SB
608

COMMITTEE REPORT

SENATE

FURTHER:

Date: ____________

Mr. President:

The Committee on ____________ has had ____________

under consideration and (a majority of the committee) (the committee) reports it back with the following recommendations:

[ ] do pass [ ] do not pass

[ ] do pass with attached amendments(s)

[ ] replace with CS for ____________ [ ] same title [ ] new title

and recommends ____________

[ ] AND attaches a "Letter of Intent" [ ] New Fiscal Note

[ ] reports it back without recommendation

[ ] referred to the ____________ Committee

MEMBERS SIGNING DO PASS

MEMBERS HAVING OTHER RECOMMENDATIONS:

____
CHAIRMAN

S 60 (Rev. 12/78)

SENATE AMENDMENT

BY Senator Gilman

To: CSSS SENATE BILL No. 608 (Resources)

To: HOUSE BILL No.

PAGE: 1 LINE: 27

Sec. 7. The sum of $35,000,000 is appropriated from the general fund to Alaska Power Authority for construction of Bradley Lake hydroelectric project.

SENATE AMENDMENT

BY Senator Dick Eliason

To: Senate Resources Committee SENATE BILL No. CSSSSB 608

To: ______ HOUSE BILL No. ______

PAGE:	LINE:	
1	27	Add new Section 7
		The sum of $200,000 is appropriated from the general fund to the Alaska Power Authority for a new power distribution system in Tenakee Springs.
		Renumber subsequent sections accordingly.

SB 608

TO: Billy Berrier
Director
Legal Services

DATE: 3/12/82

Attn: Pegues

FROM: Bettye Fahrenkamp
Chairman

RE: CSSSSB 608(Res)

Attached is CSSSSB 608(Res) the Committee would like the following changesinncorpporated in the bill:

Under "Funding Information" delete "34,400,000" and insert "$36,900,000"

Page 1, line 27 insert a new Sec. 7 to read:

"The sum of $2,5C0,000 is appropriated from the general fund to the Alaska Power Authroity for an electric generation unit for Cordova."

And renumber the following sections accordingly.

If you have any questions please contact Resa King at 465-3834. When the bill is completed please return it to Room 211 Capitol Building.

Attachments.

Original sponsors: Kerttula, Dankworth, Bennett, et al

<u>Funding Information</u>

General Fund	$34,400,000
Other Funds	-0-
	$34,400,000

$36,900,000

IN THE SENATE BY THE RESOURCES COMMITTEE

CS FOR SPONSOR SUBSTITUTE FOR SENATE BILL NO. 608 (Resources)

IN THE LEGISLATURE OF THE STATE OF ALASKA

TWELFTH LEGISLATURE - SECOND SESSION

A BILL

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

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

* Section 1. The sum of $25,600,000 is appropriated from the general fund to the power development fund of the Alaska Power Authority (AS 44.83.380 - 44.83.425) for the Susitna River hydroelectric project (AS 44.83.300 - 44.83.360).

* Sec. 2. The sum of $500,000 is appropriated from the general fund to the Alaska Power Authority for design and right-of-way activities for a possible Kake-Petersburg intertie.

* Sec. 3. The sum of $2,000,000 is appropriated from the general fund to the Alaska Power Authority for installation of waste heat facilities in rural villages.

* Sec. 4. The sum of $2,000,000 is appropriated from the general fund to the Alaska Power Authority for the Lower Kuskokwim power plan.

* Sec. 5. The sum of $4,000,000 is appropriated from the general fund to the Alaska Power Authority for feasibility studies in rural villages.

* Sec. 6. The sum of $300,000 is appropriated from the general fund to the Alaska Power Authority for feasibility analysis of alternatives that can lower the cost of power for Angoon.

* Sec. 7. The appropriations made by this Act are for capital projects and are subject to AS 37.25.020.

* Sec. 8. This Act takes effect immediately in accordance with AS 01.10.-

Cordova 2,500,000

070(c).

The items listed below are in the subject file - Hydro, -82.

Alaska State Legislature

BETTYE FAHRENKAMP, CHAIRMAN
VIC FISCHER, VICE-CHAIRMAN
BRAD BRADLEY
DICK ELIASON
DON GILMAN
BOB MULCAHY
ARLISS STURGULEWSKI

POUCH V
STATE CAPITOL
JUNEAU, ALASKA 99811
(907) 465-3834
(907) 465-3835

Senate

Committee on Resources

TO: Senate Resources Committee

FROM Senate Resources Committee Staff

DATE: 2/27/82

RE: Hearing - 3/3/82 - SB 608 - Special appropriation to the power development fund of the Alaska Power Authority for the Susitna River hydroelectric project and other projects.

Attached are several reports and documents regarding the Susitna project; and other related materials:

1. Battele Pacific Northwest Laboratories; Railbelt Electric Power Alternatives Study;

2. Four House Research Agency Reports;

3. State of Alaska Long Term Energy Plan - 1982 Report - Summary (entire report previously distributed);

4. Department of Labor Official Population and projections through 1985;

5. January 15, 1982 Birch, Horton, Bittner and Monroe Report - Summary (the report is 3 volumns and 2 volumns of regulations);

6. February 5, 1982 Birch, Horton, Bittner and Monroe Report;

7. Arlon Tussing - Susitna Hydropower; A Review of the Issues;

8. February 24, 1982, Budget and Audit Memorandum, regarding general funds available for appropriation; and,

9. Alaska Ruralite aritcle: The Alaska Scene.

Attachments

ed: 3/8/82

ALASKA POWER AUTHORITY

334 WEST 5th AVENUE - ANCHORAGE, ALASKA 99501

Phone: (907) 277-7641
(907) 276-0001

March 5, 1982

The Honorable Bettye Fahrenkamp
Alaska State Legislature
Pouch V
Juneau, Alaska 99811

Dear Senator Fahrenkamp:

At your 3 March 1982 Senate Resources Committee hearing on SB-608, you requested that I identify the minimum funding requirements needed to insure that the energy development program proceeds unimpeded. Last year the Legislature appropriated both funds and interest to be earned on those funds to construct a number of projects. The Attorney General has made a preliminary funding that interest was improperly appropriated and thus is not available. In addition, construction costs of some of the projects have risen while the cost of others decreased.

The Power Authority has provided tax exempt interim financing for two of the projects and is prepared to do the same for others if necessary. This technique must be construed only as a temporary solution, however, as it will ultimately be necessary to provide long term financing through state appropriations or Revenue Bonds. Please also be aware that this is my perceptions of funding needs that would maintain the current program, but it has not been endorsed by Governor Hammond or his staff. The Governor's Budget Review Committee has a much broader view of the state's program priorities and should be consulted when reviewing this input. Finally, I have identified for Senator Dankworth those funds previously appropriated which are excessive to specific project needs and thus are available for reappropriation. Following is the information which you requested:

1. Swan Lake - It appears that it will cost up to $16 million to complete the acquisition and construction of this project through December 1983. However, interim financing is in place. Therefore it is possible to defer subsequent appropriations of these amounts to the future, or long term bonds could be issued sometime prior to the maturity of the interim financing. Therefore the appropriation request could be reduced to zero for the current fiscal year.

2. Lake [illegible]ee - Interim financing has also been accomplished for this project, however, $40 million in state funding may be necessary to complete the construction financing of this project if the state is going to directly fund the full costs of this project. It is possible that the FY 83 appropriation for this project could be deferred to FY 84.

3. Bradley Lake - The Power Authority is currently preparing its recommendations to the Governor and the Legislature for this project. $15 million has been appropriated to date for the project and it has been indicated by the Corps of Engineers that in order to enter into an agreement to proceed with construction of the project in FY 83, it would be necessary for an additional $35 million to be appropriated in FY 83. In addition, the Legislature must authorize the Power Authority to proceed with design and construction of the project.

4. Anchorage/Fairbanks Intertie - Since interest earnings may not be available, unless the law is changed for funds appropriated for projects to be financed from the Power Development Fund, it would be necessary to appropriate $57 million to complete construction of the project through FY 84. The Power Authority would need authorization to issue bonds to complete construction of the project if appropriations were not available in FY 83. For this project it is also necessary to amend or repeal Sec. 14, Ch. 118, SLA 1981, which is special legislation which could jeopardize efforts of the Power Authority to proceed with construction of the project.

5. Terror Lake - The estimated cost to complete construction of this project for the low dam scheme is $174 million. The Power Authority will receive bids in mid-April for the major Civil Construction Contract associated with this project. It will only be at that time that we'll have a more definitive cost to complete construction of this project. The Power Authority can interim finance this project with the existing bond authorization of $120 million and the $81.5 million in appropriated funds if the civil construction bids come in reasonably close to the estimated cost of the project. The reason the existing $120 million bond authorization would be insufficient, if the construction cost increase by from $5 to $15 million, is because the interim financing mechanism requires that all interest during construction be capitalized out of note proceeds. Therefore it would be advisable to obtain an approximately $20 million appropriation in FY 83 for the Terror Lake project or receive an increased authorization to issue bonds for the project of $20 million.

6. Rural Electrificaton Loan Fund - This appropriation request could be reduced to zero for FY 83 since no utility has applied to date for our FY 82 funds. However restructuring of the fund may generate instant demands for existing funds.

7. Power Cost Assistance Fund - This capital appropriation was shifted into the operating budget request of the Power Authority by the Budget Review Committee and by knowledge has been included in the Governor's request for funding.

8. Black Bear Lake - The Power Authority does not have to initiate construction with funds to be appropriated in FY 83 and the Power Authority could be prepared to proceed with construction in FY 84 if $3 million was appropriated in the current fiscal year to proceed with design of the project. It would also be advisable to authorize the Power Authority to issue bonds in the amount not to exceed $60 million for the project which would also include capitalized interest. The actual present pay cost of the project is roughly $35 million.

9. Kake/Petersburg Transmission Line Intertie - The Power Authority is still studying the feasibility of this project and there will not be a determination for approximately another 4 months. If the project is feasible, approximately $500,000 would be necessary in FY 83 to proceed with design and right-of-way activities.

10. Kotzebue District Heating Project - Funding request of $2.5 million would be necessary in FY 83 to proceed with the detailed engineering and design of the project. Feasibility study results may not be available for at least 2 months.

11. Chester Lake Hydroelectric Project - The Power Authority recommendations are currently being prepared on the feasibility of this project. If the project is authorized for construction approximately $14 million would be necessary in FY 83. A FERC license will not be required to initiate construction of this project. The Legislature would have to authorize the Power Authority to proceed with design and construction of the project, in addition to a bond authorization of $20 million if the project is not state funded.

12. Rural Small Hydro Construction - The $27 million request for this program represents $5 million in FY 83 and only the best of the projects currently being investigated would proceed with design and construction. Construction could begin this summer on some of the small projects.

13. Rural Waste Heat Construction - The full funding request of $2 million is necessary for FY 83 because the assessments demonstrate that waste heat recapture is very attractive for many rural communities.

14. Susitna Hydroelectric Project - The budget request of $25.6 million is what will be necessary to proceed with the detailed design and continued processing of the FERC license during FY 83. Authorization to proceed with engineering and design of the project is necessary.

15. West Creek Hydroelectric Project - The budget request of $2 million is what would be necessary to initiate the detailed design of this project if the determination of feasibility is made within the next 2 months. If the Power Authority is going to be appropriated funds and to proceed with design of this project once the determination of feasibility is made it would be necessary to receive an authorization to proceed with design of the project from the Legislature.

16. Grant Lake - The Power Authority is currently completing the feasibility study for this project. If the Power Authority were going to proceed with design of this project at least $2 million would have to be appropriated in FY 83. In addition, legislative authorization for construction would be required.

17. Bristol Bay Project Licensing and Final Design - The feasibility study is still proceeding, however, there will not be a final determination of feasibility of the project before the end of the legislative session. If the capital intensive alternative is determined to be feasible in the region it would cost approximately $4 million to complete the detailed design of the project. In addition the Power Authority would have to be authorized to proceed with detailed design in accordance with our statutes.

18. Lower Kuskokwim Power Plan - $2 million is necessary in FY 83 to complete the detailed feasibility study of the preferred alternatives which will be identified as a result of the studies currently underway. The $1 million in funding in FY 82 was sufficient to complete Phase I of the detailed feasibility study of the Lower Kuskokwim Region.

19. Chakachamna Hydroelectric Project - $2.2 million is necessary in FY 83 in order to complete the Chakachamna feasibility study which was funded for $1 million in FY 82.

20. Rural Village Feasibility Study - The budget request of $4 million for this project is necessary to address the severe problems in rural Alaska and to establish the feasibility of those alternatives which are identified in FY 81 as a result of the rural recon studies currently underway. If funding is reduced below $4 million, then feasibility studies will only be undertaken on the alternatives that showed the greatest potential as a result of the FY 82 reconnaissance studies in rural Alaska.

21. Hoonah Intertie - If a detailed feasibility study and initiation of design of this project is going to be initiated, Appropriation necessary in FY 83 will be $1.1 million.

22. Reynolds Creek Hydroelectric Project - Funding for the initial environmental studies associated with this project could be deferred to a later year since the Black Bear Lake Hydroelectric Project will be capable of addressing the near to mid term needs of the communities on Prince of Wales Island.

23. Emergency Maintenance Fund - This fund will be capitalized out of program receipts received from revenues from the sale of power. Since consumers will be paying in their rates the revenues derived to capitalize this fund, and since it is not known specifically when the emergency maintenance fund may be drawn on, it is requested that the $500,000 for this appropriation be appropriated with interest earnings so that the value of the revenues collected from consumers is not diminished overtime.

24. Renewal and Replacement Fund - The $750,000 requested in FY 83 would be again program receipts derived from revenues from the sale of power. The appropriation of these program receipts should be with interest earnings so that the value of the revenues collected from consumers will not be diminished from the period of time they are collected until they are actually utilized for renewal and replacement of components of the project.

If you have any questions or would like any additional information, please call upon me.

Sincerely,

E. P. Yould

Eric P. Yould
Executive Director

Attachment: as stated

cc: Chuck Conway
Ron Lehr
Jerry Reinwand
Commissioner Mueller

2

ALASKA STATE LEGISLATURE
HOUSE OF REPRESENTATIVES
RESEARCH AGENCY

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

February 18, 1982

MEMORANDUM

TO: Representative Brian Rogers
Attn: Nancy Lord

FROM: Jack Kreinheder JK
Research Staff

RE: Current Electric Power Generation Costs in Alaska Communities
Research Request 82-13 (additional information)

This memorandum contains the information you requested on current (or recent) power costs in areas to be served by planned hydro projects. In my memorandum to you dated February 9, estimates of the wholesale or busbar cost of power from various hydro projects were made. To make a reasonable comparison of these power cost estimates with current costs, it is necessary to look at the comparable cost of power generation for each utility from their current generation facilities, rather than retail or consumer power rates. The attached table summarizes these current power generation cost estimates for the major communities to be served by each power project.

The estimated power costs range from 1.6 cents per kilowatt hour (KWH) for the Chugach Electric Association, serving Anchorage and surrounding communities, to 19.4 cents per KWH for the Tlingit-Haida Regional Electric Authority, which serves Klawock and other villages. The average generation cost was about 6.9 cents per KWH.

These estimates are approximate figures because of limitations in the cost information we could obtain, as explained below. Time did not allow the inclusion of all utilities; for communities served by more than one utility, generation costs were calculated for the largest utility. The years used as a basis for these estimates range from 1979 to 1981, depending on the data available for each utility.

It is also important to consider the effect of inflation when comparing these current power cost estimates with the hydro cost estimates in the last memo, because the hydro estimates included the impact of inflation on operation and maintenance expenses and the repayment of State funds invested in the hydro facilities. Therefore, the current or recent power generation costs in the attached table have been inflated by

7 percent per year for the years 1986, 1990, 1995, 2000, 2010, and 2015, which are the years used in the previous memo. The 7 percent inflation adjustment matches the assumed rate of inflation used in projecting future operation and maintenance expenses in that memo.

It should be emphasized that the future cost figures in the attached table are not projections of the actual cost of power in these years, but are just current costs adjusted for inflation for the purpose of comparison. Actual power costs in future years will depend on load growth, fuel cost increases, and other factors.

The power generation cost estimates in the table include the cost of fuel, operation and maintenance of generating facilities, and debt service for utility facilities. It was not possible to separate the debt service for generating facilities from that for distribution or other facilities. However, depreciation was not included as a cost in an effort to balance this overstatement of power generation costs. The cost of power distribution, line maintenance, administrative expenses, and so on were not included because these costs would not be affected by the conversion to hydro power from present generating facilities. It should be noted that a small portion of the current generating costs would continue even under full conversion to hydro, because of the need to maintain backup generating capability in the event of a line failure or other problem with the hydro facility.

This memo completes our work on this research request. If you have any questions or would like additional information, please give us a call.

Prepared by
House Research Agency
February 18, 1982

CURRENT AND INFLATION-ADJUSTED POWER GENERATION COSTS IN COMMUNITIES TO BE SERVED BY HYDRO PROJECTS PLANNED OR UNDER CONSTRUCTION

			POWER GENERATION COST (Cents per KWH)						
Community	Hydro Project	Utility	Current	1986	1990	1995	2000	2010	2015
Anchorage	Susitna	Chugach Electric Association	1.6 (1980)	2.4	3.1	4.3	6.0	11.8	16.5
Fairbanks	Susitna	Golden Valley Electric Association	5.8 (1980)	8.7	11.4	16.0	22.4	44.1	61.7
Kenai Peninsula	Bradley Lake	Homer Electric Association	1.7 (1981)[1]	2.4	3.1	4.3	6.0	11.8	16.5
Ketchikan	Swan Lake	Ketchikan Public Utility	3.2 (1980)	4.8	6.3	8.8	12.3	24.2	33.9
Klawock	Black Bear Lake	Tlingit-Haida Regional Electric Authority	19.4 (1980)	29.1	38.1	53.3	74.6	147.0	205.8
Kodiak	Terror Lake	Kodiak Electric Association	7.4 (1979)	11.9	15.6	21.8	30.5	60.1	84.1
Petersburg	Tyee Lake	Petersburg Public Utility	5.7 (1981)		10.5	14.7	20.6	40.6	56.8
Valdez	Solomon Gulch	Copper Valley Electric Association	7.3 (1979)	11.8	15.5	21.7	30.4	60.0	84.0
Wrangell	Tyee Lake	Wrangell Public Utility	9.9 (1981)	13.9	18.2	25.5	35.7	70.3	98.4

SOURCE: Rural Electrification Association forms 7A and 7E, and utility estimates.

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[1] The Homer Electric Association buys over 99 percent of its power from Chugach Electric. Therefore, the cost shown is the wholesale cost of power purchased from Chugach, rather than the cost of power generation for the Homer Electric Association.

ALASKA POWER AUTHORITY

334 WEST 5th AVENUE - ANCHORAGE, ALASKA 99501

Phone: (907) 277-7641
(907) 276-0001

March 5, 1982

SB608

The Honorable M. E. Dankworth
Alaska State Legislature
Pouch V
Juneau, Alaska 99811

Dear Senator Dankworth:

You have requested information on funds which have been appropriated to the Power Authority in recent years which may be available for reappropriation. I understand that this is necessary due to the fact that the state's revenue projections for FY 83 have been considerably reduced. In addition preliminary indications from the Attorney General's office on the law suit of the Trustees for Alaska are that interest earnings, which were appropriated with funds appropriated in FY 82 for the Power Development Fund, may not have been properly appropriated and may not accrue to the projects for which they are appropriated. The following is a listing of those appropriations which we feel are available for reappropriation for other projects and purposes.

1. Angoon Title - Original appropriation was for $250,000 in Ch. 120 SLA 1980. This project does not appear that it will proceed in any form and the total amount of the appropriation could be used for other purposes.

2. Akutan - Ch. 54 SLA 1980 appropriated $1.1 million for a small hydroelectric project at Akutan. $126,000 was loaned to the City of Akutan for the purchase of a turbine for the project. The balance of this appropriation or $974,000 could be used for other purposes. I recommend that the appropriated amount be reduced to $126,000, since the project will not proceed to construction.

3. Bethel - $2 million was appropriated in Ch. 54 SLA 1980. The purpose of the appropriation was for a loan to the City of Bethel to purchase the Bethel Utilities Corporation. $2 million is insufficient to purchase the utility and the effective interest rate for loans from the power project loan fund is unacceptable to the City of Bethel. The City of Bethel does not appear to be interested in pursuing an application for the loan of these funds for this purpose. These funds could be made available for reappropriation for other purposes.

4. Green Lake - Ch. 90 SLA 1981 appropriated $60 million for the Green Lake Project. Ch. 92 SLA 981 repealed and reenacted

Section 1 of Ch. 90 SLA 1981 to appropriate $50 million for Green Lake in FY 82 and $10 million in FY 83. If the City and Borough of Sitka determines that they want to participate in the Energy Program for Alaska, the Power Authority would have to acquire the Green Lake project with the appropriated funds. It is not clear as yet what the definitive cost would be for acquisition since the resolution of construction claims, and the method of defeasance of bonds issued by the City of Sitka to finance the construction of the project have not as yet been determined. If funds were to be made available for reappropriation I would advise that the FY 83 appropriation contained in Ch. 92 SLA 1981 be reduced from $10 million to $2 million. Remaining funds would be sufficient to acquire the project with no impact to Sitka.

5. Solomon Gulch - $68 million was appropriated in Ch. 90 SLA 1981 for the acquisition of this project. Ch. 92 SLA 1981 deferred $10 million of the $68 million appropriation to FY 83. The cost of acquisition of this project should be more definitively defined within the next 3 weeks. At that time it will be clearly established what the necessary costs will be to pay off certain loans from the Federal Financing Bank which had been made to the Copper Valley Electric Association and what it will cost to defease certain low interest loans from the Rural Electrification Administration. In addition, there are approximately $6 million in outstanding construction contract claims which will have to be resolved. It appears that it is possible to designate up to $15 million of the $68 million which had been appropriated for the project for reappropriation for other projects. I would suggest that the FY 83 appropriation contained in Ch. 92 SLA 1981 be reduced to zero and the FY 82 appropriation be reduced to $53 million.

6. Lake Elva - Ch. 90 SLA 1981, Sec. 11 appropriated $4.5 million for the Lake Elva project. The Power Authority is not going to proceed with this project and is still investigating the Lake Tazimina project and other alternatives for this region. Some funds have been expended or obligated from the original appropriation, therefore I recommend that the appropriated amount be reduced to $50,000. The funds should be reappropriated to the Bristol Bay project as funds will be needed there.

7. Petersburg - Ch. 90 SLA 1981, Sec. 20 appropriated $1.5 million for a loan to the City of Petersburg for local transmission and distribution lines. It does not appear that the City of Petersburg is prepared to borrow the funds for the specified purposes at the current interest rate which is available for loans from the power project loan fund. It is possible that these funds are available for reappropriation

for other projects including the Lake Tyee Hyroelectric Project.

8. Wrangell - Ch. 90 SLA 1981, Sec. 21 appropriated $1.5 million to the City of Wrangell for the same purposes as described in number 7 above. For the same reasons it is possible that the funds would be available for reappropriation for other projects, including the Lake Tyee project.

9. Akutan - Ch. 90 SLA 1981, Sec. 34 appropriated $127,000 for a loan to the City of Akutan for electrification. As indicated in item 2 above, the loan had been made prior to the appropriation referenced in this section from a prior appropriation. Therefore, the funds appropriated in section 34 of this act could be reappropriated for other purposes.

10. Ouzinkie - Ch. 90 SLA 1981, Sec. 46 appropriated $700,000 for the Ouzinkie Waste Heat Project. This appropriation could be reduced to the amount of $250,000 since it is possible to complete the project for that cost.

You also asked me to specify and justify for you what would be the minimum appropriations which may be necessary for FY 83 for the power development program. I was also asked this question by Senator Fahrenkamp at a recent Senate Resources Committee hearing on SB-608. Attached is my response to Senator Fahrenkamp.

If you have any questions or would like additional information, please call upon me.

Sincerely,

E. P. Yould

Eric P. Yould
Executive Director

Attachment: as stated

cc: Chuck Conway
Ron Lehr
Jerry Reinwand
Commissioner Mueller

Resource Development Council for Alaska, Inc.
444 West 7th Avenue, Anchorage, Alaska 99501
Box 516, Anchorage, Alaska 99510 - 907/278-9615

RESOLUTION ON ALASKA'S HYDROELECTRIC DEVELOPMENT

December 1981

WHEREAS in 1981 the Alaska Legislature recognized the seriousness of the energy needs in the state, and

WHEREAS after seven years and millions of dollars spent studying energy needs, not one dam had been completed, no windmills, no solar systems, nor any geothermal or tidal systems were in operation with the exception of some isolated government research projects, and individual alternative energy systems, and

WHEREAS the Alaska Legislature acknowledged the lack of an energy plan or any direction from the state administration and passed SB 25 and SB 26 relating to hydroelectric projects, and

WHEREAS the Governor permitted the bills to become law, and

WHEREAS hydroelectric power could be a long-term source of revenue to the state as other resources are depleted, and

WHEREAS SB 25 and SB 26 constitute a five year energy plan disgned by the legislature to assure the majority of Alaskans some 50-100 years of clean, safe and reasonably priced energy to replace our non-renewable energy resource which flows from Alaska at the rate of 1.5 million barrels a day, and

WHEREAS SB 25 and SB 26 also included over $50 million appropriated for the purpose of doing reconnaissance and feasibility studies on other possible sources of energy as well as a wide spectrum of grants for energy sources other than hydroelectric,

THEREFORE BE IT RESOLVED that the Resource Development Council strongly supports the legislation passed in 1981.

.....continued

BE IT FURTHER RESOLVED that the Resource Development Council supports the development of economically viable hydroelectric projects funded with state revenues, and

BE IT FURTHER RESOLVED that the Resource Development Council supports rates for hydroelectricity that reflect the operation and maintanence costs of the project supplying that power, and

BE IT FURTHER RESOLVED that the Resource Development Council will actively support continuation of the legislative intent to provide needed energy at reasonable costs in Alaska.

#

From Dept. of Labor

TABLE I.1

Official Alaska Population, 1980 and 1981, By Census Area

Census Area	April 1, 1980 Population	July 1, 1981 Population
STATE OF ALASKA	401,851	422,187
Aleutian Islands	7,768	8,624
Anchorage, Municipality of	174,431	180,740
Bethel	10,999	10,864
Bristol Bay Borough	1,094	1,182
Dillingham	4,616	4,534
Fairbanks-North Star Borough	53,983	58,313
Haines Borough	1,680	1,712
Juneau, City and Borough of	19,528	21,080
Kenai Peninsula Borough	25,282	26,520
Ketchikan Gateway Borough	11,316	11,373
Kobuk	4,831	4,960
Kodiak Island Borough	9,939	9,728
Matanuska-Susitna Borough	17,816	19,123
Nome	6,537	7,565
North Slope Borough*	4,199	7,098
Prince of Wales Island - Outer Ketchikan	3,822	4,041
Sitka, City and Borough of	7,803	7,927
Skagway - Yakutat - Angoon	3,478	3,311
Southeast Fairbanks	5,676	5,803
Valdez- Cordova	8,348	8,846
Wade Hampton	4,665	4,726
Wrangell - Petersburg	6,167	6,541
Yukon - Koyukuk	7,873	7,576

* The 1981 population estimate for the North Slope Borough is based on censuses conducted by each of the cities inside the Borough except Barrow, along with a Borough-wide census of all villages and oilrelated work sites.

A degree of caution is needed in comparing the 1980 and 1981 population data given for the North Slope Borough. In 1980, the U.S. Bureau of the Census treated the Prudhoe Bay area as a unique site and departed from the definition of "residency" used for Alaska's population determinations. By doing this, the oil workers who could have been counted as census residents of the Prudhoe Bay area (based upon the amount of time spent at Prudhoe Bay) were "allocated" to a communited stated to be an oil worker's "usual place of residence". The difference between the Census Bureau's 1980 figure and the State's 1981 figure (which is based on a complete census of all oil-related work sites) is not based on a fundamental difference in residency definitions used by the Census Bureau and the State. The State's census program is recognized by the U.S. Census Bureau as being in accordance with its own definitions and concepts. Further, the Census Bureau accepts the state-certified census results in the annual population determinations that are used for federal revenue sharing. The difference between the 1980 and 1981 figures is based upon the procedural policy implemented by the U.S. Census Bureau that in effect did not treat Prudhoe Bay as a place in which people "resided".

TABLE I.2

OFFICIAL ALASKA POPULATION, CITIES AND BOROUGHS, 1980 and 1981, BY CENSUS AREA

	April 1, 1980 Population	July 1, 1981 Population
STATE OF ALASKA	401,851	422,187
Aleutian Islands Census Area	7,768	8,624
Akutan	169	189
King Cove	460	513
Saint Paul	551	591*
Sand Point	625	697
Unalaska	1,322	1,944**
Total Incorporated Places	3,127	3,934
Remainder	4,641	4,690
Anchorage, Municipality of	174,431	180,740
Total Incorporated Places	174,431	180,740
Remainder	0	0
Bethel Census Area	10,999	10,864
Akiachak	438	435
Akiak	198	197
Akolmiut	641	695*
Aniak	341	338
Atmautluak	219	226*
Bethel	3,576	3,549
Chefornak	230	230*
Chuathbaluk	105	104
Eek	228	226
Goodnews Bay	168	167
Kwethluk	454	451
Mekoryuk	160	176*
Napakiak	262	283
Napaskiak	244	24[illegible]
Newtok	131	175*
Nightmute	119	135*
Platinum	55	55
Quinhagak	412	409
Toksook Bay	333	331
Tuluksak	236	234
Tununak	298	301*
Lower Kalskag	246	244
Upper Kalskag	129	128
Total Incorporated Places	9,223	9,331
Remainder	1,776	1,533

TABLE I.2

OFFICIAL ALASKA POPULATION,
CITIES AND BOROUGHS,
1980 and 1981, BY CENSUS AREA
(continued)

	April 1, 1980 Population	July 1, 1981 Population
Bristol Bay Borough	1,094	1,182
Total Incorporated Places	1,094	1,182
Remainder	0	0
Dillingham Census Area	4,616	4,534
Aleknagik	154	152
Clark's Point	79	78
Dillingham	1,563	1,670*
Ekwok	77	76
Manokotak	294	290
Newhalen	87	135*
New Stuyahok	331	327
Nondalton	173	171
Port Heiden	92	91
Togiak	470	511*
Total Incorporated Places	3,320	3,501
Remainder	1,296	1,033
Fairbanks-North Star Borough	53,983 1/	58,313 1/
Fairbanks	22,645	25,568**
North Pole	724	928*
Total Inc. Places (within borough)	23,369	26,496
Remainder	30,614	31,817
Haines Borough	1,680	1,712
Haines	993	1,017
Total Inc. Places (within borough)	993	1,017
Remainder	687	695
Juneau, City and Borough of	19,528	21,080
Juneau, City and Borough of	19,528	21,080
Total Inc. Places (within borough)	19,528	21,080
Remainder	0	0

TABLE I.2

OFFICIAL ALASKA POPULATION,
CITIES AND BOROUGHS,
1980 and 1981, BY CENSUS AREA
(continued)

	April 1, 1980 Population	July 1, 1981 Population
Kenai Peninsula Borough	25,282	26,520
Homer	2,209	2,588
Kachemak	403	425
Kenai	4,324	4,558
Seldovia	479	505
Seward	1,843	1,943
Soldotna	2,320	2,445
Total Inc. Places (within borough)	11,578	12,464
Remainder	13,704	14,056
Ketchikan Gateway Borough	11,316	11,373
Ketchikan	7,198	7,200
Saxman	273	276
Total Inc. Places (within borough)	7,471	7,476
Remainder	3,845	3,897
Kobuk Census Area	4,831	4,960
Ambler	192	198
Buckland	177	211*
Deering	150	155
Kiana	345	356
Kivalina	241	249
Kobuk	62	64
Kotzebue	2,054	2,250
Noorvik	492	508
Selawik	361	372
Shungnak	202	208
Total Incorporated Places	4,276	[illegible]
Remainder	555	389
Kodiak Island Borough	9,939 2/	9,728 2/
Akhiok	105	103
Kodiak	4,756	4,678
Larsen Bay	168	167*
Old Harbor	340	334
Ouzinkie	173	170
Port Lions	215	218
Total Inc. Places (within borough)	5,757	5,670
Remainder	4,182	4,065

TABLE I.2

OFFICIAL ALASKA POPULATION,
CITIES, AND BOROUGHS,
1980 and 1981, BY CENSUS AREA
(contained)

	April 1, 1980 Population	July 1, 1981 Population
Matanuska-Susitna Borough	17,816	19,123
Houston	370	583
Palmer	2,141	2,275
Wasilla	1,559	1,928
Total Inc. Places (within borough)	4,070	4,786
Remainder	13,746	14,337
Nome Census Area	6,537	7,565
Brevig Mission	138	149
Diomede	139	149*
Elim	211	228
Gambell	445	480
Golovin	87	94
Koyuk	188	203
Nome	2,301	3,039**3/
St. Michael	239	258
Savoonga	491	530
Shaktoolik	164	177
Shishmaref	394	425
Stebbins	331	357
Teller	212	229*
Unalakleet	623	672
Wales	133	143
White Mountain	125	135
Total Inc. Places	6,221	7,268
Remainder	316	297
North Slope Borough 4/	4,199	7,098
Anaktuvak Pass	203	235*
Barrow	2,207	2,539
Kaktovik	165	201*
Nuiqsut	208	270*
Point Hope	464	531*
Wainwright	405	410*
Total Inc. Places (within borough)	3,652	4,186
Remainder	547	2,912*

TABLE I.2

OFFICIAL ALASKA POPULATION,
CITIES, AND BOROUGHS,
1980 and 1981, BY CENSUS AREA

	April 1, 1980 Population	July 1, 1981 Population
Prince of Wales-Outer Ketchikan Census Area	3,822	4,041
Craig	527	560
Hydaburg	298	356*
Kasaan	25	64*
Klawock	318	389*
Total Incorporated Places	1,168	1,369
Remainder	2,654	2,672
Sitka, City and Borough of	7,803	7,927
Total Incorporated Places	7,803	7,927
Remainder	0	0
Skagway-Yakutat-Angoon Census Area	3,478	3,311
Angoon	465	445
Hoonah	680	799*
Pelican	180	172
Skagway	768	819
Tenakee Springs	138	132
Yakutat	449	430
Total Incorporated Places	2,680	2,797
Remainder	798	514
Southeast Fairbanks Census Area	5,676	5,803
Delta Junction	945	945
Eagle	110	186*
Total Incorporated Places	1,055	1,131
Remainder	4,621	4,672
Valdez-Cordova Census Area	8,348	8,846
Cordova	1,879	2,223**
Valdez	3,079	3,279
Whittier	198	211
Total Incorporated Places	5,156	5,713
Remainder	3,192	3,133

TABLE I.2

OFFICIAL ALASKA POPULATION,
CITIES, AND BOROUGHS,
1980 and 1981, BY CENSUS AREA
(continued)

	April 1, 1980 Population	July 1, 1981 Population
Wade Hampton Census Area	4,665	4,726
Alakanuk	522	534*
Chevak	466	491*
Emmonak	567	568*
Fortuna Ledge	262	243*
Hooper Bay	627	624
Kotlik	293	339*
Mountain Village	583	580
Pilot Station	325	323
Russian Mission	169	168
St. Mary's	382	432*
Scammon Bay	250	249
Sheldon Point	103	103
Total Incorporated Places	4,549	4,654
Remainder	116	72
Wrangell-Petersburg Census Area	6,167	6,541
Kake	555	583
Kupreanof	47	49
Petersburg	2,821	3,001**
Port Alexander	86	90
Wrangell	2,184	2,345**
Total Incorporated Places	5,693	6,068
Remainder	474	473
Yukon-Koyukuk Census Area	7,873	7,576
Allakaket	163	158
Anderson	517	500
Anvik	114	110
Fort Yukon	619	599
Galena	765	805*
Grayling	209	202
Holy Cross	241	233
Hughes	73	71
Huslia	188	230*
Kaltag	247	239
Koyukuk	98	95
McGrath	355	343
Nenana	470	592
Nikolai	91	88
Nulato	350	338

TABLE I.2

OFFICIAL ALASKA POPULATION,
CITIES, AND BOROUGHS,
1980 and 1981, BY CENSUS AREA
(continued)

	April 1, 1980 Population	July 1, 1981 Population
Yukon-Koyukuk Census Area (cont.)		
Ruby	197	190
Shageluk	131	127
Tanana	388	463*
Total Incorporated Places	5,216	5,383
Remainder	2,657	2,193

FOOTNOTES

1/ Although Eielson Air Force Base is located within the boundaries of the Fairbanks-North Star Borough, it has not been officially annexed to the Borough. Its resident population is, however, included in the total Borough population.

2/ Kodiak Island Coast Guard Station is located within the boundaries of the Kodiak Island Borough but it has never been annexed to the Borough. Its resident population is, however, included in the total Borough population.

3/ The 1981 State-assisted census of Nome was based on municipal boundaries as redefined after the 1980 federal census.

4/ The 1981 population estimate for the North Slope Borough is based on censuses conducted by each of the cities inside the Borough except Barrow, along with a Borough-wide census of all villages and oil-related work sites.

A degree of caution is needed in comparing the 1980 and 1981 population data given for the North Slope Borough. In 1980, the U.S. Bureau of the Census treated the Prudhoe Bay area as a unique site and departed from the definition of "residency" used for Alaska's population determinations. By doing this, the oil workers who could have been counted as census residents of the Prudhoe Bay area (based upon the amount of time spent at Prudhoe Bay) were "allocated" to a communited stated to be an oil worker's "usual place of residence". The differenc between the Census Bureau's 1980 figure and the State's 1981 figure (which is based on a complete census of all oil-related work sites) is not based on a fundamental difference in residency definitions used by the Census Bureau and the State. The State's census program is recognized by the U.S. Census Bureau as being in accordance with its own definitions and concepts. Further, the Census Bureau accepts the state-certified census results in the annual population determinations that are used for federal revenue sharing. The difference between the 1980 and 1981 figures is based upon the procedural policy implemented by the U.S. Census Bureau that in effect did not treat Prudhoe Bay as a place in which people "resided".

* Indicates a census conducted by a municipality in accordance with State guidelines.

** Indicates a census conducted under the auspices of, and certified by the State Demographer.

Greater Fairbanks
CHAMBER OF COMMERCE
In Association With
U.S. Chamber of Commerce
Alaska State Chamber of Commerce
Fairbanks Visitor & Convention Bureau
Fairbanks Industrial Development Corporation
FAIRBANKS
ALASKA 99701

To SENATE RESOURCES

RESOLUTION SUPPORTING SUSITNA RIVER
AND OTHER HYDRO-ELECTRIC PROJECTS

RESOLUTION 2-282

WHEREAS, the Greater Fairbanks Chamber of Commerce Board of Directors has previously gone on record in support of the Susitna River and other hydro-electric projects; and

WHEREAS, the Legislature in the last session took necessary steps to assure that some of our oil revenues would be invested in hydro-electric projects that will benefit a large majority of Alaskans; and

WHEREAS, hydro-electric projects generally provide clean, safe and reasonably priced energy for indefinite periods of time; and

WHEREAS, studies done by professional consulting firms indicate a projected need for additional electrical generating facilities within the State; and

WHEREAS, the lead time required for building hydro-electric projects is substantial; and

WHEREAS, most hydro-electric projects and especially Susitna River, have been studied extensively for a number of years; and

WHEREAS, the longer we delay start of construction, the more expensive these, or any other electric generating plants will become:

NOW, THEREFORE BE IT RESOLVED that the Greater Fairbanks Chamber of Commerce once again goes on record as strongly supporting the Susitna River and other hydro-electric projects and we strongly endorse the provisions and intent of sponsor substitute for Senate Bill number 608 and recommend the Bill be passed.

