesel generator	200,000
City of Akutan	Feasibility study for small hydro project	1,100,000
Iliamna - Newhalen	Diesel generator	300,000
Alaska Electric Light & Power	Transmission line	1,000,000
Alaska Electric Light & Power	Salmon Creek	200,000

(3) loans from the Department of Revenue:

Qualified Utility	Project	Beginning Balance
Sitka	Green Lake (ch. 111, SLA 1978)	$7,000,000
Sitka	Green Lake (ch. 52, SLA 1977)	1,600,000

* Sec. 9. The maximum amount specified for power project equity grants in AS 44.83.172(c) contained in sec. 1 of this Act, does not apply to a project for which the Alaska Power Authority has started but not completed a feasibility study before the effective date of this Act. For those projects, the power project equity grants may not exceed $2,500 for each person residing in the service area of the project less the amount of state money used to finance the feasibility study. However, the cost of a reconnaissance study financed by an appropriation made in ch. 54 SLA 1980 is not included in the cost of a feasibility study for the purposes of this section.

* Sec. 10. AS 44.83.170 is repealed.

ALASKA POWER AUTHORITY

333 WEST 4th AVENUE - SUITE 31 - ANCHORAGE, ALASKA 99501

Phone: (907) 277-7641
(907) 276-2715

March 6, 1981

TO: ALL RECIPIENTS OF NOTICE OF PROPOSED CHANGES IN THE REGULATIONS OF THE ALASKA POWER AUTHORITY

Enclosed for your information is a copy of Notice of Proposed Changes in the Regulations of the Alaska Power Authority dated March 5, 1981

This Notice differs from the Alaska Power Authority's earlier notice of these changes, dated December 17, 1980, only by the addition of a statement that adoption of the proposed changes is not expected to require an increased appropriation and in that the period for public comment now closes on March 23, 1980. We have also taken the opportunity to change all references to the Alaska Power Authority Act from AS 44.56 to AS 44.83 to conform with action taken recently by the Revisor of Statutes.

Thank you for your consideration of the proposed changes to the Alaska Power Authority regulations.

Sincerely,

Eric P. Yould

Eric P. Yould
Executive Director

Enclosure:
as noted

S T A T E O F A L A S K A

NOTICE OF PROPOSED
CHANGES IN THE REGULATIONS
OF THE
ALASKA POWER AUTHORITY

NOTICE IS HEREBY GIVEN that the Alaska Power Authority under authority vested by AS 44.83.080(4) proposes to adopt new regulations and to amend existing regulations in Chapter 94 of Title 3 of the Alaska Administrative Code to implement AS 44.83, as amended, as follows:

(1) 3 AAC 94.010 is amended to change the name of the Power Project Revolving Fund to the Power Project Fund. This change is made throughout the proposed regulations.

(2) 3 AAC 94.050 is amended to clarify the time in the development of a power project at which the Authority must by resolution make certain findings. The proposed amendment also changes the name of the Long-term Electrical Power Development Plan to the Long-term Energy Plan, which change is also made elsewhere in the proposed regulations.

(3) 3 AAC 94.055 sets out the purpose of a reconnaissance study, outlines the techniques and methods to be used in conducting such a study and describes the standard criteria and measures to be used in analyzing alternative power sources in a reconnaissance study.

(4) 3 AAC 94.060 sets out the purpose of a feasibility study, outlines the techniques and methods to be used in conducting such a study and describes the standard criteria and measures to be used in analyzing alternative power sources in a feasibility study.

(5) 3 AAC 94.065 sets out the purpose of a plan of finance, outlines the techniques and methods to be used in preparing a plan of finance and describes the standard criteria and measures to be used in analyzing alternative financing arrangements for a power project.

(6) 3 AAC 94.067 provides that proposed new regulation sections 3 AAC 94.055-.065 apply only to reconnaissance studies, feasibility studies and plans of finance which the Authority begins after the effective date of those sections.

(7) 3 AAC 94.070 is amended to make several technical and language changes and to provide for the inclusion in appropriate loan applications of information regarding leveraged lease financing arrangements.

(8) 3 AAC 94.080 is amended to make several technical and language changes and to require that the Executive Director in his recommendation to the Board of Directors concerning a loan application include written comments as to whether a project to be constructed in financially feasible and whether, in the case of a project which is not financially feasible, a loan from the Power Project Fund or other State of Alaska assistance if made available would make the project financially feasible.

(9) 3 AAC 94.090 is amended to make several technical and language changes and to require the Board of Directors in considering a loan application and making its determination to take into account the financial feasibility of the project, whether sufficient funds are available to loan from the Power Project Fund at an interest rate low enough to make the project financially feasible and, if not, what other State of Alaska assistance, if any, the Board of Directors should recommend be made available to assist in financing the project. The proposed amendment provides that in the case of a loan which is not for construction of a project that financial feasibility is established if timely repayment is assured. The proposed amendment also provides for receipt of evidence of action taken by the applicant approving the terms of the loan prior to execution of a loan agreement by the Executive Director.

(10) 3 AAC 94.100 is amended to provide that the interest rate on Power Project Fund loans must meet the criteria contained in AS 44.83.170(f) and that the interest rate may not be less than five percent, except for power projects for which loans were outstanding from the Water Resources Revolving Loan Fund on July 13, 1978, in which case the interest rate must be between three percent and five percent. The proposed amendment also exempts from the security requirements of the section loans to an applicant regulated by the Alaska Public Utilities Commission which has a substantial history of repaying loan-term loans and the capacity to repay the loan.

(11) 3 AAC 94.900 is amended to delete the definition of "city" or "borough" and of "small scale" and to add a definition of "financially feasible project". The defined term "long-term electrical power development plan" is changed to "long-term energy plan".

NOTICE IS ALSO GIVEN that any person interested may present written statements or arguments relevant to the action proposed by mailing or delivering the statements or arguments to the Authority at 333 West Fourth Avenue, Suite 31, Anchorage, Alaska 99501 so as to be received prior to 4:30 p.m. on March 23, 1981.

This action is not expected to require an increased appropriation.

Copies of the proposed regulations may be obtained by contacting the Authority at 333 West Fourth Avenue, Suite 31, Anchorage, Alaska 99501 (277-7641).

The Alaska Power Authority, upon its own motion or at the instance of any interested person, may after the public comment period described above and the lapse of thirty (30) days from the first publication of this notice adopt the proposals substantially as described above without further notice or may decide to take no action on them.

DATED at Anchorage, Alaska
March 5, 1981

Eric P. Yould

ERIC P. YOULD
Executive Director

STATE OF ALASKA

THE LEGISLATURE

BUDGET AND AUDIT COMMITTEE

FINANCE DIVISION
POUCH WF–STATE CAPITOL
JUNEAU, ALASKA 99811
PHONE: (907) 465-3795

M E M O R A N D U M

DATE: March 31, 1981

TO: Honorable Bob Bettisworth
House Resources Committee

FROM: Milt Barker, MB Fiscal Analyst
Legislative Finance Division

SUBJ: Hydro Financing & Distribution of State Wealth

This memo attempts to analyze financing of hydroelectric facilities first from the standpoint of maximizing net benefits to the state as a whole, and secondly from the standpoint of maximizing benefits to the private sector. In other words, the second viewpoint considers the efficiency and equity of hydro financing methods as a means of distributing state revenues that exceed the requirements of the state operating and capital budgets.

Alternatives

Methods of financing hydro facilities that are analyzed are:

1) Governor's plan - per capita equity grants and revenue bonds (rate restructuring loans are disregarded);

2) Alaska Power Authority Plan - state subordinated loan and revenue bonds;

3) GO Bonds;

4) direct appropriation.

In addition, the following are considered as a means of distributing state revenue:

1) Permanent Fund dividends - 50% of permanent fund earnings;

2) direct grants to citizens.

Swan Lake as an Example

For purposes of fleshing out the analysis, Swan Lake is used as an example. This memo is not an analysis of the economic or financial feasility of Swan Lake for several reasons:

1) benefits are calculated assuming demand for power is equal to Swan Lake's annual average generation from the beginning of operations;

2) the financing methods would affect the demand for power; specifically, the direct appropriation or GO bond methods result in ratepayers paying no capital costs and therefore much lower rates; while such methods might alleviate the surplus of power in the initial years, they might also result in the need for additional hydro facilities before their time; of course it might be cheaper at that point for the state to finance conservation measures rather than the additional hydro;

3) diesel is assumed to be the least cost alternative for the entire period; possibly wind, interconnection, or another source would be cheaper at some point;

4) economic multipliers and opportunity costs are not considered;

5) the analysis is only carried out to 30 years while life of the hydro facility is considerably longer;

6) the sensitivity of the project to cost overruns is not examined.