BE IT FURTHER RESOLVED that the Greater Fairbanks Chamber of Commerce does not support the provisions and intent of Senate Bill 646 which would result in additional delays of the projects and which would increase the cost to the consumers substantially over a

From: Chamber of Commerce
FBX

State Resources
Page 2 of 2

number of years by having the consumer pay back to the State the cost of capital for construction of these projects, in addition to normal operation and maintenance costs.

BE IT FURTHER RESOLVED that the following members of the Board of Directors were present at the meeting in which this Resolution was unanimously adopted: Judy Allington, Bill Bubbell, Frank Chapados, Gary Danielson, Chuck Gray, Bill Green, Marc Langland, Tom Owen, Bill Whaley, Ralph Seekins, Roxie Palczer, Bill Pair, Jim Drew, Bernie Brown and Ron Davis.

Tom Owen

Tom Owen - Vice Chairman

R Davis

Ron Davis - President

Testified 2/22/82
608

TESTIMONY OF RURALCAP

SS SB608

APPROPRIATION TO THE POWER DEVELOPMENT FUND

OF THE ALASKA POWER AUTHORITY

My name is Matt Zencey and I am from RurALCAP, the Rural Alaskan Community Action Program. We appreciate the opportunity to testify today on SB608.

SS SB608 would commit $1.0 billion to the Alaska Power Authority's Power Development Fund, which implements the Energy Program for Alaska. This $1.0 billion is to be used for only Susitna and other hydroelectric projects even though the authority for the Power Development Fund includes other types of power projects.

The $1.0 billion is an awesome commitment of expected state revenues to a single purpose. As was clear from the debate over the Energy Program for Alaska last year, the Program is a way to distribute wealth to Alaskans by using subsidies to power projects, almost exclusively hydroelectricity, to produce below market energy prices.

The appropriation in SB608 is a distribution of wealth which is owned equally by all Alaskans. Everyone recognizes that Alaskans throughout the state have a right to ask if this appropriation is an equitable distribution of that wealth. Last year, 99.5% of appropriations to the Energy Program for Alaska (i.e. the Power Development Fund) went to urban areas. RurALCAP has noted in the past that the Energy Program for Alaska does not serve rural areas well. Will regional equity in the distribution of wealth under this appropriation be better than it was last year? Will this be an equitable distribution of wealth owned equally by all Alaskans? This appropriation will do even less for rural areas than the Energy Project itself since the appropriation is restricted to hydroelectric projects. Based on what we see now, we must conclude that this appropriation will not be equitable.

As Alaskans consider uses for their wealth, a second point to consider is how reasonable and prudent the legislature's spending decisions are. The bulk of the appropriation is clearly intended to begin construction of a project which has not yet finished the review process set down by the legislature. As a result, there is still some question about what the legislature is committing itself to and how much it will cost. Does wise planning support this immediate commitment of nearly 30% of next year's hoped for revenues to a single project which is still under study? This action is extremely important since it involves a future commitment of even more money at a time when revenues are very uncertain. Projections of next year's revenues have already dropped by a third and they may drop even more. It is clear our surplus revenues cannot fund everyone's wish list. We must learn to live within these new limits and set priorities.

We believe the use of state wealth to bring secure energy at stable prices to all areas of the state is an important goal. The specific projects and programs to meet this goal in each area need careful evaluation, especially where literally billions are at stake. The most pressing energy needs for rural villages cannot be met by appropriations such as SB608 because their needs are not for new electric power projects owned by a remote state government. The Power Authority's Village Energy Reconnaissance Studies and RurALCAP's work with villages have found an immediate need to improve the efficiency of the very expensive energy that is now being used in rural areas. This can be done by home weatherization and by other projects such as waste heat recovery and running diesel generators more efficiently. A lasting commitment to using an equitable share of state wealth for home weatherization and increased energy efficiency in rural areas would soothe the bitter inequity of appropriations under the current Energy Program for Alaska. RurALCAP is ready to work with the Legislature in making an on-going commitment to use state wealth to bring secure, affordable energy to <u>all</u> areas of the state.

Alaska Center for the Environment
1069 W. 6th Avenue
Anchorage, Alaska 99501
(907) 274-3621

February 24, 1982

TESTIMONY ON SB 608 FOR THE SENATE RESOURCES COMMITTEE

SUBMITTED BY THE ALASKA CENTER FOR THE ENVIRONMENT

My name is Cynthia Marquette and I am the Executive Director for the Alaska Center for the Environment. I am testifying today on SB 608.

The choice before us is to begin the design and construction of the Susitna Hydro-electric project or to consider the development of alternative, diversified power sources for Alaska's future and the promotion of a strong energy conservation plan.

There have been numerous alternatives proposed to Susitna, including possibly less-costly hydro-projects. Significant wind energy potential, abundant natural gas and coal reserves, and the possibilities of tidal power have also been suggested.

To pour State monies into the Susitna project at this point would be short-circuiting the rational, decision-making process that has already been funded by the Legislature. The Battelle Alternative Energy Study and the Susitna Feasibility studies should be completed and discussed thoroughly before any more funds are allocated for this project. To charge ahead before the results of these studies are known is not logical.

For the above reasons, the Center asks the Senate Resources Committee to hold off on SB 608. We also would like to urge that this particular issues - the Go, No-Go decision on Susitna - be put before the public on the fall ballot.

(more)

Traditionally the Center has supported and promoted small-scale, alternative technologies. Thousands of Alaskans have attended the Alternative Energy Conferences co-sponsored by the Center over the last three years. These Alaskans, combined with citizens who use the Denslow Memorial Alternative Energy Library on a daily basis reflect an eagerness on the part of many Alaskans to explore alternative energy sources throughout our State.

A rational decision must be made. Now is the time to consider the costs, both financial and environmental. Now is the time to look toward the future and consider creating an energy plan for Alaska that will focus on decentralized, diversified power sources combined with a strong conservation program. An energy plan that will benefit ALL Alaskans.

MAR 2 1982

MEMORANDUM

TO: Senator Fahrenkamp

FROM: Kurt S. Dzinich KSD

SUBJECT: Hydropower Electricity Costs

DATE: March 2, 1982

Discussions over the past few weeks surfaced the fact that there did not exist an analysis of long range power costs based on the proposed hydropower construction program. The attached analysis by the Alaska Power Adminstration is an analysis that projects expected power costs out to year 2005 based on some simplifying assumptions.

Because of the assumptions the program has its limitations and should not be used for predicting exact cost of power in the future. The program will only indicate the magnitude of future power costs under various repayment criteria. The analysis could be used to evaluate various repayment criteria against a given set of goal(s) such as lowest power cost, return on investment etc.

A review of the data shows that return of investment rate and repayment period will have a major influence on future cost of power.

KSD/bb

Department Of Energy
Alaska Power Administration
P.O. Box 50
Juneau, Alaska 99802

February 26, 1982

Mr. Kurt Dzinich
Senator J.M Kerttula
Capitol Building
Pouch V MS 3100
Juneau, AK 99811

Dear Mr. Dzinich:

Alaska Power Administration has developed a general computer program for comparing revenue requirements of power projects under various sets of repayment criteria. This program allows a user to look at any number of projects scheduled to be built in the next twenty years and calculates the annual revenue requirements and energy rates needed to meet these requirements.

We are enclosing an abstract of the program and analyses for projects which may be developed in the State during the next twenty years. The data for the projects was obtained from the latest information available to APA, however, there may be changes that we are not aware of. This should not affect the outcome of the analyses since the main purpose was to compare the different sets of repayment criteria and the same data was used in all the alternatives examined.

The output presented here includes analyses of revenue criteria in existing and proposed legislation as well as one representing a standard method of financing. Firm energy was used in each case and the rates listed for firm energy cost should not be construed to represent the actual energy cost when the projects are built. Additional costs such as administration and overhead have not been considered and they would be included in any actual rate determination.

This program was developed for APA studies, however, we would welcome its use by anyone interested in making comparisons of various methods of financing power projects. Please feel free to contact this office if you have any questions.

Sincerely,

Robert J. Cross
Administrator

Enclosures

PROGRAM ABSTRACT

This program allows the user to calculate the future revenue requirements and energy costs for power projects financed under a broad range of financing criteria. The following methods may be selected.

1. Standard Financing (e.g. 7% for 25 years)
2. Annual Return on Investment (e.g. 10%)
3. Repayment of Investment Only (e.g. over a 20-year period)

The program reads input data on any number of projects expected to come on-line through the year 2005. This input data consists of project name, construction costs, OM&R costs, energy output, and on-line date. Projects may be fully loaded when brought on-line or they may have staged output. All costs are assumed to be January 1982

Output consists of a schedule of projects showing on-line dates, costs, energy, and a yearly tabulation of the revenue requirements and energy costs. A summary of the repayment methods follows.

STANDARD FINANCING - this method allows the user to specify any interest rate and any period of repayment. Revenue requirements would include the repayment of investment based on these rates plus the costs of OM&R.

ANNUAL RETURN ON INVESTMENT - this method allows the user to specify any return on investment desired. The user has the option of including OM&R costs in the annual revenue requirements or using the greater of a.)the annual return on investment or b.)the OM&R costs as the value to use for the annual revenue requirement. The latter option represents existing Alaska legislation.

REPAYMENT OF INVESTMENT ONLY - this method allows the user to specify any period for repayment of investment interest-free. An option allows the user to adjust future payments for inflation based on the Consumer Price Index -- representative of proposed legislation. Annual revenue requirements are based on the repayment costs plus OM&R costs.

A future inflation rate may be specified. This rate would inflate the construction costs for the projects to the mid-point of construction while the OM&R costs would increase at this annual rate thoughout the project life.

The user may use firm or average energy in the input as long as all projects are treated in the same manner. Using average energy will result in lower energy rates, however, the results are for comparison purposes only and are not meant to show the exact cost of energy. Administrative and overhead costs are not included in in these calculations and they would increase the cost of energy. The energy from the projects can also be at full load at project start or it may be built up over a period of years. Transmission facilities do not contribute to the overall production of energy therefore the energy associated with them is always zero.

The user also has the option of performing a present-worth study of the above financing methods. This analysis should only be completed if the period of study is extended through the life of the projects.

INFLATION

0%

ALASKA POWER ADMINISTRATION
FINANCIAL ANALYSIS PROGRAM

SCHEDULE FOR PROJECTS EXAMINED

YEAR	PROJECT NAME	1982 CONSTRUCTION COST ($1000)	ANNUAL OM&R\1 ($1000)	FIRM ENERGY (MWH)
1982	SOLOMON GULCH	49,500	280	40,780
1983	SWAN LAKE	90,000	690	85,000
1984	TYEE	99,000	1,050	127,000
	RAILBELT INTERTIE	131,000	4,700	0
	KAKE/PETERSBURG INTERTIE	8,000	28	0
	WEST CREEK	57,500	750	26,540
	PRESSURE REDUCING TURB.	10,900	225	52,000
1985	TERROR LAKE	174,000	830	129,000
1986	KENAI PENINSULA T/LINE	79,000	850	0
	JUNEAU-HOONAH INTERTIE	21,000	585	0
	TAZIMINA I	58,600	102	78,000
	CORDOVA INTERTIE	12,800	140	0
1988	BRADLEY LAKE	363,600	825	317,500
1990	TAKATZ	153,000	3,000	93,200
	BLACK BEAR	31,000	133	23,700
	ALLISON CREEK	38,400	224	37,250
	TAZIMINA II	52,800	128	110,000
1993	SUSITNA - WATANA	3,700,000	10,000	533,000
1994	WATANA LOAD INCR.	0	0	634,000
1995	WATANA LOAD INCR.	0	0	712,000
1996	WATANA LOAD INCR.	0	0	541,000
2002	SUSITNA - DEVIL CANYON	1,500,000	5,400	559,000
2003	DEVIL CANYON LOAD INCR.	0	0	665,000
2004	DEVIL CANYON LOAD INCR.	0	0	747,000
2005	DEVIL CANYON LOAD INCR.	0	0	569,000

\1 - First year cost only; future years increased by inflation

APA - 2/82

ALASKA POWER ADMINISTRATION
FINANCIAL ANALYSIS PROGRAM

FUTURE INFLATION - 0%

ANNUAL REVENUE REQUIREMENTS:
0% ANNUAL RETURN ON INVESTMENT
ANNUAL OM&R COSTS

YEAR	INVESTMENT PAYMENT ($1000)	OM&R ($1000)	ANNUAL REVENUE REQUIREMENT\1 ($1000)	FIRM ENERGY (MWH)	FIRM ENERGY COST\2 (c/kWh)
1982	0	280	280	40,780	.7
1983	0	970	970	125,780	.8
1984	0	7,723	7,723	331,320	2.3
1985	0	8,553	8,553	460,320	1.9
1986	0	10,230	10,230	538,320	1.9
1987	0	10,230	10,230	538,320	1.9
1988	0	11,055	11,055	855,820	1.3
1989	0	11,055	11,055	855,820	1.3
1990	0	14,540	14,540	1,119,970	1.3
1991	0	14,540	14,540	1,119,970	1.3
1992	0	14,540	14,540	1,119,970	1.3
1993	0	24,540	24,540	1,652,970	1.5
1994	0	24,540	24,540	2,286,970	1.1
1995	0	24,540	24,540	2,998,970	.8
1996	0	24,540	24,540	3,539,970	.7
1997	0	24,540	24,540	3,539,970	.7
1998	0	24,540	24,540	3,539,970	.7
1999	0	24,540	24,540	3,539,970	.7
2000	0	24,540	24,540	3,539,970	.7
2001	0	24,540	24,540	3,539,970	.7
2002	0	29,940	29,940	4,098,970	.7
2003	0	29,940	29,940	4,763,970	.6
2004	0	29,940	29,940	5,510,970	.5
2005	0	29,940	29,940	6,079,970	.5
			444,336	55,739,000	.8

\1 - Excludes Administrative and overhead costs
\2 - If energy sales are less than firm energy available cost will be higher

APA - 2/82

ALASKA POWER ADMINISTRATION
FINANCIAL ANALYSIS PROGRAM

FUTURE INFLATION - 0%

ANNUAL REVENUE REQUIREMENTS:
THE GREATER OF:
10% ANNUAL RETURN ON INVESTMENT
OR ANNUAL OM&R COSTS

YEAR	INVESTMENT PAYMENT ($1000)	OM&R ($1000)	ANNUAL REVENUE REQUIREMENT\1 ($1000)	FIRM ENERGY (MWH)	FIRM ENERGY COST\2 (c/kWh)
1982	4,950	280	4,950	40,780	12.1
1983	13,950	970	13,950	125,780	11.1
1984	44,590	7,723	44,590	331,320	13.5
1985	61,990	8,553	61,990	460,320	13.5
1986	79,130	10,230	79,130	538,320	14.7
1987	79,130	10,230	79,130	538,320	14.7
1988	115,490	11,055	115,490	855,820	13.5
1989	115,490	11,055	115,490	855,820	13.5
1990	143,010	14,540	143,010	1,119,970	12.8
1991	143,010	14,540	143,010	1,119,970	12.8
1992	143,010	14,540	143,010	1,119,970	12.8
1993	513,010	24,540	513,010	1,652,970	31.0
1994	513,010	24.540	513,010	2,286,970	22.4
1995	513,010	24,540	513,010	2,998,970	17.1
1996	513,010	24,540	513,010	3,539,970	14.5
1997	513,010	24,540	513,010	3,539,970	14.5
1998	513,010	24,540	513,010	3,539,970	14.5
1999	513,010	24,540	513,010	3,539,970	14.5
2000	513,010	24,540	513,010	3,539,970	14.5
2001	513,010	24,540	513,010	3,539,970	14.5
2002	663,010	29,940	663,010	4,098,970	16.2
2003	663,010	29,940	663,010	4,763,970	13.9
2004	663,010	29,940	663,010	5,510,970	12.0
2005	663,010	29,940	663,010	6,079,970	10.9
			8,212,880	55,739,000	14.7

\1 - Excludes Administrative and overhead costs
\2 - If energy sales are less than firm energy available
cost will be higher

APA - 2/82

Corrected copy

ALASKA POWER ADMINISTRATION
FINANCIAL ANALYSIS PROGRAM

FUTURE INFLATION - 0%

ANNUAL REVENUE REQUIREMENTS:
REPAYMENT OF INVESTMENT ONLY IN 33.33 Years
(Adjusted for Inflation)
ANNUAL OM&R COSTS

YEAR	INVESTMENT PAYMENT ($1000)	OM&R ($1000)	ANNUAL REVENUE REQUIREMENT\1 ($1000)	FIRM ENERGY (MWH)	FIRM ENERGY COST\2 (c/kWh)
1982	1,485	280	1,765	40,780	4.3
1983	4,251	970	5,221	125,780	4.2
1984	13,627	7,723	21,350	331,320	6.4
1985	19,411	8,553	27,964	460,320	6.1
1986	25,344	10,230	35,574	538,320	6.6
1987	26,365	10,230	36,595	538,320	6.8
1988	38,336	11,055	49,391	855,820	5.8
1989	39,861	11,055	50,916	855,820	5.9
1990	49,704	14,540	64,244	1,119,970	5.7
1991	51,663	14,540	66,203	1,119,970	5.9
1992	53,682	14,540	68,222	1,119,970	6.1
1993	166,764	24,540	191,304	1,652,970	11.6
1994	172,796	24,540	197,336	2,286,970	8.6
1995	179,017	24,540	203,557	2,998,970	6.8
1996	185,433	24,540	209,973	3,539,970	5.9
1997	192,080	24,540	216,620	3,539,970	6.1
1998	198,891	24,540	223,431	3,539,970	6.3
1999	205,943	24,540	230,483	3,539,970	6.5
2000	213,182	24,540	237,722	3,539,970	6.7
2001	220,677	24,540	245,217	3,539,970	6.9
2002	273,419	29,940	303,359	4,098,970	7.4
2003	281,551	29,940	311,491	4,763,970	6.5
2004	289,760	29,940	319,700	5,510,970	5.8
2005	298,110	29,940	328,050	6,079,970	5.4
			3,645,690	55,739,000	6.5

\1 - Excludes Administrative and overhead costs
\2 - If energy sales are less than firm energy available cost will be higher

APA - 2/82

ALASKA POWER ADMINISTRATION
FINANCIAL ANALYSIS PROGRAM

FUTURE INFLATION - 0%

ANNUAL REVENUE REQUIREMENTS:
STANDARD FINANCING For 40 Years at 7%
ANNUAL OM&R COSTS

YEAR	INVESTMENT PAYMENT ($1000)	OM&R ($1000)	ANNUAL REVENUE REQUIREMENT\1 ($1000)	FIRM ENERGY (MWH)	FIRM ENERGY COST\2 (c/kWh)
1982	3,713	280	3,993	40,780	9.8
1983	10,464	970	11,434	125,780	9.1
1984	33,447	7,723	41,170	331,320	12.4
1985	46,498	8,553	55,051	460,320	12.0
1986	59,355	10,230	69,585	538,320	12.9
1987	59,355	10,230	69,585	538,320	12.9
1988	86,628	11,055	97,683	855,820	11.4
1989	86,628	11,055	97,683	855,820	11.4
1990	107,271	14,540	121,811	1,119,970	10.9
1991	107,271	14,540	121,811	1,119,970	10.9
1992	107,271	14,540	121,811	1,119,970	10.9
1993	384,804	24,540	409,344	1,652,970	24.8
1994	384,804	24,540	409,344	2,286,970	17.9
1995	384,804	24,540	409,344	2,998,970	13.6
1996	384,804	24,540	409,344	3,539,970	11.6
1997	384,804	24,540	409,344	3,539,970	11.6
1998	384,804	24,540	409,344	3,539,970	11.6
1999	384,804	24,540	409,344	3,539,970	11.6
2000	384,804	24,540	409,344	3,539,970	11.6
2001	384,804	24,540	409,344	3,539,970	11.6
2002	497,318	29,940	527,258	4,098,970	12.9
2003	497,318	29,940	527,258	4,763,970	11.1
2004	497,318	29,940	527,258	5,510,970	9.6
2005	497,318	29,940	527,258	6,079,970	8.7
			6,604,747	55,739,000	11.8

\1 - Excludes Administrative and overhead costs
\2 - If energy sales are less than firm energy available cost will be higher

APA - 2/82

INFLATION

7%

ALASKA POWER ADMINISTRATION
FINANCIAL ANALYSIS PROGRAM

PROJECT COSTS UNDER
7% INFLATION

YEAR	PROJECT NAME	CONSTRUCTION COST ($1000)	ANNUAL OM&R\1 ($1000)
1982	SOLOMON GULCH	49,500	280
1983	SWAN LAKE	90,000	738
1984	TYEE	99,000	1,202
	RAILBELT INTERTIE	135,507	5,381
	KAKE/PETERSBURG INTERTIE	8,560	32
	WEST CREEK	57,500	859
	PRESSURE REDUCING TURB.	11,663	258
1985	TERROR LAKE	179,987	1,017
1986	KENAI PENINSULA T/LINE	96,778	1,114
	JUNEAU-HOONAH INTERTIE	25,726	767
	TAZIMINA I	67,091	134
	CORDOVA INTERTIE	15,681	184
1988	BRADLEY LAKE	445,426	1,238
1990	TAKATZ	229,612	5,155
	BLACK BEAR	46,523	229
	ALLISON CREEK	57,628	385
	TAZIMINA II	79,239	220
1993	SUSITNA - WATANA	6,357,289	21,049
2002	SUSITNA - DEVIL CANYON	4,738,223	20,896

\1 - OM&R will continue to increase at inflation rate

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ALASKA POWER ADMINISTRATION
FINANCIAL ANALYSIS PROGRAM

FUTURE INFLATION - 7%

ANNUAL REVENUE REQUIREMENTS:
0% ANNUAL RETURN ON INVESTMENT
ANNUAL OM&R COSTS

YEAR	INVESTMENT PAYMENT ($1000)	OM&R ($1000)	ANNUAL REVENUE REQUIREMENT\1 ($1000)	FIRM ENERGY (MWH)	FIRM ENERGY COST\2 (c/kWh)
1982	0	280	280	40,780	.7
1983	0	1,038	1,038	125,780	.8
1984	0	8,842	8,842	331,320	2.7
1985	0	10,478	10,478	460,320	2.3
1986	0	13,409	13,409	538,320	2.5
1987	0	14,348	14,348	538,320	2.7
1988	0	16,591	16,591	855,820	1.9
1989	0	17,752	17,752	855,820	2.1
1990	0	24,982	24,982	1,119,970	2.2
1991	0	26,731	26,731	1,119,970	2.4
1992	0	28,602	28,602	1,119,970	2.6
1993	0	51,653	51,653	1,652,970	3.1
1994	0	55,269	55,269	2,286,970	2.4
1995	0	59,138	59,138	2,998,970	2.0
1996	0	63,277	63,277	3,539,970	1.8
1997	0	67,707	67,707	3,539,970	1.9
1998	0	72,446	72,446	3,539,970	2.0
1999	0	77,517	77,517	3,539,970	2.2
2000	0	82,944	82,944	3,539,970	2.3
2001	0	88,750	88,750	3,539,970	2.5
2002	0	115,858	115,858	4,098,970	2.8
2003	0	123,968	123,968	4,763,970	2.6
2004	0	132,646	132,646	5,510,970	2.4
2005	0	141,931	141,931	6,079,970	2.3
			1,296,158	55,739,000	2.3

\1 - Excludes Administrative and overhead costs
\2 - If energy sales are less than firm energy available cost will be higher

APA - 2/82

ALASKA POWER ADMINISTRATION
FINANCIAL ANALYSIS PROGRAM

FUTURE INFLATION - 7%

ANNUAL REVENUE REQUIREMENTS:
THE GREATER OF:
10% ANNUAL RETURN ON INVESTMENT
OR ANNUAL OM&R COSTS

YEAR	INVESTMENT PAYMENT ($1000)	OM&R ($1000)	ANNUAL REVENUE REQUIREMENT\1 ($1000)	FIRM ENERGY (MWH)	FIRM ENERGY COST\2 (c/kWh)
1982	4,950	280	4,950	40,780	12.1
1983	13,950	1,038	13,950	125,780	11.1
1984	45,173	8,842	45,173	331,320	13.6
1985	63,172	10,478	63,172	460,320	13.7
1986	83,699	13,409	83,699	538,320	15.5
1987	83,699	14,348	83,699	538,320	15.5
1988	128,242	16,591	128,242	855,820	15.0
1989	128,242	17,752	128,242	855,820	15.0
1990	169,542	21,982	169,542	1,119,970	15.1
1991	169,542	26,731	169,542	1,119,970	15.1
1992	169,542	28,602	169,542	1,119,970	15.1
1993	805,271	31,653	805,271	1,652,970	48.7
1994	805,271	35,269	805,271	2,286,970	35.2
1995	805,271	59,138	805,271	2,998,970	26.9
1996	805,271	63,277	805,271	3,539,970	22.7
1997	805,271	67,707	805,271	3,539,970	22.7
1998	805,271	72,446	805,271	3,539,970	22.7
1999	805,271	77,517	805,271	3,539,970	22.7
2000	805,271	82,944	805,271	3,539,970	22.7
2001	805,271	88,750	805,271	3,539,970	22.7
2002	1,279,093	115,858	1,279,093	4,098,970	31.2
2003	1,279,093	123,968	1,279,093	4,763,970	26.8
2004	1,279,093	132,646	1,279,093	5,510,970	23.2
2005	1,279,093	141,931	1,279,093	6,079,970	21.0
			13,423,564	55,739,000	24.1

\1 - Excludes Administrative and overhead costs
\2 - If energy sales are less than firm energy available
cost will be higher

APA - 2/82

Corrected og.

ALASKA POWER ADMINISTRATION
FINANCIAL ANALYSIS PROGRAM

FUTURE INFLATION - 7%

ANNUAL REVENUE REQUIREMENTS:
REPAYMENT OF INVESTMENT ONLY IN 33.33 Years
(Adjusted for Inflation)
ANNUAL OM&R COSTS

YEAR	INVESTMENT PAYMENT ($1000)	OM&R ($1000)	ANNUAL REVENUE REQUIREMENT\1 ($1000)	FIRM ENERGY (MWH)	FIRM ENERGY COST\2 (c/kWh)
1982	1,485	280	1,765	40,780	4.3
1983	4,251	1,038	5,289	125,780	4.2
1984	13,807	8,842	22,649	331,320	6.8
1985	19,825	10,478	30,302	460,320	6.6
1986	26,872	13,409	40,282	538,320	7.5
1987	28,090	14,348	42,439	538,320	7.9
1988	42,728	16,591	59,319	855,820	6.9
1989	44,744	17,752	62,496	855,820	7.3
1990	59,247	24,982	84,230	1,119,970	7.5
1991	62,135	26,731	88,866	1,119,970	7.9
1992	65,193	28,602	93,795	1,119,970	8.4
1993	259,198	51,653	310,851	1,652,970	18.8
1994	274,101	55,269	329,370	2,286,970	14.4
1995	290,005	59,138	349,143	2,998,970	11.6
1996	306,996	63,277	370,273	3,539,970	10.5
1997	324,984	67,707	392,690	3,539,970	11.1
1998	344,375	72,446	416,821	3,539,970	11.8
1999	364,925	77,517	442,442	3,539,970	12.5
2000	387,023	82,944	469,967	3,539,970	13.3
2001	410,463	88,750	499,213	3,539,970	14.1
2002	577,546	115,858	693,405	4,098,970	16.9
2003	618,741	123,968	742,709	4,763,970	15.6
2004	663,191	132,646	795,837	5,510,970	14.4
2005	711,008	141,931	852,940	6,079,970	14.0
			7,197,091	55,739,000	12.9

\1 - Excludes Administrative and overhead costs
\2 - If energy sales are less than firm energy available cost will be higher

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ALASKA POWER ADMINISTRATION
FINANCIAL ANALYSIS PROGRAM

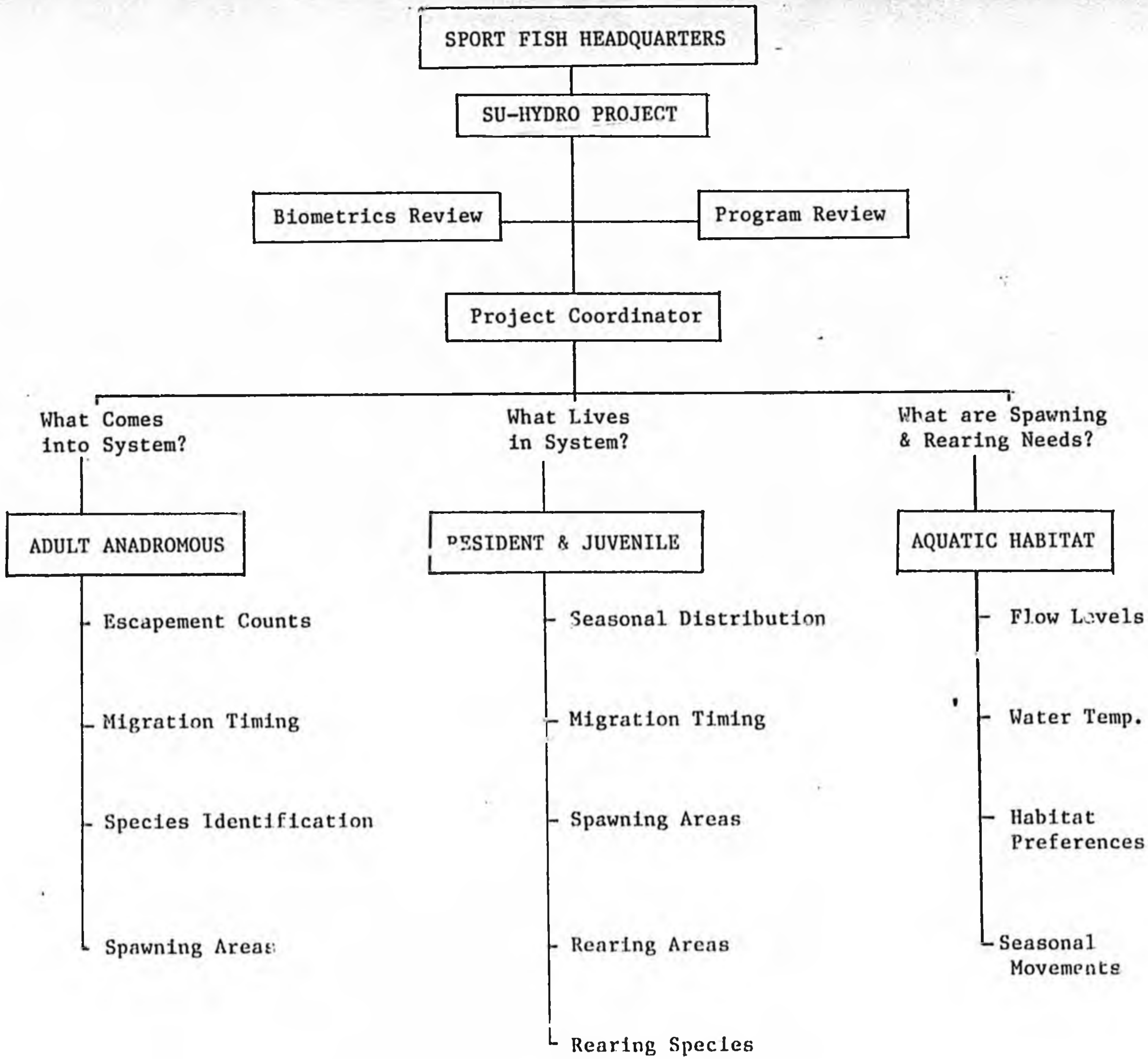
FUTURE INFLATION - 7%

ANNUAL REVENUE REQUIREMENTS:
STANDARD FINANCING For 40 Years at 7%
ANNUAL OM&R COSTS

YEAR	INVESTMENT PAYMENT ($1000)	OM&R ($1000)	ANNUAL REVENUE REQUIREMENT\1 ($1000)	FIRM ENERGY (MWH)	FIRM ENERGY COST\2 (c/kWh)
1982	3,713	280	3,993	40,780	9.8
1983	10,464	1,038	11,502	125,780	9.1
1984	33,884	8,842	42,726	331,320	12.9
1985	47,385	10,478	57,862	460,320	12.6
1986	62,782	13,409	76,192	538,320	14.2
1987	62,782	14,348	77,130	538,320	14.3
1988	76,193	16,591	112,784	855,820	13.2
1989	96,193	17,752	113,945	855,820	13.3
1990	127,172	24,982	152,154	1,119,970	13.6
1991	127,172	26,731	153,903	1,119,970	13.7
1992	127,172	28,602	155,774	1,119,970	13.9
1993	604,027	51,653	655,680	1,652,970	39.7
1994	604,027	55,269	659,296	2,296,970	28.8
1995	604,027	59,138	663,164	2,498,970	22.1
[illegible]	604,027	63,277	667,304	3,539,970	18.9
[illegible]	604,027	67,707	671,733	3,539,970	19.0
[illegible]	604,027	72,446	676,473	3,539,970	19.1
1999	604,027	77,517	681,544	3,539,970	19.3
2000	604,027	82,944	686,970	3,539,970	19.4
2001	604,027	88,750	692,776	3,539,970	19.6
2002	959,437	115,858	1,075,295	4,098,970	26.2
2003	959,437	123,968	1,083,405	4,763,970	22.7
2004	959,437	132,646	1,092,083	5,510,970	19.8
2005	959,437	141,931	1,101,368	6,079,970	18.1
			11,365,058	55,739,000	20.4

\1 - Excludes Administrative and overhead costs
\2 - If energy sales are less than firm energy available
cost will be higher

APA - 2/82


SPORT FISH HEADQUARTERS
SU-HYDRO PROJECT
Biometrics Review
Program Review
Project Coordinator
What Comes into System?
What Lives in System?
What are Spawning & Rearing Needs?
ADULT ANADROMOUS
RESIDENT & JUVENILE
AQUATIC HABITAT
Escapement Counts
Migration Timing
Species Identification
Spawning Areas
Seasonal Distribution
Migration Timing
Spawning Areas
Rearing Areas
Rearing Species
Flow Levels
Water Temp.
Habitat Preferences
Seasonal Movements

III. ILLUSTRATIVE POPULATION PROJECTIONS

Introduction

This section presents illustrative projections to 1985 of the resident population of Alaska, classified by age, race, and sex. Three series of projections show the effects of applying three different assumptions (scenarios) concerning migration to the 1980 population as classified by age, race, and sex. The series have common assumptions concerning projected fertility and mortality. They also assume that military strength will remain at current levels. The major differences found in comparing data from each series are due to the effects of migration. For each series the migration assumptions are:

Series	Assumption
A	The number of people moving into the state exceeds the number leaving; similar to the migration pattern experienced between 1970 and 1973.
B	The number of people leaving the state exceeds the number moving into the state; similar to and continuing the migration pattern experienced between 1979 and 1981.
C	The number of people moving into the state equals the number leaving; zero net numbers of migrants, 1980 to 1985.

The projections are best viewed as showing what would happen if the specific migration patterns assumed for each series were to occur between 1980 and 1985. By reviewing both the assumptions and results for each series, someone can select the set of projections that most closely resembles one's own assumptions. Some help in selecting a series can be provided by briefly describing the scenarios underlying the three sets of migration patterns.

The most likely scenario, that represented by series A, shows steady but not explosive in-migration. It portrays Alaska as offering employment opportunities attractive to outsiders without the occurrence of a "pipeline boom." On the other hand, the least likely scenario is represented by series C, which shows zero net migration. Although this is very unlikely, the series serves a useful purpose by illustrating what would be likely to occur to the state's population from the effects of fertility and mortality alone. This series provides a basis from which to measure the effects of any other projection that does include migration. Series B, which shows continued but low levels of out-migration, could represent a scenario in which employment opportunities do not keep pace with the potential Alaskan labor force so that people are forced to go outside for work.

In general, the three series should accommodate a wide range of applications and needs. Still, someone may decide that not one of the scenarios represents one's own ideas of the future. However, even in this case the projections given here -- especially series C -- should be useful by providing a starting point from which alternatives can be generated.

The projections are given for April 1st of each year from 1981 to 1985 because the 1970 and census results, which form, respectively, a basis and calibration point for the projections, are for an April 1st date. Because of the necessity to use an April 1st date and the assumptions used, the total population given for 1981 in each series is different than the total population estimated for July 1st, 1981.

Comparative Results

Under these three sets of assumptions, comparisons of the expected demographic characteristics of Alaska by 1985 are informative. For example, the assumption of zero net migration (Series "C" found in Table III.1) projects a total population of nearly 442,000 by 1985, which represents an increase of approximately 40,000 people over the total population counted in the 1980 census. The scenario for positive net migration (Series A, found in Table III.2) projects, as expected, an even larger total population by 1985: nearly 465,000 people. Finally, even if the state experiences the scenario given in Series B, (found in Table III.3) and more people leave the state than move into the state, the total population by 1985 still shows an increase over 1980: 32,000 more people are expected to be residing in Alaska. Significantly, these comparisons show that "natural increase," the excess of births over deaths, is sufficient to guarantee an increase in population by 1985 even under the assumption of negative net migration given in Series B. Under all three scenarios, it is, in fact, natural increase and not migration that is the major force acting on the state's population.

In terms of other characteristics of the population, the three scenarios show very little divergence by 1985. For example, under Series A, B, and C, the percent of the population aged 65 and over is 3.10, 3.16, and 3.09, respectively. Similar equivalencies are found for the percent non-white, percent male, and percent aged 20-34.

Methodology

The Alaska population projections are based upon the cohort-component method, which is a standard demographic approach to forecasting. The logic of the cohort-component methodology calls for Alaska's population to be disaggregated by age-sex-race groups and then projected by these groups. This disaggregation is necessary because populations have a variable age-sex-race structure and rates of components of demographic change such as mortality and migration vary by age,sex, and race. For each series, A, B, and C, the components of change are found, along with the preceding and resulting population by year 1980 to 1985, in Tables III.4, III.5, and III.6, respectively.

Because of a need to develop migration data for analytical purposes, the three sets of projections are actually taken from the 1970 census results for Alaska and "passed through" the 1980 census population classified by age, race and sex. This calibration resulted in a 1980 base population that varies slightly from the reported 1980 census data. A comparison of the differences is shown in Table III.7 and the model's results for 1980 are found in Table III.8.

Special procedures were used in the projections to deal with Alaska's military-related population so that members of the armed forces would not be projected into the future in the same manner as the civilian population. Another special procedure allows for dealing with college-related migration in a manner similar to the military.

An "inflation-deflation" procedure often found in demographic forecasts was not used for the projections given here. This procedure, which assumes an undercount in the census population forming the basis of a forecast scenario, usually applies correction factors to "inflate" the base population and additional factors to "deflate" the projected population. While this procedure can correct for assumed distortions in a base population's age, sex, and race structure it inhibits an evaluation of the components of change. It was because of the desire to develop an analysis of Alaska's components of change, and an assumption

7/

that errors did not create significant structural distortions in the 1970 and 1980 census results, that the "inflation-deflation" procedure was not used.

SENATE RESOURCES COMMITTEE
LEGISLATION CHECKLIST

BILL NUMBER SB 608

IDENTIFICATION:

BILL NAME: spec. approp. to APA for Susitna R. Hydro project

SPONSOR(S): Kertulla
Donkavorth

RELATED BILLS PENDING:

DATE INTRODUCED: 1·11·82

REFERRALS: Resources, Finance

INITIAL RESEARCH:

INITIAL BILL SUMMARY COMPLETED ✓

SUMMARY BY LEGAL DIVISION:
DEPT. OF LAW SUMMARY:

SPONSOR CONTACTED FOR BACKUP MATERIALS: 1/20 - autumn - sen K's office - will respond - 1/25 Legit Dominich, Senate Advisory Council Memo.

FISCAL NOTE:

AGENCY RESPONSE:
1/25 - S.S. Data.

OTHER INTERESTED SENATORS OR REPS. NOTIFIED:

BACKGROUND RESEARCH:

SIMILAR BILLS INTRODUCED IN PREVIOUS LEGISLATURES:

RESPONSES FROM INTERESTED PERSONS AND/OR GROUPS:
1/25 - Dave ARECA - chilled out of Baranoff

OTHER STATE OR FEDERAL PRECEDENTS, REGULATIONS, LAWS:

HEARING PREPRATION:

CHAIRMAN BRIEFED:

DATE AND PLACE SET: Butro 2/22 2/24

STAFF MEMO TO COMMITTEE:

TELECONFERENCE 2/22 & 2/24

BACKGROUND MATERIAL DISTRIBUTED

PSA/PRESS RELEASE

LIST OF WITNESSES:
APA
ARECA
John Greeley

SUGGESTED AMENDMENTS/CS DRAFTED:

SENATE RESOURCES COMMITTEE
LEGISLATION CHECKLIST

BILL NUMBER SSSB 608

IDENTIFICATION:

BILL NAME: spec. approp. APA power dev. fund for Susitna hydro + other hydro projects

SPONSOR(S): Kettula
Dankworth

RELATED BILLS PENDING:

DATE INTRODUCED: 1/25/82

REFERRALS Resources, Finance

INITIAL RESEARCH:

INITIAL BILL SUMMARY COMPLETED ✓

SUMMARY BY LEGAL DIVISION:
DEPT. OF LAW SUMMARY:

SPONSOR CONTACTED FOR BACKUP
MATERIALS: 1/26-MARSHA (KERTULA)- REQUESTED MAT'L ON SS-TITLE CHANGE

FISCAL NOTE:

AGENCY RESPONSE:

OTHER INTERESTED SENATORS OR REPS. NOTIFIED:

BACKGROUND RESEARCH:

SIMILAR BILLS INTRODUCED IN PREVIOUS LEGISLATURES:

RESPONSES FROM INTERESTED PERSONS AND/OR GROUPS:

OTHER STATE OR FEDERAL PRECEDENTS, REGULATIONS, LAWS:

HEARING PREPRATION:

CHAIRMAN BRIEFED:

DATE AND PLACE SET:

STAFF MEMO TO COMMITTEE:

TELECONFERENCE

BACKGROUND MATERIAL DISTRIBUTED

PSA/PRESS RELEASE

LIST OF WITNESSES:

Sen. Kertulla
Sen. Dankworth – 3/1 No
Eric Yould - Alaska Power Authority, Anchorage called 2/22/82 3/3
Dave Hutchins - AK Rural Elec. Coop. Assoc (Baranof)
3/3 Bill Ashton if time
✓3/1 Pete Quons/Dankworth (
✓3/1 F & G will have someone here to say a few words

SUGGESTED AMENDMENTS/CS DRAFTED:

✓3/1 ✓ specifics r other needs

III.1
Series A: Projected Population By Age, Race, and Sex

1981

Series A, Table III.1

Series A, Table III.1

Series A, Table III.1

Series A, Table III.1

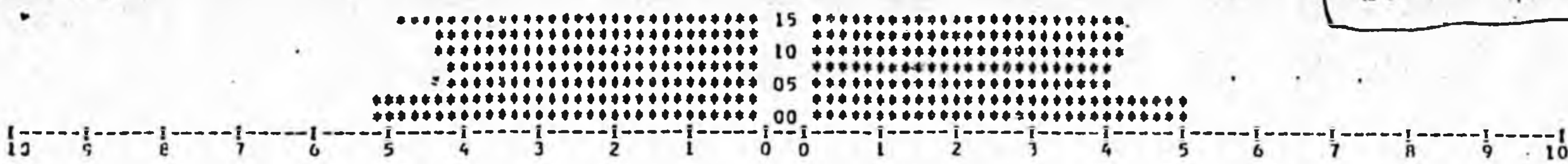
1982

1983 1984 1985

1'4 pt Bold

ASKA DEPARTMENT OF LABOR, RESEARCH AND ANALYSIS DIVISION; SUMMARY TABLE BY RACE AND SEX: 1981

	---TOTAL---			---WHITE---			--NONWHITE--			
AGE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	AGE
TOTAL	407661	216318	191343	313132	167637	145495	94529	48681	45848	TOTAL
0- 4	41475	21201	20274	30293	15489	14804	11182	5712	5470	0- 4
5- 9	33333	17027	16306	23592	12054	11538	9741	4973	4768	5- 9
10-14	34650	17829	16821	25295	13058	12237	9355	4771	4584	10-14
15-19	36473	19519	16954	25692	13879	11813	10781	5640	5141	15-19
20-24	45979	25417	20562	34638	19337	15301	11341	6080	5261	20-24
25-29	48852	25161	23691	38970	20021	18949	9882	5140	4742	25-29
30-34	42942	23102	19840	35410	19265	16145	7532	3837	3695	30-34
-39	32010	17721	14289	26547	14943	11604	5463	2778	2685	35-39
0-44	23293	12679	10614	18852	10404	8448	4441	2275	2166	40-44
5-49	18727	10133	8594	14998	8229	6769	3729	1904	1825	45-49
0-54	15877	8828	7049	12730	7247	5483	3147	1581	1566	50-54
5-59	12851	6836	6015	10412	5593	4819	2439	1243	1196	55-59
-64	8941	4694	4247	7105	3787	3318	1836	907	929	60-64
5-69	5587	2918	2669	4123	2184	1939	1464	734	730	65-69
-74	3311	1704	1607	2269	1163	1106	1042	541	501	70-74
5-79	1899	909	990	1235	576	659	664	333	331	75-79
-84	832	389	443	546	249	297	286	140	146	80-84
5+	629	251	378	425	159	266	204	92	112	85+



PERCENT OF TOTAL POPULATION

ALASKA DEPARTMENT OF LABOR, RESEARCH AND ANALYSIS DIVISION; SUMMARY TABLE BY RACE AND SEX: 1982

AGE	---TOTAL--- TOTAL	MALE	FEMALE	---WHITE--- TOTAL	MALE	FEMALE	--NONWHITE-- TOTAL	MALE	FEMALE	AGE
TOTAL	417211	221281	195930	320647	171611	149036	96564	49670	46894	TOTAL
0- 4	43666	22322	21344	32056	16191	15665	11610	5931	5679	0- 4
5- 9	33520	17123	16397	23680	12099	11581	9840	5024	4816	5- 9
10-14	35063	17987	17076	25883	13310	12573	9180	4677	4503	10-14
15-19	36816	19716	17100	26002	14038	11964	10814	5678	5136	15-19
20-24	46777	26464	20313	35260	20288	14972	11517	6176	5341	20-24
25-29	48119	24316	24023	37967	18845	19122	10152	5251	4901	25-29
30-34	43461	23882	19579	35626	19858	15768	7835	4024	3811	30-34
35-39	34989	19041	15948	29200	16125	13075	5789	2916	2873	35-39
40-44	24377	13088	11289	19770	10738	9012	4607	2353	2257	40-44
45-49	17212	10418	8794	15328	8445	6832	3884	1573	1911	45-49
50-54	15882	8803	7079	12772	7244	5528	3110	1559	1551	50-54
55-59	13162	7008	6154	10551	5681	4870	2611	1327	1204	55-59
60-64	9466	4944	4522	7579	3598	3531	1887	946	941	60-64
65-69	5757	3025	2732	4285	2309	1976	1472	716	756	65-69
70-74	3486	1767	1719	2375	1206	1169	1111	561	559	70-74
75-79	1952	941	1011	1301	611	690	651	330	321	75-79
80-84	885	415	470	583	267	316	302	148	154	80-84
85+	621	241	380	429	150	271	192	83	109	85+

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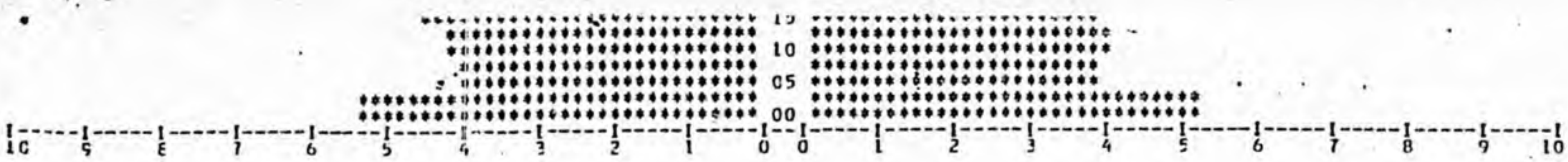
ALASKA DEPARTMENT OF LABOR, RESEARCH AND ANALYSIS DIVISION: SUMMARY TABLE BY RACE AND SEX: 1983

	---TOTAL---			---WHITE---			--NONWHITE--			
AGE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	AGE
TOTAL	431461	228823	202638	332822	178146	154676	98639	50677	47962	TOTAL
0- 4	45979	23505	22474	33999	17384	16615	11980	6121	5859	0- 4
5- 9	34863	17810	17053	24823	12684	12139	10040	5126	4914	5- 9
10-14	35860	18402	17458	26647	13729	12918	9213	4673	4540	10-14
15-19	36357	19402	16955	25914	13880	12034	10443	5522	4921	15-19
20-24	48691	28085	20606	36934	21795	15139	11757	6290	5467	20-24
25-29	46670	22642	24028	36419	17344	19075	10251	5298	4953	25-29
30-34	46093	25474	20619	37755	21176	16579	8339	4299	4040	30-34
35-39	37879	20594	17295	31605	17448	14157	6274	3146	3129	35-39
40-44	26326	14204	12122	21672	11807	9865	4654	2397	2257	40-44
45-49	19818	10756	9062	15855	8755	7100	3963	2001	1962	45-49
50-54	16186	8911	7275	12893	7271	5622	3293	1640	1653	50-54
55-59	13591	7241	6350	10951	5913	5038	2640	1328	1312	55-59
60-64	9919	5184	4735	7911	4160	3751	2008	1024	984	60-64
65-69	6014	3144	2870	4547	2469	2078	1467	675	792	65-69
70-74	3607	1817	1790	2458	1238	1220	1149	579	570	70-74
75-79	2032	985	1047	1365	651	714	667	334	333	75-79
80-84	966	432	534	640	281	359	326	151	175	80-84
85+	610	235	375	434	161	273	176	74	102	85+



A

ALASKA DEPARTMENT OF LABOR, RESEARCH AND ANALYSIS DIVISION; SUMMARY TABLE BY RACE AND SEX: 1984 14 pt Bold

AGE	---TOTAL--- TOTAL	MALE	FEMALE	---WHITE--- TOTAL	MALE	FEMALE	--NONWHITE-- TOTAL	MALE	FEMALE	AGE
TOTAL	446931	237039	209892	346147	185330	160817	100784	51709	49075	TOTAL
0- 4	48200	24641	23559	36076	18447	17629	12124	6194	5930	0- 4
5- 9	36990	18900	18090	26533	13560	12973	10457	5340	5117	5- 9
10-14	35956	18372	17584	26520	13585	12935	9436	4787	4649	10-14
15-19	36447	19403	17044	26441	14141	12300	10006	5262	4744	15-19
20-24	50440	29776	20664	38553	23346	15207	11887	6430	5457	20-24
25-29	45185	21207	23978	34770	15910	18860	10415	5297	5118	25-29
30-34	49162	26946	22216	40403	22420	17983	8759	4526	4233	30-34
35-39	41041	22591	184[illegible]0	34290	19170	15120	6751	3421	3330	35-39
40-44	28490	15349	131[illegible]1	23594	12844	10750	4896	2505	2391	40-44
45-49	20372	11098	9274	16454	9108	7346	3919	1990	1929	45-49
50-54	16570	9064	7506	13122	7363	5759	3448	1701	1747	50-54
55-59	13912	7394	6518	11232	6049	5183	2680	1345	1335	55-59
60-64	10494	5529	4965	8320	4419	3901	2174	1110	1064	60-64
65-69	6200	3202	2998	4714	2523	2191	1486	679	807	65-69
70-74	3729	1873	1856	2559	1301	1258	1170	572	598	70-74
75-79	2107	1011	1096	1433	685	748	674	325	349	75-79
80-84	1032	452	580	704	298	406	328	154	174	80-84
85+	604	231	373	429	161	268	175	70	105	85+

A

ALASKA DEPARTMENT OF LABOR, RESEARCH AND ANALYSIS DIVISION; SUMMARY TABLE BY RACE AND SEX: 1985 14 pt Bold

AGE	---TOTAL--- TOTAL	MALE	FEMALE	---WHITE--- TOTAL	MALE	FEMALE	--NONWHITE-- TOTAL	MALE	FEMALE	AGE
TOTAL	464606	246466	218140	361497	153640	167857	103109	52826	50283	TOTAL
0- 4	50435	25782	24653	37995	19427	18568	12440	6355	6085	0- 4
5- 9	39831	20330	19501	29122	14886	14236	10759	5494	5265	5- 9
10-14	35241	17598	17243	25598	13074	12524	9643	4924	4719	10-14
15-19	37232	19785	17447	27523	14759	12764	9709	5026	4683	15-19
20-24	52051	31404	20647	40145	24895	15250	11906	6509	5397	20-24
25-29	44232	20201	24031	33903	15029	18874	10329	5172	5157	25-29
30-34	52699	28473	24226	43276	23566	19710	9423	4907	4516	30-34
35-39	44545	24662	19883	37255	20957	16298	7290	3705	3585	35-39
40-44	30395	16399	13996	25364	13856	11508	5031	2543	2488	40-44
45-49	21025	11628	9397	16998	9565	7433	4027	2063	1964	45-49
50-54	1714[illegible]	9269	7879	13639	7512	6127	3509	1757	1752	50-54
55-59	14443	7709	6734	11600	6316	5284	2843	1393	1450	55-59
60-64	10878	5679	5199	8636	4542	4094	2242	1137	1105	60-64
65-69	6529	3353	3176	5000	2659	2341	1529	694	835	65-69
70-74	3539	1967	1572	2712	1379	1334	1227	589	638	70-74
75-79	2193	1058	1135	150[illegible]	726	78[illegible]	684	332	352	75-79
80-84	1142	490	652	7[illegible]	331	457	354	159	195	80-84
85+	598	229	369	43[illegible]	162	272	164	67	97	85+

III.2
Series B: Projected Population By Age, Race, and Sex

Series B, Table III.2

Series B, Table III.2

Series B, Table III.2

Series B, Table III.2

1981 1982 1983

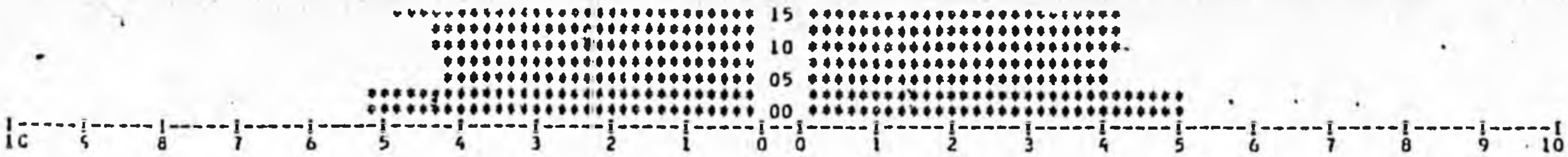
1984 1985

(Title) Series B: Projected Population by Age, Race and Sex

Table

ALASKA DEPARTMENT OF LABOR, RESEARCH AND ANALYSIS DIVISION: SUMMARY TABLE BY RACE AND SEX: 1981

	---TOTAL---			---WHITE---			--NONWHITE--			
AGE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	AGE
TOTAL	407661	216318	191343	313132	167637	145495	94529	48681	45848	TOTAL
0- 4	41475	21201	20274	30293	15489	14804	11182	5712	5470	0- 4
5- 9	33333	17027	16306	23592	12054	11538	9741	4973	4768	5- 9
10-14	34650	17829	16821	25295	13058	12237	9355	4771	4584	10-14
15-19	36473	19519	16954	25692	13879	11813	10791	5640	5141	15-19
20-24	45979	25417	20562	34638	19337	15301	11341	6080	5261	20-24
25-29	48852	25161	23691	38970	20021	18949	9882	5140	4742	25-29
30-34	42942	23102	19840	35410	19265	16145	7532	3837	3695	30-34
35-39	32010	17721	14289	26547	14943	11604	5463	2778	2695	35-39
40-44	23293	12679	10614	18852	10404	8448	4441	2275	2166	40-44
45-49	18727	10133	8594	14998	8229	6769	3729	1904	1825	45-49
50-54	15877	8828	7049	12730	7247	5483	3147	1581	1566	50-54
55-59	12851	6836	6015	10412	5591	4819	2439	1243	1196	55-59
60-64	8941	4694	4247	7105	3787	3318	1836	907	929	60-64
65-69	5587	2918	2669	4123	2184	1939	1464	734	730	65-69
70-74	3311	1704	1607	2269	1163	1106	1042	541	501	70-74
75-79	1899	909	990	1235	576	659	664	333	331	75-79
80-84	832	389	443	546	249	297	286	140	146	80-84
85+	629	251	378	425	159	266	204	92	112	85+



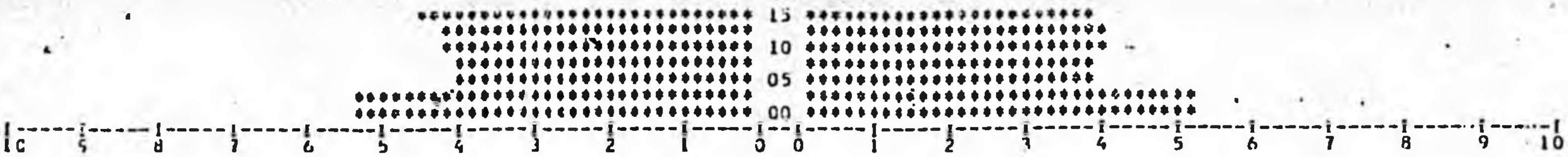
PERCENT OF TOTAL POPULATION

ALASKA DEPARTMENT OF LABOR, RESEARCH AND ANALYSIS DIVISION; SUMMARY TABLE BY RACE AND SEX: 1982

AGE	---TOTAL--- TOTAL	MALE	FEMALE	---WHITE--- TOTAL	MALE	FEMALE	--NONWHITE-- TOTAL	MALE	FEMALE	AGE
TOTAL	414291	219814	194477	317877	170230	147647	96414	45584	46830	TOTAL
0- 4	43421	22157	21224	31815	16268	15547	11606	5929	5677	0- 4
5- 9	33277	16999	16278	23445	11979	11466	9832	5020	4812	5- 9
10-14	34819	17861	16958	25639	13184	12455	9180	4677	4503	10-14
15-19	36611	19607	17004	25797	13929	11868	10814	5678	5136	15-19
20-24	46612	26431	20181	35125	20281	14844	11487	6150	5337	20-24
25-29	47696	23898	23798	37572	18661	18911	10124	5237	4887	25-29
30-34	43056	23666	19390	35251	9657	15594	7805	4009	3796	30-34
35-39	34682	11871	15811	28909	15963	12946	5773	2908	2865	35-39
40-44	24134	12979	11205	19587	10634	8953	4597	2345	2252	40-44
45-49	19074	10342	8732	15200	8374	6826	3874	1968	1906	45-49
50-54	15774	8742	7032	12674	7188	5486	3100	1554	1546	50-54
55-59	13036	6568	6118	10479	5643	4836	2607	1325	1282	55-59
60-64	9402	4515	4487	7515	3969	3546	1887	946	941	60-64
65-69	5708	3001	2707	4236	2285	1951	1472	716	756	65-69
70-74	3456	1753	1703	2345	1192	1153	1111	561	550	70-74
75-79	1932	931	1001	1281	601	690	651	330	321	75-79
80-84	882	414	468	580	266	314	302	149	154	80-84
85+	619	239	380	427	156	271	192	83	109	85+

ALASKA DEPARTMENT OF LABOR, RESEARCH AND ANALYSIS DIVISION: SUMMARY TABLE BY RACE AND SEX: 1983 14 pt Bold

AGE	---TOTAL--- TOTAL	MALE	FEMALE	---WHITE--- TOTAL	MALE	FEMALE	--NONWHITE-- TOTAL	MALE	FEMALE	AGE
TOTAL	420741	223219	197522	322502	172767	149735	98239	50452	47787	TOTAL
0- 4	45180	23097	22083	33208	16980	16228	11972	6117	5855	0- 4
5- 9	34024	17382	16642	24006	12267	11739	10018	5115	4903	5- 9
10-14	35025	17972	17053	25812	13299	12513	9213	4673	4540	10-14
15-19	35608	19011	16597	25165	13489	11676	10443	5522	4921	15-19
20-24	47437	27373	20064	35726	21120	14606	11711	6253	5458	20-24
25-29	45278	22051	23227	35115	16808	18307	10163	5243	4920	25-29
30-34	44578	24644	19934	36314	20383	15931	8264	4261	4003	30-34
35-39	36704	19944	16760	30474	16820	13654	6230	3124	3106	35-39
40-44	25615	13800	11815	20991	11418	9573	4624	2382	2242	40-44
45-49	19370	10506	8864	15437	8520	6917	3933	1986	1947	45-49
50-54	15857	8726	7131	12594	7101	5493	3263	1625	1638	50-54
55-59	13353	7117	6236	10733	5799	4934	2620	1318	1302	55-59
60-64	9741	5104	4637	7741	4084	3657	2000	1020	980	60-64
65-69	5895	3088	2807	4428	2413	2015	1467	675	792	65-69
70-74	3513	1762	1751	2384	1283	1101	1149	579	570	70-74
75-79	1986	965	1021	1319	[illegible]	688	667	334	333	75-79
80-84	950	425	525	674	324	350	326	151	175	80-84
85+	607	232	375	431	158	273	176	74	102	85+



PERCENT OF TOTAL POPULATION

ALASKA DEPARTMENT OF LABOR, RESEARCH AND ANALYSIS DIVISION; SUMMARY TABLE BY RACE AND SEX: 1984 14 pt Bold

	---TOTAL---			---WHITE---			--NONWHITE--			
AGE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	AGE
TOTAL	427211	226637	200574	327127	175308	151819	100084	51329	48755	TOTAL
0- 4	46877	23964	22913	34768	17778	16990	12109	6186	5923	0- 4
5- 9	35423	18099	17324	25004	12778	12226	10419	5321	5098	5- 9
10-14	34489	17620	16869	25055	12834	12221	9434	4786	4648	10-14
15-19	35094	18701	16393	25096	13443	11653	9998	5258	4740	15-19
20-24	48076	28382	19694	36225	21976	14249	11851	6406	5445	20-24
25-29	42714	20146	22568	32459	14954	17505	10255	5192	5063	25-29
30-34	46264	25367	20857	37629	20903	16726	8635	4464	4171	30-34
35-39	38753	21310	17443	32086	17931	14155	6667	3379	3288	35-39
40-44	27088	14555	12533	22252	12080	10172	4836	2475	2361	40-44
45-49	19562	10641	8921	15692	8674	7018	3870	1967	1903	45-49
50-54	15990	8737	7253	12591	7060	5531	3399	1677	1722	50-54
55-59	13482	7169	6313	10840	5943	4997	2642	1326	1316	55-59
60-64	10183	5385	4798	8029	4285	3744	2154	1100	1054	60-64
65-69	5984	3103	2881	4508	2429	2079	1476	674	802	65-69
70-74	3597	1811	1706	2433	1242	1101	1164	569	595	70-74
75-79	2029	979	1050	1357	654	703	672	325	347	75-79
80-84	1003	439	564	675	285	390	328	154	174	80-84
85+	603	229	374	428	159	269	175	70	105	85+

ALASKA DEPARTMENT OF LABOR, RESEARCH AND ANALYSIS DIVISION: SUMMARY TABLE BY RACE AND SEX: 1985 \ 14 pt bold

	---TOTAL---			---WHITE---			--NONWHITE--			
AGE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	AGE
TOTAL	433686	230070	203616	331777	177875	153902	101909	52195	49714	TOTAL
0- 4	49580	24833	23747	36165	18491	17674	12415	6342	6073	0- 4
5- 9	37311	19067	18244	26624	13609	13015	10687	5458	5229	5- 9
10-14	33101	16905	16196	23470	11987	11433	9631	4918	4713	10-14
15-19	25107	13681	16426	25424	13668	11756	9683	5013	4670	15-19
20-24	48387	29185	19202	36525	22698	13827	11862	6487	5375	20-24
25-29	40467	18566	21901	30380	13546	16834	10087	5020	5067	25-29
30-34	47987	25942	22045	38768	21137	17631	9219	4805	4414	30-34
35-39	40787	22551	18236	33645	18920	14725	7142	3631	3511	35-39
40-44	28078	15086	12992	23149	12594	10555	4929	2492	2437	40-44
45-49	19760	10899	8861	15815	8877	6938	3945	2022	1923	45-49
50-54	16247	8770	7477	12816	7051	5765	3431	1719	1712	50-54
55-59	13772	7350	6422	10995	5990	5005	2777	1360	1417	55-59
60-64	10409	5458	4951	8207	4341	3866	2202	1117	1085	60-64
65-69	6196	3201	2995	4699	2523	2176	1497	678	819	65-69
70-74	3727	1769	1958	2525	1293	1232	1202	576	626	70-74
75-79	2079	[illegible]	1070	1395	677	718	684	332	352	75-79
80-84	1035	[illegible]	623	743	314	429	352	158	194	80-84
85+	59[illegible]	[illegible]26	370	432	159	273	164	67	97	85+

III.3
Series C: Projected Population By Age, Race, and Sex

Series C, Table III.3

Series C, Table III.3

Series C, Table III.3

Series C, Table III.3

1981 1982 1983

1984 1985

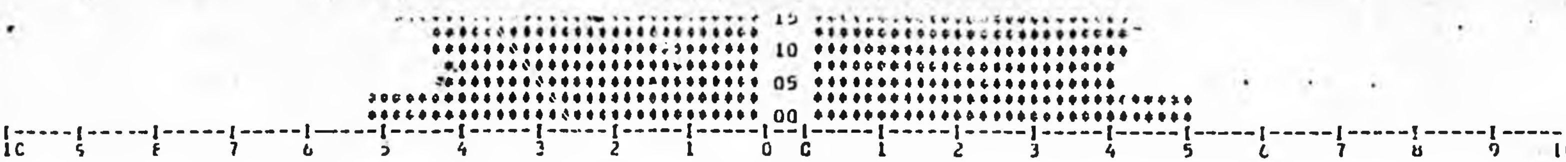
(title) Series 2: Projected ... Age, Race, and Sex ... 14 pt Bold 4 of These 11 pt B.

ALASKA DEPARTMENT OF LABOUR, RESEARCH AND ANALYSIS DIVISION; SUMMARY TABLE BY RACE AND SEX: 1981

	---TOTAL---			---WHITE---			--NONWHITE--			
AGE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	TOTAL	MALE	FEMALE	AGE
TOTAL	408311	216813	191498	313882	168051	145831	94429	48762	45667	TOTAL
0- 4	41454	21173	20264	30347	15517	14830	11107	5673	5434	0- 4
5- 9	33303	17013	16290	23645	12331	11564	9655	4929	4726	5- 9
10-14	34514	17811	16903	25351	13087	12264	9263	4724	4539	10-14
15-19	36548	19557	16991	25746	13907	11839	10802	5653	5152	15-19
20-24	46506	25746	20760	34763	19414	15345	11743	6332	5411	20-24
25-29	49157	25371	23786	39101	20092	19009	10056	5279	4777	25-29
30-34	43030	23102	19656	35510	19322	16188	7528	3860	3668	30-34
35-39	32079	17762	14317	26620	14985	11635	5459	2777	2682	35-39
40-44	23283	12677	10606	18893	10427	8466	4390	2250	2140	40-44
45-49	18692	10120	8572	15023	8244	6779	3669	1876	1793	45-49
50-54	15832	8801	7031	12746	7255	5491	3086	1546	1540	50-54
55-59	12817	6817	6000	10422	5558	4824	2395	1219	1175	55-59
60-64	8885	4672	4213	7111	3789	3322	1774	883	991	60-64
65-69	5511	2882	2629	4126	2186	1940	1385	696	689	65-69
70-74	3263	1680	1583	2272	1163	1109	991	517	474	70-74
75-79	1878	900	978	1235	576	659	643	324	319	75-79
80-84	829	386	443	546	249	297	283	137	146	80-84
85+	625	249	376	425	159	266	200	90	110	85+

-13

III 3



PERCENT OF TOTAL POPULATION

ALASKA DEPARTMENT OF LABOR, RESEARCH AND ANALYSIS DIVISION; SUMMARY TABLE BY RACE AND SEX, 1982 14 of B.

AGE	---TOTAL--- TOTAL	MALE	FEMALE	---WHITE--- TOTAL	MALE	FEMALE	--NONWHITE-- TOTAL	MALE	FEMALE	AGE
TOTAL	416361	221104	195257	319997	171273	148724	96364	49831	46533	TOTAL
0- 4	43469	22213	21256	31992	16358	15634	11472	5860	5612	0- 4
5- 9	33241	17005	16236	23629	12073	11556	9662	4932	4730	5- 9
10-14	34842	17873	16969	25838	13286	12552	9004	4587	4417	10-14
15-19	36753	19683	17070	25945	14008	11937	10805	5672	5133	15-19
20-24	47418	26868	20550	35165	20239	14926	12253	6629	5624	20-24
25-29	48482	24403	24079	37874	18807	19067	10608	5596	5012	25-29
30-34	43363	23884	19479	35530	19807	15723	7838	4082	3756	30-34
35-39	34905	19000	15905	29132	16087	13045	5773	2913	2860	35-39
40-44	24251	13019	11232	19737	10717	9020	4514	2302	2212	40-44
45-49	19064	10348	8716	15308	8434	6874	3756	1914	1842	45-49
50-54	15747	8727	7020	12755	7234	5521	2992	1493	1499	50-54
55-59	13059	6950	6109	10542	5676	4866	2517	1274	1243	55-59
60-64	9346	4894	4452	7575	3996	3579	1771	898	873	60-64
65-69	5599	2952	2647	4282	2309	1973	1317	643	674	65-69
70-74	3372	1710	1662	2379	1206	1173	993	504	489	70-74
75-79	1912	923	989	1301	611	690	611	312	299	75-79
80-84	875	408	468	583	267	316	293	141	152	80-84
85+	615	237	378	430	158	272	185	79	106	85+

ALASKA DEPARTMENT OF LABOR, RESEARCH AND ANALYSIS DIVISION: SUMMARY TABLE BY RACE AND SEX: 1983 14 AB

AGE	---TOTAL--- TOTAL	MALE	FEMALE	---WHITE--- TOTAL	MALE	FEMALE	--NONWHITE-- TOTAL	MALE	FEMALE	AGE
TOTAL	424511	225404	199107	326322	174610	151712	98289	50894	47395	TOTAL
0- 4	45292	23153	22139	33507	17132	16375	11785	6021	5764	0- 4
5- 9	34117	17479	16638	24356	12446	11910	9761	4983	4778	5- 9
10-14	35134	18030	17104	26101	13408	12693	8953	4542	4411	10-14
15-19	35013	18317	16696	25433	13628	11805	10380	5489	4891	15-19
20-24	48617	28024	20593	35875	21135	14740	12738	6885	5853	20-24
25-29	46480	22742	23738	35430	16872	18558	11050	5870	5180	25-29
30-34	45282	25171	20111	36831	20654	16177	8371	4417	3954	30-34
35-39	37131	20191	16940	30990	17949	13041	6241	3142	3099	35-39
40-44	25313	13319	11994	21300	11595	9705	4529	2330	2199	40-44
45-49	19410	10547	8863	15647	8637	7010	3763	1910	1853	45-49
50-54	15866	8732	7134	12754	7193	5561	3112	1539	1573	50-54
55-59	13342	7103	6239	10859	5865	4994	2483	1238	1245	55-59
60-64	9696	5085	4611	7858	4137	3721	1838	948	890	60-64
65-69	5766	3037	2729	4520	2458	2062	1246	579	667	65-69
70-74	3421	1724	1697	2433	1214	1219	968	490	478	70-74
75-79	1959	956	1003	1361	651	710	598	305	293	75-79
80-84	944	418	526	639	281	358	305	137	168	80-84
85+	602	230	372	434	161	273	168	69	99	85+

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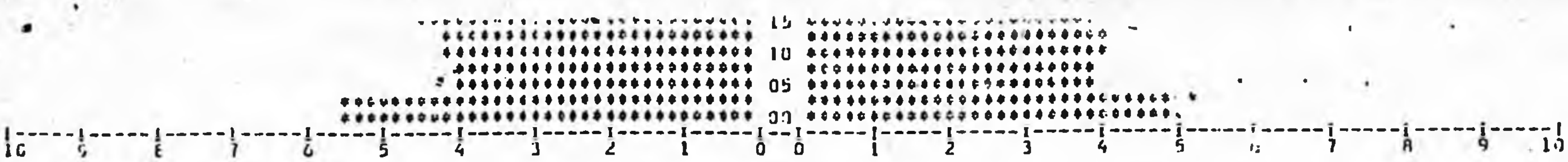

PERCENT OF TOTAL POPULATION

ALASKA DEPARTMENT OF LABOR, RESEARCH AND ANALYSIS DIVISION; SUMMARY TABLE BY RACE AND SEX: 1984 14 pt B

AGE	---TOTAL--- TOTAL	MALE	FEMALE	---WHITE--- TOTAL	MALE	FEMALE	--NONWHITE-- TOTAL	MALE	FEMALE	AGE
TOTAL	433081	229860	203201	332847	178051	154796	100234	51029	49405	TOTAL
0- 4	47153	24104	23045	35173	17584	17185	11980	6120	5860	0- 4
5- 9	35707	18244	17463	25549	13057	12492	10158	5197	4971	5- 9
10-14	34770	17763	17007	25592	13106	12486	9178	4657	4521	10-14
15-19	35362	18842	16520	25507	13657	11850	9855	5185	4670	15-19
20-24	49115	28935	20180	36512	22067	14445	12603	6868	5735	20-24
25-29	44150	20862	23288	32766	14926	17840	11384	5936	5448	25-29
30-34	47265	26004	21261	38427	21310	17117	9038	4694	4144	30-34
35-39	39435	21708	17727	32746	18296	14450	6689	3412	3277	35-39
40-44	27512	14792	12720	22729	12349	10390	4793	2443	2349	40-44
45-49	19729	10750	8979	16018	8856	7162	3711	1894	1817	45-49
50-54	16093	8801	7292	12835	7199	5637	3258	1603	1655	50-54
55-59	13539	7190	634	11039	5950	5089	2500	1240	1260	55-59
60-64	10201	5393	4808	8206	4365	3841	1995	1028	967	60-64
65-69	5918	3085	2833	4655	2498	2157	1263	587	676	65-69
70-74	3515	1769	1747	2543	1293	1250	973	476	497	70-74
75-79	2019	975	1045	1421	681	740	593	294	299	75-79
80-84	1012	443	572	702	298	404	310	142	168	80-84
85+	590	223	367	427	160	267	163	63	100	85+

ALASKA DEPARTMENT OF LABOR, RESEARCH AND ANALYSIS DIVISION; SUMMARY TABLE BY RACE AND SEX: 1985

14 pt B

AGE	---TOTAL--- TOTAL	MALE	FEMALE	---WHITE--- TOTAL	MALE	FEMALE	--NONWHITE-- TOTAL	MALE	FEMALE	AGE
TOTAL	441756	234385	207371	339497	181580	157917	102259	52805	49454	TOTAL
0- 4	48952	25043	23945	36644	18735	17909	12349	6309	6040	0- 4
5- 9	37835	19335	18501	27405	14008	13397	10431	5327	5104	5- 9
10-14	33530	17123	16407	24155	12335	11820	9375	4788	4587	10-14
15-19	35501	18889	16612	26003	13959	12034	9498	4920	4578	15-19
20-24	49313	27662	19651	36760	22676	14084	12353	6786	5567	20-24
25-29	42033	19243	22780	30457	13417	17240	11376	5828	5548	25-29
30-34	49442	26819	22623	39869	21680	18189	9573	5139	4434	30-34
35-39	41776	23135	18641	34582	19441	15141	7194	3694	3500	35-39
40-44	28750	15462	13288	23821	12973	10848	4929	2439	2440	40-44
45-49	20060	11080	8930	16262	9129	7133	3798	1951	1347	45-49
50-54	16453	8893	7560	13152	7239	5913	3301	1654	1647	50-54
55-59	13909	7419	6490	11270	6141	5125	2639	1278	1361	55-59
60-64	10514	5510	5004	8446	4454	3992	2069	1056	1012	60-64
65-69	6201	3223	2978	4900	2615	2285	1301	608	693	65-69
70-74	3683	1846	1837	2676	1363	1313	1007	483	524	70-74
75-79	2091	1013	1071	1486	716	770	595	294	301	75-79
80-84	1104	475	629	780	330	450	324	145	179	80-84
85+	578	216	362	429	159	270	149	57	92	85+

Independence through Susitna Hydro

ENERGY SUPPLY

Harnessing the Susitna River as a source of power would make a dramatic statement for energy independence in Alaska.

Government studies differ in their projections of the percentage of energy demand the project would meet, but the Anchorage Municipal Power & Light utility estimates the Susitna would supply 60-80 per cent of the railbelt area's needs for electrical power when the project first comes on line.

The two dams in the system would generate up to 6.1 billion kilowatt hours of firm annual energy to Fairbanks, Anchorage and points beyond served by utilities in those areas.

More important, the river would supply a reliable, perpetual energy source–little affected by fluctuations in fuel prices, oil embargos or decreasing supplies of finite, nonrenewable fuel sources. Construction of a single project in southcentral Alaska would mean that fewer rivers would be impacted by numerous smaller dams.

PLANNING

Attention to the Susitna River as a power potential intensified in the 1970s when environmentalists and others urged that a proposed dam on the Rampart River be rejected in favor of a hydroelectric facility on the Susitna.

Today, extensive studies are being conducted under a $30 million contract to a private consulting firm--Acres American--through the Alaska Power Authority.