Equity Considerations

In evaluating the alternatives, it may help to keep in mind certain aspects about the distribution of benefits:

1) benefits of cheaper power go to residential, commercial and industrial users; in the analysis 50% of the power is assumed be be consumed by residential users[1] to illustrate the distribution of direct benefits to individuls; the benefits of cheaper power for commercial and industrial users would create some spillover benefits to individuals not estimated in the analysis;

---

[1] In 1978, 44% of Ketchikan Public Utilities power sales were to residential users according to Ketchikan Power Market Analysis by the Alaska Power Administration, September 1979.

2) benefits of cheaper power are received in proportion to power consumption;

3) benefits of cheaper power are received over the life of the project by users of power with the greater benefits received in the later years;

4) benefits of permanent fund dividends go to residents;

5) benefits of permanent fund dividends are received in proportion to length of residency;

6) benefits of permanent fund dividends are distributed in perpetuity;

7) benefits of grants to citizens go to residents;

8) benefits of grants to citizens are received equally;

9) benefits of grants to citizens are distributed entirely in the current year.

Grants to citizens are considered in the analysis to allow other hydro financing alternatives to be compared or executed on a basis more similar to direct appropriation and GO bonds. Direct appropriation or GO bonds involves transfer of the principle of the appropriations to power users. So do citizen grants; permanent fund appropriations do not.

Efficiency

Table I calculates the benefits of Swan Lake power compared to diesel generation. Table II shows that the cheapest way of obtaining these benefits, if we disregard who pays, is the Governor's plan. GO bonds are almost as inexpensive.

The reason these two alternatives are the least expensive is that the tax-exempt rate of interest on the bonds is less than the rate of inflation. The rates assumed in this analysis, namely:

inflation	10%
taxable interest rates	12%
revenue bonds	9%
GO bonds	8%

reflect recent historical experience (see attached charts). However, even if the bond interest rates were above the rate of inflation, consideration of opportunity costs would probably result in the same relative merits for the financing alternatives.

The reason the Governor's plan is cheaper than GO bonds even though revenue bonds bear a higher interest rate is the earning of arbitrage on the reserve fund for revenue bonds, i.e. the reserve fund earns 12% while paying 9%.

Efficiency and Equity

If we now consider hydro financing as an alternative means of distributing state wealth, the objective becomes to maximize the benefits received by the private sector. To compare the alternatives, Tables III through VI consider the appropriation of $71,550,000. The balance of funds not required for hydro financing goes either into the permanent fund or into citizen grants. Table VII summarizes the results for those cases in which diesel fuel prices escalate at 12% per annum (the relative merits would be the same for the 15% fuel cost escalation cases).

If one is only concerned with distribution of state wealth, it sufficies to consider only the total benefits in Table VII. To the extent that there are competing needs, uses or distribution plans to the alternatives presented here, one should consider the benefit/cost ratios in Table VII.

The results in Table VII are due to a confluence of factors:

1) the benefits of hydro power;

2) the subsidy of tax-exempt bond rates provided by the federal government;

3) the amount of leverage, i.e. the percent of facilities financed with debt;

4) the absence of federal income taxation on benefits to users of subsidized power.

The following are a few observations that can be made:

1) if a power project offers as much benefit relative to alternatives as the example, it is clearly superior to permanent fund appropriations or grants to citizens in such amounts as to preclude undertaking the project;

2) if any balances left after hydro financing are to be put in the permanent fund, then GO bonds are the preferred financing method if the objective is purely to disstribute what are perceived to be surplus funds;

3) if the objective is to place the maximum dollars directly into individual's pockets, the Governor's hydro financing plan with the balance paid in grants to citizens succeeds the best.

These observations have been made to suggest how to use Table VII. Many other observations can be made based on one's individual evaluation of the equity issues involved, the competing need for state funds, and the desire to leave the state with a debt-free future.

ADDENDUM

Estimate of Alaskan Marginal Tax Rate

The following information from Individual Income Tax Returns, 1977 Statistics of Income by the Internal Revenue Service was used to estimate an average 30% marginal federal income tax rate for Alaskans for tax year 1977:

	Returns	Average Taxable Income	Marginal Rate
Joint	80,734	22,065	32%
Individuals	100,857	10,333	27%

Total persons filing were 262,325.

The tax schedules were revised in 1975 and 1979 so that 1977 may represent the average marginal rate in the future if continued revisions are made to keep the federal share of income from increasing.

attachments

MB:bf

Municipal Newsletter

Foster & Marshall Inc.

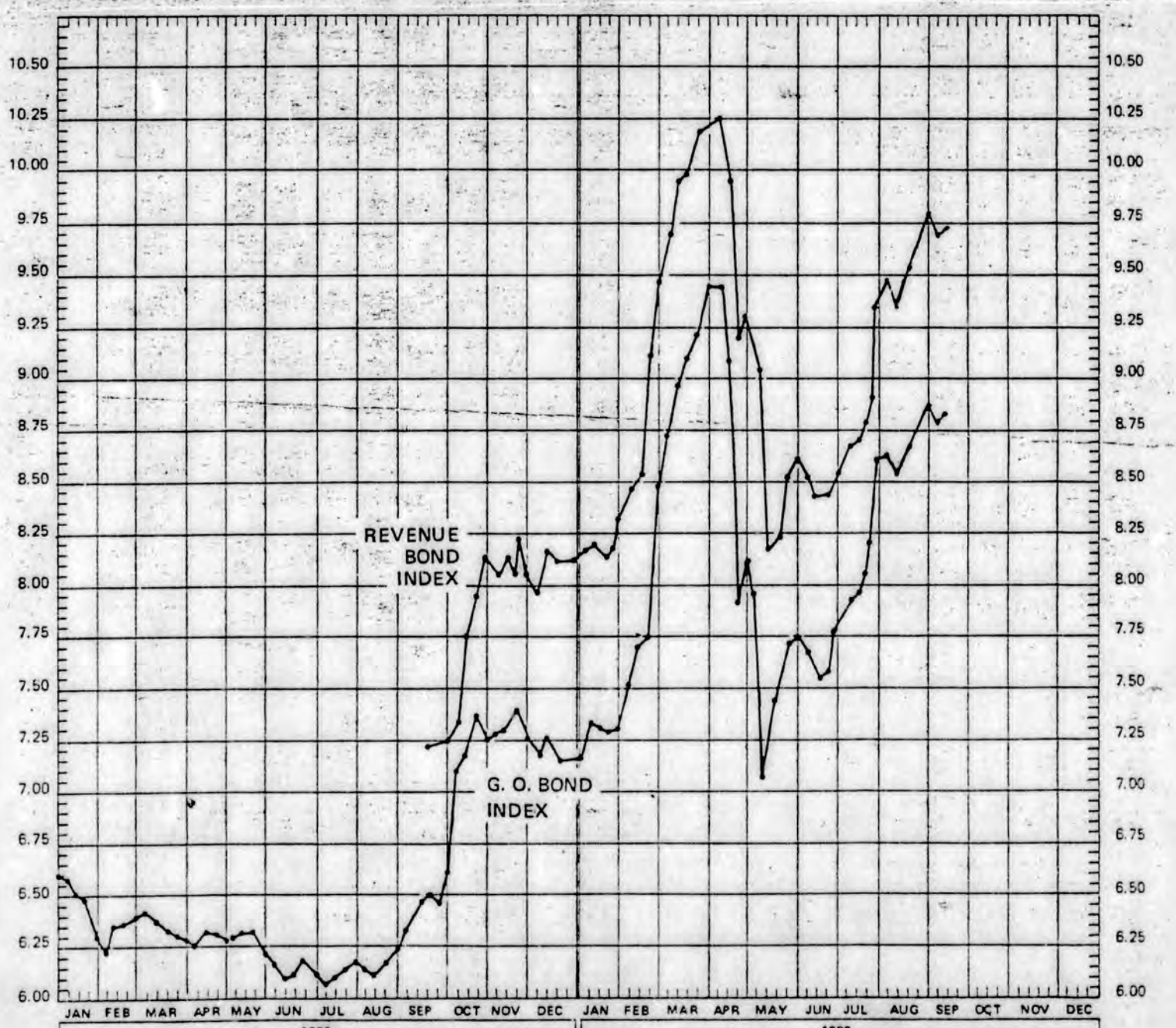
Offices: Alaska, Idaho, Utah and Montana

September 15, 1980

The Bond Buyer's G.O. Index stands at 8.82% and the Revenue Bond Index at 9.73%. The last two weeks have seen a leveling of the rapid climb in rates since mid-year, but the supply of new issues coming to market is still heavy, making it less likely that there will be a significant drop in rates by election time.