When complete, the study will identify environmental and social aspects of the Susitna project, and the means to mitigate any potential adverse effects. The Department of Fish & Game is conducting detailed studies of fish and wildlife resources in the project area.

Design and engineering as well as other techniques will be developed to assure that valuable fish and wildlife species will flourish.

Recreation potential for the lakes that would be formed by the two dams also will be studied, with potential plans for developing fishing, boating and other activities for tourists and Alaskans.

With continued good planning, the Susitna project can be a model for the nation in providing environmental protection, recreation benefits and economic stability.

JOBS

Construction of the Watana and Devil Canyon dams will provide jobs for Alaskans for nearly 11,000 man years. The project will invest more than $850 million in skilled and unskilled labor, at 1978 wage levels.

It will provide employment stability for Anchorage, Fairbanks and other areas where unemployment levels have reached more than 12 per cent

For more than a decade, Susitna will help free Alaska from chronic boom-bust economy ills. And once the dams are built, they will provide operation and maintenance jobs with a $1.4 million annual payroll, according to Corps of Engineers 1978 estimates.

A recreation industry in the private sector could grow around the estiated 15,000-190,000 visitors the project area could attract with full recreation facility planning.

PETROLEUM

More than any other factor, oil dictates our economy. The U.S. imports nearly half its supply from foreign nations, principally those in the politically unstable OPEC cartel.

OPEC prices have driven the cost of oil up from $3.65 just 10 years ago to $33, and higher, today. And the state Department of Revenue estimates the wellhead price of crude oil could reach $150 a barrel in 1995–about the time the Susitna Hydropower project could be on line.

That will mean consumers will pay from $5.50-$6 for gasoline and home and commercial heating fuel. For Alaska utilities, these cost increases would mean ever-rising bills to the consumer.

And while U.S. petroleum reserves are dwindling, national energy policy mandates deregulation of oil and gas prices and prohibits utilities from burning these fuels in new facilities.

Alternative energy supplies must be found for the future ... and in Alaska, one of the most promising is the Susitna Hydro project.

ALASKA POWER AUTHORITY

SB608

334 WEST 5th AVENUE - ANCHORAGE, ALASKA 99501

Phone: (907) 277-7641
(907) 276-0001

FEB 10 1982

January 25, 1982

Bettye Fahren amp
4016 Evergree
Fairbanks, Ak. 99701

Dear Ms. Fahre amp:

With this etter, I am announcing a third revision to the Susitna Hydroelectric P oject Plan of Study (POS). The revision consists of a schedule adjust nt that changes the submittal of the Federal Energy Regulatory Commi sion (FERC) license application from June 30, 1982 to September 30, 19 2. This plan revision has been made for several reasons.

First and fo emost, it is believed that the quality of certain aspects of the li ense application will be materially improved by the postponement. Sp cifically, the assessment of fishery impacts will benefit from data lerived during ADF&G's winter program, and there will be additional tim available to further define both the fish and wildlife mitigatic plans. Also, since the winter of 1980-81 was atypically mild, t e inclusion of data from the winter of 1981-82 will enhance the enviro mental data base.

Second, a rel ation of the original schedule will permit additional opportu ty for agency review of the proposed project and mitigation plans. gency suggestions received by June 15, 1982 can be more fully addresse and plans can be revised as necessary.

Third, this sc edule revision is not expected to delay the eventual issuance of the lic nse application by FERC, nor the initiation of project constructio . An improved license application will facilitate its acceptance and rocessing by FERC, and it is believed that the three month postponement ll be more than compensated for by the increased ease with which the mproved application will be processed. The postponed license ap lication submittal will not affect the schedule of design activities p grammed in parallel with the licensing process. Therefore, the initi tion of project construction will not be delayed.

This POS revision, like the original POS, is predicated on the assumption that the Board of Directors of the Alaska Power Authority, the Governor and the Legislature will determine that the Susitna Project has sufficient merit to warrant the filing of a FERC license application. If the determination and decision are to the contrary, of course, the entire issue of license application submittal schedules will become moot.

Sincerely,

E. P. Yould

Eric P. Yould
Executive Director

SB 608

TO: Billy Berrier
Director
Legal Services

DATE: 3/17/82

Attn: Pegues

FROM: Bettye Fahrenkamp
Chairman

RE: Final Committee Substitute
SSSB 608

The Committee today completed work on SSSB 608. Attached is a work draft in which they would like to have incorporated the following additions:

#1 Page 2, line 4, a new section 8 to read:

"The sum of $1,100,000 is appropriated from the general fund to the Alaska Power Authority for a feasibility study and initiation of design for the Hoonah intertie."

#2 Renumber the following sections 8 - 11 accordingly.

#3 Page 2, line 14, a new "renumbered" section 13 to read:

"The sum of $35,000,000 is appropriated from the general fund to the Alaska Power Authority for construction of the Bradley Lake hydroelectric project."

#4 Page 2, following #3 above, to read:

"The sum of $200,000 is appropriated from the general fund to the Alaska Power Authority for a new power distribution system in Tenakee Springs."

#5 Renumber the follwing sections accordingly.

#6 Page 3, line 7, delete "9" and "10" and insert "10" and "19" in their place.

#7 Page 3, line 9, delete "8" and insert "9" in its place.

#8 Page 3, line 9, delete "10 - 15" and insert "11 - 18" in its place.

#9 Page 3, line 9, delete "17 - 18" and insert "20 - 21" in its place.

#10 Page 1, under Funding Information delete "$55,900,000" and insert "$92,200,000" in its place.

If you have any questions please contact Resa King at 465-3834.

When the bill is completed please return to Room 211 Capitol Building.

#19

SENATE AMENDMENT

BY Senator Dick Eliason

To: Senate Resources Committee SENATE BILL No. CSSSSB 608

To: HOUSE BILL No.

PAGE: ~~1~~ LINE: ~~27~~ Add new Section ~~7~~

The sum of $200,000 is appropriated from the general fund to the Alaska Power Authority for a new power distribution system in Tenakee Springs.

Renumber subsequent sections accordingly.

 WORK DRAFT PAPER 3/17/82 12:30 pm WORK DRAFT PAPER

Pegues
3-17-82

#2

Original sponsors: Kerttula, Dankworth, Bennett, et al

Funding Information		
General Fund	$55,900,000	55,900,000
Other Funds	-0-	1,100,000
	~~$55,900,000~~	35,000,000
	92,200,000	200,000
		92,200,000

IN THE SENATE BY THE RESOURCES COMMITTEE

CS FOR SPONSOR SUBSTITUTE FOR SENATE BILL NO. 608 (Resources)

IN THE LEGISLATURE OF THE STATE OF ALASKA

TWELFTH LEGISLATURE - SECOND SESSION

A BILL

For an Act entitled: "An Act making special appropriations for various power projects and energy-related purposes; and providing for an effective date."

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

* Section 1. The sum of $25,600,000 is appropriated from the general fund to the power development fund of the Alaska Power Authority (AS 44.83.380 - 44.83.425) for the Susitna River hydroelectric project (AS 44.83.300 - 44.83.360). ~~in gov budget~~

* Sec. 2. The sum of $200,000 is appropriated from the general fund to the Department of Fish and Game for assessment of the fisheries enhancement potential of the Susitna River system. ~~add on where possible~~

* Sec. 3. The sum of $600,000 is appropriated from the general fund to the Office of the Governor to complete alternatives studies and additional work necessary to make key decisions on construction of the Susitna River hydroelectric project.

* Sec. 4. The sum of $200,000 is appropriated from the general fund to the Alaska Power Authority for railbelt windpower feasibility studies.

* Sec. 5. The sum of $500,000 is appropriated from the general fund to the Alaska Power Authority to continue Chakachamna fisheries and habitat studies.

* Sec. 6. The sum of $1,200,000 is appropriated from the general fund to the Office of the Governor for an assessment of the economic and engineering feasibility of generating and transmitting gas-fired power from the North Slope to the railbelt.

3-17-82

#21

* Sec. 7. The sum of $500,000 is appropriated from the general fund to the Alaska Power Authority for design and right-of-way activities for a possible Kake-Petersburg intertie.

8

* Sec. ~~8~~ 9. The sum of $300,000 is appropriated from the general fund to the Alaska Power Authority for feasibility analysis of alternatives that can lower the cost of power for Angoon.

* Sec. ~~9~~ 10. The sum of $2,500,000 is appropriated from the general fund for payment as a grant to the City of Cordova for an electric generation unit.

* Sec. ~~10~~ 11. The sum of $1,250,000 is appropriated from the general fund to the Alaska Power Authority for a substation and distribution system for Cantwell.

* Sec. ~~11~~ 12. The sum of $2,000,000 is appropriated from the general fund to the Alaska Power Authority for the Lower Kuskokwim power plan.

#1 = 13 #2 = 14

* Sec. ~~12.~~ 15 The sum of $2,000,000 is appropriated from the general fund to the Alaska Power Authority for installation of waste heat facilities in rural villages.

* Sec. ~~13.~~ 16 The sum of $2,000,000 is appropriated from the general fund to the Alaska Power Authority for feasibility studies in rural villages.

* Sec. ~~14.~~ 17 The sum of $1,600,000 is appropriated from the general fund to the division of energy and power development, Department of Commerce and Economic Development, for reconnaissance studies in rural villages.

* Sec. ~~15.~~ 18 The sum of $14,000,000 is appropriated from the general fund to the division of energy and power development, Department of Commerce and Economic Development, for residential energy conservation and weatherization programs.

* Sec. ~~16.~~ 19 The sum of $1,200,000 is appropriated from the general fund to the division of energy and power development, Department of Commerce and Economic Development, for grants to regional nonprofit corporations for village energy planning and education.

3-17-82

* Sec. ~~17~~ ~~19~~ 20. The sum of $100,000 is appropriated from the general fund to the Office of the Governor for a longitudinal cost-benefit analysis of energy conservation and weatherization program.

* Sec. ~~18~~ ~~20~~ 21. The sum of $150,000 is appropriated from the general fund to the division of energy and power development, Department of Commerce and Economic Development, to continue work on the long-term energy plan.

* Sec. ~~19~~ ~~21~~ 22. The appropriations made in secs. ~~9~~ 10 and ~~16~~ 19 of this Act shall be disbursed in accordance with AS 37.05.315 - 37.05.319.

* Sec. ~~20~~ ~~22~~ 23. The appropriations made in secs. 1 - ~~8~~ 9, ~~10 - 15~~ 11 - 18, and ~~17~~ 20 - ~~19~~ 21 of this Act are for capital projects or are related to capital projects and do not lapse in accordance with AS 37.25.010.

* Sec. ~~21~~ ~~23~~ 24. This Act takes effect immediately in accordance with AS 01.10.070(c).

(REVIEW DRAFT: SUBJECT TO REVISION)

SUSITNA HYDROPOWER: A REVIEW OF THE ISSUES

Prepared for the Alaska State Legislature

History of the Susitna Proposal
The Acres Plan of Study
Overview of the Electric Power Industry
Planning for New Generating Capacity
Existing Railbelt Utilities
Federal and State Regulation

By Arlon R. Tussing
Lois S. Kramer
Barbara F. Morse

15 April 1980

ARLON R. TUSSING & ASSOCIATES, INC.
Anchorage, Juneau, Seattle

7

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CHAPTER I: HISTORY OF THE SUSITNA PROPOSAL

During the first half of the Twentieth Century hydroelectric generation, with its high reliability and its freedom from recurring fuel costs, was the preferred source of electricity wherever suitable damsites existed, and one of the chief missions of the Interior Department's Bureau of Reclamation was to identify potential hydropower sites, particularly on the Western federal lands.

Origins of the Susitna project.

Alaska's rivers were included in the federal site identification program, but they were too remote from the continent's population centers to be affected by the federal dam-building program of the 1930's, which resulted in major developments on the Tennessee, Columbia, Colorado and other Lower 48 river systems. The push for large hydro projects in Alaska seems to date from the late 1940's.

> [In 1950,] the Department of the Interior provided $150,000 to be used by the Bureau of Reclamation to update its Alaskan investigations of 1948. The results of these studies were to be used as a basis for legislation authorizing the development of the territory's water resources.
>
> In its final report, published in 1952, the Bureau of Reclamation identified a large number of possible hydroelectric power sites throughout Alaska. The Bureau pointed out that, among all the potential rivers, the Susitna River was the most strategically located of all Alaska streams because of its proximity to Anchorage and Fairbanks and the connecting railbelt. The Susitna River basin occupies the northern half of the Cook Inlet area. It is bounded on the west and north by the Alaska Range, and on the east by the Copper River Plateau. The Susitna River enters Cook Inlet 25 miles west of Anchorage. The main stream originates in a series of glacier-bearing peaks some 90 miles south of Fairbanks and 200 miles north of Anchorage of which Mt. Hayes at 13,940 feet is the highest.

Susitna development both within Alaska and in Congress. Advocates of the gigantic Rampart Dam on the Yukon River successfully persuaded Congress to defer action on the Susitna concept until studies of Rampart were completed.

Although Governor Egan, two major Alaska utilities, the Anchorage Daily News and the Fairbanks News-Miner, the National Electric Contractors Association, and the Alaska Conservation Society all strongly supported Susitna development, the Corps of Engineers and Senator Ernest Gruening captured the public's interest for the much more dramatic Rampart project throughout the mid-sixties. One recent review of the project's political history concluded that Alaska's obsession with the grandiose and unrealistic Rampart proposal delayed serious consideration of the Susitna by more than a decade.

A 1967 report by the Interior Department effectively eliminated Rampart as a contender, finding that the project was neither economically nor environmentally sound. Instead, Interior recommended creation of a power pool that would interconnect the Cook Inlet and Interior Alaska load centers, and construction of new gas-fired plants in the Cook Inlet area and a mine-mouth coal-fired plant at Healy. For the longer-term it recommended further consideration of hydroelectric projects on the Susitna River and at Bradley Lake near the head of Kachemak Bay.

By the time that Interior issued its report, two organizational changes had occurred that affected the outlook for the Susitna project. First, the Army and Interior Departments, responding to Congressional annoyance about their competitive posture on river-development schemes, agreed to end their rivalry. The lead in hydropower policy and research was to be located in the Bureau of Reclamation (Interior), while design and construction responsibilities went to the Corps of Engineers (Army).

Creation of the Alaska Power Administration.

Subsequently, in 1967, the Interior Department withdrew the Bureau of Reclamation from Alaska entirely, and transferred its duties to the Alaska Power Administration (now part of the Department of Energy, and not to be confused with the state's Alaska Power Authority). The new agency is charged with forecasting electricity demand, and planning water resource development and electrical transmission facilities. The Administration also operates and markets power from the existing Eklutna hydroelectric installation near Anchorage and the Snettisham project near Juneau.

New federal interest in Susitna.

In 1972, the U.S. Senate Public Works Committee, of which Alaska's Mike Gravel was a member, passed a resolution requesting the appropriate federal agencies to assess the electricity needs of Alaska's railbelt area, and to take a new look at development of the Upper Susitna. In 1974, the Alaska Power Administration had completed an update of the Bureau of Reclamation's 1961 report and again recommended construction of a two-dam system, using the Denali and Devil Canyon sites.

In 1976 the Corps proposed to proceed with Phase I of the project's engineering and design on the basis of the 1975 studies. In the same year, Congress authorized spending of $25 million for the Phase I effort, conditional upon "notification to Congress of the approval of the Chief of

Engineers." All the required procedures for this approval had been completed in May 1977, when the Office of Management and Budget (OMB) blocked the expenditure, insisting instead on supplementary geological, engineering, and economic studies. The Corps issued its supplemental feasibility report in February 1979; OMB subsequently approved the report, and in the Summer of 1979 the Corps forwarded it to Congress, which now has it under consideration.

State initiatives: The Kaiser proposal and establishment of the Alaska Power Authority.

In 1973, the state of Alaska had begun to consider independent initiatives to advance Susitna hydropower development. The state contracted for an economic and engineering feasibility study with the Henry J. Kaiser Company, which was considering Alaska locations for a major aluminum refining plant. Kaiser's 1974 report proposed a wholly different construction strategy, composed of a higher dam (Susitna I) to be built about five miles upstream from the Devil Canyon site recommended by the Bureau of Reclamation and the Corps of Engineers, and subsequent smaller dams downstream (Olson) and upstream (Vee and Denali). This concept appears to have no active support today.

The 1976 session of the Alaska Legislature created the Alaska Power Authority (to be distinguished from the federal Alaska Power Administration) as a vehicle for direct state initiatives in the design, financing, construction and operation of a Susitna hydroelectric project, or other electrical generating and transmission facilities in the state.

The Authority may conduct engineering, economic, and financial feasibility studies; finance power projects directly through issuance of revenue bonds; lend to existing utilities or regional power authorities through a power project revolving loan fund; and contract with producers for the purchase of electricity. The Authority received its initial staff and funding in 1978.

Senator Gravel's funding proposal.

In 1976, the Susitna development did not seem to be moving very rapidly on the federal level. At the same time, it appeared to Alaska's Senator Mike Gravel that the time was quickly running out on the practice of appropriating vast amounts of federal money for river-development projects whose benefits were wholly local, and particularly for one that would direct a large proportion of total federal appropriations for power development to an oil-rich state, for the benefit of as little as one-tenth of one percent of the nation's population.

> Senator Gravel argued the urgent need for a break with tradition. Alaska must rely upon another means of financing hydroelectric projects. The senator proposed that Congress appropriate monies to a revolving fund equal to the phase one or the advanced engineering and design portion of any one project. The sponsoring state agency, in this case the Alaska Power Authority, soon to be created by the state legislature, would issue bonds based on the proposed project to pay the Corps for the phase-one work.
>
> In the event that the proposed development was not feasible, the federal revolving fund monies would be used to pay off the state bonds. If, however, the proposed project proved to be feasible, the Alaska Power Authority would issue revenue bonds and contract for the work. Under the Gravel plan, the federal revolving fund would act solely as a guarantee for the phase-one costs incurred by the state sponsor. [Naske and Hunt, 1978]

Current investigations.

The Gravel proposal as such was not adopted by Congress, but the conditional authorization of the Phase I work in the Water Resources Development Act of 1976 incorporated his philosophy to the extent that it provided for a cooperative federal-state effort in making detailed feasibility studies of the project, and required the state to reimburse the federal government for any Phase I expenditures made by the Corps of Engineers if the project proved feasible.

As an alternative to executing a cooperative agreement with the Corps of Engineers, the state had the option of arranging for and financing its own studies. The creation of the Alaska Power Authority in 1976, combined with suspicions in Alaska that the federal government was both out of sympathy with Alaskan goals and unable to move with dispatch or competence, led the state legislature to appropriate $8.17 million to begin a series of feasibility analyses and design studies that would ultimately cost $29.6 million.

The Acres study.

In this context the Alaska Power Authority treated the Corps equally with three private consulting firms as competitors for the Phase I effort. In November, 1979, the Authority contracted for the studies with a group led by Acres American, Inc. of Buffalo, N.Y., and Columbia, Maryland. Acres' subcontractors include ---

*** R & M Consultants of Anchorage (geotechnical field studies);

*** Frank Moolin & Associates of Anchorage (construction management):

*** Terrestrial Environmental Specialists, Inc., of Phoenix & New York (environmental assessment);

*** Woodward-Clyde Consultants of Anchorage & San Francisco (seismic studies);

*** Salomon Brothers of New York (financial advisors); and

*** Cook Inlet Region, Inc., and Holmes and Narver, of Anchorage (logistical support).

Work will begin in January, 1980. and continue for about 30 months. There is no guarantee that the engineering, environmental, and economic findings will be favorable, but even the most positive conclusion would only begin a state and federal permitting process that would take at least three more years before construction could begin.

CHAPTER II of this report summarizes Acres' February 1980 Plan of Study, identifies some weaknesses in the Plan, and proposes some modifications to it.

The legislature's study of alternatives to Susitna.

In 1977, the Alaska legislature appropriated $200,000 to the Division of Legislative Research to "(1) analyze existing assumptions and findings concerning power needs and population growth projections of the Railbelt . . . [and] . . . (2) analyze energy supply alternatives, including Susitna . . ." When the division was disbanded in the Summer of 1979, the House Power Alternatives Study Committee, composed of Representatives Brian Rogers and Hugh Malone, was established to oversee this appropriation. (The Committee funded the present report with a part of the $200,000.)

The Alaska Power Authority subsequently augmented the legislative appropriation with $30,000 for a study (by the Institute of Social and Economic Research) on end uses of energy in Alaska. The study committee's final report is to be submitted to the legislature by April 15, 1980.

CHAPTER II: THE ACRES PLAN OF STUDY

Introduction

In February 1980, Acres American, Inc., published its Susitna Hydroelectric Project Plan of Study, based upon a preliminary plan that Acres submitted to the Alaska Power Authority in September 1979, as part of Acres' response to the Power Authority's June 1979 request for Susitna study proposals. Eric P. Yould, executive director of the Power Authority, introduced the Study Plan "to the public at large and all interested agencies and organizations," stating:

> 1. The fact that a feasibility study is to be undertaken does not necessarily mean that a hydroelectric project of any kind will ever be constructed on the Susitna River. It will provide the basis, however, upon which an informed decision can be made as to whether the State could or should proceed in the matter.
>
> 2. The publication of this plan does not permanently fix the manner in which the proposed work is to be accomplished. On the contrary, I regard it as a dynamic document which will, I hope, be steadily improved with your assistance. It has already undergone an important metamorphosis as a result of testimony and correspondence received during the past four months, and I have no doubt that further editions will be responsive to your suggestions and comments.

The Alaska House of Representatives' Power Alternatives Study Committee commissioned this report partly in response to the Power Authority's request that interested parties continue to review the Acres Study Plan, in the interest of improving it further. After examining the February 1980 document, we believe that the plan still needs major changes before it can remotely be considered as the basis for an informed State decision on the Susitna project. This chapter briefly summarizes the Study Plan, identifies those shortcomings of the plan which we are competent to address, and proposes amendments to both its emphasis and the sequence of its study tasks.

General Description.

The $25 million Acres American, Inc., study plan is intended to establish the technical, economic and financial feasibility of the proposed Susitna hydroelectric project for meeting the future power needs of the Railbelt region, and to evaluate its environmental consequences. If the Alaska Power Authority determines that the venture is feasible, Acres and its subcontractors would prepare a license application for submission to the Federal Energy Regulatory Commission.

The study itself is scheduled to take 30 months and involves a multidisciplinary team of consulting firms:

*** Woodward-Clyde Consultants --- power studies and seismic analysis;

*** Salomon Brothers --- financing plan;

*** R & M Consultants --- hydrologic investigations;

*** Frank Moolin & Associates --- project and construction management;

*** Terrestrial Environmental Specialists --- environmental assessement; and

*** Cook Inlet Region, Inc., and Holmes and Narver --- logistical support.

The project team will undertake essentially thirteen tasks as follows, at a total cost of $29,604,249:

1. Power studies --- demand forecasts, generation alternatives, expansion sequence and plant mix, and impact assessment. ($359,200)
2. Survey and site facilities --- land tenure and jurisdictional analysis, field studies and surveys, aerial photography and mapping, and access roads. ($7,858,600)
3. Water resource studies --- development of stream flow data; reservoir operation; glacial movement, flooding, ice, sedimentation, etc. ($1,826,000)

4. Seismic studies --- seismic risk analysis, and development of seismic design criteria for dams, transmission lines and access roads. ($1,139,000)

5. Geotechnical exploration --- data collection and analysis for surface and subsurface geology and geotechnical conditions. ($3,620,500).

6. Design development --- development of preliminary engineering design and cost information for Watana and Devil Canyon damsites. ($1,769,000)

7. Environmental studies --- assessment of alternatives for power generation, access road and site facility locations and power transmission corridors; preparation of FERC license application exhibit. ($6,570,300)

8. Transmission --- selection of transmission route, preliminary engineering designs, and cost estimates. ($729,300)

9. Construction cost estimates and schedules --- cost estimate summaries and construction schedules suitable for the application to FERC; analysis of possible delays, changes and their effects on costs and schedules. ($185,000)

10. Licensing --- preparation and assembly of all necessary documentation for the application to FERC. ($293,500)

11. Marketing and financing --- examination of financial feasibility and development of a financing plan. ($383,100)

12. Public participation --- establishment of a public information office; conduct of public workshops and meetings; and preparation of information, materials, and action lists. ($383,000)

13. Administration --- project management. ($467,700)

Information for decision-making

The Study Plan relies upon a series of "Power Studies", to be completed 11 months into the overall study, as the documentation upon which the Power Authority is to justify its go or no-go decision. The Power Alternatives Study Report will contain:

> "load forecasting for the Railbelt region;
>
> "selection of alternative energy and/or power generation scenarios;
>
> "evaluation of viable expansion sequence scenarios; and the
>
> "recommended expansion sequence."

This first phase of the study is thus its most vital element from the standpoint of deciding whether or not the state should develop the hydropower potential of the Susitna River. Unfortunately, this phase seems to be both the worst thought-out part of the Acres plan, and the worst funded, accounting for only 1.2 percent of the total study budget ($359,200).

The gravest defect in the power study phase is, moreover, one that can not be remedied simply by providing more funds or a more sophisticated work plan for some of its study subtasks but is, rather, a fault that demands an overhaul of the organization and scheduling of the study project as a whole. Under the current plan of study, the decision regarding Susitna's viability will not be based on either its economic or financial feasibility.

The power study phase does not provide for any cost, scheduling, or contingency analyses concerning the Susitna project itself, as a basis for evaluating alternative generation strategies. The study plan does not begin making even preliminary cost and scheduling estimates for the project until the 73rd week --- five weeks after the go/ no-go decision --- nor does it begin to consider "potential contingencies/risks and to evaluate their effects upon cost estimates and schedules" until the 115th week. The study plan, moreover, would begin considering the marketability of Susitna power an the project's financibility only after the Power Authority had made a decision to proceed.

Cost and risk comparisons for alternative methods of electric generation (to Susitna) will be examined in the power alternatives study prior to the go/no-go decision, but all these studies of alternatives will be "developed for each technology (cost/unit energy) based on . . . existing studies." The sources explicitly referenced are 1976 documents, while the work tasks dedicated to analyzing alternative power generation strategies and determining the optimal plant mix account for only 4/1000 of the total project budget ($126,000). Even if this information on alternatives were adequate for making a choice among them, it is hard to see what use it would be in the absence of cost and risk estimates for the Susitna project itself.

Demand studies.

The "need" for Susitna power, its marketability, its cost to consumers, and the project's financibility all depend upon the total amount of electricity demanded by residential, commerical and institutional, and industrial consumers in the Railbelt. In order to choose the best combination (or indeed, even a workable combination) of generating facilities, power system planners need to know two dimensions of future demand: (1) the total demand for electrical energy, which is usually measured in megawatt-hours over the course of a year, and (2) the peak load, which is the highest number of megawatts demanded at any time during the year.

In the Acres plan, the Institute of Social and Economic Research of the University of Alaska (ISER) will prepare forecasts of total demand, while Woodward-Clyde Consultants are to produce peak power demands and load duration curves "in a manner which is consistent with the economic, social, political, and technical assumptions made by the ISER when developing their energy consumption forecasts."

ISER's demand scenarios. This report does not review or criticize the scope or methodology of the ISER study, because of our own continuing professional relationship with ISER, and because both Acres and the House Committee have explicitly assigned that task to other contractors. It is important, however, to recognize one crucial limitation of the "scenario" approach to demand projection used by ISER and most other forecasters.

In the words of the Acres Plan of Study, "the scenario method implies a consistent description of a system's evolution by fixing, through exogenous assumptions, the evolution of the scenario components: those variables characteristic of the system." More simply stated, the scenario method uses an economic model to produce results that are consistent with some set of assumptions about (say) future oil discoveries or petrochemical development in Alaska, world energy prices, federal regulations regarding the end-uses and pricing of natural gas, and the like. But the scenarios themselves say nothing, and most forecasting technicians are unwilling to express strong opinions, about the truth or even the likelihood of those assumptions.

Using the scenario method, therefore, ISER will surely present several forecasts of future electricity demand, some of which will seem to argue in favor, and others against building the Susitna project, but will decline to say which (if any) the Power Authority ought to use in planning electrical generating facilities for the Railbelt. If a rational decision is ever to be made, however, somebody ultimately must (1) make an implicit or explicit judgment which scenarios are the most plausible descriptions of Alaska's future, and (2) prepare for the various ways in which that judgment might be wrong.

In our judgment the most likely scenarios for the state's future are ones that no recent power demand forecast (including ISER's 1976 study) has even mentioned, let alone formally considered: scenarios in which no combination of existing and new basic industries can equal or replace government revenues from Prudhoe Bay oil and gas as a source of Alaska income and employment. In these scenarios, the inevitable decline in Prudhoe Bay production will mean that the Railbelt's business activity, employment, population --- and electricity demand --- will peak in the late 1980's or early 1990's, and fall sharply for at least several years.

We do not expect the Alaska Power Authority to agree with our judgment that this is the most probable course for Railbelt electricity demand, but it is vital for power planners in Alaska to recognize that it is a wholly plausible course, and to consider the implications for the State of a decision to build Susitna if power demand did actually begin to decline at just about the time the project was completed.

It would be a relatively simple matter for ISER to add one or more boom-and-bust scenarios to its forecasts if they are not already there. Our more serious concern is that the Study Plan does not even mention the need to deal systematically with <u>any</u> kind of uncertainty or risk (demand forecasting errors, delay or non-completion risks, construction cost overruns, uncertainties regarding the availability of alternative fuels, and interest rates and other financial risks) in choosing among different strategies for providing electricity to the Railbelt.

<u>Forecasts of peak loads and load duration curves</u>. The amount of generating capacity a region requires in a given year stems directly from two needs: (1) to meet the highest anticipated peak load for the year, and (2) sufficient reserve capacity to serve unanticipated peaks and to allow for scheduled and unscheduled equipment outages. Estimates of total annual requirements for electrical energy, however, reveal very little about this need for generating capacity.

Total demand and peak demand are both functions of population, per capita income, climate, the regional industrial mix, and the like, but <u>the ratio between them</u> also varies powerfully with each of these factors, and moreover, can be powerfully influenced by utilities' rate structures, and by various "load management" measures. T[illegible] Study Plan contemplates that Woodward-Clyde will deri[illegible]eak load [illegible]recasts and load duration curves from ISER[illegible]jections of annual demand for electrical energy, on the[illegible]ent (and wholly unwarranted) assumption that peak loads and load patterns are are a relatively simple function of total demand.

Total demand can be always be derived from a load duration curve, but the opposite is never possible. In order to produce a load duration curve and a peak demand forecast, Woodward-Clyde will have to duplicate everything ISER did --- and much more --- for each of ISER's scenarios. But the Study Plan provides only $43,700 for this effort. No credible forecast can be produced for this sum, and we do not believe that any credible firm would offer to produce one for that amount.

Peak responsibility pricing and load management. Peak loads can be reduced, and the efficiency of base-load generating capacity enhanced, by means of peak-responsibility pricing and other techniques of load management; and load management strategies are also a potenti substitute for reserve generating capacity. While these approaches are relatively novel in the United States, European experience suggests that they can reduce the need for total generating capacity by 20 to 30 percent, and in some cases put off the need for new investment in generating capacity for several years. U.S. law, moreover, now requires federal and state regulatory commissions to consider implementing both peak-responsibility pricing and load management strategies.

In our view, any serious forecast of peak loads or the future need for generating capacity must give serious attention to the potential impact of peak responsibility pricing and other load-management techniques. The Acres Study Plan, however, does not mention them anywhere.

Selection of new generating facilities.

Acres plans to use a mathematical model that combines the ISER and Woodward-Clyde demand forecasts and the capital and operating costs for various power alternatives (still seemingly without any cost information on the Susitna project, however), in order "to determine the total system costs of selected future Railbelt expansion sequences, both with and without incorporation of the Susitna Hydroelectric Project, and rank the preferred generation expansion scenarios" according to the cost of electricity.

The program Acres has selected for choosing among the various generation strategies would combine "system reliability evaluation, operations cost estimation, and investment cost estimation." Even the most sophisticated, state-of-the art planning model of this type would be wasted, however, on the incomplete or defective information inputs Acres intends to process. In the context of the current study plan, therefore, the model's output will be rubbish: it will be of no use whatsoever in making an informed decision on Susitna. It is therefore as appropriate as it is surprising that Acres plans to spend only one-tenth of one percent of the project budget ($30,000) for a systematic comparison of generation alternatives.

Financial Feasibility.

As we pointed out earlier, the current Acres plan would begin to consider the marketability of Sustina power and the project's financial feasibility only after the Power Authority had made its decision whether or not to proceed. Even so, the plan's approach to financing is based upon two assumptions that are doubtful as best, and which in any case warrant a close and early examination. The first is that the Susitna project can be financed by revenue bonds (preferably tax-exempt) and the second is that the electric utilities of the Railbelt will voluntarily enter into full-cost-of-service take-or-pay contracts with the Alaska Power Administration.

The fact is that there has never yet been a utility project as large as the Sustita project financed entirely, or even 75 percent, with non-recourse debt. Gas and electric companies have consistently failed in such attempts, even for projects of proved design in familiar environments, facing guaranteed markets. In recent years a substantial number of conventionally-financed electrical generation projects (fossil-fueled and hydro, as well as nuclear) have foundered in mid-construction, because of design faults, poor management, revised demand forecasts, or regulatory hurdles, and it is not suprising that financial institutions have been reluctant to buy bonds whose only security is project revenue.

Rightly or wrongly, lenders are bound to perceive the Susitna project as bearing greater risks of non-completion, extended delays, cost overruns, or market deficiencies than the Lower 48 projects they have already declined to finance on a non-recourse basis. Moreover, since Salomon Brothers first considered methods of project financing for the Susitna project, inflation has severely damaged the bond markets; and unless general economic conditions improve radically between now and the time a Susitna financial plan is completed, debt in the quantities it requires may be unavailable at any price, on any terms.

These considerations suggest that that it may be imprudent to count on selling revenue bonds as the principal means of financing Susitna and even more imprudent to assume that the costs or availability of financing will not influence the project's viability or merits. Although we are considering a facility project whose completion is at least ten years away, the feasibility of project financing may indeed be an important consideration, especially when comparing Susitna's cost with those of its alternatives.

Marketability.

The second assumption, concerning the utilities' willingness to enter into take-or-pay contracts, should not be taken as given. Railbelt utilities are not a single entity, and unless the legislature is willing to impose Susitna power on reluctant utilities and their customers, the Alaska Power Authority will have to negotiate individual contracts with each utility. Non-recourse financing, moreover, would require all-events contracts (compelling consumers to pay for Susitna whether or not they ever got Susitna power, and no matter how much it turned out to cost) prior to construction. Since Susitna power is likely to be more expensive than conventional Railbelt power generation, at least at the outset, the Power Authority could face a buyer's market, especially if gas prices remain relatively low or if Beluga coal development proves economically feasible.

Chugach Electric Association is by far the biggest electric utility in the Railbelt; its service area and those of its wholesale electricity customers encompass the region in which most of the future growth of population and power demand in Alaska is likely to occur. It is not yet clear whether or not Susitna power would be the lowest-cost alternative for Chugach customers but it is almost certain that Susitna power will not be marketable or financially feasible and that, as a result of underutilization, it would not be the lowest-cost alternative for anybody without Chugach and its customers.

Chugach Electric Association has not thus far been an enthusiastic backer of the Susitna project, and its management is not now convinced that Susitna power is the lowest-cost or most practical way of serving its customers --- who are the owners of the utility and elect its management. Curiously, these realities have not yet been mentioned in any of the public literature on the feasibility of Susitna, and it is not alluded to even indirectly in the Acres plan of study.

Although the study's Subtask 11 is titled "Marketing and Financing", the plan contains no explicit discussion of power marketing, and we can not be sure exactly what the consultants have in mind when they use the term. (The section on financing and marketing does explictly discuss means of generating "the necessary degree of infectious enthusiasm which is an essential ingredient for even a determined team to succeed." Thus, it is conceivable that the authors are not referring to selling electricity at all, but only to selling the project.)

<u>Study findings and credibility.</u>

The Plan of Study does not explicitly presume that the Susitna project is feasible, and its introduction explicitly rejects any such presumption. The substance and sequence of work tasks, however, strongly imply that Acres and possibly the Power Administration have already decided that Susitna is in fact the best generation alternative for the Railbelt, and that the project should go ahead.

The current study plan's treatment of economic, financial, and institutional issues is consistently superficial, and nowhere does it provide the funding necessary for timely and professionally competent demand forecasts, cost and risk analyses, or studies of marketing and rate design, reliability and load management, or financial feasibility. Acres seem to treat these issues (if at all) only as afterthoughts or window-dressing.

Clearly, the $13.5 million already spent on the study at the time the power alternatives report is issued will create substantial momentum for the contractor and subcontractors to complete their work in progress. Even more importantly, the $16.1 million remaining to be spent if and only if the go/no-go decision is affirmative cannot help but be a powerful incentive for the study team to arrive at a favorable conclusion.

As it approaches construction, the Susitna project will become more rather than less controversial. It will arouse controversy within the state's utility industry, in the legislature, and among the public at large; before FERC, EPA, and other federal agencies involved in the licensing process, and possibly in the Congress; and it will be controversial at best in the financial community. If the project is indeed the best alternative for the Railbelt an inadequate information -base or patently biased decision-making process will not make the project any easier to sell. If the project is not sound, we ought to find out earlier rather than later. Thus, the current Study Plan requires a major overhaul.

Summary of recommendations.

1. Total and peak loads, and load duration curves, must be derived by one study team, in a single effort, and must take into account the potential impact of peak-responsibility pricing and load management on the need for peak generating capacity. A credible effort of this sort would require at least $250,000 and one year.

2. Preliminary cost, risk, and scheduling analyses for alternative Susitna scenarios should be available as inputs to the decision on generating strategy. These preliminary analyses would cost at least $300,000, and require one year.

3. Cost, risk, and scheduling analyses for the most promising alternatives to Susitna according to the current studies should be as thorough and reliable as those for Susitna itself. At least $150,000 and six months would be necessary.

4. Preliminary marketing and financial analyses are necessary as inputs to the demand, cost, risk, and, scheduling studies, and to any practical decision regarding Susitna. The cost of these studies would probably be about $75,000 over six months.

5. A multidisciplinary panel of contractor, subcontractor, agency and outside experts should examine and reexamine the major assumptions used in the demand, cost, risk, scheduling, marketing, and financing studies. The views of these experts should be translated into probability distributions and systematically incorporated into the assumptions by means of Delphi or comparable methods. This process would cost on the order of $75,000, and run concurrently with the other studies mentioned here.

6. The program used to rank expansion strategies for Railbelt electrical generating capacity should take account of all of the information generated in the power studies, and its results should be expressed in terms of probabilities. Operating a state-of-the art power planning model with the information described here would cost at least $100,000.

7. The results of the decision model should be "run backward" through the process that led to those results. That is, those strategies the model identifies as having the greatest expected net benefit, or having the greatest benefit in the most likely scenario, should be analyzed under other plausible assumptions in order to compare (say) the consequences of not building Susitna if it turned out to be "needed" with the consequences of building the facility if its power turned out to be unmarketable. The costs of this process are incorporated in the previous figures, which total (at minimum) $950,000.