Municipal issuers needing money now have a difficult decision whether to borrow at these near record interest rates or wait in hopes of some improvement. At the moment, we happen to be on the side of waiting a short time for what could be a slight improvement through the fall. However, don't look for dramatic drops in tax-exempt interest rates in the near future.

BOND BUYER'S INDEX OF MUNICIPAL INTEREST RATES



An informational Bulletin of our MUNICIPAL FINANCE DEPARTMENT – a part of our full range of municipal financing services.

R. O. Yeasting, Senior Vice President
Municipal Finance Department

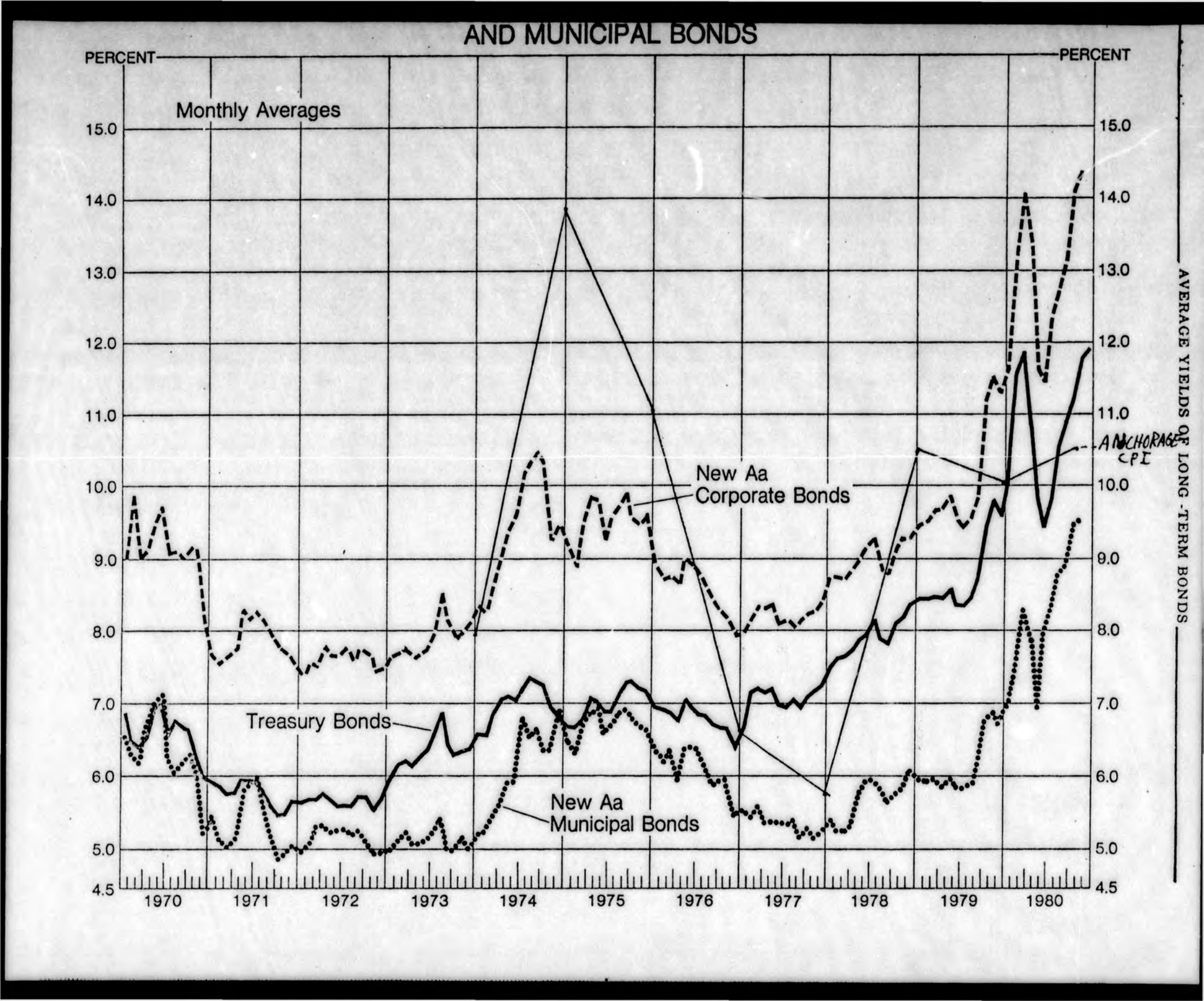

AND MUNICIPAL BONDS
PERCENT
PERCENT
Monthly Averages
15.0
14.0
13.0
12.0
11.0
10.0
9.0
8.0
7.0
6.0
5.0
4.5
New Aa
Corporate Bonds
ANCHORAGE
CPI
Treasury Bonds
New Aa
Municipal Bonds
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
AVERAGE YIELDS OF LONG-TERM BONDS

Table I
SWAN LAKE BENEFITS
Disregarding Capital Costs
($ millions)

Fiscal Year	(1) Hydro Operating & Maintenance Costs[1]	(2) Diesel Fixed Costs[2]	(3) Diesel Operating & Maintenance Costs[3]	(4) Diesel Fuel Costs @ 12% Escalation[4]	(5) Diesel Fuel Costs @ 15% Escalation[4]	(6)=(2+3+4) Total Diesel Costs @ 12% Fuel Escalation	(7)=(2+3+5) Total Diesel Costs @ 15% Fuel Escalation	(8)=(6-1) Benefit to Electrical Users @ 12% Fuel Escalation	(9)=(7-1) Benefit to Electrical Users @ 15% Fuel Escalation
1982								0	0
1983								0	0
1984								0	0
1985	1.72	2.85	3.25	10.20	11.34	16.30	17.44	14.58	15.72
1986	1.87	2.85	3.57	11.42	13.04	17.84	19.46	15.97	17.59
1987	2.06	2.85	3.93	12.79	14.99	19.57	21.77	17.51	19.71
1988	2.26	2.85	4.32	14.33	17.25	21.50	24.42	19.24	22.16
1989	2.49	2.85	4.75	16.05	19.83	23.65	27.43	21.16	24.94
1990	2.73	2.85	5.23	17.97	22.80	26.05	30.88	23.32	28.15
1991	3.01	2.85	5.75	20.13	26.23	28.73	34.83	25.72	31.82
1992	3.31	2.85	6.33	22.54	30.16	31.72	39.34	28.41	36.03
1993	3.64	2.85	6.96	25.25	34.68	35.06	44.49	31.42	40.85
1994	4.01	2.85	7.66	28.28	39.89	38.79	50.40	34.78	46.39
1995	4.40	2.85	8.43	31.68	45.87	42.96	57.15	38.56	52.75
1996	4.85	2.85	9.27	35.48	52.75	47.60	64.87	42.75	60.02
1997	5.33	2.85	10.20	39.73	60.67	52.78	73.72	47.45	68.39
1998	5.87	2.85	11.22	44.50	69.77	58.57	83.84	52.70	77.97
1999	6.45	2.85	12.34	49.84	80.24	65.03	95.43	58.58	88.98
2000	7.10	2.85	13.58	55.83	92.27	72.26	108.70	65.16	101.60
2001	7.81	2.85	14.93	62.53	106.11	80.31	123.89	72.50	116.08
2002	8.59	2.85	16.43	70.03	122.03	89.31	141.31	80.72	132.72
2003	9.45	2.85	18.07	78.43	140.33	99.35	161.25	89.90	151.80
2004	10.40	2.85	19.87	87.85	161.38	110.57	184.10	100.17	173.70
2005	11.43	19.14	21.86	98.38	185.59	139.38	226.59	127.95	215.16
2006	12.58	19.14	24.05	110.18	213.42	153.37	256.61	140.79	244.03
2007	13.83	19.14	26.46	123.41	245.43	169.01	291.03	155.18	277.20
2008	15.21	19.14	29.10	138.22	282.25	186.46	330.49	171.25	315.28
2009	16.74	19.14	32.01	154.80	324.59	205.95	375.74	189.21	359.00
2010	18.41	19.14	35.21	173.38	373.28	227.73	427.63	209.32	409.22
2011	20.26	19.14	38.73	194.19	429.27	252.06	487.14	231.80	466.88
Total	205.81	190.98	393.51	1,727.42	3,215.46	2,311.91	3,799.95	2,106.10	3,594.14
Total Benefits in 1981 Dollars								297.27	452.62

Table I

Footnotes:

1. 2% of construction costs for first year of generation; escalated @ 10%; Swan Lake construction cost is $86,000,000; construction begins 6-1-81; interest earned during construction @ 12% on average $36,500,000 balance.

2. $1,443/kw capacity in FY 84 times 18,000 kw Swan Lake dependable capacity; levelized charge based on 20-year life @ 9% tax-exempt interest rate; $9,707/kw installed capacity for replacement diesel generator in 2004.

3. 1.95¢/kwh in FY 85; times 85,400,000 kwh average annual energy delivered to load center by Swan Lake; escalated @ 10%.

4. 85,400,000 kwh requires 6,569,230 gallons of diesel fuel @ 13 kwh/gallon; March 1981 Ketchikan Public Utilities diesel price is 98.7¢ per gallon.

Sources:

1. Swan Lake capacity and average annual generation from Application for License for the Swan Lake Project before the Federal Energy Regulatory Commission, Ketchikan Public Utilities, Ketchikan, Alaska, February 1979.

2. Swan Lake construction cost from "Swan Lake Project" analyses, Nuveen & Co., February 1981.

3. Swan Lake operating and maintenance costs from Swan Lake, Lake Grace, and Mahoney Lake Hydroelectric Projects Appraisal Report, Ketchikan Public Utilities, Ketchikan, Alaska, June 1977.

4. Diesel costs from Ketchikan Power Market Analysis, Alaska Power Administration, September 1979.

Prepared By:
Legislative Finance
March 30, 1981

TABLE II

SWAN LAKE CAPITAL COSTS
(Millions 1981 Dollars)

	Construction of Swan Lake							
	GOVERNOR'S PLAN		APA PLAN		GO BONDS		DIRECT APPROPRIATION	
	12% Fuel Escalation	15% Fuel Escalation	12% Fuel Escalation	15% Fuel Escalation	12% Fuel Escalation	15% Fuel Escalation	12% Fuel Escalation	15% Fuel Escalation
Capital costs								
Payments on Revenue Bonds	(34.20)	(34.20)	(32.20)	(32.20)	--	--	--	--
Subordinated Loan	--	--	(43.00)	(43.00)	--	--	--	--
GO Bond Debt Service	--	--	--	--	(61.93)	(61.93)	--	--
Grant	(26.93)	(26.93)	--	--	--	--	--	--
Direct Appropriation	--	--	--	--	--	--	(71.55)	(71.55)
Total Capital Costs	(61.13)	(61.13)	(75.20)	(75.20)	(61.93)	(61.93)	(71.55)	(71.55)

TABLE II-A

SWAN LAKE
SOURCES AND USES OF FUNDS
FOR CAPITAL COSTS
($ Millions)

Uses	Governor's Plan	APA Plan	GO Bonds	Direct Appropriation
Construction (3 years)	86.00	86.00	86.00	86.00
Reserve Fund (15% of Revenue Bonds)	10.11	8.68	--	--
Capitalized Interest on Revenue Bonds and Subordinated Loan (3 years at 9%)	18.20	27.23	--	--
Costs of Bond Issuance (3 1/2% of Bonds)	2.36	2.02	2.58	--
Total Uses	116.67	123.93	88.58	86.00
Sources				
Revenue Bonds	67.42	57.84	--	--
Grant ($2000 X 13,463 persons)	26.93	--	--	--
Subordinated Loan	--	43.00	--	--
GO Bonds	--	--	73.94	--
Direct Appropriation	--	--	--	71.55
Sources Subtotal	94.35	100.84	73.94	71.55
Interest Earned During Construction (3 years at 12% on reserve funds plus 55% of sources subtotal)	22.32	23.09	14.64	14.45
Total Sources	116.67	123.93	88.58	86.00

Prepared by:
Legislative Finance Division
March 30, 1981

Table III

SWAN LAKE AND PERMANENT FUND OPTIONS
BENEFIT/COST RATIOS FOR ALTERNATIVE USES OF $71,550,000
(Millions 1981 Dollars)

	Construction of Swan Lake								
	Governor's Plan		APA Plan		GO Bonds		Direct Appropriation		Appropriation to Permanent Fund
	12% Fuel Escalation	15% Fuel Escalation	12% Fuel Escalation	15% Fuel Escalation	12% Fuel Escalation	15% Fuel Escalation	12% Fuel Escalation	15% Fuel Escalation	
Hydro Benefits to Users (From Table I)	297.27	452.62	297.27	452.62	297.27	452.62	297.27	452.62	--
Less: User Payments on Revenue Bonds @ 9% for 27 years repaid 6/1/85 to 6/1/2011	(34.20)	(34.20)	(32.20)	(32.20)	--	--	--	--	--
User Payments on Subordinated Loan @ 9% for 27 years repaid 6/1/85 to 6/1/2011	--	--	(27.07)	(27.07)	--	--	--	--	--
Plus: Permanent Fund Earnings on $71,555,000 less amount of grant subordinated loan, GO debt service, or direct appropriation @ 12% 6/1/82 to 6/1/2011	50.47	50.47	32.29	32.29	10.88	10.88	--	--	80.92
Permanent Fund Earnings @ 12% on repayment of subordinated loan 6/1/85 to 6/1/2011	--	--	30.54	30.54	--	--	--	--	--
Less: 50% of Permanent Fund Earnings to State	(25.23)	(25.23)	(31.41)	(31.41)	(5.44)	(5.44)	--	--	(40.46)
30% average marginal rate for individuals' federal income tax on Permanent Fund earnings paid as dividends	(7.57)	(7.57)	(9.42)	(9.42)	(1.63)	(1.63)	--	--	(12.13)
Total Benefits to Users	280.74	436.09	260.00	415.35	301.08	456.43	297.27	452.62	28.11

Table III (continued)

SWAN LAKE AND PERMANENT FUND OPTIONS
BENEFIT/COST RATIOS FOR ALTERNATIVE USES OF $71,550,000
(Millions 1981 Dollars)

Cost to State	Construction of Swan Lake								Appropriation to Permanent Fund
	Governor's Plan		APA Plan		GO Bonds		Direct Appropriation		
	12% Fuel Escalation	15% Fuel Escalation	12% Fuel Escalation	15% Fuel Escalation	12% Fuel Escalation	15% Fuel Escalation	12% Fuel Escalation	15% Fuel Escalation	
Grant	(26.93)	(26.93)	--	--	--	--	--	--	--
Subordinated Loan	--	--	(43.00)	(43.00)	--	--	--	--	--
Less: Subordinated Loan Repayment	--	--	27.07	27.07	--	--	--	--	--
Debt Service @ 8% for 30 years on GO Bonds	--	--	--	--	(61.93)	(61.93)	--	--	--
Direct Appropriation for Swan Lake	--	--	--	--	--	--	(71.55)	(71.55)	--
Appropriations to Permanent Fund	(44.62)	(44.62)	(28.55)	(28.55)	(9.62)	(9.62)	--	--	(71.55)
Appropriation of Subordinated Loan to Permanent Fund	--	--	(27.07)	(27.07)	--	--	--	--	--
Total Cost to State	(71.55)	(71.55)	(71.55)	(71.55)	(71.55)	(71.55)	(71.55)	(71.55)	(71.55)
Less: 50% of Permanent Fund Earnings	25.23	25.23	31.41	31.41	5.44	5.44	--	--	40.62
Net Cost to State	(46.32)	(46.32)	(40.14)	(40.14)	(66.11)	(66.11)	(71.55)	(71.55)	(30.93)
Ratio of Benefits to Net Cost	6.06	9.41	6.48	10.35	4.55	6.90	4.15	6.36	.92

TABLE IV

SWAN LAKE AND PERMANENT FUND OPTIONS
BENEFIT/COST RATIOS FOR RESIDENTIAL USERS FOR ALTERNATIVE USES OF $71,550,000
ASSUMING 50% OF POWER IS CONSUMED BY RESIDENTIAL USERS
(Millions 1981 Dollars)