8. Because circumstances and knowledge about the Susitna project and its alternatives will change substantially during the overall study period, all of the assumptions, methods, and results of the preliminary study phase should be reevaluated and updated before any construction actually takes place. This process is likely to cost less than one-fourth the original studies, or $250,000.

CHAPTER III: OVERVIEW OF THE ELECTRIC POWER INDUSTRY

Electric power industry functions.

Generation, transmission, distribution. The electric power business has three main branches: generation, transmission, and distribution. Electric utilities as power distributors own and operate the local low-voltage lines, transformers, and switching facilities that deliver electricity to retail customers in their respective service areas.

Utilities may also own generating plants (fossil-fuel, hydro, nuclear, etc.), alone or jointly with other utilities, or they may purchase electricity from other utilities, federal power projects, or other entities. Some utilities are wholly self-sufficient, but most utilities buy and/or sell electricity; some are net buyers (buy more than they sell) and others are net sellers at wholesale.

Utilities either own the high-voltage transmission lines connecting the generating plants with their distribution systems, or depend on other utilities or governmental entities to wheel power for them.

Non-utility generation; Cogeneration. Institutions and industrial plants often produce electricity to meet their own requirements at lower cost than they could purchase power from a utility, or to supplement or backstop utility-supplied power. Where power generation is incidental to, or a co-product of other activities, such as raising steam for space heating or industrial processes, it is called cogeneration.

In Alaska's Railbelt, the chief non-utility power producers are military installations, the University of Alaska at Fairbanks, and petroleum-related installations on the Kenai peninsula.

Interconnection and power pools.

Transmission lines owned by electric utilities and other entities are typically interconnected into regional power pools or grids that allow the utilities (and non-utility power producers) to lend, exchange, or sell power to one another. Interconnection helps ---

(1) to minimize joint costs (One utility can shut down a high-cost generating unit when another utility has surplus power available at lower cost);

(2) to level daily and seasonal load peaks (The loads of different utilities peak at different times of the day or the year; thus interconnection can reduce their joint need for high-cost peaking generation capacity); and

(3) to meet emergencies (Interconnection reduces the utilities' joint need for reserve generating capacity).

In the Anchorage area, the generating capacity of the two major utilities, Chugach Electric Association and Anchorage Municipal Light and Power, are interconnected at the Eklutna substation, but these two utilities do not in practice manage their facilities jointly in order to minimize costs or reduce the need for reserve generating capacity. In the Fairbanks area, however, the intertie composed of Golden Valley Electric Association, the Fairbanks municipal utility, the University of Alaska, and the two military bases, does actually function as a local power pool.

Methods of organizing and financing electric power supply.

The chief forms of business organization in the electric power industry are private utilities, cooperatives, municipal utilities, and federal agencies.

Private utilities. Private or investor-owned electric utilities account for about three-fourths of the electricity sold in the United States, but their role is insignificant in Alaska and none currently exists in the Railbelt area.

A private utility is an ordinary business corporation governed by a board of directors responsible to the shareholders, who are typically individuals, other businesses, and financial institutions (insurance companies, pension funds, etc.). Its earnings are taxable, and it has no power to issue tax-exempt bonds.

Most private utilities do business only in a single state and have local operational management, but many are controlled by multi-state utility holding companies that make major construction and financing decisions. State public utility commissions or public service commissions like the Alaska Public Utilities Commission (APUC) typically regulate retail rates and terms of service for private utilities, while in most cases (but not in Alaska), the Federal Energy Regulatory Commission (FERC) regulates their wholesale rates and service.

Cooperatives. Rural electrification (REA) cooperatives (or coops) are subscriber-owned utilities, governed by a board of directors elected by the ratepayer-members. Most coops outside of Alaska are distribution utilities for small towns and rural areas, and buy their power from private utilities or federal projects. Coops, however, currently generate more than half of the electricity sold in Alaska's Railbelt. Anchorage-based Chugach Electric Association (CEA), with about 75,000 subscribers, is the largest electric utility in Alaska.

CEA sells electricity to two other coops, Matanuska Electric Association (MEA) and Homer Electric Association (HEA). Golden Valley Electric Association (GVEA), the state's second largest utility, serves the Fairbanks area, the upper Tanana valley, and the Nenana-Healy-McKinley Park area.

The retail business of electric coops is regulated by state utility commissions, including APUC, and their interstate wholesale business is regulated by FERC. As private enterprises, electric cooperatives do not have the power to issue tax-exempt securities, but they can borrow from the Rural Electrification Administration (REA) at 2 and 5 percent.

REA will also guarantee the ordinary bonds or electric cooperatives, most of which they sell to the Federal Financing Bank at rates one to two percentage points below market rates for private utility bonds, and cooperatives can borrow from the National Rural Utility Cooperative Financing Corporation at rates slightly below those of the private market.

Municipal utilities. The term municipal utility refers to any utility operated by a subdivision or agency of a state or province. In North America, most municipal utilities are distributors to a single community, and most of them are relatively small. The municipals do, however, include some large-city systems with substantial generating capacity, such as the Los Angeles and Seattle city utilities. In Alaska's Railbelt, there are municipal utilities in Anchorage, Fairbanks and Seward, and the first two, while interconnected with other utilities, generate all or most of the power they sell.

State- or county-chartered <u>public utility districts</u> and state or provincial <u>power or hydro authorities</u> (such as the Alaska Power Authority) are also regarded as municipals.

A municipal utility may be a city, county, or state agency whose accounts are consolidated with the general government accounts, and whose management serves under the direction of the general political authorities (like the Anchorage and Fairbanks municipal utilities). Alternatively, it may be an autonomous government-owned corporation with an independent board of directors and a wholly separate budget, and with the power to make its own construction and borrowing decisions (like the British Columbia Hydro Authority), or something in-between (like the Alaska Power Authority).

In some states, the retail business of municipal utilities is regulated by the state utility commission, and in others it is unregulated. The APUC regulates municipal utility rates and terms of service in Alaska only (1) outside the limits of the municipality, (2) where they compete with other utilities in the same service area (e.g., CEA and the Anchorage municipal utility), or (3) in their sales to other regulated utilities.

The Alaska Power Authority is exempt from APUC regulation, but the APUC may regulate the purchase and resale of Authority-generated electricity by utilities under its jurisdiction.

As agencies of government, municipal utilities are generally exempt from federal, state, and local taxes. The legislation that established the Alaska Power Authority, however, explicitly allows it to make payments in lieu of local property taxes, but does not state who (the local government or the Authority) decides whether or not such payments will actually be made.

The Internal Revenue Code allows municipal utilities that engage in the retail distribution of electricity to issue tax-exempt securities, but it is not clear whether tax-exempt bonding would be available for a wholesale power project like the proposed Susitna facility. Most financing of municipal power projects is with revenue bonds, for whose interest and amortization the utility pledges only its own income. In some cases, however, general obligation bonds are issued, under which the full faith and credit of the municpality or state is committed to servicing the debt.

Federal power. Outside of the Tennessee Valley Authority (TVA) (a special case of little relevance to Alaska), federal power in the United States is generated in hydroelectric projects built by the Army Corps of Engineers or the Interior Department's Bureau of Reclamation. The Bureau of Reclamation or a regional subdivision of the Department of Energy (like the Bonneville Power Administration in the Pacific Northwest or the Alaska Power Administration) operates the facilities and markets the power. The Alaska Power Administration operates two projects --- Snettisham near Juneau and Eklutna near Anchorage.

Each federal power project must be approved by Congress several times during its planning, design and construction. The inevitable cost overruns create a need for further rounds of Congressional deliberation, authorization and appropriation. As a result, projects sometimes require decades from their conception to commencement of operation.

FERC reviews rates charged by federal power projects; these rates are supposed to cover operating costs, provide for depreciation, pay interest, and repay principal to the U.S. Treasury on the funds invested. Congress typically stipulates the interest rate for each project in the specific legislation authorizing it. In most cases, interest rates on federal projects have embodied a large subsidy element, because at any particular time they have been only a fraction of the rates paid on U.S. Treasury bonds.

Regulation of the electric power industry.

The distribution of electricity is a natural monopoly, in that the economic cost of service (sometimes called resource cost --- the value of labor, materials, and capital actually consumed) tends to be lowest when only one firm serves each market area. Thus, the public is not necessarily better off when there are competing firms, but unregulated private monopolies tend to charge excessive prices for insufficent service..

There are two general ways to deal with this dilemma: public utility regulation and government enterprise. The United States and the state of Alaska use both approaches in dealing with the electric power industry. In either case, public authorities have to deal with three broad types of decision:

*** <u>franchising</u> (sometimes <u>certification</u> or <u>licensing</u>) --- <u>designation of an entity to operate in a given service area</u>;

*** <u>certification</u> (sometimes <u>licensing</u> or <u>permitting</u>) <u>of new facilities</u>; and

*** <u>ratemaking</u> --- setting or approving charges to customers.

Regardless of the type of utility involved, construction of new facilities typically requires approval from several federal, state, and local agencies, with respect to safety, environmental and other concerns. The term <u>regulation</u> is often reserved, however, to decisions regarding the three economic issues just listed.

For municipal utilities and other government enterprises, the franchising decision is made when the city council, state legislature, or Congress authorizes the utility or agency's establishment or expansion, while the budget approval process serves the function of certifying new projects. The utility itself may have complete discretion over its own rates (perhaps within some statutory guideline), or rates may be made or reviewed by the general political authorities (e.g., the city council) or regulated by a state <u>public utility commission</u> or the <u>Federal Energy Regulatory Commission</u> (FERC).

<u>Rate regulation</u>. The various forms of utility organization use significantly different accounting concepts, and different regulatory commissions and government agencies define and measure the several elements of utility cost somewhat differently. Nevertheless, the basic principles of utility ratemaking are essentially the same for regulated

private utilities and government enterprises. Rates are generally designed to cover the utility's cost of service, which is composed of ---

*** operating costs, such as the costs of fuel, labor, materials, and purchased services;

*** interest on debt;

*** amortization (repayment) of debt;

*** depreciation (to the extent not covered by amortization of debt);

*** taxes (if any); and

*** a fair and reasonable return (or a competitive return) to the owners' equity investment.

The Alaska Public Utilities Commission. The Alaska Public Utilities Commission (APUC) has jurisdiction over service areas, licensing of new facilities, and both retail and wholesale rates and terms of service for all Alaska private utilities, including cooperatives.

The APUC also has authority to regulate municipal utilities ---

*** where they compete with another utility in the same service area; (Chugach Electric Association and the Anchorage Municipal Utility, for example, have overlapping service areas.)

*** where they operate outside municipal limits; and

*** in their wholesale electricity sales to regulated (i.e., non-municipal) utilities. (This authority has apparently never been exercised.)

The APUC has no direct jurisdiction over the Alaska Power Authority (state) or the Alaska Power Administration (federal), but it may approve or disapprove electricity purchase contracts that Alaska regulated utilities propose to sign with either agency.

<u>The Federal Energy Regulatory Commission</u>. The Federal Energy Regulatory Commission (FERC), formerly the <u>Federal Power Commission</u> (FPC), is an independent agency housed in the U.S. Department of Energy. FERC jurisdiction includes:

*** <u>Licensing of all power facilities (1) on navigable rivers, and (2) on federal lands</u>.

Any Susitna power project will need a license from FERC, because the upper Susitna is a navigable river for purposes of the Federal Power Act. The damsites and their surroundings are now on federal lands, but by the time any license could be granted, they will have been conveyed to the Cook Inlet regional corporation under the Alaska Native Claims Settlement Act.

*** <u>Review of rates and terms of service on wholesale electricity sales in interstate commerce</u>.

The federal courts have repeatedly upheld FPC claims of jurisdiction over wholesale electricity sales in the Lower 48, even within a single state, on the theory that almost all commerce is at least indirectly interstate commerce. Alaska's geographical isolation and the absence of electrical interties with other states may make a difference, however. Thus far, anyway, FPC and FERC have not tried to assert jurisdiction over wholesale electricity sales by Alaska utilities.

*** Review of rates and terms of service for electricity sold by federal power projects --- including the Alaska Power Administration's Snettisham and Eklutna hydroelectric projects.

*** Transportation of natural gas for resale in interstate commerce.

FERC might use this authority to restrict shipment of Prudhoe Bay natural gas for use as electric utility fuel in Alaska. The federal courts have upheld FPC prohibitions of shipment of gas on an interstate pipeline even within a single state and even for direct sale (that is, not a sale for resale), for an "inferior" purpose --- electric utility boiler fuel.

The Economic Regulatory Administration. The Economic Regulatory Commission (ERA) of the U.S. Department of Energy administers the Powerplant and Industrial Fuels Act of 1978 (PIFUA), which generally prohibits use of oil or natural gas as fuel for new electrical generating plants. The Act provides several grounds on which ERA may waive the prohibition.

Other licensing, permitting, and regulatory agencies. The appendix to this report lists other state and federal agencies with licensing, permitting, or other regulatory or supervisory authority over new electrical generating plants and associated transmission lines. This list is not complete, however, either with respect to the agencies involved, or with respect to the responsibilities of the agencies listed.

CHAPTER IV: PLANNING FOR NEW GENERATING CAPACITY

This chapter considers the decision to install new electrical generating capacity from four vantage points:

1. Demand forecasting. How much new central-station electrical generating capacity will the Railbelt require over the next ten to twenty years?

2. Facilities planning. What combination of generating and transmission facilities will provide this capacity at lowest cost?

3. Organization and financing. What organizational and financial arrangements will provide this capacity most efficiently?

4. Marketing. How should the fixed and operating costs of the new and old facilities be allocated among different user groups?

Promotion vs. conservation. Despite the seemingly distinct headings, these four issues are intricately tangled with one another. For example, utilities and government power agencies project their need to install new generating capacity on the basis of the expected future demand for electricity. But these same entities have a powerful influence on future demand, because their decisions whether and what kind of new generating capacity to install, and how to allocate its cost among different categories of consumers and uses, determine the future electricity prices that will in turn determine how much electricity each category of consumer will use.

To put the point a bit more broadly, utilities and government agencies can legitimately combine demand forecasting, facilities planning, organization and financing, management, and marketing in ways that promote greater electricity demand and thereby maximize the need for new capacity, or in ways that foster electricity conservation and thus minimize the need for new capacity.

Electric utilities, both private and public, understandably tend to favor the first strategy, which was almost unchallenged in the United States until the 1970's. In the Lower 48, the promotional approach to electric power planning has recently lost much of its support outside the utility industry itself, but it still has many enthusiastic backers in Alaska.

This purpose of this chapter is not to provide support for one approach or the other, but in passing we shall point out some of the assumptions on which they differ.

Demand forecasting.

The amount of new electrical generating capacity needed in the Railbelt depends, of course, on the increase in total demand for electricity, which reflects (a) the area's population growth, (b) its per-capita demand for electricity in residential, commercial, and small industrial uses, and (c) the electrical requirements of new energy-intensive basic industries.

The kind of generating equipment that will meet this demand growth most efficiently will depend upon (d) the load characteristics of demand --- its daily and seasonal variations --- as well as on the technical characteristics of the various kinds of generating equipment, the kind and capacity of existing facilities, and on the rate of demand growth.

Finally, because large-scale power projects take many years to plan, design, build, and put into reliable full-capacity operation, their justification typically depends upon forecasts of demand ten or twenty years or even further into the future. Projections of electricity consumption are notoriously inaccurate, no matter how sophisticated their methodology, even for much shorter periods. Power facility planners must therefore take into account (e) a large degree of <u>uncertainty</u>, and compare the consequences of underbuilding with those of overbuilding.

<u>Population and real income</u>. The most powerful influences on electricity demand are population and per-capita real income. Projections of rapid demand growth for the Railbelt rest mainly upon the assumption that its population and economy will continue to boom at annual rates like those of the 1970's.

<u>Economic boom in the 1980's</u>. The most likely prospect is indeed that rapid economic growth will resume in 1980 or 1981, fueled by the spending of Prudhoe Bay (and perhaps other) oil and gas revenues. Major construction projects, including the Alaska Highway gas pipeline and possibly the Alpetco refinery, one or more petrochemical plants, or the Susitna hydroelectric project, are likely to give the boom added force during the mid-1980's.

The Railbelt's long-term economic outlook, however, is dominated by the manner and rate at which the state government spends its oil and gas income. Over the ten-to-twenty year span that is relevant for planning new electrical generating facilities, nothing else is really very important. Without extremely large new petroleum discoveries on state lands, the coming boom will have run its course by the late 1980's or early 1990's at the latest.

Decline in the 1990's? No other basic industry or combination of industries is now in sight to replace the state's Prudhoe Bay petroleum revenues or otherwise to support even Alaska's 1979 levels of population, employment, and per-capita income, much less the levels that will be reached by the mid-1980's. As a result, Alaska's population, and thus the residential and commercial demand for electricity, will probably peak and then begin a long-term decline some time before the end of the 20th Century.

Electricity consumption per capita. Electricity consumption tends to increase with real incomes per capita; it tends to decrease with rises in the real (constant-dollar) price of electricity; and it tends to increase as the prices of competing energy forms rise.

Together with population, therefore, per-capita real income, electricity prices, and the prices and availability of alternative fuels will be the chief influences on the residential, commercial, and institutional demand for electricity in the Railbelt. The effect various deliberate conservation measures would have on electricty demand also belongs under this heading.

Per capita income. In the past, higher levels of real family income have consistently resulted in greater residential and commercial use of electricity, as people moved into larger houses, used more lights and electrical appliances, and demanded more and better commercial and public services that use electricity --- generously lit and outfitted stores, offices, schools, and the like.

Since World War II, however, the most income-sensitive part of electricity demand nationally has been air-conditioning --- an application of little relevance in Alaska. Except for air-conditioning, most households in the Railbelt now have most of the heavy energy-using appliances that characterize the American lifestyle, so that income-driven increases in per-capita electricity demand may have about run their course --- at least in the residential and commercial sectors.

<u>Electricity prices</u>. Higher electricity prices discourage elecricity consumption generally; they also make voluntary conservation measures more attractive economically, and mandatory conservation measures more acceptable. They also encourage owners and builders of homes and commercial buildings to install solar heating and cooling equipment, and industry to rely more on co-generation.

Higher electricity prices outside of Alaska will likely restrain the future growth of per-capita electricity consumption in the Railbelt, even if real costs for power there do not increase at all, as Alaskans adopt the more energy-efficient appliances and construction techniques developed in response to Lower 48 conditions, or mandated nationwide by federal regulations.

<u>Fuel substitution</u>. During the 1980's, energy conservation will almost certainly more than offset any tendency of higher personal incomes to increase electricity consumption. Thus, per-capita demand in the Railbelt is likely to grow only to the extent that higher prices or unavailability of heating oil and natural gas may induce households, businesses, and public institutions to use more electricity for space heating, water heating, cooking, and the like.

Competition between electricity and fossil fuels for the home and commercial space-heating market has its greatest impact at the time owners or developers choose the equipment to go into new buildings. Conversion of existing structures takes place only where very substantial differences exist in the price or supply reliability of alternative fuels; even in these cases, conversion tends to be gradual and incomplete.

For this reason, the timing of new power projects may be crucial. If Susitna power could be made available in the early 1980's, for example, and if it were significantly cheaper than natural gas as a fuel for space-heating, most of the structures built in the Railbelt during the next decade would be electrically-heated.

No power is likely to come on line from any new low-cost source, however, until the end of the Decade at the earliest, when the economic expansion and construction boom driven by development of Prudhoe Bay oil and gas will have played themselves out. Thus, a new power source may face a large existing stock of residential and commercial structures already committed to oil or gas, and little or no opportunity to provide heating for newly-built structures.

In any event, a realistic forecast of residential and commercial demand for electricity in the Railbelt must carefully consider the area's natural gas price and supply outlook, including the question whether gas distribution systems are likely to be established in the Matanuska-Susitna and Fairbanks areas.

Electricity consumption by new energy-intensive industry. Forecasting the growth of large-scale industrial demand for electricity is particularly tricky in a relatively small market like the Alaska Railbelt, where one plant could account for a very large fraction of total electricity consumption. While projections of residential, commercial, and small industrial use of electricity can normally rely on forecasts of broad economic indicators like population, employment, or personal income, a realistic estimate of the demand for electricity by large energy-intensive firms has to be approached on a plant-by-plant basis.

The demand for electricity by large-scale energy-intensive industrial plants is even more sensitive to power costs and to the relative prices of different energy sources than are residential, commercial, and small industrial demand. Heavy industry's choice among sources of energy is also more affected by government regulation, which currently tries to discourage industry from using oil and gas, even where they are plentiful.

Unfortunately, the plants whose potential electrical requirements need to be analyzed do not yet exist, and in most cases are purely speculative. Forecasters of electric power demand thus have to make assumptions about the economic potential of various industries in Alaska; about the likelihood, timing, and location of actual investments; as well as about the technical characteristics of each kind of facility and about prices and the other factors that will influence their choice of energy inputs.

Does cheap power attract industry? Forecasts of large-scale industrial demand for electricity in Alaska are therefore not only highly speculative, but are bound to be controversial. Much of the push to build large electrical generating facilities comes from Alaskans who hope and assume --- almost as a matter of faith --- that abundant or cheap electrical power will attract energy-intensive industries like aluminum or other primary metals refining. Ironically, some of the opposition to the same projects comes from people who fear heavy industrialization, but share the boomers' faith, for example, that construction of the Susitna dams will guarantee establishment of an aluminum refining industry in Alaska.

The cost of electric power, like the cost of any input to production, will surely have <u>some</u> effect on Alaska's attractiveness as a location for heavy industrial investments, but there will be few instances in which it will be decisive. One illustration should put the issue into perspective: Suppose that a given plant costs 1.6 times as much to build in Alaska as in the Lower 48, Europe, or East Asia. Energy costs faced by such a plant outside of Alaska would therefore have to equal at least 60 percent of its fixed capital costs (depreciation, interest, and required return on equity) before even <u>free</u> energy in Alaska would offset the plant's construction cost handicap.

In almost every case, energy-intensive industries are also capital-intensive industries; and we know of only two --- uranium enrichment and basic aluminum --- for which energy costs in the form of electricity normally exceed 10 percent of total costs, or 20 percent of fixed costs.

It is worth noting that a uranium enrichment plant accounted for more than half of the Railbelt's industrial power consumption in the Alaska Power Administration's 1974 forecasts for 1990 and 2000. The U.S. market for new light-water reactors had virtually disappeared even before the Three Mile Island incident, and the prospect that an enrichment facility would be installed in Alaska in this Century is almost nil. It is probably safe, therefore, to say that basic aluminum is the only industry that might plausibly be attracted to Alaska by the prospect of abundant or relatively cheap power as such.

The potential for attracting aluminum refiners to Alaska is a legitimate consideration in estimating the probable benefits (and costs) of a project like the Susitna dams. But many factors beside the availability and cost of electricity influence an aluminum producer's decision whether, where, and when to build a new plant, including the world supply-and-demand outlook for aluminum and for other primary metals; the particular company's existing capacity and market position; the type and source of ore available and the cost of shipping it to the proposed location; and local construction, labor, and other costs.

It would therefore be prudent for power supply planners to include new energy-intensive industries in the forecasts they use to determine whether or not the Susitna project is feasible <u>if and only if</u> the new industrial facility is made an integral part of the development plan by the industrial firm's willingness to sign a minimum-bill <u>take or pay</u> contract to purchase a definite part of the plant's capacity.

Load characteristics.

Electricity consumption in a given service area will have large daily, weekly, and seasonal fluctuations. The daily peak is typically in the late afternoon or early evening; loads tend to be greater on weekdays than on Saturdays, and lightest on Sundays and holidays. In warm climates the annual peak is usually in the summer when air conditioners are operating; in cold climates, including Alaska's, demand usually peaks in the winter.

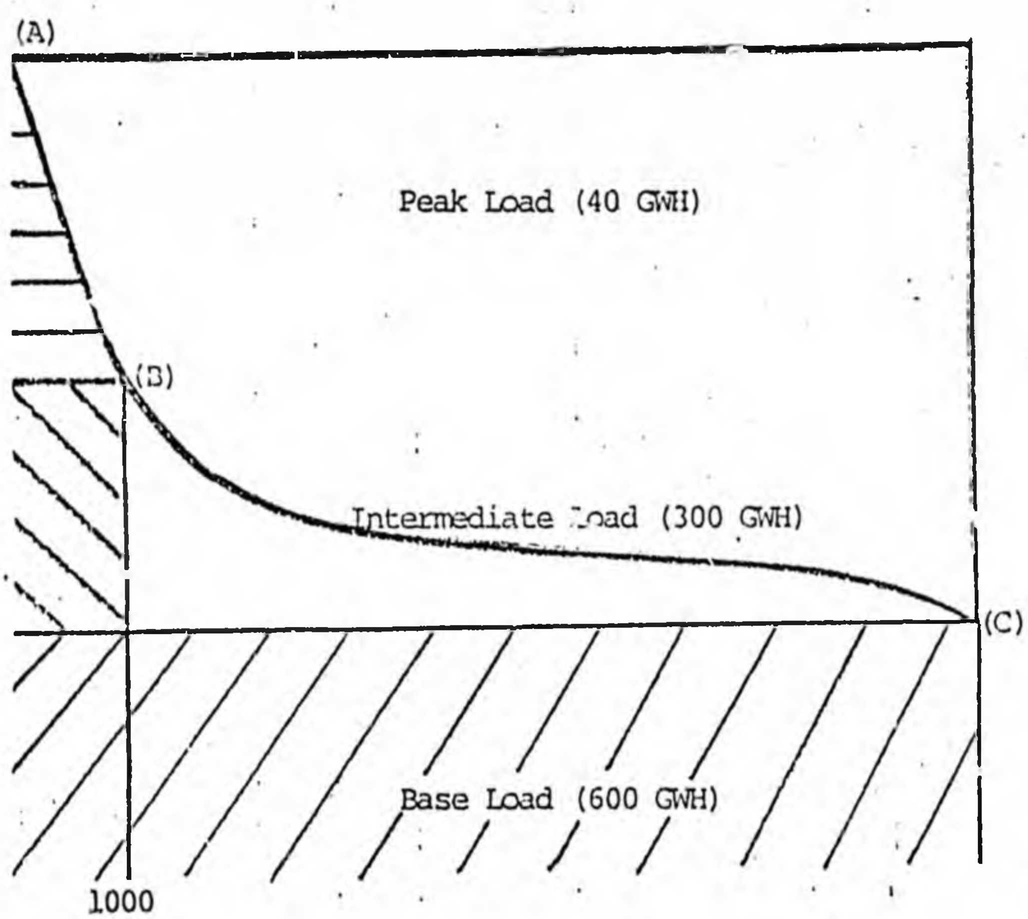
The load characteristics of a given system can be described by means of an annual load duration curve, which represents the number of hours in each year that consumers demand a given amount of electricity. Figure 1 shows such a curve for a hypothetical power supply system with a peak demand of 250 MW, and an annual load of 1,000 GWH.

Base loads. The horizontal axis of Figure 1 measures the number of hours in a the year's total of 8760 hours [365 days X 24 hours]. The vertical axis measures electrical consumption in MW. Thus, point c shows that demand never falls below 75 MW; this level of demand is called the base load, and the annual base load demand is 660 GWH [8760 hours X 75 MW].

Peak loads. For a small part of the year consumption greatly exceeds the annual average. A load exceeding some specified level is called a peak load. In Figure 1, levels of consumption more than 150 MW --- twice the base load --- are regarded as peak loads. Point a shows the annual peak, 250 MW, and point b shows that consumption is 150 MW or more for 1000 hours during the year. (This 1000 hour total may

Figure I

HYPOTHETICAL LOAD DURATION CURVE



be made up of 100 separate periods of 10 hours average duration on 100 separate days.) The total peak load demand during the year is 40 GWH.

Intermediate loads. Consumption that exceeds the base load [75 MW] but is less than the lower boundary of the peak load [150 MW] is referred to as an intermediate load. In Figure 1 the total annual intermediate load is 300 GWH.

The generating capacity of a power supply system must be able to deliver both the highest peak load and the total amount of power expected over the year, with an adequate reserve to cope with equipment failures or unexpectedly high demand. For this reason, load forecasts are generally stated in terms of two demensions of demand:

*** the peak load, which is measured in

kilowatts . . . (KW = 10^3 watts),
megawatts . . . (MW = 10^6 watts), or
gigawatts . . . (GW = 10^9 watts); and

*** the annual load, which is measured in

kilowatt-hours (KWH = 10^3 watt-hours),
megawatt-hours (MWH = 10^6 watt-hours), or
gigawatt-hours (GWH = 10^9 watt-hours).

System load factors. The peak load and the total annual load can be combined into a single measure that indicates the greatest efficiency with which a power supply system could use its generating capacity. The system's load factor is its average consumption, expressed as a percentage of peak consumption. In the hypothetical power supply system of Figure 1, the average annual load is 114 MW [1,000 GWH / 8760 hours], and peak consumption is 250 MW. Thus its load factor is 46 percent. The average load factor for the utilities of Alaska's Railbelt is currently around 50 percent.

The peak loads are exceedingly costly in terms of capacity. In figure 1, the peak load accounts for only 4 percent of total electricity sales, but requires 40 percent of the system's capacity. The intermediate load accounts for 30 percent of total sales and 30 percent of capacity, and the base load accounts for 60 percent of total sales and only 30 percent of capacity. Thus, each KWH of peak load power may require 20 times as much fixed capital as a KWH of base load power.

The preceding figures exaggerate the disparity between peak load and average generating costs per KWH, because the kind of generating equipment that can produce the lowest-cost power operating every hour of every day is likely to be different from the equipment that produces the lowest-cost peaking power. Knowledge of a system's expected load characteristics is therefore necessary for deciding what combination of generating facilities will be most economical for meeting future electricity demand. We explore this issue later in the present chapter.

Alternatives to peaking power. Regardless of the combination of generating equipment a power supply system chooses, peak load power is still exceedingly expensive in terms of capacity. As the system's total demand grows, the need to serve peak loads accounts for a very large part projected investment needs. Thus, a strategy capable of increasing system load factors might significantly reduce capital needs and the average cost of electricity.

In the United States, however, forecasts of electricity demand have traditionally accepted a system's load duration curve as given, and the normal inclination of utility and power agency planners is to design and build new facilities to serve the projected peaks. Recent demand forecasts and proposed planning strategies for the Railbelt all seem to assume that load factors, and thus the efficiency with which new facilities are utilized, will remain at their present low levels.

Measures do exist, however, that can significantly increase load factors, thereby improving the efficiency with which installed generating capacity is operated and economizing on the need for new capacity, thereby reducing average costs per KWH. These measures, which include (1) interconnection, (2) interruptible electricity sales, (3) central-station load management, and (3) peak responsibility pricing, are described later in this chapter.

Facilities Planning

Even given some idea of the amount of electricity needed and the load characteristics of that demand, we are still faced with the problem of choosing a combination of generating and transmission facilities that will provide electricity at lowest cost. Facilities planners have, in the past, used forecasts of demand and load as the major determinents of required plant size. However, there are a number of other considerations important when thinking about how to expand an electrical supply system. Capital and fuel costs for new power facilities are obviously important factors as are system requirements for reliability. We also ought to be concerned with uncertainties and consider how flexible a system is to changes in anticipated demand, for example, or the prices and availability of fuel.

Facilities planning involves looking at the entire supply system --- including its present and anticipated load factors, use of existing equipment and the management of reserve capacity --- and for that reason, facilities planning is quite site-specific. One factor that complicates any evaluation of the Susitna project is the fact that the existing generating plants and distribution system are owned and operated by several different utilities and thus, how to optimize use of existing plant facilities in order to supply the Railbelt is an important question still to be resolved.

Cost concepts. Several concepts frequently used in describing the costs of a particular generation facility or system supply plan are worth mentioning at the outset.

Fixed Costs. Fixed costs are costs incurred by a facility regardless of whether it is operating or not. They include costs for purchase and development of a site, equipment and assembly, materials, engineering, overhead and contingencies, and interest. Fixed costs are generally spread over the operating life of a facility and, if they are very large, they will significantly affect the cost of electricity. As a working index of how important fixed costs are to the cost of electricity, they are often expressed in dollars per installed kilowatt or installed cost. Table 1 compares (1976) installed costs for a variety of generating equipment.

Table 1 tells us that for each kind of generating facility (with the possible exception of hydroelectric, where fixed costs per unit of capacity vary enormously from one site to another), the larger the generating unit, the smaller the installed cost per unit of electricity. Table 1 also suggests that initial capital costs for diesel generators are considerably less than the capital costs for steam turbines or hydroelectric plants.

Table 1
Installed Cost Estimates for Typical Generating Units*

Unit	Size (MW)	$/KW Installed
Diesel Generator	0.1	680
	3.0	412
Gas Turbine (Simple)	.8	526
	10.0	322
	50.0	210
Steam Turbine (Coal Fired)	.3	1346
	10.0	891
	200.0	494
Steam Turbine (Gas Fired)	.3	1130
	10.0	749
	200.0	415
Hydroelectric	5.0	1557
	30.0	1032
	125.0	1748
Nuclear	1000.0	1000+

* The installed costs are taken from estimates for Alaska, made by the Institute of Social and Economic Research in 1976 and should be considered only as examples.

Operating Costs. Operating costs, or variable costs as they are sometimes called, refer to expenses incurred to operate, maintain and insure a particular facility. With the exception of nuclear and hydroelectric plants where fuel is relatively cheap, fuel is the number one operating cost if a plant is operating near full capacity. For example, in 1978, Anchorage Municipal Light and Power spent 85 per cent of its operation and maintenance budget or over $5.3 million on fuel. If fuel is a large portion of total costs (fixed and operating), the cost of electricity from that particular facility will be very sensitive to the price of fuel.

Heat Rate. Heat rate is a measure of energy-efficiency of a given generating facility, stated as the amount of heat energy in BTU that a specific fuel must provide in order to produce one KWH of electrical energy. The heat rate for a given facility depends not only the type of fuel, but also on the type of generating unit, the characteristics of the particular plant, and its operating schedule. Together with the price of individual fuels, heat rates determine the relative fuel costs for a unit of electricity.

Table 2 illustrates the different heat rates for different kinds of generating units. One plant's greater energy-efficiency in converting fossil fuel to electricity may be balanced against a higher price for the fuel it requires. Combustion turbines, for example, are less efficient in converting natural gas energy into electricity than diesel generators are in converting distillate fuel oil. In Alaska, however, the greater efficiency of the diesel engine is more than offset by its higher price for fuel.

Table 2
Heat Rates and Relative Fuel Costs for Electrical Generation

Plant	Heat Rate (MBTU/KWH)	Fuel Price (¢/MMBTU)	Fuel Cost (Mills/KWH)
Steam turbine — coal fired	10	90	9.0
Combustion turbine, open cycle — gas fired	16	60	9.6
Combustion turbine, regenerative cycle — gas fired	14	60	8.4
Combustion turbine — distillate oil fired	17	221	37.6
Combustion turbine — residual oil fired	18	180	32.6
Diesel — distillate oil fired	11	221	24.3

Source: Estimates for Alaska made by ISER in 1976.

Electrical generating technologies.

In practical terms, it makes sense to talk about four basic types of generating technologies that could be used to augment generating capacity in the Railbelt.

Diesel Electric Generating Units. Diesel generating units are diesel-type internal combustion engines directly connected to an alternating generator. The units are built as a complete assembly and marketed by major manufacturers as an "on-the-shelf" item. If properly installed and maintained, they are fairly reliable both for base loads and for emergency on-line systems. Larger units (500 KW or greater) can approach fuel efficiencies of 13 kwh/gallon or a heat rate of 10,800 btu/kwh, which is competitive with the larger steam plants. However, smaller units (75 to 250 KW diesels) may have efficiencies as low as 7 kwh/gallon or 20,000 btu/kwh.

Diesel generators have low fixed costs relative to other fossil-fuel-fired generating units, but they need a high-priced fuel. As a result, the price of distillate fuel oil is tne single most important factor determining the cost of electricity generated by diesel plants.

Combustion (or gas) turbine generating units. Gas turbines are installations in which either gas or oil is fired in a turbine that drives a generator. There are a variety of types of turbines, each designed for different capacities and fuel efficiencies. Smaller simple-cycle units can be purchased like diesel units ready-made from the manufacturer; larger regenerative or compined-cycle units may take two years to build and another year to bring on line.

Heat rates for simple-cycle gas turbines range from 12,000 to 16,000 btu/kwh, depending on their size. Regenerative-cycle gas turbines are more fuel-efficient and can have heat rates between 9,500 and 13,500 btu/kwh.

In the Railbelt, gas-fired turbines are the predominant type of electrical generating unit, carrying about 70 per cent of the total load in 1977. (See Table 3.) The popularity of gas turbines in Alaska reflects their ability to respond quickly to rapid (and uneven) demand growth, and the exceptionally low price of natural gas in the Anchroage area (where it constitutes the cheapest utility fuel in the United States.)

Because of rising gas prices, gas turbines may prove too expensive in the future for base-load power generation. As Figure 2 suggests, for a limited number of hours, the

Table 3
Railbelt Electrical Generating Capacity --- 1977

	Installed Capacity --- Megawatts				
	Hydro	Diesel	Gas Turbine	Steam Turbine	TOTAL
Anchorage-Cook Inlet					
Utilities	45.0	9.8	435.1	14.5	504.5
Military		9.2		40.5	49.7
Industrial		10.2	14.8		25.0
Subtotal	45.0	29.3	449.9	55.0	579.2
Fairbanks-Tanana Valley					
Utilities		32.1	203.1	53.5	288.8
Military		14.0		63.0	77.0
Subtotal		46.1	203.1	116.5	365.8
TOTAL	45.0	75.4	653.0	161.5	945.0

cost per kilowatt hour for electricity produced by gas turbines is, and probably will remain, inexpensive relative to other types of generation. However, as the load factor increases, unit costs climb rather rapidly making gas turbines most attractive for limited peak load situations.

Nevertheless, the low capital costs of gas-fired power are an especially welcome feature in a period of double-digit interest rates and disorganized bond markets, and gas-based generating strategies are by far the most flexible in the face of uncertain future demand growth. For these reasons, the installation of new gas turbines is one of the most attractive options for Alaska utilities, even for base-load generation. This is likely to remain the case despite the prospect that prices for new gas supplies, whether from Cook Inlet or the North Slope, will be at least ten times as costly as the utilities' current supplies.

For almost a decade, FPC and FERC and most state utility commissions have discouraged the use of natural gas as electric utility fuel. More importantly, the Power Plant and Industrial Fuels Use Act (PIFUA) prohibits the use of gas in new generating facilities, with certain exceptions. The Economic Regulatory Administration of the Department of Energy (ERA), which administers PIFUA, has thus far tried to interpret it very strictly.

Since 1977, when the law was enacted, however, the national outlook for natural gas supply has improved radically, and unless ERA interprets PIFUA quite liberally, Congress will almost certainly amend or repeal it. If Railbelt utilities conclude that gas turbines remain the least-cost or most prudent source of additional power, we do not believe that federal regulators will prevent them from obtaining as much gas as they need for the new facilities, as well as for their existing plants.

Federal policies, coupled with uncertainty about future gas prices, do contribute significant risks to any natural-gas-based generation strategy. It is not clear, however, whether these risks are greater than the engineering, cost, scheduling, marketing, and regulatory risks of strategies that depend upon Susitna hydropower or steam generating plants fied by Beluga coal.