	GOVERNOR'S PLAN		APA PLAN		GO BONDS		DIRECT APPROPRIATION		Appropriation To Permanent Fund
	12% Fuel Escalation	15% Fuel Escalation	12% Fuel Escalation	15% Fuel Escalation	12% Fuel Escalation	15% Fuel Escalation	12% Fuel Escalation	15% Fuel Escalation	
Hydro Benefits to Users (50% of Table I)	148.63	226.31	148.63	226.31	148.63	226.31	148.63	226.31	--
Less: User Payments on Revenue Bonds (50% of Table III)	(17.10)	(17.10)	(16.10)	(16.10)	--	--	--	--	--
User Payments on Subordinated Loan (50% of Table III)	--	--	(13.53)	(13.53)	--	--	--	--	--
Plus: Permanent Fund Dividents After-Tax (From Table III)	17.67	17.67	21.99	21.99	3.81	3.81	--	--	28.33
Total Benefits to Residential Users	149.20	226.88	140.99	218.67	152.44	230.12	148.63	226.31	28.33
Net Cost to State (From Table III)	(46.32)	(46.32)	(40.14)	(40.14)	(66.11)	(66.11)	(71.55)	(71.55)	(30.93)
Ratio of Residential Benefits to Net Cost	3.22	4.90	3.51	5.45	2.31	3.48	2.08	3.16	.92

Prepared by:
Legislative Finance Division
March 30, 1981

TABLE V
SWAN LAKE AND DIRECT CITIZEN GRANT OPTIONS
BENEFIT/COST RATIOS FOR ALTERNATIVE USES OF $71,550,000
(Millions 1981 Dollars)

	GOVERNOR'S PLAN		APA PLAN		GO BONDS		DIRECT APPROPRIATION		DIRECT
	12% Fuel Escalation	15% Fuel Escalation	12% Fuel Escalation	15% Fuel Escalation	12% Fuel Escalation	15% Fuel Escalation	12% Fuel Escalation	15% Fuel Escalation	CITIZEN GRANTS
Hydro Benefits to Users (from Table I)	297.27	452.62	297.27	452.62	297.27	452.62	297.27	452.62	--
LESS: User Payments on Revenue Bonds (from Table III)	(34.20)	(34.20)	(32.20)	(32.20)	--	--	--	--	--
User Payments on Subordinated Loan (from Table III)	--	--	(27.07)	(27.07)	--	--	--	--	--
PLUS: Citizen Grants of $71,550,000 less amount of hydro grant, subordinated loan, GO debt service, or direct appropriation	44.62	44.62	28.55	28.55	9.62	9.62	--	--	71.55
Citizen Grants of Subordinated Loan Repayments	--	--	27.07	27.07	--	--	--	--	--
LESS: 30% average marginal rate for individuals' federal income tax on citizen grants	(13.39)	(13.39)	(16.69)	(16.69)	(2.89)	(2.89)	--	--	(21.46)
Total Benefits to Users	294.30	449.65	276.93	432.28	304.00	459.35	297.27	452.62	50.09
Cost to State									
Hydro Grant	(26.93)	(26.93)	--	--	--	--	--	--	--
Subordinated Loan	--	--	(43.00)	(43.00)	--	--	--	--	--
Less: Repayment of Subordinated Loan	--	--	27.07	27.07	--	--	--	--	--
Debt Service on GO Bonds	--	--	--	--	(61.93)	(61.93)	--	--	--
Direct Appropriation for Swan Lake	--	--	--	--	--	--	(77.55)	(71.55)	--
Citizen Grants	(44.62)	(44.62)	(55.62)	(55.62)	(9.62)	(9.62)	--	--	(71.55)
Total Cost to State	(71.55)	(77.55)	(71.55)	(71.55)	(71.55)	(71.55)	(71.55)	(71.55)	(71.55)
Ratio of Benefit to Cost	4.11	6.28	3.87	6.04	4.24	6.41	4.15	6.32	.70

TABLE VI

SWAN LAKE AND DIRECT CITIZEN GRANT OPTIONS
BENEFIT/COST RATIOS FOR ALTERNATIVE USES OF $71,550,000
ASSUMING 50% OF POWER IS CONSUMED BY RESIDENTIAL USERS
(Millions 1981 Dollars)

	GOVERNOR'S PLAN		APA PLAN		GO BONDS		DIRECT APPROPRIATION		DIRECT CITIZEN GRANTS
	12% Fuel Escalation	15% Fuel Escalation	12% Fuel Escalation	15% Fuel Escalation	12% Fuel Escalation	15% Fuel Escalation	12% Fuel Escalation	15% Fuel Escalation	
Hydro Benefits to Users (50% of Table I)	148.63	226.31	148.63	226.31	148.63	226.31	148.63	226.31	--
LESS: User Payments on Revenue Bonds (50% of Table III)	(17.10)	(17.10)	(16.10)	(16.10)	--	--	--	--	--
User Payments on Subordinated Loan (50% of Table III)	--	--	(13.53)	(13.53)	--	--	--	--	--
PLUS: Citizens Grants After-Tax (From Table V)	31.23	31.23	38.93	38.93	6.73	6.73	--	--	50.09
Total Benefits to Residential Users	162.76	274.64	157.93	235.61	155.36	233.04	148.63	226.31	50.09
Cost to State (From Table V)	(71.55)	(71.55)	(71.55)	(71.55)	(71.55)	(71.55)	(71.55)	(71.55)	(71.55)
Ratio of Residential Benefits to Cost	2.27	3.84	2.21	3.29	2.17	3.26	2.08	3.16	.70

PREPARED BY:
Legislative Finance Division
March 30, 1981

TABLE VII

TOTAL BENEFITS AND BENEFIT/COST RATIOS FOR
ALTERNATIVE USES OF $71,550,000
ASSUMING 12% ESCALATION IN DIESEL FUEL COSTS
(Millions 1981 Dollars)

Construction of Swan Lake	ALL BENEFITS				RESIDENTIAL BENEFITS			
	Balance To Permanent Fund		Balance To Citizen Grants		Balance To Permanent Fund		Balance To Citizens Grants	
	Total Benefits	Benefit/Cost Ratio	Total Benefits	Benefit/Cost Ratio	Total Benefits	Benefit/Cost Ratio	Total Benefits	Benefit/Cost Ratio
Governor's Plan	280.74	6.06	294.30	4.11	149.20	3.22	162.76	2.27
Alaska Power Authority Plan	260.00	6.48	276.93	3.87	140.99	3.51	157.93	2.21
GO Bonds	301.08	4.55	304.00	4.24	152.44	2.31	155.36	2.17
Direct Appropriations	297.27	4.15	297.27	4.15	148.63	2.08	148.63	2.08
Appropriation to Permanent Fund	28.11	.92	--	--	28.33	.92	--	--
Appropriation of Grants to Citizens	--	--	50.09	.70	--	--	50.09	.70

PREPARED BY:
Legislative Finance Division
March 30, 1981

Original sponsors: Kerttula, Dankworth, Ziegler, et al

Final

IN THE SENATE BY THE RESOURCES COMMITTEE

HOUSE CS FOR CS FOR SPONSOR SUBSTITUTE FOR SENATE BILL NO. 25 (Resources)

IN THE LEGISLATURE OF THE STATE OF ALASKA

TWELFTH LEGISLATURE - FIRST SESSION

A BILL

For an Act entitled: "An Act relating to energy projects and programs of the Alaska Power Authority; and providing for an effective date."

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

* Section 1. AS 44.83 is amended by adding new sections to read:

ARTICLE 8. ENERGY PROGRAM FOR ALASKA.

Sec. 44.83.400. PROGRAM ESTABLISHED. (a) The energy program for Alaska is established. The program shall be administered by the Alaska Power Authority.

(b) The energy program for Alaska is a program by which the authority may acquire or construct power projects with money appropriated by the legislature to the power development fund established in AS 44.83.410. A power project may be acquired or constructed as part of the energy program for Alaska only if the project is submitted to and approved by the legislature in accordance with procedures set out in AS 44.83.177 - 44.83.187.

(c) The provisions of AS 36.10.010 - 36.10.125 apply to power projects constructed by the authority under AS 44.83.400 - 44.83.510.

Sec. 44.83.410. POWER DEVELOPMENT FUND ESTABLISHED. (a) A power development fund is established in the Alaska Power Authority to carry out the purposes of the energy program for Alaska (AS 44.83.400 - 44.83.510).

(b) The fund includes all money appropriated to it by the legislature.

Sec. 44.83.420. USE OF FUND BALANCE. (a) The fund may be used by the authority to provide money for

(1) reconnaissance and feasibility studies and power project finance plans prepared under AS 44.83.177 - 44.83.181;

(2) the cost of a power project, including but not limited to costs of acquiring necessary licenses, preparing engineering designs, obtaining land, and constructing the power project;

(3) the defeasance of bonds, or the payment of debt service on loans for or on an issue of bonds sold in connection with a power project; and

(4) the power cost assistance fund (AS 44.83.162).

(b) Money in the fund may be used under (a) of this section only for a power project which

(1) meets the revenue requirements of AS 44.83.470; and

(2) provides the lowest power cost to utility customers in the market area for the estimated life of the power project, whether operated by itself or in conjunction with other power projects in the market area, and which operates or will operate on one or more of the following:

(A) renewable energy resources, including but not limited to hydroelectric power, wind, biomass, geothermal, tidal or solar energy, or a method which uses temperature differentials or other physical properties of the ocean;

(B) coal or peat;

(C) energy derived from waste heat from thermal generating plants; or

(D) fossil fuel, including oil or natural gas.

Sec. 44.83.430. INVESTMENT OF FUND. The Department of Revenue shall invest the money in the fund in accordance with AS 37.10.070 and

37.10.075. The Department of Revenue shall provide money in the fund to the authority only after a cost for a project is incurred.

Sec. 44.83.440. ALLOTMENT TO PROJECTS. (a) The authority shall maintain records of power project allocations from the fund for each power project

(1) approved in accordance with AS 44.83.185; and

(2) for which an allocation is made from an appropriation made by the legislature without specifying an appropriation to a project.

(b) Income earned from investment of money appropriated to the fund shall be deposited in the general fund and may be appropriated to the fund by the legislature.

Sec. 44.83.450. REAPPROPRIATION OF FUND BALANCE. (a) If a power project designated by the legislature by law is not constructed, the amount appropriated to it may be reappropriated to other power projects by the legislature.

(b) The legislature may reappropriate money under (a) of this section only for a power project which is economically feasible under AS 44.83.181(b) and only if the project will serve the market area that would have been served by the power project designated by the legislature and not constructed.

Sec. 44.83.460. LAPSE OF EXCESS APPROPRIATIONS. If at the end of construction of a power project appropriations for the power project exceed the amount required for construction of it, the excess lapses into the general fund.

Sec. 44.83.470. REVENUE REQUIREMENTS. (a) The authority may not use money in the fund for a power project unless the authority makes a feasibility study under AS 44.83.181, and determines that the power project is economically and financially feasible and that, after con-

struction, operation of the power project will provide revenue sufficient to return to the state five percent of the amount which the authority has spent from the fund for the power project.

(b) For purposes of this section, a proposed power project is economically and financially feasible if the cost-benefit ratio for the power project exceeds the cost-benefit ratio of the existing system which provides power in the area. If there is no system providing power in the area, a proposed power project is economically and financially feasible if the cost-benefit ratio for the power project exceeds the cost-benefit ratio for a power project which generates electric power in the area by using diesel fuel. The authority shall determine a cost-benefit ratio by considering all direct and indirect benefits and costs attributable to the power project which can be given a value in money, and the effect of government financial assistance for the power project.

Sec. 44.83.480. OPERATION OF POWER PROJECT. (a) A power project which is acquired or constructed as part of the energy program for Alaska is owned by the state and shall be administered by the authority.

(b) When a power project has been acquired or constructed by the authority, the project may be operated for the authority under a contract or lease entered into by a qualified utility and the authority.

Sec. 44.83.490. SALE OF POWER FROM POWER PROJECT. (a) The authority shall sell power produced from power projects acquired or constructed under the energy program for Alaska. A utility which purchases power produced by a power project of the authority shall agree with the authority

(1) to give preference in the sale of power at retail to all classes of consumers of power except industrial consumers;

(2) to charge industrial consumers of power a rate determined

by the authority in accordance with (e) of this section.

(b) The authority shall establish a wholesale power rate structure applicable to sales of power to its customers at the busbar of the power project as follows:

(1) If, by July 1, 1986, the legislature has not appropriated at least $5,000,000,000 to the power development fund, the authority shall, beginning on that date, establish and maintain a wholesale power rate for each power project which rate will return to the authority, on an annual basis, 10 percent of the amount appropriated to the power development fund for each project.

(2) After the effective date of this Act and until June 30 of the fiscal year in which the production capacity of all power projects acquired or constructed by the authority under the energy program for Alaska exceeds 500 megawatts, the authority shall establish and maintain a wholesale power rate for each power project which rate will return to the authority, on an annual basis, not less than five percent of the amount which the authority has invested in the power project from the fund for each project, including loans and grants made by the state.

(3) Beginning July 1 of the first fiscal year following the date on which the production capacity of all power projects acquired or constructed by the authority under the energy program for Alaska exceeds 500 megawatts, the authority shall establish and maintain a single wholesale power rate applicable to all power projects which it has acquired or constructed under the energy program for Alaska; the wholesale power rate shall be computed by the authority annually, and shall equal the rate which the authority estimates is necessary to produce revenue which is sufficient to pay

(A) operation, maintenance, and equipment replacement

costs of the power projects;

(B) debt service costs of the power projects;

(C) safety inspections and investigations of the power projects by the authority; and

(D) annual costs of the power cost assistance program (AS 44.83.162).

(c) The authority shall transmit the money which it receives from sales of power at rates determined under (b) of this section to the commissioner of revenue for deposit in the state general fund.

(d) From the amount collected under (b)(2) and (3) of this section which the commissioner of revenue estimates will be deposited into the general fund, the legislature may appropriate to the authority the amount required under AS 44.83.470 for paying costs of operating and maintaining power projects which it acquired or constructed as part of the energy program for Alaska. The balance of the amount collected under (b)(2) and (3) of this section and estimated by the commissioner of revenue to be deposited into the general fund may be appropriated by the legislature to the power cost assistance fund. The estimates of amounts required for each of the appropriations shall be provided to the governor in the budget submitted under AS 37.07.

(e) A rate for an industrial consumer under (a)(2) of this section

(1) may exceed the wholesale power rate determined under (b) of this section;

(2) may not be less than the rate charged residential consumers.

(f) The legislature may, by law, annul or change the wholesale power rate for sales of power which the authority adopts under (b) of this section.

Sec. 44.83.500. ENERGY CONSERVATION. The authority shall ensure

(1) that communities served by energy projects built from amounts appropriated to the power development fund implement cost-effective energy conservation measures for residences, commercial and public buildings, and industries; and

(2) that communities shall fulfill their responsibilities under (1) of this section by cooperating with state agencies concerned with development and conservation of energy, including but not limited to

(A) the Alaska Public Utilities Commission;

(B) the Alaska Energy Center;

(C) the division of energy and power development, Department of Commerce and Economic Development; and

(D) the division of business loans, Department of Commerce and Economic Development.

Sec. 44.83.510. DEFINITIONS. In AS 44.83.400 - 44.83.510,

(1) "busbar" means the substation which serves as the delivery point from the generation and transmission system of the authority to the transmission and distribution system of the utility;

(2) "fund" means the power development fund;

(3) "industrial consumer" means a customer of a utility which customer has a peak power demand in excess of 500 kilowatts and uses the power principally for

(A) manufacturing;

(B) pipeline transportation;

(C) the recovery or processing of minerals;

(D) the processing of timber, agricultural, or seafood products or their by-products; or

(E) the operation of facilities owned by the federal government;

(4) "qualified utility" means any of the following which the authority determines is capable of operating and maintaining a power project of the kind and magnitude which has been constructed or is to be constructed to provide power for a market area:

(A) a corporation organized under the Alaska Nonprofit Corporation Act (AS 10.20);

(B) an electric cooperative organized under the Electric and Telephone Cooperative Act (AS 10.25);

(C) a utility, whether or not regulated under AS 42.05, which generates, transmits, or distributes electrical service to the public; and

(D) a regional electrical authority (AS 18.57).

* Sec. 2. AS 44.83.030 is amended to read:

Sec. 44.83.030. MEMBERSHIP OF THE AUTHORITY. [(a)] The authority shall consist of the following directors:

(1) <u>three</u> [FOUR] directors at large to be appointed by the governor and confirmed by the legislature; <u>only one director may be appointed from each judicial district described in AS 22.10.010;</u>

(2) <u>four persons appointed by the governor from among the heads of state agencies</u> [THE COMMISSIONER OF COMMERCE AND ECONOMIC DEVELOPMENT.