<u>Steam Turbine Generating Units.</u> Conventional steam plants consist of a fuel-fired boiler for generating steam which drives a steam turbo-generator. Steam turbine generators, especially units built to handle large base loads (100 to 1000 MW), are considered the <u>most reliable</u> and <u>fuel-efficient</u> means to generate electric power. Plants can be

fired by oil, gas, natural gas liquids, coal or nuclear fuel and, except for the smallest units, are always custom designed with long lead times for environmental assessment, fabrication and delivery of major equipment.

As with gas turbines and diesel generators, the economics of steam plants are very sensitive to the price of fuel. In Figure 3, uranium and coal seem to be the least expensive fuels for steam generation in Alaska. While nuclear power may be viable technically, the Alaska Power Administration and most of the utilities in the region have ruled it out because of its high initial cost, siting problems, and potential public opposition.

Coal-fired plants remain a serious alternative as a source of additional power for the Railbelt, because of the nearby Beluga coal reserves. Although fuel costs would probably be low compared with those of oil or gas, initial cost for an enclosed plant with scrubbers will be extremely high: the Power Administration has estimated them at $372 million (1978 dollars) for a 200 MW plant ($1,860 per kilowatt installed), and $810 million for a 500 MW plant ($1,620 per kilowatt installed).

Hydroelectric generating units. Hydroelectric facilities create electricity from falling water and are considered among the most reliable types of generating equipment. Minimum maintenance requirements and the virtual absence of fuel costs make these facilities very cheap to operate. Initial capital costs are usually very high, however, with investment per KW of total capacity greater than fossil fuel-fired installations. Transmission of hydropower from remote generating sites to the load centers is often a large portion of the initial cost. In Table 4, the 1978 cost estimates suggest that hydroelectric plants would be more expensive to build but cheaper to run than coal-fired steam turbine plants.

Table 4
Estimated Costs for Coal-Fired
Steam Plants and the Susitna Project

	Installed Cost		OM&R Cost	
	(mil.$)	($/KW)	(mil.$/ year)	($/KW/ year)
100 MW coal steam turbine	245.4	2,454	3.76	37.6
200 MW coal steam turbine	372.0	1,860	5.70	28.5
400 MW coal steam turbine	646.8	1,617	9.80	24.5
Watana dam (795 MW)	2,020.7	2,554	0.74	0.94
Transmission line	470.5			2.01
Devil Canyon dam (778 MW)	834.0	1,072	0.73	0.94
Total Susitna project	3,335.2	2,120	1.47	3.89

Source: Alaska Power Administration, October 1978

Hydroelectric energy conversion efficiency is the ratio between electric energy delivered out of the plant and the maximum theoretical energy of falling water. The ratio is typically about 90 per cent, compared to a maximum conversion efficiency of about 38 per cent in the best fossil-fueled plants.

Each hydroelectric site and each facility is unique, and thus the economics of hydroelectric plants are very sensitive to local conditions (e.g., topographic and hydrographic conditions, distance to load centers, etc.). Typically, hydroelectric facilities require long lead times for design and installation.

Cost hierarchy for electrical generation. As the previous discussion shows, the composition of generating costs depends upon the type of plant. When initial costs are high, variable costs play a relatively small role in the unit cost of electricity: fixed costs tend to be a large proportion of total costs for steam and hydroelectric plants. At the other end of the hierarchy, gas turbine and diesel plants have relatively low initial costs and high variable costs for fuel and maintenance.

This cost hierarchy is the main consideration in power supply and management strategies. Where fixed costs are large and must be recovered whether electricity is generated or not, it makes sense to operate a plant as much as possible. From the perspective of minimizing unit costs, a plant operating for most hours of the year spreads fixed costs over a large number of kilowatt hours. If such a plant operates only half the time, however, its unit cost for electricity will nearly double.

Where variable costs are a larger percentage of total costs, on the other hand, unit costs are more sensitive to the price of fuel. Thus, a gas turbine is relatively expensive to operate as a base-load supply, but as fuel and labor are its major costs, this type of plant is comparatively inexpensive to hold in reserve for peak loads or emergencies.

Plant mix. The cost hierarchy among generating technologies, plus the load duration curve, determines what mix of facilities would provide the lowest cost electricity for base, intermediate, and peak load situations, and thus, for the entire system.

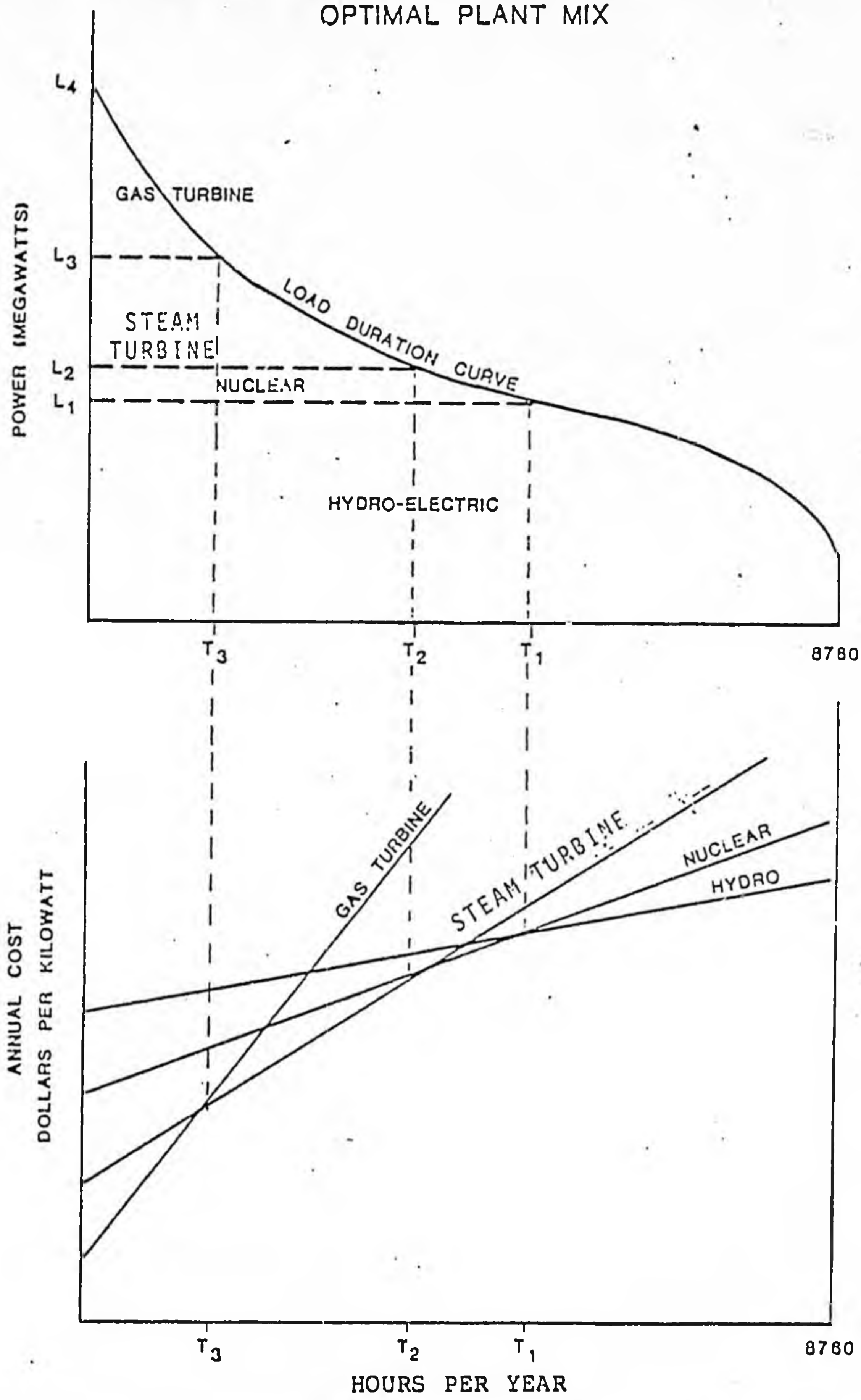
The top graph in figure 2 is a load duration curve that describes the variation in a hypothetical utility's load during a year. At the bottom of the figure 4 are curves representing annual costs (in dollars per kilowatt of capacity) for four types of generating technology. The initial point for each line on the cost axis reflects the capital cost of a given type of technology and the slope reflects operating costs over time (including fuel).

In this example, the four cost curves indicate that hydroelectric generation is the least-cost way to satisfy any load that will persist at least T_1 hours. For any load whose annual duration is less than T_2 and more than T_1 hours, nuclear facilities would have the lowest unit cost. In a similar manner, load blocks can be assigned to steam and combustion turbines. The assignment of load blocks to different generating technologies shows the optimum amount of generating capacity for each: L_1 kilowatts of hydroelectric, L_2-L_1 kilowatts of nuclear, and so on.

Use of existing equipment. When facilities planners choose a mix of technologies, they must match the system's load characteristics to both existing and proposed equipment in order to determine what kind of supply system will best serve base, intermediate, and peak loads, and provide sufficient reserve capacity to meet unanticipated demand, and scheduled and unscheduled equipment outages. Each utility or region has a unique hierarchy, and the available generation technologies are not always arrayed on load duration curves as suggested in Figure 4. Some hydroelectric projects, for example, are most suitable for use as base-load supply, and others are more valuable for peak

Figure 2

OPTIMAL PLANT MIX



loads, depending upon their individual combination of annual stream flow, storage capacity, and installed generating capacity.

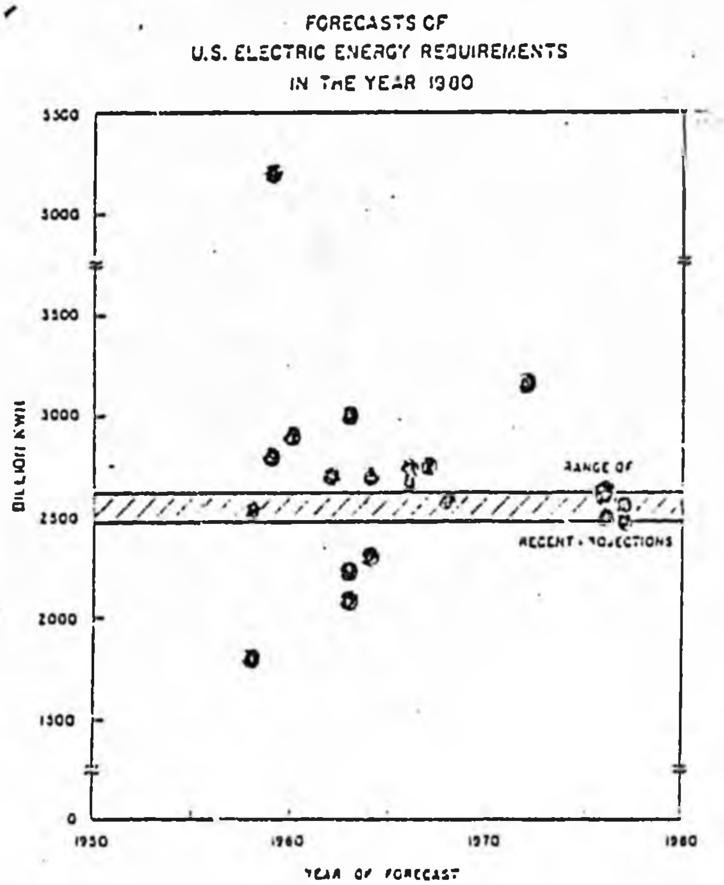
The functional role of an existing plant may also change over time. An older fossil-fired plant may be shifted from base-load to peaking service, and ultimately retained only as back-up, if operating costs are lower on newer parts of the system. A older hydropower facility may likewise be shifted from base-load to peaking service if the cost per KWH of additional generating capacity installed at an existing dam is less than the combined capital and operating cost per KWH of a new thermal plant. In either case, the aim is to minimize system-wide unit costs for electricity.

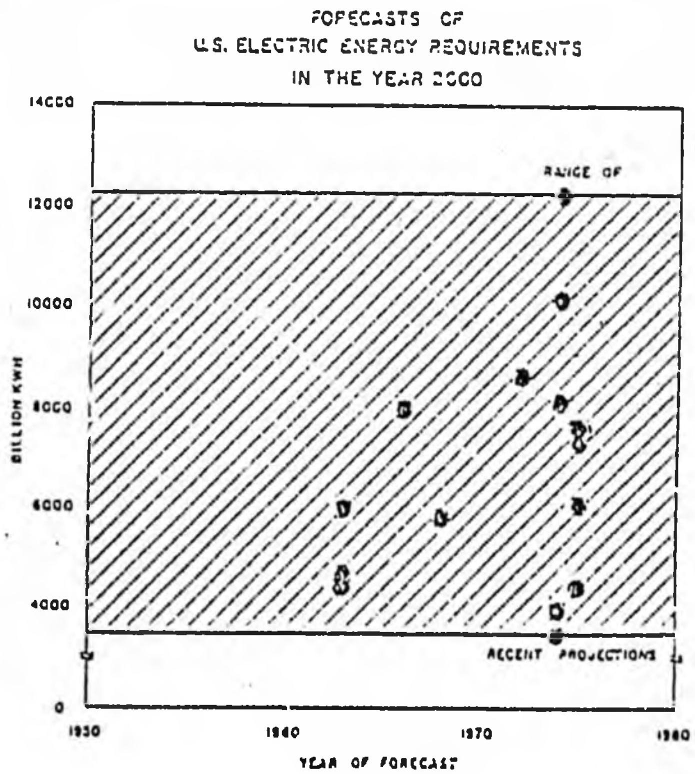
Dealing with Uncertainty. In hindsight, it would certainly be possible to reconstruct the rationale for choosing one technology or plant mix over another, but the future is quite uncertain.

Demand forecasts are notorously inaccurate, especially for Alaska where major development projects continue to have an uneven and often unanticipated effect on demand. Even without big surprises, 20 year forecasts are bound to be speculative. Figure 3 compares the forecasts of authoritative government and industry groups, made between 1960 and 1970 regarding U.S. electric energy requirements in 1980, and the forecasts made between 1970 and 1980 for the year 2000. Power system planners must anticipate requirements at least that far in advance, but the range of their judgments is astonishingly wide.

Figure 3

Long Range Forecasts of U.S. Electric Energy Requirements





Most government and industry forecasters in the 1960's and early 1970's essentially extrapolated the high rates of electrical load growth that had prevailed since World War II. Until very recently they took very little account of the price-elasticity of demand for electricity --- that is, the responsiveness of power loads to higher electric rates. As a result, most regional and national forecasts in the Lower 48 greatly overestimated the growth of demand, and most large utilities have voluntarily postponed or curtailed their building programs.

During the 1960's, forecasters in Alaska consistently underestimated the demand growth that would occur in the Railbelt during the 1970's, because they (understandibly) failed to anticipate the economic stimulus of TAPS construction and Prudhoe Bay oil revenues. It appears, however, that 1980 power demand will turn out to be considerably lower than the lowest forecasts for that year in either the Alaska Power Administration's 1974 study or ISER's 1976 report. As we have indicated earlier in this paper, current forecasts of Railbelt demand in 1990 and 2000 are also more likely to be too high than too low.

[illegible] are other uncertainties as well. Large projects are more prone to cost overruns and delays in completion and operation than small, quickly constructed plants. Large ($1 billion and up) custom-engineered construction ventures in North America begun in the 1970's typically took three to five years more to complete than originally planned, and cost overruns of 100 to 500 percent were not unusual. A mere six month delay in commencement of service can increase the final capital cost --- and thus the unit cost of electricity --- of a project financed with a construction loan at 13 per cent interest by as much as 6 percent.

The bigger the unit of construction, the more unique the design, the more novel the technology or environment, and the larger the number of governmental entities and permits and licenses involved, the greater the overruns and the longer the delays tend to be. A project that seemed feasible on the basis of its original engineering cost estimate and planned completion date sometimes turns out to be uneconomic on the basis of a more realistic schedule and cost estimate.

Choosing to built a series of small generation plants, say gas turbines, avoids most of the uncertainty about construction cost overruns and construction, licensing or startup delays, but invokes another unknown: the rate of fuel cost escalation. The latter was certainly one of the great surprises of the last decade.

In planning for an uncertain future, therefore, we must be aware of the consequences of both overbuilding and underbuilding. The costs of excess capacity will consist largely of fixed charges on investment in plant, resulting in higher per unit costs of electricity and higher costs to consumers. Proponents of maximizing capacity tend to argue that the new capacity, with its greater thermal efficiency, can be expected to save on fuel costs. But a new fuel-efficient facility can be justified as a replacement for, or duplication of, an existing facility if and only if operating costs for the old installation exceed the new plant's full cost per unit of electricity generated --- that is, its fixed and operating costs combined.

If capacity turns out to be inadequate, a power system usually has considerable latitude for using its existing generating capacity more intensively. Doing so is likely to require more high-priced fuel, however, and some reduction in system reliability. Utilities can also bring on line additional capacity in smaller --- if less efficient --- units as they are needed, and not run the risk of investing large amounts of capital for a demand that may not materialize.

Reserve requirements and load management.

The investment strategy of most electric utilities in the United States has historically been a passive response to growing demand. Each utility tried to construct, in advance of need, sufficient generating capacity to meet its forecasted total and peak load demands, plus an adequate reserve to cover unexpected peak loads and scheduled or unscheduled equipment outages. To the extent that rate design or marketing strategies were deliberately used to influence demand, they tended to be promotional --- aimed at stimulating demand and thus justifying new cosntruction.

In Europe and Asia, however, where both capital and operating costs have been considerably higher than in the United States, [illegible]ers and utility managers have given much more attention to conservation --- both of capital and of fuel --- as a goal of ratemaking and system management. As a result, system load factors in some countries are as high as 65 to 75 percent, in contrast to a range of 45 to 60 percent in the United States. Also, reserve margins required above forecasted peak loads have been reduced below 10 percent in some countries, while utilities in the United States tend to carry reserves of 20 to 30 percent.

While conditions vary widely among countries and power systems, these figures suggest that domestic utilities might be able to get by 20 to 30 percent less capacity than their current forecasts and policies would indicate.

The promotional policies of North American utility systems generally had the support of state and federal regulators and of the public at large, so long as utility fuel remained cheap, electrical generation seemed to have major economies of scale, and newer plants tended to be cheaper and more efficient than older ones.

Recently, however, the growing difficulty of siting and licensing new plants, higher construction costs and interest rates, and above all higher fuel costs, have finally created an interest among utility planners and regulators in promoting the more intensive use of existing generating capacity and reducing the need for new facilities, by means of (1) peak-responsibility pricing, (2) load manangement, and (3) reduction of planned reserve ratios.

These initiatives were boosted in 1978 by passage of the Public Utility Regulatory Policies Act (PURPA), which is intended to encourage:

- o conservation of energy supplied by electric utilities;
- o efficient use of existing generation facilities and resources; and,
- o equitable rates to electric consumers.

Among other things, PURPA requires FERC and the state utility commissions to consider peak-responsibility pricing and other rate-design measures intended to foster efficiency and energy conservation.

<u>Reserve generating capacity</u>. Electric power systems always carry some reserve capacity in excess of their forecasted peak demand. The excess capacity provides insurance against system failure, and is available to meet unanticipated peak loads or future increases in base load demand.

Reserve capacity is usually measured in terms of a reserve margin, which is the percentage of total capacity that is in excess of the anticipated annual peak load. In the two Railbelt load centers, 1977 reserve margins were as follows:

Place	(1) Peak Load (MW)	(2) Generating Capacity (MW)	(3) (2)-(1) Reserve Capacity (MW)	(4) (3)/(2) Reserve Margin (%)
Anchorage-Cook Inlet	464.4	691.1	226.7	32.8
Fairbanks-Tanana Valley	159.9	364.9	220.5	56.2

Source: Alaska Power Administration.

The reserve margins that Railbelt utilities carried, even at the peak of the TAPS construction boom were thus considerably higher the 20 to 25 percent sought by most Lower 48 utilities. This comparison does not necessarily mean that the Alaska margins were excessive, because they reflect in part the relatively small size of these systems, in which the shutdown of a single unit would make a very significant dent in total generating capacity. They do, however suggest that measures that reducing the required reserve margins could serve as a substitute for a large volume of new plant construction.

Suppose, for example, that the two load centers were interconnected into a single power pool, and that this pooling, plus load management and selective load-shedding strategies, permitted reserve margins to fall as low as 15 percent and yet preserved acceptable levels of reliability: The 1056 MW of generating capacity that existed in 1977 would then be able to serve a peak load of 898 MW [85 percent of 1056], an increase of 44 percent over the 1977 peak. The additional useful capacity thus made available from the Railbelt's existing equipment would be equal to more than one-third of the projected capacity of the Susitna project's Watana dam.

System reliability is the extent to which power is provided to customers without interruption and at an acceptable voltage and frequency. System planners have developed a number of statistical measures of reliability, which serve as their targets in determining each system's optimum reserve margin, taking into account uncertainty of load forecasts, size of generating units relative to total system size, need for preventive maintenance and the reliability of individual units.

A growing number of analysts believe that the prevailing reliability standards are unnecessarily strict, and require wasteful excess capacity. For example, Louis Roddis Jr., former vice chairman of Consolidated Edison, has estimated that U.S. utilities could save as much as $20 billion in investments by over a ten year period by cutting generation reserve margins by up to eight per cent: half this cut would cause little change in customer service perception [Electrical Week, February 3, 1975].

One reason for this new skepticism about traditional reliability standards is of course the rising cost of new plants, and the difficulty of siting and licensing them, but it also stems from a growing recognition that the great majority of the power interruptions that electric customers actually experience result from distribution system failures, rather than generating plant outages. It makes little sense to provide a generation loss of load probablity (LOLP) of one day in ten years while the utilities, the regulatory authorities, and consumers are willing to put up with, say, an average of one outage per year arising from a failure of transmission lines, substations, or distribution lines.

Load Management. Utilities in the United States are belatedly finding it attractive to reduce reliability target levels and devise peak-responsibility pricing or load management schemes. Load management permits a utility to make more intensive use of its low-cost base-load generating capacity; economize on the higher operating costs of existing intermediate and peak capacity; and reduce the amount of new construction required to serve intermediate and peak loads, and to maintain reserve margins.

Load management techniques include:

1. Establishment of power pools or interties with other utilities, in order to take advantage of peaks occuring at different hours or times of the year and to share reserve generating capacity.

2. Installation of time switches to shut off less essential heavy-load appliances and industrial equipment during peak demand hours.

3. Installation of remote-control switches that permit the utility to shed off less essential loads during peak demand hours or system emergencies, by means of a signal sent through the power line.

4. Design of peak-responsibility rate structures, under which consumers are billed for peak period power at its relatively high cost to the system and for off-peak power at the much lower cost of base-load generation, creating an incentive for consumers themselves to reduce peak-hour demand.

5. Sale of off-peak or surplus power to industry at low <u>interruptible rates</u>.

Only pooling (#1) and interruptible sales (#5) are commonplace in the United States today, and the latter is actually a device for increasing off-peak loads rather than for reducing peak demand. In the past, the cost of installing time-switches, remote control load-shedding equipment, and time-of-day metering was a major obstacle to implementation of load management strategies in the United States --- or so the utilities argued. The appearance of the $10 microprocessor has swept away any substance this objection may have had in the past.

In the future, environmental and consumer spokesmen at licensing and rate hearings; federal and state regulators, and the utilities' bankers and investors will all demand that utility planners fully exlore the potential of using rate design and load-management strategies to reduce capital and operating costs, <u>before</u> they raise rates or build expensive new plants. Thus far, the question is practically unheard-of in Alaska, but we are confident that --- sooner or later --- it will be a prominent issue in debate over the Susitna project, and rightly so.

Organization and financing.

Principles of finance. When utilities must replace equipment or build new capacity, they are concerned, from a financial standpoint, with two questions: how to raise the necessary capital and who will assume the risk. .These questions are major ones, for advances in technology, strciter environmental and safety standards, inflation, and the cost of capital have all conspired to drive up the original cost of electrical generating plants.

Economies of scale dictate large projects, but their sheer size increases the investment risk. In recent years, other economic circumstances, such as the unanticipated fall-off in demand growth, rapidly and unpredicatbly rising fuel prices, changes in laws and regulations, equipment and technology failures, cost overruns and delays in plant construction, have also aggravated the uncertainty of actual completion and final costs for large projects.

To overcome or minimize these risks, lenders invariably require one, and usually both of the following assurances:

> The project's anticipated cash flow from operations must be sufficient to make all scheduled payments of principal and interest on time, and with a substantial margin ("coverage") to spare; and
>
> The borrower or a creditworthy third party must pledge sufficient collateral or unrelated income to pay of the entire loan plus accumulated interest, even if the particular project should fail altogether.

These requirements are normally met by the borrower's equity in the venture. The more equity there is in the borrower's <u>capital structure</u>, the less likely it is that revenues will fail to cover operating expenses and debt service. Conversely, the more leveraged a firm's capital structure --- that is, the higher the percentage of debt --- the greater the danger that, for some reason, revenues will not be adequate.

Most firms have a capital structure about evenly divided between equity and debt. The 1978 debt of the top 50 manufacturing companies in the <u>Fortune 500</u>, for example, was 51 percent of their total assets. Even for the top 50 utility companies, debt was only 62 percent of total assets, and among the utilities, there were just two that had <u>debt ratios</u> exceeding 75 percent.

<u>Conventional balance-sheet financing</u>. Traditionally, private and municipal utilities alike have raised capital and assumed the risk of building and operating new generating facilities through conventional balance-sheet financing. That is, all debt capital contributed to the project is secured not only by the assets of and the cash flow from that project, but by the entire income and assets of the sponsoring economic unit, in most cases a single company (or the parent company of a project subsidairy) or governmental entity.

Capital for conventional balance-sheet financing is usually raised by selling securities (stocks and bonds) to the public --- individuals, banks, mutual funds, pension funds, and insurance companies. Municipal utilities usually sell tax-exempt bonds, at a lower interest rate than conventional bonds, and cooperatives ar able to borrow from the Rural Electrification Administration (REA).

The surplus earnings that a utility retains from its operations, and depreciation allowances on existing facilities, are also sources of capital. Generally, private utilities do not pay out all their net earnings in dividends to shareholders, but rather retain a portion for reinvestment of to cover their debt service (principal and interest payments) obligations. (Municipal utilities and governmental power authorities generally do not calculate a "profit" entry in their books, or pay dividends at all. They may nevertheless accumulate surplus earnings and depreciation for reinvestment or debt service coverage.)

Most utility expansions, including all projects we are aware of in Alaska (other than federal power projects) have been financed conventionally on the utility's balance-sheet. Several factors, however, are undermining the ability of individual utilities to finance large projects conventionally, particularly in Alaska:

Projects are getting bigger. In most places, new base-load generating facilities are designed to carry greater loads and to take advantage of economies of scale. With high initial fixed costs, compounded by long construction and shake-down schedules, the assets and markets of a single utility may not be able to cover construction and operating costs, or bear the risks of cost-overruns, delay, or non-completion.

Traditional sources of direct and third-party guaranteed loans to Alaska utilities are drying up. Most cooperatives in Alaska have financed their expansion heretofore with two- and five-percent REA revolving loans. Payments of principal and interest on earlier REA loans are the chief source of new loan money. Because the demand for these loans is increasing, while the original appropriation into the revolving fund is limited, this source of capital will be depleted within the next five- to ten-year period unless Congress injects additional money.

Rapid facilities expansion in the 1970's created unprecedented debt ratios and inadequate debt service coverage rates. Rapid expansion during the TAPS construction boom aggravated the already high debt ratios of REA cooperatives in the Railbelt. Despite their exceptionally low interest ratesrThe utilities appear to be facing increasing difficulty servicing their existing long-term debt.

As a general rule REA expects its borrowers to have an interest coverage ratio of at least 1.5. Table 5 shows that the utilities' debt ratios have tended to increase, and their interest coverage to fall, to levels that may preclude large debt issues in the future, at least without very large and unpopular rate increases.

Table 5

Debt and Interest Coverage Ratios for Railbelt REA Cooperatives

Utility	Debt Ratio		Interest Coverage	
	1973	1977	1973	1977
Matanuska Electric Association	87.0	93.7	2.76	1.03
Homer Electric Association	88.5	87.7	2.07	1.51
Golden Valley Electric Association	92.1	95.9	2.07	1.61
Chugach Electric Association	90.9	94.7	1.52	.93

Thus far, the Alaska regional office of REA has managed successfully to meet the utilities' demand for low interest capital. If the cooperatives must turn to other sources, such as the Federal Financing Bank or the National Rural Electrical Cooperative Financing Corporation, they will face not only higher interest rates, but the need to reduce their debt ratios and increase their interest coverage.

The cost of money is increasing, and fixed-rate utility bonds may be unsaleable at any price With soaring interest rates, utilities that need to raise capital will have to pay dearly for that money --- if, indeed they can obtain it at all in a disorganmized bond market. Recent rates in municipal bond sales have been at 8 to 9 percent or higher, and the outlook may be for double-digit rates on municipals before the end of 1980. Higher interest rates may require more than proportional increases in electricity prices, because of the need for higher absolute levels of interest coverage --- in addition to the rate increases dictated by higher fuel and construction costs.

Alternative financing strategies.

Project financing. The circumstances we have described probably make conventional balance-sheet financing of a project as large as Susitna infeasible for any existing Alaska utility or any combination of existing utilities. Instead, the Alaska Power Authority is considering an alternative method.

The essence of project financing is creation of a new business entity in charge of the project for which the sponsoring companies or government bears no liability. The new entry has virtually no assets outside of the project itself; hence prospective lenders must be assured that some other creditworthy party will meet the tab for principal and interest payments in the event that the project does not generate sufficient revenues to meet these payments.

Project financing carries two advantages for sponsoring utilities: (1) the debt ratio can be comparatively high (70 to 100 percent), and (2) the debt is secured by means other than placing the assets of the parent companies (or the full faith and credit of the governmental sponsor) on the line. It virtually absolves the sponsoring companies from carrying any business risks beyond contributed equity capital, if any. Moreover, because the debt does not appear on the sponsors' balance sheet, they can use project financing to sidestep provisions in their existing debt obligations that would otherwise limit their ability to incur further debt.

Project financing is not, however, a means of shifting construction, operating, or marketing risks to the lenders. All such risks must be assumed by some other party or parties at least as firmaly as the sponsors would have assumed them in a conventional financing. There are essentially two methods of securing debt <u>without recourse</u> against the sponsors as such --- guarantees from consumers, and guarantees from government or other third parties.

The first approach relies on revenues from project customers, secured by <u>all-events</u>, <u>minimum-bill</u>, <u>take-or-pay</u> contracts, whereby the wholesale customers (Alaska utilities) bind themselves to pay the costs of operation and maintenance, interest and the scheduled repayment of principal --- <u>however high those charges may be, and whether or not the service or product is actually delivered</u>. There are three preconditions for this kind of project financing:

1. Distribution utilities must be willing to sign all-events, minimum-bill, take-or-pay contracts, <u>in advance of construction</u>, obliging them to pay all of the project's debt service and operating costs, however high those costs might be.

2. The Alaska Public Utilities Commission (APUC) must have the legal authority, and use that authority, to assure in advance that those contract obligations will be perfectly tracked into the bills of the final electricity consumers, whether or not consumers actually need or want the power, whether electricity is actually delivered or not, and no matter how great the charges may be.

3. Lenders must be confident, despite these contractual and legal assurances, that an adequate market exists for the power, and that the bills paid by final consumers will in fact be enough to meet the utilities' contractual obligations to the project entity (along with their other obligations).

These conditions are not implausible, but they are exceedingly demanding. If they can not be met, a non-recourse (revenue bond) project financing will be impossible, and capital can be raised for plant construction only by means of general obligation bonds or some other forms of state loan guarantee, or by direct governmental financing.

Construction financing. Take-or-pay contracts do not normally take effect until projects are complete and operating. There is no chance whatsover that private lenders will accept the risk that a major Alaska power project will not be completed, will be completed only after an extended delay or, if completed, will not work properly.

There are only two parties capable of securing the construction debt of a large project-financed generating plant in Alaska: once again they are final consumers and the state government. The preconditions for consumer guarantees of construction debt are even more demanding, and considerably less probable of achievement, than those for securing long-term debt by means of take-or-pay contracts:

1. The utilities that contract to buy power from the project entity must agree to pay interest and to begin repaying the principal on all funds used for construction work in progress (CWIP) during the entire construction period. This arrangement is in contrast to the more conventional one in which all pre-operational costs, incuding interest on construction debt (the allowance for funds used during construction [AFUDC]) are capitalized, and all charges to customers postponed until the facility begins operating.

2. The APUC must have the authority, and must use that authority, to assure that these pre-operational charges are perfectly tracked into final consumer bills, despite the fact that consumers might not receive any electricity from the project for ten years (if ever).

3. Lenders must be confident, despite these contractual and legal assurances, that the existing market for electricity in the Railbelt can bear the additional charges, and that the bills paid by final consumers will in fact be enough to meet the utilities' contractual obligations to the project entity in addition to their other obligations.

We have not rigorously calculated the expected impact of this method of financing on consumer electric bills, but in the case of the Susitna project it is likely to double or triple the average cost of electricity to Chugach Electric Association customers over the entire period of ten years or more before they began to receive Susitna power. Consumer bills after the facility went on line would be correspondingly lower (because much of the project's capital cost would already have been paid), but we believe that the public acceptablility of such an arrangement is virtually nil.

APPENDIX A: EXISTING RAILBELT UTILITIES

Excluding the military bases, the University of Alaska and the private industrial installations on the Kenai Peninsula, the majority of Alaskans receive their electric power from eight major utility systems located throughout the Railbelt region. Of the utilities, three are municipally owned and operated, one is a federal power project, and four are rural electric cooperatives:

CEA	Chugach Electric Association, Inc.
AML&P	Anchorage Municipal Light and Power
MEA	Matanuska Electric Association, Inc.
SES	Seward Electric System
HEA	Homer Electric Association, Inc.
APA-E	Alaska Power Authority-Eklutna
GVEA	Golden Valley Electric Association, Inc.
FMUS	Fairbanks Municipal Utility System

The (CVEA) Copper Valley Electric Association, Inc., and the region from Valdez to Glenallen served by this utility is not expected to become part of the interconnected Railbelt until such time as construction of the Susitna Dam becomes a reality, and is, therefore, excluded from this discussion.

As of December 1979, CEA estimated the number of its customers at 50,000 retail and 24,000 wholesale accounts making it the largest utility in the state. Peak demand reached 310 MW in 1979, with a recent annual growth rate of about 12 percent. The retail service area of CEA encompasses the Greater Anchorage Municipality, the City of Whittier and the Eastern Kenai Peninsula, while the utility supplies wholesale power to the City of Seward, the Homer Electric Association service area, and the Matanuska Valley.

Aside from being the largest electric utility in Alaska, Chugach Electric currently supplies its customers with the some of the least expensive power in the country. Natural gas prices in Anchorage are less than those in other states; hence, wholesale generation costs of operating natural gas turbines are now at a minimum and are being passed along to customers of the cooperative.

How much for how long? It is both an enviable and difficult position in which CEA now finds itself. The National Energy Act of 1978 technically prohibits the use of natural gas in future powerplant facilities and encourages utilities to convert to coal-fired generation. At the same time, certain exemptions can be granted under special conditions. It is logical for Chugach to seek these exemptions, either temporarily or permanently, in the hope of retaining the low-priced natural gas generation for as long as possible. What is difficult for both the utility and others to determine is exactly how long a time that will be.

The delay of lobbying and legal efforts that may be used to retain access to the gas could serve to maintain the status quo for the short run. What is not clear is whether conversions to coal, small hydro, or other alternative technologies could be made then in a relatively short period of time to serve the mid-term growth needs of CEA's service area, if prohibitions on use of natural gas are enforced. Let us assume, however, that the short-term needs are satisfied by natural gas and that CEA attempts to meet its mid-term needs by coal or another alternative, the question remains as to the amount of power needed for long-term development. Should Chugach Electric Association enter into a take-or-pay contract to guarantee their willingness to sell Susitna-generated power in the next decade?

Can the growth of demand make Susitna an economic power source for the railbelt, or can a series of smaller generation projects meet the demand at the same or less cost for both the utility and its customers? It is the examination of questions such as these on which Chugach Electric Association is basing its future actions. Chugach is probably the key to a yes or no determination on Susitna's financial feasibility, and therefore, to the ultimate fate of the project itself.

On the Kenai Peninsula, power outages are frequent in severe winters, but they usually stem from transmission and distribution failure than of inadequate generating capacity. While abundant power from a major hydroelectric project would seem to be a general boon, the cost of tapping into that power would still have to be borne by the customers of the smaller cooperatives, thus making individual billings higher during the time those tie-in services are being amortized. This, combined with the amortization of the capital costs of the Susitna Dam itself, might make any of several energy alternatives more attractive to the Kenai residents. A smaller hydro project such as the one being considered at Bradley Lake may be more in scale with the size and demands of this area of the Railbelt.

Currently, only the Seward Electric System is engaging in new construction, the majority of which is aimed at upgrading transmission and tie-in facilities for wholesale power purchased from Chugach Electric. Both SES and HEA (Homer) purchase the bulk of their present generation from CEA. During winter outages, each utility relies on minimal back-up systems. HEA has generators on lease from Golden Valley Electric Association in Fairbanks, these leases expire in the near future. SES and HEA remain under long-term contracts to purchase power from Chugach until the turn of the Century, locking them into costs and budgets that will depend on the decisions Chugach makes as to its own future course. If Chugach decides not to participate in a take-or-pay contract for Susitna, these smaller cooperatives may be hard-pressed to keep up with generation needs of their customers given a development spurt in the Anchorage area. On the other hand, if Chugach does guarantee their purchase of Susitna generated power, initial expenses will be passed to wholesale and retail customers alike. For the Kenai Peninsula, electricity is going to become more expensive whatever the source.

The Matanuska Valley Electric Association, Inc. service area is located immediately adjacent to the proposed Susitna dams. Distance from the generation source might make power here somewhat less expensive than in the further extremes of the Railbelt. Anticipation of new industry, new construction jobs, and general Susitna related growth, make the project very appealing to many residents of this region. In light of a current economic slump in the Valley, high initial costs seem less significant, if the long-range picture would be brighter. One large project is more appealing to local business and political leaders than the suggested alternative of several smaller hydroelectric projects, as the developmental benefits of the former would be more concentrated in the Mat-Su area.

The Northern Railbelt is served by the Golden Valley Electric Association, Inc. and the Fairbanks Municipal Utility System. GVEA, as MEA, has again felt the effects of the "bust" end of the cycle. Anticipation of gas pipeline construction project has been keeping some investors interested in the area, but according to one utility executive, there were in December 1979 "some 1300 to 1400 idle services in Fairbanks at the moment." Expansion is needed here to revitalize business, and the costs of guaranteeing electric service to new industries or employed residents seem, to some, almost insignificant when weighed against the positive impact new activity would have on the economy and stability of the area.

GVEA's short and mid-term expansion plans are progressing both along the "pipeline corridor" (tapping of waste heat from Alyeska pump stations) and extension of transmission lines down the Railbelt (soon to extend from Fairbanks to Summit), with individual tie-ins occurring north of Fairbanks on occasion. While no new generating plants are planned, and plans to use coal from Healy were cancelled due to the cost of compliance with Environmental Protection Agency clean air standards, conversions to waste heat facilities and effective conservation efforts are anticipated and are being encouraged in order to meet the immediate and near future demand. Implementation of plans for a completed Railbelt intertie, also now under consideration, might alter GVEA'S reading of the need for a Susitna Dam project, if wheeling and reserve spinning capacities were more available through an intertied system.

FMUS, serving the Fairbanks urban area as an arm of the municipal government, is perhaps the most influenced by the boom/bust cycle of all Railbelt utilities. Rapid growth, as during TAPS construction, causes overuse of electricity as construction workers and others crowd the town. Yet long-range or even mid- to short-range generation plans cannot be made on the basis of these relatively short bursts of activity. Money for new and expensive facilities must come from the local tax bases, whether they be sales, residential or industrial. These tax sources are in a constant state of fluctuation making planning all the more complicated. For now, no new money is going into utility expansion, and as is the case for GVEA conservation and conversion of existing facilities is anticipated to meet future needs.

The Alaska Power Administration-Eklutna, and the Anchorage Municipal Light and Power services in the Southern Railbelt would be less affected by construction of a Susitna Dam than the other utilities mentioned here. APA-E could sell unused power to the military installations in the area if Susitna power were in competition with it in Anchorage. AML&P is serving a specific service area whose growth might be only minimally affected by construction of a major hydroelectric or gasline project. There is no current expansion planned for Eklutna, and, as with its counterpart in the north, the municipal utility servicing Anchorage plans its expansion budget around the the service area's tax base, which is currently reflecting a period of slow growth. Past projections of demand have been scaled down from a high growth rate in the mid-teens to a current 12 percent figure. Installation of two gas turbines in the early 1980's should keep this utility well on track for meeting its 1989 capacity goal of 225 MW. As with Chugach Electric, effects of the National Energy Act on future plans remain to be seen.

EXISTING UTILITY PLANT AND ORGANIZATION: ANCHORAGE -- COOK INLET

UTILITY	SERVICE AREA	CUSTOMERS	TYPE OF UTILITY	PRESENT AND PLANNED GENERATING EQUIPMENT	PEAK LOAD	DEMAND FORECASTS
CHUGACH ELECTRIC ASSOCIATION, INC. (CEA)	Greater Anchorage, Eastern Kenai Peninsula, Whittier	50,000 retail, 24,000 wholesale (via MEA, HEA) (1979)	REA coop since 1948	Five generation plants, 13 gas turbines, 2 hydro turbines (Cooper Lake). Present base capacity (including 9.0 MW purchase from Eklutna) 403 MW. New gas turbine will add 60 MW in 1980 ; 5 gas turbines to be retired in 1985. Interconnections: MEA, HEA, SES, Eklutna	310 MW peak (Dec 1979)	1985: 856 MW (1976 study) New study in 1980 will probably lower forecast
ANCHORAGE MUNICIPAL LIGHT & POWER (AML&P)	Anchorage municipality within and specific locations outside old city limits	16,378 retail 4,756 street lights Merrill Field (1979)	Municipal utility owned by Muncipality of Anchorage	Six gas turbines, 5 simple; one waste heat. One gas turbine scheduled for installation 1980, one more in 1982-83. Interconnectionm: Emergency 20 MW connectiom to Elmendorf	107 MW peak (Sep 1979) 109 MW peak (1978)	1989: 225 MW
MATANUSKA ELECTRIC ASSOCIATION, INC. (MEA)	Matanuska-Susitna Borough including Palmer, Eagle River, Talkeetna	13,000 retail (1979)	REA coop since 1941	93 percent of power purchased from CEA; 7 percent from Eklutna. 600 KW standby diesel generator at Talkeetna. Interconnection: CEA	63 MW peak (Feb 1979) 13 MW 1970 11 MW 1969	1989: 225 MW (does not include new capital)

EXISTING UTILITY PLANT AND ORGANIZATION: ANCHORAGE -- COOK INLET (CONTINUED)

UTILITY	SERVICE AREA	CUSTOMERS	TYPE OF UTILITY	PRESENT AND PLANNED GENERATING EQUIPMENT	PEAK LOAD	DEMAND FORECASTS
HOMER ELECTRIC ASSOCIATION (HEA)	Western Kenai Peninsula, Port Graham, Seldovia, Homer, Soldotna	10.422 retail (1979)	REA coop	Four diesel and two simple gas turbines, 9.3 MW. Balance purchased from CEA. Interconnection: CEA	55 MW peak Dec 197[illegible] 184 million KWH (1977)	1989: 100 1982: 502 KWH (annu 1989: 967 KWH (annu
SEWARD ELECTRIC SYSTEM (SES)	City of Seward to mile 24, Seward Highway	1,319 retail (1979)	Municipal utility owned by city of Seward	All power purchased from CEA. Interconnection: CEA	5 MW average daily peak (1979)	
ALASKA POWER ADMINISTRATION-EKLUTNA	not applicable	CEA, MEA	Federal hydropower project	2 hydro turbines, 30 MW	not available	not appli

EXISTING UTILITY PLANT AND ORGANIZATION: FAIRBANKS — TANANA VALLEY

UTILITY	SERVICE AREA	CUSTOMERS	TYPE OF UTILITY	PRESENT AND PLANNED GENERATING EQUIPMENT	PEAK LOAD	DEMAND FORECAST
GOLDEN VALLEY ELECTRIC ASSOCIATION INC (GVEA)	Fairbanks North Star Borough, including part of Fairbanks city; North Pole, Ester, Delta Junction, Healy, Clear, Anderson, Cantwell, Rex, McKinley Park, Ft. Wainwright, Eilson AFB. Will extend to Summit	15,000 retail	REA coop	Coal-fired steam turbine (Healy) 25 MW; Six oil-fired gas turbines 179 MW; 10 diesel 22 MW --- Total 226 MW Interconnections: FMUS, Fort Wainwright, Eilson AFB, U. of A.	850 KHW/mo/ customer (1979)	1983: 90 KWH/mo/ custome 1988: 10 kwh/mo/ customer
FAIRBANKS MUNICIPAL UTILITY SYSTEM (FMUS)	Fairbanks city limits	5,615 retail (1979)	Municipal utility owned by city of Fairbanks	Four steam turbines 8 MW Two oil-fired gas turbines 32 MW; three diesel 8 MW --- Total 68 MW Interties: GVEA, U of A	28.7 MW (1979)	n.a.

APPENDIX B: FEDERAL AGENCIES HAVING JURISDICTION OVER NEW ELECTRICAL GENERATING AND TRANSMISSION FACILITIES IN ALASKA

AGENCY	PERMIT OR JURISDICTION
DEPARTMENT OF ENERGY (DOE)	
Federal Energy Regulatory Commission (FERC)	Licenses power facilities on navigable waters and on federal lands.
	Regulates wholesale electric rates and service in interstate commerce
	Reviews electric rates on federal power projects.
	Regulates natural gas sales and transmission in interstate commerce.
Economic Regulatory Administration (ERA)	Administers PIFUA, grants exceptions allowing new generating facilities to burn oil or gas.
	Establishes and administers price ceilings, entitlements treatment, and allocation of petroleum, including electric utility fuel. This authority reverts to standby emergency power only on October 1, 1981.
Alaska Power Administration (APA)	Constructs and operates federal power projects in Alaska, as authorized by Congress.
DEPARTMENT OF THE INTERIOR (DOI)	
Office of the Secretary	Administers overall policy.
Geological Survey (USGS)	Advises on geological, seismic, geotechnic, and hydrological criteria and design.
Fish & Wildlife Service (FWS)	Protection of fish, wildlife, and migratory birds; anadromous fish; endangered species.

FEDERAL AGENCIES HAVING JURISDICTION OVER NEW ELECTRICAL GENERATING AND TRANSMISSION FACILITIES IN ALASKA (CONTINUED)

AGENCY	PERMIT OR JURISDICTION
DEPARTMENT OF THE INTERIOR (DOI) (CONTINUED)	
Bureau of Land Management (BLM)	Grants rights-of way for electrical transmission lines across public lands.
National Park Service (NPS)	Supports BLM and USFS in protecting archeological and palentological remains under Antiquities Act.
Bureau of Indian Affairs	Advises Alaska Native organizations on lands, employmwent, etc.
Mining and Safety Enforcement Administration (MESA)	Approves gravel removal from federal lands.
DEPARTMENT OF AGRICULTURE	
Forest Service (USFS)	Grants rights-of-way, permits for use and occupancy in national forests.
DEPARTMENT OF THE ARMY	
Corps of Engineers (COE)	Issues permits for construction in and affecting navigable waters as designated by COE; floodplains management. Builds hydreoelctric and other river basin developments as authorized by Congress.
DEPARTMENT OF LABOR	
Occupational Safety and Health Administration (OHSA)	Establishes and enforces safety and health standards for workers.
DEPARTMENT OF TRANSPORTATION	
Federal Aviation Administration (FAA)	Reviews construction affecting airspace use, control and safety.
DEPARTMENT OF THE TREASURY	
Bureau of Alcohol, Tobacco & Firearms	Issues permits for use and storage of explosives (if not overseen by OSHA or Alaska Department of Labor)

FEDERAL AGENCIES HAVING JURISDICTION OVER NEW ELECTRICAL GENERATING AND TRANSMISSION FACILITIES IN ALASKA (CONTINUED)

AGENCY	PERMIT OR JURISDICTION
DEPARTMENT OF COMMERCE National Oceanic and Atmospheric Administration	Coordinates and/or advises on administration of Coastal Zone Management Act (CZM), particularly with reference to protection of anadromous fish.
ENVIRONMENTAL PROTECTION ADMINISTRATION (EPA)	Administers air and water quality standards. Grants permits for discharge into navigable waters. Grants exemption from noise control standards.
COUNCIL ON ENVIRONMENTAL QUALITY (CEQ)	Advises DOI, DOE, COE, EPA, et al, and the President on environmental issues.

ALASKA STATE AGENCIES HAVING JURISDICTION OVER NEW ELECTRICAL GENERATING AND TRANSMISSION FACILITIES

DEPARTMENT OF COMMERCE & ECONOMIC DEVELOPMENT	
Division of Energy & Power Development	Forecasts electricity demand; plans facilities.
Alaska Power Authority (APA)	Review and approve construction plans; oversee design, construction, acquisition, financing, and operation of hydroelectric and other power generation projects; lend money to utilities.
Alaska Public Utilities Commission (APUC)	Grants and amends authority to operate generation and transmission facilities. Oversees rates, classifications, practices, services, and facilities of utility companies.

CONGRESSIONAL AUTHORITY AND PROPOSED LEGISLATION

TO FORESHORTEN REGULATORY APPROVALS FOR THE

SUSITNA DAM PROJECT

Prepared For:

The Senate Finance Committee

Alaska State Legislature

Prepared By:

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of

BIRCH, HORTON, BITTNER, MONROE

PESTINGER & ANDERSON

February 5, 1982

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INTRODUCTION

This Report is submitted pursuant to the contract of November 10, 1981 between BIRCH, HORTON BITTNER, MONROE, PESTINGER & ANDERSON and the SENATE FINANCE COMMITTEE of the Alaska State Legislature. The contract provides in relevant part:

> "Contractor will analyze each relevant regulatory process-shortening measure enacted by Congress in recent years, focusing primarily on energy project measures such as the Alaska Natural Gas Transportation Act. Contractor will extract critical provisions that have already been considered and approved by Congress and then draft a bill that will mandate a two year maximum amount of Susitna Dam regulatory review process."

As outlined in the Table of Contents of this report, the format is basically as follows:

I. Proposed Legislation to Foreshorten the Susitna Regulatory process. This section contains the proposed Federal legislation which, if enacted, would result in a Federal regulatory review process for Susitna lasting not longer than two years.

II. Magnitude of the Regulatory Problems. This section briefly outlines the major regulatory difficulties which have plagued virtually all federally licensed and regulated hydroelectric projects since the mid 1960's and which can reasonably be anticipated to similarly delay a timely resolution of the Susitna Dam Project.

III. Authority of Congress to Foreshorten the Regulatory Process. This section reviews the constitutional sources of Congressional power to regulate - and not to regulate - the Susitna Dam Project. A review of the relevant case law is also included in this section.

IV. Major Congressional Actions Foreshortening the Regulatory Process. This section reviews a variety of Congressional enactments in recent years where the regulatory process has been foreshortened, where relevant Federal law has been waived and/or Federal judicial review precluded or eliminated on major projects. As directed in the contract, the emphasis in this section is on major energy projects.

V. General Considerations and Strategy Issues. The final section of the report briefly discusses alternative legislative solutions to the Susitna regulatory foreshortening problem with analysis of their respective strengths and weaknesses. Further, some comment is provided on other issues raised in the preparation of this report.

I. PROPOSED LEGISLATION TO FORESHORTEN THE SUSITNA REGULATORY PROCESS

97th CONGRESS
2nd Session

S. or H.R. __________

IN THE SENATE (OR H.R.) OF THE UNITED STATES

Legislative Date, 1982

Read twice and referred to the Committee on Environment and Public Works

AN ACT

An Act to expedite a decision on the construction of the Susitna Dam project, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled.

SHORT TITLE

Sec. 1. This Act may be cited as the "Susitna Facilities Development Act of 1982."

CONGRESSIONAL FINDINGS

Sec. 2. The Congress finds and declares that -

(1) The Susitna River is a navigable water of the United States;

(2) The expeditious construction of environmentally sound and economically viable dams and related facilities on the Susitna River for the improvement of navigation, the control of floods, the improvement of recreational access and usage and for the generation of hydroelectric power is in the national interest;

(3) The regulatory and administrative procedures established pursuant to existing acts of Congress governing issuance of licenses, permits and other Federal approvals necessary for hydroelectric and other development on navigable waters of the United States present significant unacceptable potential for delay in reaching a final determination as to the scope and nature of development, if any, appropriate for the Susitna River;

CONGRESSIONAL DECLARATION OF POLICY

Sec. 3. It is declared to be the purpose of the Congress in this Act to require a sound and expeditous decision as to the development of a dam or dams and related facilities on the Susitna River for the purposes of improvement of navigation, control of floods, improvement of recreational access and usage and for the generation of hydroelectric power, and, if such development is approved by Federal agencies under this Act, to expedite its construction and initial operation by (1) limiting the jurisdiction of the courts to review the actions of Federal officers or agencies taken pursuant to the direction and authority of this Act, and (2) requiring the limitation of administrative procedures and effecting the limitation of judicial procedures related to such actions. To accomplish this purpose it is the intent of the Congress to exercise its constitutional powers to the fullest extent in the authorizations and directions herein made, and particularly with respect to the limitation of judicial review of actions of Federal officers or agencies taken pursuant thereto.

DEFINITIONS

Sec. 4. As used in this Act, unless the context otherwise requires, the term -

(1) "Agency" means any agency, board, commission or instrumentality of the United States empowered or required to grant an approval;

(2) "Applicant" means any person including a corporation or an agency of a state government who applies for a permit for construction of hydroelectric facilities on the Susitna River pursuant to the Federal Power Act;

(3) "Approval" means any permit, license, lease, certificate, right of way or other grant, rate, ruling, or decision authorized or issued by an agency of the Federal government;

(4) "Chairman" means the Chairman of the Federal Energy Regulatory Commission;

(5) "Commission" means the Federal Energy Regulatory Commission;

(6) "Project" means any dam or dams and related facilities in the Watana and Devil Canyon areas of Susitna River proposed by an Applicant; and

(7) "Susitna River" means a river of that name in south central Alaska flowing into Cook Inlet.

AUTHORITY OF THE FEDERAL ENERGY REGULATORY COMMISSION

Sec. 5. Notwithstanding any provision of the Federal Power Act as amended or any other provision of law, the Commission shall, upon the filing of any application for a license for construction of a project, accept or deny such application for consideration within thirty days of its filing, provided:

(1) That any denial of acceptance of an application for processing shall be accompanied by a statement of reasons for the denial, stating with particularity the defects in the application which led to denial and the specific information required to cure such defects.

(2) No application shall be denied under this section if the Commission in its discretion determines that any defects with respect to the content or required information contained in such application can be cured within a reasonable time and consistent with the requirements of this Act.

(3) Upon acceptance of an application for filing, the Commission shall publish in the Federal Register a summary of the proposed project in sufficient detail to allow timely agency response under Section 6 of this Act.

Sec.6. Not later than thirty days after notice appears in the Federal Register of a decision by the Commission to accept an application for filing, any Federal agency with authority to grant or deny any approval related to the project or any part thereof shall transmit to the Commission -

(1) A compilation of all significant actions required by such agency before any final approval of the project can be rendered or performed;

(2) A compilation of all significant actions required of the applicant by such agency before a final approval can be made;

(3) A tentative schedule for completing actions listed in subsections (1) and (2) of this section within one year; and

(4) All necessary application forms which must be completed by the applicant before such approval can be granted.

Sec. 7. (a) Not later than sixty days after acceptance of a project application, the Commission shall publish in the Federal Register a Susitna Decision Schedule containing reasonable deadlines for all agency approvals and all significant applicant action about which the Commission has received notice pursuant to Section 6 of this Act and for any other approvals which the Commission in its discretion deems significant.

(b) Notwithstanding any other provision of law, the Commission may establish special procedures in the Susitna Decision Schedule for any Federal agency subject to such schedule. Such procedures shall be consistent with all statutes, rules, regulations, and orders promulgated by the agency except that the Commission may require the agency to -

(1) Consolidate, to the maximum extent practicable, its proceedings respecting approvals which are subject to the Susitna Decision Schedule with the proceedings of other agencies;

(2) Establish approval, filing and other requirements which eliminate duplication and, to the maximum extent practicable, provide for uniform collection, analysis and reporting of such data;

(3) Substitute legislative-type hearings in lieu of trial-type hearings: Provided, however, that, in any cases in which (A) a formal hearing hearing, including an opportunity for cross examination of witnesses is authorized by any provision of statute other than this Act, and (B) the agency determines there is a genuine and substantial dispute of fact which can only be resolved with sufficient accuracy by the introduction of evidence in a formal hearing, the agency shall designate such dispute for resolution in a formal hearing conducted in accordance with the statute providing for such hearing;

(4) Short time periods for approvals required by agency procedures;

(5) Establish procedures for issuing approvals in which the presiding employee at any hearing may be required to certify the hearing record to the agency for approval without an initial decision. Such procedures may also require the presiding employee to submit the record to the agency without a recommended or tentative decision, but with such analysis of the record as the agency may specify. The agency itself shall omit a tentative or recommended approval if the Commission determines that due and timely execution of its function so requires; or

(6) Utilize any combination of procedures authorized by this subsection;

(c) No Susitna Decision Schedule shall encompass a period of more than eighteen months;

(d) The deadlines in the Susitna Decision Schedule shall be consistent with the deadlines submitted to the Commission pursuant to Section 6 unless the Commission determines that different deadlines are necessary in order to meet the requirements of subsection (c) of this section;

(e) Notwithstanding any other provision of law, the deadlines and special procedures imposed by the Susitna Decision Schedule shall constitute the lawful decision making deadlines and procedures for reviewing applications filed by an applicant.

ENFORCEMENT OF THE SUSITNA PROJECT DECISION SCHEDULE

Sec. 8. (a) (1) If any agency has failed to make an approval within the time required by the Susitna Decision Schedule, the Commission shall make the approval determination in lieu of the agency.

(2) In determining an approval in lieu of an agency, the Commission shall apply the criteria that would have been applied had the agency made the determination.

(3) If the Commission notifies an agency that it has determined that the agency has failed to make a decision or perform an action required for an approval within the time required by the Susitna Project Decision Schedule and that the Commission will decide in lieu of the agency, the agency shall transmit to the Commission forthwith all records in the possession of the agency pertinent to that approval. The Commission may take whatever additional action is necessary to develop an adequate record for a final decision or action on the approval.

CONGRESSIONAL REVIEW

Sec. 9. (a) Any approval granted by the Commission under Section 8 shall be transmitted to the appropriate authorizing committees of both Houses of Congress and shall be considered received by such Houses for the purposes of this section on the first day on which both are in session occurring after such approval is transmitted. Such approval shall be accompanied by a report explaining the basis for the Commission's approval and the reasons for Commission action in lieu of agency action under Section 8.

(b) Any approval granted by the Commission under Section 8 shall take effect, unless disapproved under subsection (c) of this section, upon the expiration of forty five calendar days of continuous session of Congress beginning on the date after the date of receipt of the Senate and House of Representatives of an approval transmitted pursuant to subsection (a) of this section.

(c) If both Houses of Congress enact a joint resolution disapproving a Commission approval under Section 8 within the forty five day period designated in subsection (b) of this section, such Commission approval shall not take effect. In the event of a disapproval by both Houses of Congress, the Commission may resubmit such approval for consideration under subsection (a), provided such resubmitted approval differs in a material respect from the prior submitted approval.

(d) For purposes of this section -

(1) Continuity of session of Congress is broken only by an adjournment sine die; and

(2) The days on which either House is not in session because of an adjournment of more than three days to a day certain are excluded in the computation of the forty five day calendar period.

(e)(1) This subsection is enacted by Congress -

(A) As an exercise of the rule making power of each House of Congress, respectively, and as such it is deemed a part of [illegible] rules of each House, respectively, but applicab[illegible]y with respect to the procedure to be followed in that [illegible] in the case of resolutions described by Paragra[illegible] of this subsection; and it supersedes other rules on[illegible] the extent that it is inconsistent therewith; and

(B) With full recognition of the constitutional right of either House to change the rules (so far as those rules relate to the procedure of that House) at any time, in the same manner and to the same extent as in the case of any other rule of such House.

(2) For purposes of this Act, the term "resolution" means (A) A joint resolution, the resolving clause of which is as follows: "That the House of Representatives and Senate disapprove the Federal Energy Regulatory Commission approval under Section 8 of the Alaska Susitna Facilities Development Act of 1982 submitted to the Congress on __________, 19__"; the blank space therein shall be filled with the date on which the Commission submits its approval to the House of Representatives and the Senate.

(3) A resolution of disapproval under this section, once introduced with respect to a Commission approval under Section 8 of this Act, shall be referred to one or more committees (and all resolutions with respect to the same Commission approval shall be referred to the same committee or committees) by the President of the Senate or by the Speaker of the House of Representatives, as the case may be.

(4)(A) If any committee to which a resolution with respect to a Commission approval under this Act has been referred has not reported it at the end of thirty calendar days after its referral, it shall be in order to move either to discharge such committee from further consideration of such resolution or to discharge such committee from consideration of any other resolution with respect to such Commission approval under this Act which has been referred to such committee.

(B) A motion to discharge may be made only by an individual favoring the resolution, shall be highly privileged (except that it may not be made after the committee has reported a resolution with respect to the same Commission approval under this Act), and debate thereon shall be limited to not more than one hour, to be divided equally between those favoring and those opposing the resolution. An amendment to the motion shall not be in order, and it shall not be an order to move to reconsider the vote by which the motion was agreed to or disagreed to.

(C) If the motion to discharge is agreed to or disagreed to, the motion may not be made with respect to any other resolution with respect to the same Commission approval under this Act.

(5) (A) When any committee has reported, or has been discharged from further consideration of, a resolution, but

in no case earlier than thirty days after the date of receipt of the Commission's approval by the Congress, it shall be at any time thereafter in order (even though a previous motion to the same effect has been disagreed to) to move to proceed to the consideration of the resolution. The motion shall be highly privileged and shall not be debatable. An amendment to the motion shall not be in order, and it shall not be in order to move to reconsider the vote by which the motion was agreed to or disagreed to.

(B) Debate on the resolution described in subsection (d)(2)(A) shall be limited to not more than ten hours. This time shall be divided equally between those favoring and those opposing such resolution. A motion further to limit debate shall not be debatable. An amendment to, or motion to recommit the resolution shall not be in order, and it shall not be in order to move to reconsider the vote by which such resolution was agreed to or disagreed to or, thereafter within such forty five day period, to consider any other resolution respecting the same Commission approval.

(6)(A) A motion to postpone, made with respect to the discharge from committee, or the consideration of a resolution and motions to proceed to the consideration of other business, shall be decided without debate.

(B) Appeals from the decision of the chair relating to the application of the rules of the Senate or the House of Representatives, as the case may be, to the procedures relating to a resolution shall be decided without debate.

REVISION OF SUSITNA DECISION SCHEDULE

Sec. 10. At any time prior to the completion of the Susitna Decision Schedule, the Commission may (i) revise the special procedures for Federal agencies on the Susitna Decision Schedule; (ii) add new special procedures for Federal agencies on the Susitna Decision Schedule; (iii) revise any deadline on the Susitna Decision Schedule; (iv) add any new deadline on the Susitna Decision Schedule, if -

(a) Such modification is necessary after Congressional action under Section 9 of this Act;

(b) The Commission finds that fundamental changes in the circumstances surrounding the project have occurred and that adherence to the Susitna Decision Schedule would not be in the national interest and that adherence to the original Susitna Decision Schedule would not further the purposes of this Act;

(c) Is required under Section 20 of this Act;

(d) Any modification of the Susitna Project Decision Schedule made pursuant to this Act shall involve the minimum delay consistent with the objectives of this Act.

CERTIFICATION OF COMPLETED AGENCY REVIEW

Sec. 11. (a) If the Commission has been notified by the agencies with authority to grant required approvals under this Act, and if judicial review of such approvals is completed or is barred by Section 14 of this Act, the Commission shall certify the same to the applicant. Such certification shall indicate any conditions and the expiration date of any approvals that have been granted to the applicant.

(b) A certificate issued by the Commission under subsection (a) of this section shall constitute conclusive evidence in any judicial or executive proceeding that all approvals necessary to the completion and initial operation of the project have been granted for the duration and subject to the conditions specified on the certificate.

AGENCY AUTHORITY TO ADOPT SPECIAL PROCEDURES

Sec. 12. Any agency authorized to grant approvals respecting the project is authorized to establish the special procedures enumerated in Section 7(b) of this Act.

PRECEDENCE OVER OTHER LAWS

Sec. 13. Notwithstanding any other provision of law, the actions of Federal agencies pursuant to this Act shall not be subject to judicial review except as provided in this Act.

LIMITATION OF ACTIONS

Sec. 14. (a) Except as provided by subsection (c), any petition for review of any approval or action relating thereto pursuant to this Act or of the validity of this Act shall be brought not later than twenty days following the date of actual or constructive notice of the final agency action relating to the approval which is being challenged. The party challenging the reasonableness of an approval or action relating thereto shall have the burden of proof.

(b) Any petition for review of the validity of this Act or of any approval or related action pursuant to this Act shall be barred unless the complaint is filed prior to the expiration of the time limits prescribed by this Act.

(c) Any action for damages or pecuniary loss arising out of the construction or operation of the project shall not be governed by the time limitations of this section.

ADMINISTRATIVE PROCEDURE

Sec. 15. (a) Except as provided in subsection (b) of this section, the Commission and agencies authorized to grant approvals relating to the project shall be exempt from Sections 553 through 559 of Title 5, United States Code.

(b) The establishment of procedures by the Commission or an agency pursuant to this Act shall be subject to Sections 553, 704 and 706 of Title 5, United States Code and any judicial review of such procedures shall be conducted in the Temporary Emergency Court of Appeals pursuant to Sections 14 and 16 of this Act.

JUDICIAL REVIEW

Sec. 16. (a)(1) A petition for review of the validity of this Act or of any approval or related action pursuant to this Act shall be filed in the Temporary Emergency Court of Appeals. Except as provided by this Act, such court shall have exclusive jurisdiction to determine such proceeding in accordance with procedures hereinafter provided and no other district court or court of appeals of the United States and no other court of any state or locality shall have jurisdiction over any such challenge in any proceeding instituted prior to, on or after the date of enactment of this Act.

(2) Notwithstanding any other provision of law, the Temporary Emergency Court of Appeals shall exercise its powers and prescribe rules governing its procedures in such manner as to expedite the determination of cases over which it has jurisdiction under this Act. Such rules may set page limits on briefs and time limits for filing briefs and motions and other actions which are shorter than the limits specified in the Federal Rules of Appellate Procedure.

(3) In any proceeding before the Temporary Emergency Court of Appeals, the chief judge shall designate at least one judge from the circuit in which the project is located to sit on the panel presiding over the proceeding.

(4) There are hereby authorized to be appropriated such sums as are necessary to expand the capacity of the Temporary Emergency Court of Appeals in order to carry out the provisions of this Act.

(b) Any such proceedings shall be assigned for hearing and completed at the earliest possible date, and shall be expedited in every way by such court and such court shall render its final decision relative to any challenge within 120 days from the date such challenge is brought, unless such court determines that a longer period of time is required to satisfy the requirements of the United States Constitution.

(c) Notwithstanding any other provision of law, actions for damage or pecuniary loss arising out of the construction or operation of a project shall be brought in any appropriate district court of the United States.

ACTION SUBJECT TO EXPEDITED REVIEW

Sec. 17. For the purposes of this Act, "an action pursuant to this Act" means -

(a) Any approval or related significant action by the Commission pursuant to this Act, including, but not limited to, any action pursuant to Sections 5, 7 and 8 of this Act. An action of the Commission shall be deemed significant if the Commission determines that expedited review of such action is necessary to meet the objectives of this Act; or

(b) Any approval or related action by any Federal agency or officer, if such action is subject or related to a deadline under this Act or the Susitna Decision Schedule, including any action which is an intermediate step to an approval listed on such schedule; or

(c) Any other action by any Federal officer relating to a project which the Commission determines requires expedited judicial review in order to meet the objectives of this Act.

SUPREME COURT REVIEW

Sec. 18. (a) The Supreme Court shall have exclusive jurisdiction to review any interlocutory judgment or order of the Temporary Emergency Court of Appeals in any case involving an approval or related action pursuant to this Act. The petitioner must file a petition for certiorari or a certification as provided in Section 1254, Title 28, United States Code, within fifteen days after the decision of the Temporary Emergency Court of Appeals or his appeal shall be barred.

(b) Any review by the Supreme Court shall be assigned for hearing and completed at the earliest possible date. It shall, to the greatest extent practicable, take precedence over all other matters on the docket of the court at that time, and shall be expedited in every way by such court.

INJUNCTIVE RELIEF

Sec. 19. (a) Except as provided in subsection (b), no court shall have jurisdiction to grant injunctive relief respecting any action taken under this Act.

(b) The Temporary Emergency Court of Appeals shall have jurisdiction to grant injunctive relief respecting actions taken under this Act, but in any event an injunction shall not lie for a period of longer than sixty days and shall not be granted except in conjunction with a final judgment entered in a case involving an action pursuant to this Act.

ACTION ON REMAND

Sec. 20. Immediately following any court decision remanding to an agency any case or controversy involving the validity of this Act or an action pursuant to this Act, the Commission shall revise the Susitna Decision Schedule as necessary to expedite any further proceedings required by the decision of the court. Such revision shall be consistent with the objectives of this Act.

WATER LAW

Sec. 21 (a) Nothing in this Act shall be construed as expanding or conferring upon the United States, its agents, permitees, or licensees any right to acquire rights to the use of water.

(b) The United States, its agents, permittees, or licensees shall appropriate water within any state for an energy project pursuant to procedural and substantive provisions of state law, regulation or rule of law governing appropriation, use or diversion of water.

(c) The establishment or exercise pursuant to state law, of terms or conditions including terms or conditions terminating use, on permits or authorizations for the appropriation, use or diversion of water for energy projects shall not be deemed because of any interstate carriage, use or disposal of such water to constitute a burden on interstate commerce.

(d) Nothing in this Act shall alter in any way any provision of state law, regulation or rule of law of any interstate compact governing the appropriation, use or diversion of water.

CIVIL RIGHTS

Sec. 22 All Federal officers and agencies shall take such affirmative action as is necessary to assure that no person shall, on the grounds of race, creed, color, national origin or sex, be excluded from receiving, or participating in any activity conducted under, any certificates, permit, right of way, lease or other authorization granted or issued pursuant to this Act. The appropriate Federal officers and agencies shall promulgate such rules as are necessary to carry out the purposes of this section and may enforce this section, and any rules promulgated under this section through agency and department provisions and rules which shall be similar to those established and in effect under Title VI of the Civil Rights Act of 1964.

AUTHORIZATION

Sec. 23. (a) There are hereby authorized to be appropriated such sums as are necessary to carry out the provisions of this Act.

(b) Notwithstanding any other provisions of this Act, authority to enter into contracts, to incur obligations or to make payments under this Act shall be effective only to the extent and in such amounts as provided in advance in appropriation Acts.

EFFECTIVE DATE

Sec. 24. The Commission shall promulgate regulations for carrying out its functions under this Act (including regulations establishing procedures and criteria under Sections

5, 6, 7 and 8) not later than 45 days after the date of enactment.

SEPARABILITY

Sec. 25. If any provision of this Act or the application thereof to any person or circumstance is held invalid, neither the remainder of this Act nor the application of such provision to other persons or circumstances shall be effected thereby.

EXPIRATION

Sec. 26. This Act shall terminate at the end of the last day of the month in which the Commission issues a final approval of the project.

II. SCOPE OF THE REGULATORY PROBLEMS

The Susitna Project faces two distinct problems from a regulatory standpoint at the Federal level. The first such problem is the sheer multiplicity of Federal permits and approvals required. The second problem is that although the Federal Energy Regulatory Commission ("FERC") is the designated lead agency with primary licensing authority under the Federal Power Act (16 U.S.C. 791, *et seq.*), it possesses no authority with respect to other Federal agencies and regulatory bodies whose approvals are required before a construction license may be issued. Listed below are the major areas where Federal regulatory and/or licensing activity will impinge upon the Susitna Hydroelectric Project in addition to (and as conditions precedent for) issuance of the FERC License:

1. A Dredge and Fill Permit is required from the United States Army Corps of Engineers (COE).

2. The Federal Aviation Administration (FAA) requires an Air Obstruction Notice.

3. A temporary Use Permit is required from the Bureau of Land Management (BLM), Department of the Interior.

4. Compliance with Environmental Protection Agency regulations with respect to prevention of significant air qualify deterioration and for new source performance standards is required.

5. The Environmental Protection Agency must issue a permit under the National Pollutant Discharge Elimination System.

6. Consultation with the Fish and Wildlife Service (FWS), of the Department of the Interior and with the National Marine Fisheries Service (NMFS), of the Department of Commerce is required pursuant to the Fish and Wildlife Coordination Act, 16 U.S.C. 662 and Reorganization Plan No. 4.

7. Consultation with the Secretary of the Interior through the Office of Endangered Species of the Fish and Wildlife Service is required pursuant to the Endangered Species Act of 1973, 16 U.S.C. 1536.

8. Consultation with the Environmental Protection Agency is also required under the National Environmental Protection Act of 1969, 42 U.S.C. 4332 and under the Federal Water Pollution Control Act, 33 U.S.C. 1344(b) and (c).

The foregoing are provided to illustrate the magnitude and complexity of the regulatory problem facing the Susitna Project. For an exhaustive analysis of the Federal regulatory requirements facing the Susitna Project see: Managing the Federal/State Permitting Process for Alaskan Hydroelectric Projects prepared under contract to Birch, Horton, Bittner, Monroe, Pestinger & Anderson for the Senate Finance Committee, Alaska State Senate, January 15, 1982.

III. AUTHORITY OF CONGRESS TO FORESHORTEN THE REGULATORY PROCESS

The authority of Congress to exempt a hydroelectric project from Federal regulatory procedures is a logical and legal corollary of its authority to regulate that project in the first place. With respect to the Susitna Hydroelectric Project, the primary source of Congressional authority to legislate is that the Susitna River is a navigable water of the United States. Hence, the project falls squarely within Congress' authority under Article I, Section 8, Clause 3, United States Constitution, to legislate with respect to commerce.

The power of Congress to regulate navigable waters is not expressly granted in the Constitution. Rather the power arises incidentally from the expressly delegated power to regulate commerce generally. Leovy v. United States, 177 U.S. 632 (1900). An extremely expansive interpretation of Congressional authority to legislate with respect to the navigable waters of the United States was established early in the nation's history. That power was described in Gibbons v. Ogden, 22 U.S. (9 Wheat.) 1, 189 (1824) as "comprehend[illegible] navigation within the limits of every state in the Union, so far as that navigation may be in any manner connected with commerce with foreign nations or among the several states or with the indian tribes." The fact that a river lies solely within the boundaries of a single state, that it is not and has not been used for "commercial" purposes in navigation is not controlling. Where personal or private use by boat demonstrates availability of the waterway for at least rudimentary types of commercial navigation a finding of navigability, and hence, inclusion within the purview of the Commerce Clause will be upheld. See, United States v. Lewis, 355 F.Supp. 1132 (D.C. Ga. 1973). Once the navigable nature of the waterway is established (and we assume throughout this discussion that there is no serious dispute as to the navigability of the Susitna River) the power of Congress to regulate, on such terms as it chooses, structures and uses of the waterway affecting its navigable qualities is plenary in nature and has been broadly interpreted by the courts. As the Supreme Court said in United States v. Appalachian Electric Power Co., 311 U.S. 377 (1940):

> That authority [over navigable waters] is as broad as the needs of commerce. Water power development from dams in navigable streams is from the public's standpoint a by-product of the general use of the rivers for commerce. To this general power, the

> respondent must submit its single purpose of electrical production. The fact that the Commission is willing to give a license for a power dam only is of no significance in appraising the type of conditions allowable. It may well be that this portion of the river is not needed for navigation at this time. Or that the dam proposed may function satisfactorily with others, contemplated or intended. It may fit in as a part of the river development. The point is that navigable waters are subject to national planning and control in the broad regulation of commerce granted the federal government. The license conditions to which objection is made have an obvious relationship to the exercise of the commerce power. Even if there were no such relationship, the plenary power of Congress over navigable waters would empower it to deny the privilege of constructing an obstruction in those waters. It may likewise grant the privilege on terms.

Appalachian Electric Power at 426-427.

The foregoing cases give a flavor for the extreme breadth of Congressional authority in this area. One corollary of this power is that State authority to regulate with respect to construction and operation of the facility could be preempted by Congressional legislation if the Congress chose. Since it is our understanding that the terms of this contract are limited solely to consideration of regulatory foreshortening at the Federal level, we have not included analysis or examination of the issues which would be raised in the event of Congressional preemption of state authority. Nonetheless, we felt it important to point out that the option exists and that were Congress to so legislate, the legal basis for any assertion of state regulatory authority would be extremely tenuous. An example of the extraordinary reach of Congressional power in this area with respect to traditional notions of state sovereignty can be seen in Washington Department of Game v. Federal Power Commission, 207 F.2d 391 (9th Cir 1953), cert. den. 347 U.S. 936 (1954). In Washington, the Federal Power Commission (predecessor to the FERC and licensing agency for hydroelectric projects under the Federal Power Act) granted a license to construct two dams to the City of Tacoma, Washington. From its initiation, the project was opposed by state officials and citizens' groups primarily on the grounds that construction of the dam would severely damage or destroy salmon runs in the Cowlitz River, a tributary of the Columbia. In upholding the authority of the FPC to grant the license to the City of Tacoma and to proceed with construction of the dam irrespective of state policy to the contrary, the court said:

> We must now consider the fate of the fish on the Cowlitz River. Herein lies the chief concern of those who object to the construction of the dams. They contend that the project will destroy the runs of spring chinook salmon, fall chinook, silver salmon, steelhead trout, cut throat trout, and smelt, which use the Cowlitz as spawning grounds. They point out that to pass each of the dams, the fish will have to climb ladders. . ., each of which is considerably higher than the. . .highest dam over which migratory fish have been successfully passed to date. . . .
>
> As we see it, it is not within our jurisdiction to prescribe a policy. The Federal government has the jurisdiction over navigable rivers and it is within the power of the Congress and the executive to prescribe the policy in relation thereto. If the dams will destroy the fish industry of the river, we are powerless to prevent it. It is admitted that the fish industry on the river is an important one and every known method should be used to preserve it. If it is the law (and we are not holding one way or another) that the Commission is held to the use of discretion in its requirements as to the preservation of any use to which a navigable stream is currently being put, we hold that the Commission has given the subject of the fishing industry due consideration and has not abused its discretion. Washington at 397-398 [footnote omitted].