(b) THE COMMISSIONERS OF COMMUNITY AND REGIONAL AFFAIRS, NATURAL RESOURCES, TRANSPORTATION AND PUBLIC FACILITIES, AND REVENUE SHALL HAVE THE RIGHTS AND PRIVILEGES OF DIRECTORS EXCEPT FOR THE RIGHT TO VOTE AND MAY NOT BE CONSIDERED FOR PURPOSES OF QUORUM OR VOTING].

* Sec. 3. AS 44.83.040 is amended to read:

Sec. 44.83.040. OFFICERS AND QUORUM. The <u>directors</u> [DIRECTOR] shall elect one of <u>their number</u> [THE DIRECTORS AT LARGE] as chairman and <u>may elect</u> other officers they determine desirable. The powers of

the authority are vested in the directors, and four [THREE] directors of the authority constitute a quorum. Action may be taken and motions and resolutions adopted by the authority at a meeting by the affirmative vote of at least three directors. The directors of the authority serve without compensation, but they shall receive the same travel pay and per diem as provided by law for board members.

* Sec. 4. AS 44.83.045(a) is amended to read:

(a) The directors at large shall [MUST] be residents and qualified voters of Alaska and shall comply with the requirements of AS 39.50 (conflict of interests). The directors at large shall serve overlapping four-year terms. [THE FOUR ORIGINAL DIRECTORS AT LARGE HAVE TERMS OF ONE, TWO, THREE, AND FOUR YEARS, RESPECTIVELY.]

* Sec. 5. AS 44.83.080(16) is amended by adding new subparagraphs to read:

(G) an appropriation for a power project acquired or constructed under the energy program for Alaska (AS 44.83.400 - 44.83.510);

(H) appropriations for the power cost assistance fund (AS 44.83.162), and for operation and maintenance of power projects developed under the energy program for Alaska (AS 44.83.400 - 44.83.510).

* Sec. 6. AS 44.83.090(a) is amended to read:

(a) The authority shall, in addition to the other methods which it may find advantageous, provide a method by which municipal electric, rural electric, cooperative electric, or private electric utilities and regional electric authorities, or other persons authorized by law to engage in the distribution of electricity may secure a reasonable share of the power generated by a project, or any interest in a project, or for any right to the power and shall sell the power or cause the power

to be sold at the lowest reasonable prices which cover the full cost of the electricity or services, including capital and operating costs, debt coverage as considered appropriate by the authority, and other charges that may be authorized by this chapter. Except for a contract or lease entered into under AS 44.83.400 - AS 44.83.510, a [A] contract or lease for the sale, transmission and distribution of power generated by a project or any right to the capacity of it shall provide:

(1) for payment of all operating and maintenance expenses of a project and costs of renewals, replacements and improvements of it;

(2) for interest on and amortization charges sufficient to retire bonds of the authority issued for the project and reserves for them, plus a debt service coverage factor as may be determined by the authority to be necessary for the marketability of its bonds;

(3) for monitoring of the project by the authority or its agents;

(4) for full and complete disclosure to the authority of all factors of cost in the transmission and distribution of power, so that rates to any persons may be fixed initially in the contract or lease and may be adjusted from time to time on the basis of true cost data;

(5) for periodic revisions of the service and rates to persons on the basis of accurate cost data obtained by the accounting methods and systems approved by the directors and in furtherance and effectuation of the policy declared in this chapter;

(6) for the cancellation and termination of a contract or lease upon violation of its terms by any person;

(7) for security for performance as the authority may consider practicable and advisable, including provisions assuring the continuance of the distribution and transmission of power generated by a project and the use of its facilities for these purposes; and

(8) other terms not inconsistent with the provisions and policy of this chapter as the authority may consider advisable.

* Sec. 7. AS 44.83 is amended by adding a new section to read:

Sec. 44.83.105. BONDS FOR POWER PROJECTS UNDER THE ENERGY PROGRAM FOR ALASKA. The authority shall borrow money and shall issue its bonds on which the principal and interest are payable exclusively from money derived from the power project financed with the proceeds of the bonds for a power project financed under AS 44.83.400 – 44.83.510 from the power development fund if

(1) appropriations to the power development fund for the power project, and interest earned on those appropriations, are insufficient to cover the cost of acquiring or constructing the power project; and

(2) the amount of interest which the authority will pay on its bonds is not more than alternative costs of securing money to pay for the acquisition or construction of the power project.

* Sec. 8. AS 44.83.162 is repealed and reenacted to read:

Sec. 44.83.162. POWER COST ASSISTANCE. (a) The power cost assistance fund is established as a separate fund to provide financial assistance to eligible electric utilities in the state. The fund shall be administered by the authority as a fund distinct from other funds of the authority. The fund is composed of money appropriated for the purpose of providing power cost assistance to an eligible electric utility.

(b) The costs used to calculate the amount of power cost assistance under this section include the costs allowed by the commission to determine the revenue requirement for setting the rates charged to customers of the utility. However, costs which represent a return on equity may not be used to determine the amount of power cost assistance

under this section.

(c) An eligible electric utility is entitled to receive power cost assistance

(1) for sales of power to local community facilities calculated at not more than 55 kilowatt-hours per month for each resident of the community; and

(2) for not more than 600 kilowatt-hours per month sold to each customer in all classes served by the utility except the classes which provide services to customers of the utility under (1) of this subsection.

(d) The amount of power cost assistance provided per month under (c) of this section is the lesser of 95 percent of the average rate per kilowatt-hour sold or the average rate per kilowatt-hour, as determined by the commission. However,

(1) during the fiscal year ending June 30, 1982, the power costs for which power cost assistance may be paid to an electric utility are limited to a minimum power cost of 12 cents per kilowatt-hour and a maximum power cost of 45 cents per kilowatt-hour;

(2) during each following fiscal year, the power costs for which power cost assistance may be paid to an electric utility are limited to the minimum power cost specified in (1) of this subsection plus two cents per kilowatt-hour for the fiscal year ending June 30, 1983, plus two cents per kilowatt-hour for each fiscal year thereafter, and a maximum power cost of 45 cents per kilowatt-hour.

(e) An eligible electric utility may include as part of its revenue requirement for the purpose of setting rates charged to customers those costs for which assistance is provided under this section. However, the utility's approved tariff shall set out the rates without the cost assistance provided in this section and shall set out the

amount of power cost assistance per kilowatt-hour sold. The cost assistance under this section shall be used to reduce the cost of all power sold to a local community facility to the extent of 55 kilowatt-hours per month per resident of the community, and to reduce the cost of the first 600 kilowatt-hours per month for all other classes served by the utility.

(f) The power cost assistance program shall be administered by the authority based on a determination by the commission of adjusted power cost of each electric utility eligible for power cost assistance. An electric utility is eligible for power cost assistance if the power costs of the utility exceed the adjusted power costs, as determined by the commission under (b) - (d) of this section.

(g) The adjusted power cost shall be calculated in the manner prescribed by (c) and (d) of this section and shall be based on the power cost filed with the commission by each eligible electric utility, as verified by the commission. An eligible utility may not be denied power cost assistance because complete cost information is not available. The commission shall assist eligible utilities which are exempt from AS 42.05 to provide the cost information necessary to comply with the requirements of this section. The power cost shall be derived from financial data supporting the most recently approved permanent or interim rate schedule with adjustments incorporating the current cost of fuel. The determination of the cost of fuel by the commission shall be in accordance with the procedure for approving fuel cost rate adjustments in effect at the time of the determination. The commission shall review filings and approve an adjusted power cost per kilowatt-hour and revised rates based on the approved adjusted power cost per kilowatt-hour, as determined under (c) and (d) of this section. The commission may change the adjusted power costs if

(1) an increase or decrease in a utility's cost of fuel has resulted in the approval of a fuel cost rate adjustment by the commission;

(2) a permanent or interim rate increase or decrease has been approved by the commission, thereby establishing a higher or lower power cost;

(3) the authority has discovered discrepancies in its review of data submitted, monthly, by the utilities; or

(4) the authority determines that appropriations are insufficient to fund full payments to eligible utilities.

(h) Each electric utility with a rate schedule and adjusted power cost approved by the commission shall report monthly to the authority within the time and in the form the authority requires. An electric utility shall report

(1) the adjusted power costs per kilowatt-hour approved by the commission including a detailed breakdown of those costs as specified by the commission;

(2) the total kilowatt-hours sold to each class of consumer during the preceding month;

(3) the total kilowatt-hours during the preceding month eligible for power cost assistance under this section sold to each class of consumer;

(4) the total kilowatt-hours generated during the preceding month, if available;

(5) any amendments to the schedule of rates in effect during the preceding month; and

(6) any increase or decrease in the current unit price of fuel from the base price used by the commission in the determination of power costs.

(i) The authority shall review the report prepared under (h) of this section and may submit the report to the commission for additional review before payment. After review and approval of the report by the authority, the authority shall, subject to appropriation, pay to each eligible electric utility an amount equal to the difference between the power cost per kilowatt-hour approved by the commission and the approved adjusted power cost per kilowatt-hour determined under (c) and (d) of this section multiplied by the number of kilowatt-hours eligible for power cost assistance which were sold for the preceding month to each customer of the utility for all sales of power to local community facilities to the extent of 55 kilowatt-hours per month per resident of the community, and for 600 kilowatt-hours per month for other classes served by the utility, whichever is less. Payment shall be made by the authority within 30 days after receipt from the utility of the report required under (h) of this section. However, if there is a dispute between the authority and the utility relating to the payment, the authority shall submit the report to the commission within 30 days after receipt of the report by the authority for review before payment. When a report is submitted to the commission for review under this section, payment shall be made by the authority within 30 days after submission. If appropriations are insufficient for payment in full, the amount paid to each electric utility is reduced on a pro rata basis.

(j) If an electric utility receives power cost assistance under this section, the utility shall either

(1) give the following notice to its electric service customers eligible under this program for each period for which the payment is received:

NOTICE TO CUSTOMER

For the current billing period the utility has been paid under the State of Alaska's power cost assistance program (AS 44.83.162) to assist the utility and its customers in reducing the high cost of generation of electric energy.

Your total electrical service cost $.....

Less state assistance $.....

Your charge $.....; or

(2) give to its electric service customers a notice approved by the authority which notice provides electric service customers the same information provided by the notice in (1) of this subsection.

(k) In order to qualify for power cost assistance, each utility must make every reasonable effort to reduce administrative, operating, and overhead costs, including the utilization of the best available technology consistent with sound utility management practices. Each eligible utility shall cooperate with appropriate state agencies, including but not limited to the Alaska Public Utilities Commission, the Alaska Power Authority, the Alaska Energy Center, and the division of energy and power development in the Department of Commerce and Economic Development, to implement cost-effective energy conservation measures, and to plan for and implement feasible alternatives to diesel generation.

(l) In this section, "power cost" means the items specified in a system of utility accounts designated by the commission less any other assistance received within 60 days before the commission determines the adjusted power cost of the utility, which assistance reduces the customer's cost of power and which is provided to the electric utility or the customers of that utility.

(m) For purposes of (c) of this section, the number of residents of the community shall equal the number of residents of the community

determined by the Department of Community and Regional Affairs in accordance with AS 29.88.015.

(n) In this section,

(1) "commission" means the Alaska Public Utilities Commission;

(2) "community facility" means a water and sewer facility, public outdoor lighting, or community building whose operations are not paid for by the state, the federal government, or private commercial interests;

(3) "energy conservation measures" include weatherization and other insulating methods, utilization of waste heat, appropriate sizing of new generating equipment, and other programs of the state or federal government intended and available for the purpose of energy conservation;

(4) "feasible energy projects" include those which are selected through the reconnaissance and feasibility process according to the criteria in AS 44.83.177 - 44.83.181 to determine cost benefit in comparison to existing power generating methods and other alternatives considered in reconnaissance studies;

(5) "fund" means the power cost assistance fund.

* Sec. 9. AS 44.83.164(a) is amended to read:

(a) A utility which is exempt from regulation under AS 42.05.711 may receive power [PRODUCTION] cost assistance under AS 44.83.162 without becoming subject to the jurisdiction of the Alaska Public Utilities Commission if the utility is otherwise eligible for assistance and if the utility

(1) files with the commission [THE AUDITED] financial data necessary to determine the adjusted power [PRODUCTION] cost <u>as</u> [IN THE FORM] prescribed <u>by the commission</u> [IN A RECOGNIZED SYSTEM OF UTILITY

ACCOUNTS];

(2) makes a report approved by the commission which provides information concerning the cost of generating electric power and the method used by the utility to set rates [THE REPORTS REQUIRED IN AS 44.83.162(g) REQUIRED OF AN ELECTRIC UTILITY WITH A RATE SCHEDULE APPROVED BY THE COMMISSION] within the time and in the form the Alaska Power Authority designates;

(3) sets rates

(A) which consider the assistance provided under AS 44.83.162 [CHARGED FOR RESIDENTIAL SERVICES, LOCAL COMMUNITY SERVICES, AND FOR SERVICES TO CHARITABLE ORGANIZATIONS,] by subtracting from [INCLUDING AS PART OF] its revenue requirements for these services [ONLY] the [ADJUSTED] power [PRODUCTION] cost assistance per kilowatt-hour which is eligible for assistance [SOLD]; and

(B) under which the cost assistance provided in AS 44.83.162 is applied as a credit only against the cost of kilowatt-hours eligible for assistance under AS 44.83.162 which are consumed by each customer in any month;

(4) allows audits which the commission determines are necessary to insure compliance with this section; and

(5) furnishes its electric service customers eligible under this program a notice as [THE "NOTICE TO CUSTOMER"] specified in AS 44.83.162(j).

* Sec. 10. AS 44.83.177(a) is amended to read:

(a) To identify power project alternatives and energy needs and consumption patterns for a community, the authority shall, after consultation with other state agencies and after review of information on alternative sources of power, complete a reconnaissance study for each proposed new power project.

* Sec. 11. AS 44.83.177(b) is repealed and reenacted to read:

(b) A reconnaissance study shall

(1) survey all energy sources available to the community and adjacent area and evaluate the relative economic merits of alternative sources of energy, including energy conservation and capture and utilization of waste energy as provided for in AS 44.83.170(b)(1); if the study surveys

(A) potential hydroelectric sites, the study shall include one-year data collection on water flow;

(B) wind energy, the study shall include a one-year collection and evaluation of data on wind speed, direction, and other information valuable to development of wind generation;

(2) include an assessment of the total energy needs of the community, including but not limited to, electricity, space heating, and transportation fuels based on the nature and amount of energy use and the purpose of its use;

(3) include an assessment of the effect of the development of alternative sources of energy on the environment so as to assure that there is no adverse effect to the environment which would make the project inadvisable;

(4) include public comment from residents of the community and adjacent areas.

* Sec. 12. AS 44.83.177 is amended by adding a new subsection to read:

(d) In completing a reconnaissance study, the authority shall consult with the division of energy and power development in the Department of Commerce and Economic Development and with the Alaska Energy Center to determine the information which each may require for energy planning and the development of technology.

* Sec. 13. AS 44.83.224 is amended by adding a new subsection to read:

(b) Each reconnaissance study completed in accordance with AS 44.83.177 shall become part of the long-term energy plan provided for under (a) of this section.

* Sec. 14. AS 44.25.020 is amended by adding a new paragraph to read:

(5) invest and manage the balance of the power project development fund in accordance with AS 44.83.430.

* Sec. 15. Sections 51 and 54, ch. 83, SLA 1980 are repealed.

* Sec. 16. AS 44.83.162 and 44.83.164 are repealed.

* Sec. 17. APPLICABILITY OF ACT TO DIRECTORS. (a) The terms of office of all members of the Board of Directors of the Alaska Power Authority serving on the effective date of this section terminate on the effective date of this section.

(b) The governor shall appoint three directors of the Alaska Power Authority at large. When making his appointments under this subsection, the governor shall appoint persons to serve in accordance with AS 44.83.030(1) and shall specify the length of the term of office of each member he appoints. Of the members at large first appointed by the governor under this subsection,

(1) one member shall serve a two-year term;

(2) one member shall serve a three-year term;

(3) one member shall serve a four-year term.

* Sec. 18. Sections 1 - 7, 10 - 14, and 17 of this Act take effect immediately in accordance with AS 01.10.070(c).

* Sec. 19. Sections 8, 9, and 15 of this Act take effect July 1, 1981.

* Sec. 20. Section 16 of this Act takes effect July 1, 1992.