The State of Washington subsequently attempted to relitigate the issues involved in this case through the state courts and obtained a favorable judgment in the Supreme Court of Washington. However, the United States Supreme Court reversed and remanded on the grounds that exclusive jurisdiction for appeals from Federal Power Commission actions was vested in the United States Court of Appeals and that the decision in Washington, supra, was a final decision on the merits and not susceptible to a collateral attack in the state courts. City of Tacoma v. Taxpayers of Tacoma, 357 U.S. 320 (1958).

The foregoing describes the scope of Congressional authority, as exercised by a delegatee of that authority (i.e., the Federal Power Commission with delegated authority to regulate dams on navigable waters) under the Federal Power Act. As contemplated in the contract for this report, the delegated authority to a Federal agency for regulatory review and approval of the Susitna dam will be exercised, in part, under a new statute. As is generally the case in administrative law situations, the authority of the agency to regulate is derived from the underlying power of Congress to legislate with respect to the subject matter.

Thus, it seems extremely clear that Congress, acting alone, has plenary power with respect to the construction of a dam on the Susitna River. As will be discussed further in Part V of this report, the only constraint on such power is the Due Process clause of the Fifth Amendment to the United States Constitution regarding the taking of property. Within these confines, however, Congressional power is complete. What this means is that if Congress wishes, it could direct an agency of the Federal government to construct a dam on the Susitna River notwithstanding any other provision of law. And, at least with respect to navigable waters and the regulation thereof, what Congress may do directly it may do by a delegation to an administrative agency for the executive branch of government. The conclusion seems clear that with the proper Congressional enactment, providing the Federal Energy Regulatory Commission (or some other designated agency. For obvious reasons of practicability and technical expertise, we have chosen to designate the FERC as lead licensing agency in the expedited review process) the regulatory review period may be limited to two years for the Susitna project.

IV. MAJOR CONGRESSIONAL ACTIONS FORESHORTENING THE REGULATORY PROCESS

As noted in the Introduction, this section reviews a variety of Congressional enactments in recent years where the regulatory process has been amended or foreshortened, where relevant Federal law has been waived and/or Federal judicial review precluded or limited on major projects. As directed in the contract, the emphasis in this section is on major energy projects regulated by the United States Government.

An examination of Congressional enactments going back to the late 1960s reveals relatively few enactments where major regulatory foreshortening was mandated. Major examples which have arisen are those statutes with which Alaskans are most familiar: the Trans-Alaska Pipeline Act and the Alaska Natural Gas Transportation Act. Our research indicates that few other Congressional enactments during this period even approach in scope the limitations imposed by Congress on the administrative and regulatory process in these Acts. This conclusion is particularly applicable with respect to the Alaska Natural Gas Transportation Act.

Although not strictly called for in the contract, we have also included consideration of proposed legislation for establishment of the Energy Mobilization Board. Although never enacted, the proposals with respect to the Energy Mobilization Board involved one of the most sweeping attempts at regulatory foreshortening ever contemplated by Congress. It is safe to say that the provisions of the legislation which would have established the Energy Mobilization Board fall only one step short of the ultimate form of regulatory foreshortening: direct Congressional enactments directing the construction of designated projects without reference to existing provisions of law. Following is a discussion of the major Congressional enactments involving significant regulatory foreshortening or limitations on judicial review.

ALASKA NATURAL GAS TRANSPORTATION ACT OF 1976

The Alaska Natural Gas Transportation Act of 1976 (15 U.S.C. § 719 et seq.; hereinafter "ANGTA"), was enacted October 11, 1976 in an effort to resolve seemingly insoluble regulatory conflicts facing the Federal Power Commission with respect to selection of a route and sponsor for delivery of North Slope Alaskan natural gas to continental U.S. markets. ANGTA represents one of the major regulatory foreshortening exercises of recent years and established a general pattern which was followed extensively in Title V of the Public Utility Regulatory Policies Act of 1978 relating to construction of west to east crude oil pipelines (see discussion infra).

The provisions of ANGTA were unique in that Congress intervened in an on-going regulatory proceeding, directing that the proceedings be suspended and that the Commission, on the basis of the existing record, develop within five months a recommendation to the President regarding which route and sponsor should be approved. ANGTA then provided the President an additional four month period after submission of the recommendations of the Commission to reach a final decision and to submit this decision to Congress. The Act then provided for Congressional ratification of the Presidential decision within sixty days of submission by joint resolution.

Section 9 of the Act directed Federal officers or agencies to adopt expedited procedures with respect to grants and certificates, rights of way permits, leases or other authorizations necessary or related to the construction and initial operation of the approved system. Section 9 also provided for the waiver of procedural requirements where, in the discretion of the Federal officer or agency such waiver was necessary to permit expeditious and priority consideration of the application. Section 10 of the Act limited available judicial review for challenging the provisions of the Act itself or any actions taken thereunder. Essentially this section provided a sixty day statute of limitations for actions challenging the Act or actions taken under its authority. Further, exclusive jurisdiction to hear such actions was vested in the United States Court of Appeals for the District of Columbia.

The final major provision of the Act established a process under which the President could propose waivers of existing the law to Congress where such waivers were deemed necessary to expedite project schedule. The waiver provision required approval by the Congress via joint resolution before any such waiver became effective, and differed from ordinary Congressional enactments primarily with respect to the limited time period established for Congressional action once a waiver had been proposed, and in the somewhat expeditious legislative procedure relating to joint resolutions.

ANGTA is one major example of a Congressional regulatory foreshortening device and, as will be seen below, many of the provisions in ANGTA have served as general models for subsequent legislative proposals in Congress.

TITLE V, PUBLIC UTILITY REGULATORY POLICIES ACT OF 1978

The Public Utility Regulatory Policies Act of 1978 was a wide ranging piece of legislation covering retail regulatory policies for electric utilities, establishing expanded Department of Energy authorities with respect to utility and power production policies, establishing standards for retail natural gas utility sales, a program for small hydroelectric power project development, and, finally, instituting an expedited regulatory review process for certain crude oil pipeline systems.

Title V of the Act dealt with crude oil transportation systems; specifically, the systems covered were west to east crude oil pipelines designed to move the Alaskan west coast crude oil "surplus" to mid-continent U.S. markets. Although establishing an expedited regulatory review process that was nearly as comprehensive as that enacted in ANGTA, Title V was specifically limited both definitionally and via time limitations pipeline applications to existing and competing west to east pipeline proposals (i.e., Northern Tier, Northern Border and Long Beach-Midland). Section 505 directed the Secretary of the Interior to establish an expedited schedule for reviews and recommendations with respect to such transportation systems. Section 506 directed that all environmental impact statements for proposed projects be completed within four months after enactment of the bill.

As in ANGTA, the President was vested with authority to decide which, if any, of the competing systems should be approved, after considering the recommendations of various government departments and the results of the environmental impact reports. Unlike ANGTA, the President's decision was not subject to Congressional ratification. Also in keeping with ANGTA procedures was § 508 providing for Presidentially proposed waivers of Federal law, if such waivers were approved by both Houses of Congress by a joint resolution.

Section 509 of Title V established general expedited procedures for any system or systems approved by Presidential decision. While this section directed Federal officers and agencies to make all decisions as expeditiously as practicable, no applicable provisions of law were waived. However, in the case of the Long Beach-Midland project, the bill directed:

> "All decisions regarding issuance of Federal permits, rights of way, and leases and other Federal authorization is necessary for construction and operation of the Long Beach-Midland project shall be consistent with applicable provisions of Federal law, except that such

decisions shall be made within thirty days after the date this title becomes effective." 43 U.S.C. § 2009(b).

This subsection is of some interest in the context of this report in that Congress simply directed that decisions - whether for or against the project - be made within a specified period. No attempt was made to specify how the strictures of existing law were to be conformed to the thirty day schedule. Thus, subsection (b) suggests that one clear alternative for any proposed Susitna legislation would be simply to establish a two year regulatory review deadline for all necessary Federal approvals without specifying regulatory mechanisms. As will be discussed in Part V of this report, we believe there are compelling political reasons why such a relatively simple approach may be a less desirable, alternative.

Finally, Title V established some limited constraints with respect to judicial review. Actions not brought within sixty days of the Federal action or decision challenged were barred. Exclusive jurisdiction was vested in the District Courts of the United States, although no other limitations with respect to jurisdiction or venue were included in the Act.

Title IV of the 1978 Act established a program to encourage development of small hydroelectric power projects (which were defined as having not more than 15,000 kw of installed capacity). In addition to establishing loan programs for feasibility studies and for project costs, § 405 also mandated establishment of a "simplied and expeditious" licensing procedure. However, the section specifically provided that there was no exemption from any applicable Federal law for such small hydroelectric power projects, nor were any limitations with respect to judicial review established. Since this section dealt only with the Federal Energy Regulatory Commission's licensing authority under the Federal Power Act and did not establish similar expedited procedures in other Federal agencies, this section does not provide a completely useful model for any proposed Susitna legislation. In short, while FERC licensing procedures may have been "simplified" as a result of this enactment, we doubt that the overall result has been a significant decrease in total regulatory review time throughout the Federal establishment. This total delay period is, of course, the crux of the problem facing the Susitna project.

Title IV was amended in 1980, increasing the definition of small hydroelectric facilities to 30,000 kw. The 1980 amendment also provided for FERC authority to completely exempt very small hydroelectric projects (5,000 kw or less) for licensing proceedings under the Federal Power Act. However, the exemption did not extend to non-FERC matters such as environmental review.

ENERGY MOBILIZATION BOARD LEGISLATION

Proposals to establish a national Energy Mobilization Board were narrowly defeated in 1980. The Board proposals involved some of the most sweeping grants of power to a Federal agency contemplated during peace time. The bill would have created an Energy Mobilization Board (hereafter "EMB") with the authority to designate high priority, non-nuclear energy projects for "expedited" regulatory consideration and processing. Once a project had been designated for such expedited consideration, the Board had authority to establish project deadlines for every Federal, state and local approval or permit required for construction and operation. And, where any such Federal, state or local agency failed to meet a designated approval deadline, the Board was authorized to make the decision in lieu of such agency.

The Senate passed legislation provided the Board with authority to waive applicable Federal, state or local law provided that any such law had been enacted after construction of a designated project had begun. The conference bill watered down this provision, adopting a procedure whereby the Board could recommend to the President suspension, modification or amendment of Federal statutes, rules, regulations and standards. If the President in turn recommended such changes to the Congress, the recommendation would take effect upon enactment of a joint resolution of Congress approving the recommendation. Thus, the provisions of the EMB legislation followed closely the waiver sections originally enacted in ANGTA.

The bill would have further provided for the Board to possess authority to obtain court orders to enforce necessary agency action for designated projects. Finally, the bill also contained provisions relating to expedited judicial review and limiting the jurisdiction of state and local courts to hear cases arising under the Act.

TRANS-ALASKA PIPELINE AUTHORIZATION ACT

The Trans-Alaska Pipeline Act (hereafter "TAPs") is in some respects the model example of a "regulatory nightmare" which required Congressional action to resolve. Virtually from the inception of the original pipeline proposals, the project had been under heavy legal pressure from environmental groups on a variety of grounds. And, of course, in the early stages of the project the unresolved issue of native land claims also raised the spectre of great delay. However, after passage of the Alaska Native Claims Settlement Act, the problems centered on two major areas:

1. The right of way width provisions, § 28 of the Mineral Leasing Act of 1920, were inadequate to permit construction of the pipeline.

2. The adequacy of the environmental impact statement required under the National Environmental Policy Act had been under heavy challenge by environmental groups.

It was primarily to meet these twin challenges that the Act was passed. The specific impetus was the decision in Wilderness Society v. Morton, 479 F.2d 842 (D.C. Cir. 1973) requiring strict adherence to the right of way width provisions of the Mineral Leasing Act. Without an amendment to these provisions, even with an adequate environmental impact statement, pipeline construction could not go forward. And, as the legislative history of the Act reveals, the decision in Wilderness Society v. Morton raised questions as to the legality of nearly 100 pipeline rights of way granted in prior years by the Department of Interior and promised to stall virtually any new pipeline construction of significant size over Federal lands in the United States.

In consequence, the Act provided not only for a 50 foot right of way width, but vested authority in the Secretary of Interior to grant larger rights of way if the project required. Further, the Act expressly authorized temporary use permits for the period of construction and for purposes of maintenance and operation which were not specifically included in the right of way itself but which were reasonably necessary for access.

The problems which had been encountered with respect to the environmental impact statement under the National Environmental Policy Act were dealt with in the same fashion recommended by Vermont's Senator Aiken regarding the Vietnam War: on the environmental issues, Congress simply declared victory. Section 203 of the Act expressly declared that because of the extensive governmental studies that had already been made and because of the national interest in prompt construction without further administrative or judicial delay, the Secretary and other appropriate Federal officials were directed to issue and take all other necessary actions necessary for pipeline construction. Section 203 further provided that further actions under the Environmental Policy Act were not required. Judicial challenges were limited to a period of sixty days following enactment while exclusive jurisdiction over such actions was vested in any appropriate United States District Court.

In sum, the TAPs Act is probably not a regulatory foreshortening act in the sense of other legislation considered in this report. Rather, it involved enactment of a Congressional mandate to issue permits and rights of way for construction of a designated project. In contrast, ANGTA, Title V of the Public Utility Regulatory Policies Act of 1978 and the Deep Water Ports Act (discussed infra), all left discretion over whether or not to develop a given project with the administrative agencies involved. And, it is this latter approach that we have followed in drafting the proposed Susitna legislation in Part IV of this report, rather than simply mandating issuance of a Federal Power Act permit. While such a Congressional mandate for Susitna construction would clearly involve the ultimate in regulatory foreshortening, we believe, as will be discussed further below, that such a legislative approach this juncture is politically unrealistic.

DEEP WATER PORT ACT OF 1974

In the non-energy area, the Deep Water Port Act of 1974 represents perhaps the best example of a streamlined and efficient regulatory format enacted by Congress. As provided in the Act, the procedural requirements for consideration of applications and issuance or denial of a license cover a maximum period of 356 days. Any judicial review of the Secretary of Transportation's final decision must be requested no later than sixty days after such a decision is made.

As taken from the legislative history of the Act, the mandated review process can be summarized as follows:

0 days: An application for a deep water port license is filed.

21 days: The Secretary of Transportation ascertains if all the necessary information is included.

26 days: If the necessary information is included, the Secretary publishes notice and a summary of the proposal, designates the application area and designates adjacent coastal states under the Act. Copies of the application are sent to all Federal agencies involved in the review process, and such

applications to the Secretary of Transportation are deemed to be applications for requisite approvals required in all such agencies.

36 days: Copies of the application are sent to the governor of those designated adjacent coastal states.

56 days (30 days after publishing notice of application): The Secretary designates a safety zone around the proposed port. Thereafter, a safety zone is designated for each subsequent, competing application within 30 days after notice.

86 days (60 days after notice): Notice of intent to file competing applications must have been received. The administrator of the National Oceanic & Atmospheric Administration must designate any additional adjacent coastal state based on a determination of substantial pollution risk from a proposed deep water port, notify the Secretary of Transportation and publish notice of the designation.

96 days: A copy of the application is forwarded to the governor of each adjacent coastal state designated by NOA.

116 days (90 days after notice): All competing applications must have been received. Reports of Federal Trade Commission and the Attorney General with respect to antitrust considerations must be transmitted to the Secretary.

266 days (240 days after notice): All public hearings must be concluded.

311 days (45 days after the final public hearing): Agency comments must be transmitted to the Secretary of Transportation. Each adjacent coastal state governor must notify the Secretary as to whether he approves or disapproves issuance of a license. It is assumed the governor approves of the application is he does not respond within this time.

356 days (90 days after the final public hearing): The Secretary makes his decision.

At first glance, the approach taken in the Deep Water Ports Act would seem to be superior to the somewhat complex project decision schedule system which we recommended in Part IV of this report. For two reasons, however, we believe the general legislative approach taken in Part I of this report is superior to that adopted in the Deep Water Port Act. Specifically, the Deep Water Port Act involved assertion of Federal jurisdiction and agency authority in an area that was, essentially, virgin regulatory ground. Unlike the hydroelectric licensing process (and unlike pipeline rights of way), there were no entrenched, established bureaucracies with vested interests in the regulatory process. Thus, both politically and practically, establishing a relatively efficient and centrally managed regulatory process for these licenses proved to be a manageable task.

A further consideration is that the general approach suggested in Part I of this report has already been followed in various energy related pieces of legislation. In our judgment, gaining approval of any Susitna legislation will be eased if the general legislative format is already familiar to relevant members of Congress and of the Federal bureaucracy. Confronting such Federal decision makers with a new, and in the context of major energy projects, untried, regulatory approach will compound the problem of gaining ultimate Congressional approval. Within these constraints, however, the general approach set forward in the Deep Water Port Act would provide a satisfactory model for Susitna legislation, in the event an alternative to the legislation in Part I of this report is desired.

MISCELLANEOUS LEGISLATION

The foregoing pieces of legislation represent the major Congressional enactments in recent years involving regulatory foreshortening. The following acts or portions of acts are of substantially less importance in terms of analyzing the problem as it relates to Susitna but are included for purposes of completeness.

A. Emergency Petroleum Allocation Act of 1973.

Section 6 of the Emergency Petroleum Allocation Act provided a limited exemption from Federal antitrust laws in cases where otherwise collusive or anti-competitive meetings or practices were necessary among oil companies or their employees to meet the petroleum allocation and price control requirements of the Act.

B. Energy Policy and Conservation Act of 1975

Section 252(j) of the Energy Policy and Conservation Act provided for a limited exemption to antitrust laws with respect to oil companies participating in the Agreement on International Energy Program.

C. Emergency Energy Conservation Act of 1979.

Section 214 of the Emergency Energy Conservation Act of 1979 imposed some limitations on judicial review with respect to Federally established energy conservation targets applicable to the state.

D. Uranium Mill Tailings Radiation Control Act of 1978.

Section 209 of this Act authorized the Nuclear Regulatory Commission to consolidate to the maximum extent practicable licensing and licensing procedures under the Act with required licenses and related procedures under the authority of the Atomic Energy Act of 1954.

E. Ocean Thermal Energy Conversion Act of 1980.

The Ocean Thermal Energy Conversion Act established licensing procedures with respect to the construction and operation of ocean thermal energy conversion facilities to produce electricity and for the production of energy intensive products off the coast of the United States. The Act provided for an expedited review process for such licenses and approvals essentially identical to those contained in the Deep Water Port Act.

F. Regional Rail Reorganization Act of 1973.

Section 601 of this Act provided for a limited exemption from the antitrust laws with respect to formulation or implementation of the final system plan required under the Act.

V. GENERAL CONSIDERATIONS AND STRATEGY ISSUES

As noted earlier in the body of this report, alternative models exist for drafting Susitna regulatory foreshortening legislation. As we discussed in Part IV of the report, the best general alternative model would probably be the approached used in the Deep Water Port Act of 1974.

Within the context of the proposed legislation in Part I, modifications of this general approach are, of course, possible. What follows is a brief discussion of the major sections of the proposed legislation, possible alternative approaches and what we believe are the strengths and weaknesses of such alternatives.

Section 8 of the legislation allows the Commission to make necessary decisions and approvals in lieu of other Federal agencies where these agencies are unable to meet Susitna decision deadlines. A clear alternative here would be to direct each appropriate Federal officer or agency to close the record thirty days prior to a Susitna decision deadline and to reach a decision with respect to that approval either by or shortly after the decision deadline. This approach may have some political advantage with respect to Congressional acceptance of the proposed legislation in that it appears less radically disruptive of established government procedures. Further, some legal advantage might be obtained because of administrative law presumptions in favor of "agency expertise." Such presumptions might make "line" agency approvals somewhat less vulnerable to judicial challenge. On the other hand, we believe leaving the decision process in the hands of an agency that has already failed to meet the schedule deadline significantly increases the probability of a negative decision. It is our experience that there is a tendency among Federal agencies to seek regulatory "perfection" in their discrete area of expertise, without respect to the interests of an entire project. This tendency is one of the sources of regulatory delay for major projects such as Susitna. Consequently vesting the decision making authority in the Federal Energy Regulatory Commission in the event of a missed project deadline will allow a more balanced review of the the approval's relationship to the project as a whole.

With respect to the Congressional review provisions of in § 9, one alternative would be to require affirmative Congressional action to validate Commission approvals in lieu of other Federal agencies. This has been the procedure used in other acts where waiver of Federal law was involved. However, here, where there is no waiver of Federal law and where the action is essentially administrative and procedural in nature, we believe the requirement that Congress act affirmatively to stop Commission action is the more appropriate course. Such a procedure affords Congress a clear opportunity to review the completeness and adequacy of necessary regulatory approvals made by the Commission. It will not, however, place Congress in the position of reviewing in detail and acting upon, every administrative decision in order to avoid substantial project delay.

Further areas open to modifications are the various time schedules for agency review and action established in the legislation. Our general objective here was to complete all non-Commission reviews 18 months after the initial application is accepted. This provides a six month period for the Commission to complete any necessary work with respect to the project license. While we believe these time periods are appropriate, modifications would have no major project impact, so long as the Commission itself has adequate time in which to reach a decision as to a license.

The judicial review sections of the legislation are relatively straightforward with respect to review of agency actions and approvals relating to the Act. Jurisdiction was vested in the Temporary Emergency Court of Appeals because this court is arguably best equipped and experienced to deal rapidly with any questions presented. Vesting such jurisdiction in any other Court of Appeals of the United States (most typically such jurisdiction has been vested, in other acts, in the Court of Appeals for the District of Columbia Circuit) would probably have a relatively small effect on the timing of any judicial review. We would not recommend an amendment vesting such jurisdiction in the district courts of the United States, since an additional appeal would be added and because the district courts are neither as experienced nor as equipped to deal with such matters on an expedited basis as are the courts of appeal.

A further area of judicial review dealt with in the proposed legislation relates to actions arising for pecuniary loss or damage resulting from construction or operation of the project. Such losses would typically be associated with flooding of land upstream from the project, interference with usufructory water rights downstream and the taking of lands for the construction and operation of the project on and around the project site. Ordinarily, actions for recovery of such losses (i.e., valuation actions in eminent domain proceedings) may be had in either the district courts of the United States or the state courts, provided that other jurisdictional requirements are met. 16 U.S.C. 814. In the proposed legislation, we recommend limiting jurisdiction to the district courts of the United States. The primary reason we recommend this is that the limitations with respect to injunctive relief contained in § 19 of the proposed legislation thereby attach. Such a procedure allows full and fair compensation to any landowners or water users suffering compensable loss from the construction or operation of the project, but substantially reduces the possibility of significant project delay.

In this regard, our research disclosed indicated the presence of possibly significant problems with respect to damages arising from historical and statutorily based water use rights on the river. There appear to be significant issues here which State policy makers may wish to address in the context of moving forward with the Susitna project. Specifically we have identified the following areas as being of potentially significant concern and which we offer as an aid to the committee in its further consideration of the matter.

1. The Alaska Native Claims Settlement Act did not conclusively dispose of the question of aboriginal water rights. To our knowledge such claims have been asserted by several native corporations over the last few years and have to date been unsuccessful. The Committee may wish to consider the magnitude and effects of any such claims, if they were to be asserted. A subcategory of this problem involves the effect of the project on subsistence uses in the area. While the Alaska National Interest Lands Act specifically provided that subsistence uses were not a property right (and hence not compensable as a taking under the Fifth Amendment), the interrelationship of water use rights and subsistence effects might constitute a property interest compensable as a taking. It would seem to us that consideration of these areas would initially involve a close analysis of possible claims arising from such sources as well as consideration of alternative methods of dealing with them at the State and Federal level.

2. The licensee for the project is authorized to utilize the Federal power of eminent domain to the extent necessary for project construction and operation. 16 U.S.C. 814. Some condemnations under this power do not constitute compensable "takings" under the Fifth Amendment to the United States Constitution. Others, such as riparian fast lands (i.e., land above the normal high water mark which is flooded as a result of the project) and loss of water use rights, if any, are compensable. Further, since the contemplated licensee is an agency of the State of Alaska, the licensee would also have State powers of eminent domain. The use of such powers of eminent domain, the methods of valuation to be utilized, what rights and

interests are and are not compensable under Federal and State law, are all issues that involve cost and policy determinations with respect to the project and therefore may warrant further examination.

We have, of course, not engaged in a complete analysis of any of these questions. However, in aid of the Committee's responsibilities with respect to the Susitna project, we point them out as possible areas of further investigation.

Summary of 3 Volumn Report + 2 Volumns of appropiate regula

REGULATORY IMPACT MANAGEMENT PLAN

FOR THE SUSITNA HYDROELECTRIC PROJECT

Presented to:

Honorable Ed Dankworth
Honorable Don Bennett
Co-Chairmen
Senate Finance Committee

January 15, 1982

Contractor:

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REGULATORY IMPACT MANAGEMENT INC.

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EXECUTIVE SUMMARY

The Susitna hydroelectric project is facing obstacles which place its successful completion in doubt. Even if Acres American's (the license-preparation company under contract to the Alaska Power Authority) study concludes that the project is feasible (from an environmental, economic and engineering standpoint) and if the Alaska government and active interest groups agree, the massive inter-group coordination required of any major hydroelectric project could delay this project to the point of jeopardizing its completion. The most notable of the pitfalls include:

- 15 to 20 state and local government approvals
  - air and water quality permits, fish and game impact-mitigation measures, waste disposal, etc.;
- 10 to 15 federal permits
  - involving at a minimum these federal agencies:

    Federal Energy Regulatory Commission (FERC); Environmental Protection Agency (EPA); Corps of Engineers (COE); Coast Guard; U.S. Fish and Wildlife Service (USF&WS); Bureau of Land Management (BLM); Advisory Council on Historic Preservation (ACHP); National Marine Fishery Service (NMFS); and the Federal Aviation Administration (FAA);
- other factors
  - uncertain land ownership patterns, water rights disputes, and subsistence rights, plus probability of intra- and inter-agency communications breakdowns concerning the adequacy and implications of the data base.

Multi-agency involvement at the federal, state and local government levels, and the attendant demands for different information and possibly conflicting interpretations of data, make delay inevitable. Delays and resulting confusion can cost hundreds of millions of dollars. The threat of such significant cost increases alone jeopardizes the project. The project sponsors must, therefore, seek to minimize delay and maximize cooperation.

Management of the regulatory process can reduce delay and confusion substantially by coordinating and giving definition to the agency reviews and agency information needs. Avoiding agency jurisdiction disputes and planning to fill agency information requirements promptly will, in a very real sense, ensure timely and successful completion of the Susitna hydroelectric project.

A regulatory impact management system will give Alaska the appropriate tools to shepherd the project through the bureaucratic maze efficiently and at the least possible cost.

This report constitutes the first step of Phase I of such a system. It identifies and documents the problems, both regulatory and non-regulatory, facing the Susitna project. The report makes specific findings and recommendations that require state officials' immediate consideration. Futhermore, the identification of issues and deficiencies provides a foundation for implementing a regulatory management system in the future.

Examples of major problems which could affect the ultimate completion of the Susitna hydroelectric project significantly include:

- Unsettled Native land ownership disputes in the project area which could delay the project for years unless efforts are made to bring about a negotiated settlement;

- Inadequate data bases concerning fish and wildlife resources in and along the Susitna River, and the absence of any analysis of the project's impacts on subsistence uses of such resources by Natives;

- Unsettled jurisdictional disputes among federal agencies concerning certain aspects of the licensing and construction of hydroelectric dams and associated transmission facilities;

- Inadequate inventory of persons or entities who may have appropriated water rights or who may have valid water claims along the Susitna River which could be affected by construction of the dams; and

- The absence of a clearly defined policy governing land use in the project area, including an analysis of the socio-economic impacts of the project on the people and natural resources in the region.

The remaining steps of Phase I of the management system would initiate a review of all data, studies, and other materials which currently are available to interested groups and agencies. Initially the data would be checked to ensure that it is adequate to meet the agencies' informational and regulatory needs. Then the data and conclusions would be used to prepare the various permit and license applications. Agency memoranda of understanding (MOUs) would be negotiated, presetting agency review by defining its scope and timetable. This will reduce the uncertainty and confusion attendant to any project of this magnitude.

Upon filing the applications, the regulatory process formally begins. To ensure that the permitting process stays on track, the second phase will feature:

- frequent status reports to keep all parties informed and to show agency compliance with the pre-agreed schedule;

- management reports to the Alaska Legislature to facilitate effective oversight and to ensure the efficient use of public funds.

I. INTRODUCTION
II. FINDINGS AND RECOMMENDATIONS
III. LICENSING
IV. REGULATORY NEEDS
V. NON-REGULATORY FACTORS

NOTE REGARDING THE FOLLOWING FRAME ON MICROFILM:

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

Dave Hutchens

Comment Draft

Railbelt Electric Power Alternatives Study: Evaluation of Railbelt Electric Energy Plans

February 1982

For the Office of the Governor
State of Alaska
Division of Policy Development and Planning and the Governor's Policy Review Committee
Under Contract 2311204417

Battelle
Pacific Northwest Laboratories

STATE OF ALASKA

THE LEGISLATURE

BUDGET AND AUDIT COMMITTEE

AUDIT DIVISION
POUCH W — ALASKA OFFICE BUILDING

FINANCE DIVISION
POUCH WF — STATE CAPITOL

JUNEAU 99801

M E M O R A N D U M

Date: February 24, 1982

To: Honorable Don Bennett
Honorable Ed Dankworth
Honorable Al Adams
Chairmen, Finance Committees
Alaska State Legislature

From: Milt Barker MB
Fiscal Analyst

Subject: General Funds Available for Appropriation

At your request, I have estimated state revenue for FY 81 through FY 83. Based on these estimates the following liquid general funds would be available for appropriation for FY 83 or for FY 82 supplementals ($ millions):

AVAILABLE FOR APPROPRIATION

Source of Estimate	Amount
Legislative Finance	
High	$2563.9
Medium	1855.9
Low	1448.5
Department of Revenue	3240.1

The Department of Revenue amount is based on their January 1982 estimates. They will publish new quarterly estimates in April, if not before, that will probably be lower.

The revenue by year is ($ millions):

REVENUE BY YEAR

Source of Estimate	Amount
FY 82	
Legislative Finance	
High	$3847.2
Medium	3722.9
Low	3699.8
Department of Revenue	4335.8

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FY 83

Legislative Finance	
High	3946.2
Medium	3362.5
Low	2978.2
Department of Revenue	4133.7

Th. large difference in amount available for FY 83 in comparison to FY 83 revenues is due to a shortfall in FY 82 estimated to be ($ millions):

FY 82 SHORTFALL

Source of Estimate	Amount
Legislative Finance	
High	($1197.1)
Medium	(1321.4)
Low	(1344.5)
Department of Revenue	(708.4)

In this analysis, the medium case is not necessarily to be taken as the most likely. These three cases, as explained in this memo under "oil price scenarios", are a means of analyzing the two opposing sides of the debate on oil prices and the impact on Alaska if a particular view should happen to be correct.

The assumed Sadlerochit wellhead prices behind these estimates are ($ per barrel)

SADLEROCHIT WELLHEAD PRICES

Source of Estimate	FY 82	FY 83
Legislative Finance		
High	$20.27	$20.80
Medium	19.42	16.80
Low	19.28	14.00
Department of Revenue	22.41	23.62

CURRENT OIL MARKETS

A low level of demand for petroleum products has resulted in sharp decreases in January 1982 in spot market and domestic prices for crude oil. Some delivered prices for Alaskan North Slope (Sadlerochit) fell below $30.[1] Spot prices for heavier Mid-East grades have been reported as low as $27 and for Arabian Light as low as $29. U.S. posted prices have been reduced $1-$2 a barrel. Generally, official OPEC prices remain at the levels established in October, 1981.

As can be seen in the attached chart, Alaskan and spot prices are now below the official Saudi price of $34 by a record amount since decontrol of U.S. prices occurred in February, 1981. Official prices for heavier OPEC oil were reduced by 50¢ to a dollar January 1, 1982 in recognition of the especially soft markets for heavier oil products used in space heating and industrial or utility boilers. Conversions to gas for space heat and coal for boilers appear to be making significant inroads on oil consumption in these two markets.

The generally higher yield of heavier products from the relatively heavy Alaskan crude is part but not all the reason for its drop in January. The January price reductions have cut across all grades of oil. The bulk of Sadlerochit crude is sold on contract or intra-company transfer pricing which tends to lag the spot market. Thus, further declines in Alaskan wellhead prices may be expected.

Part of the reason for the generally low level of demand and January's price drop is that inventories are being drawn down. Continued high interest rates and expectations of still lower prices make inventory reduction the preferred source of supply.

Other reasons for the current slack demand are the state of the world economy and continued conservation and fuel substitution measures. In the U.S., auto production is at the lowest levels since the 1950's. U.S. fuel oil consumption was 10% below last year for the month of January despite a colder winter.

One reason to expect that official OPEC prices may come down is that refiners are generally losing $2 to $3 per barrel on each barrel of OPEC oil that they refine and sell in current markets. Significant increases in demand or reductions in supply are required if OPEC prices are to remain at their current levels.

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1. Sources for oil prices and energy consumption per GNP quoted in this memo are various issues of "Petroleum Intelligence Weekly".

WEST COAST OIL MARKET

Three factors related to the West Coast oil market are likely to have an adverse effect on Alaskan wellhead prices:

1) the current soft market is likely to spur competition in the West Coast market; current Gulf Coast prices are only $1.25 a barrel higher than on the West Coast, yet the transportation costs are as much as $3.50 a barrel more; thus West Coast prices could fall as much as $2.25 a barrel and still yield the same wellhead price; however, the incentive to compete for the West Coast market is minimized by the fact that wellhead taxes and royalty, including most notably the windfall profits tax, take around 90¢ of each dollar increase in wellhead;

2) new production from Kuparuk will intensify competition on the West Coast; because there are no windfall profits taxes on Kuparuk production (which makes a higher wellhead more valuable to producers), there will be a strong incentive to market it on the West Coast until netback prices at the wellhead are equal to the Gulf Coast;

3) the prospective long-term sale contracts of royalty oil in-kind by the state could have similar effects as Kuparuk; the extra margin earned by marketing it on the West Coast is smaller since the cost of royalty oil to a purchaser is based on the average of West Coast and Gulf Coast sales; however, this extra margin is not diluted by wellhead taxes and royalties and thus provides a strong incentive to market it on the West Coast until netback prices are equal to the Gulf Coast;

In September 1981, roughly 862,000 BPD of North Slope oil went to the West Coast and 655,000 BPD to the Gulf Coast. Assuming that Kuparuk production of 89,000 BPD and roughly 100,000 BPD of the state's royalty sales displace North Slope producers' oil to the Gulf Coast, Sadlerochit average prices would drop by 20¢ if there is no reduction of West Coast prices. Kuparuk would come in $1.18 higher than Sadlerochit except that gathering charges of $1.00 per barrel and a gravity differential of 37.5¢ a barrel would actually give it a wellhead 19¢ lower than Sadlerochit.

If West Coast prices fall the full $2.25 a barrel necessary to equalize netback prices at the wellhead with the Gulf Coast, the Sadlerochit wellhead would drop $1.27. Kuparuk would be $1.37 less than Sadlerochit.

The prospect of the trans-Panama oil pipeline opening in January 1983 means transport from the West Coast to the Gulf Coast might fall as much as $1.00 per barrel. In that case, equalizing netback prices for the two markets would require a drop of only $1.25 on the West Coast and 70¢ in the Sadlerochit wellhead. Again Kuparuk would be $1.37 less per barrel than Sadlerochit. These drops would be offset by an increase in the wellhead of $1.00 for Sadlerochit as a result of the cheaper transport through Panama and for Kuparuk as well on the assumption that the West Coast market maintains the same relationship to the Gulf Coast market.

TAPS

Effective January 1982, Exxon reduced its tariff on the Trans-Alaska Pipeline System (TAPS) to $5.30 from $5.95. With Exxon's 20% ownership in the line, this increases average wellhead values on the North Slope 13¢ a barrel.

Exxon reduced its tariff to avoid violating provisions of a 1941 consent decree between the U.S. Justice Department and certain oil companies which limits dividends that pipeline-owning companies can pay to affiliated parent companies. If tariffs are not lowered and earnings accumulate in excess of the amounts allowed as dividends, the excess is placed in a frozen account. Other TAPS companies may be following this latter course in the hopes of ultimately recovering funds so frozen. In any event, further tariff reductions by TAPS owners cannot be counted on, absent a settlement of the challenge by the state of TAPS tariffs before the Federal Energy Regulatory Commission (FERC).

OUTLOOK FOR OIL PRICES

There is currently a sharp divergence of opinion about both the demand and supply side of the market.

One group of observers emphasizes conservation and use of alternate fuels as the major and continuing factor in the slide in demand. They can point to a drop of 14% in energy consumption per real dollar of GNP between 1973 and 1981 and an even sharper drop of 27.6% in oil consumption per real dollar of GNP for the same period.[2]

2. The other side in the argument would say that these figures exaggerate the effect of conservation because 1981 was a year of recession in which energy-using industries were particularly adversely affected.

This same group generally has bearish expectations regarding supply, too. They anticipate non-OPEC production rising significantly and the return of Iran and Iraq as major producers. Most importantly, they assume that OPEC will not be able to limit its members' production efforts. They foresee cut-throat price competition among OPEC members trying to sell enough oil to meet their budgetary needs.

The other party in the debate, which has more bullish views on oil prices, identifies the current recession and inventory liquidation as the more prominent reasons for current slack demand. They generally anticipate that the economy will pick up steam towards the end of the year and that inventories will have reached satisfactory levels around the middle of the year. Thus, they expect demand to slowly increase over the year.

The bulls feel that OPEC will not break down in the face of reduced demand. Either demand for OPEC oil will be such that Saudi Arabia can soak up the glut by reducing its ~~consumption~~ production[3] or else in the face of sharp declines in demand, the sobering prospect of ruinous competition will restrain OPEC members from competing for market shares. There are signs that some OPEC members, including Nigeria, are preparing sharply reduced budgets.

OIL PRICE SCENARIOS

The two opposing views of prospective oil prices can be analyzed in three scenarios. Two scenarios, high demand and low demand cases, would have the common assumption that OPEC is able to keep the market roughly in balance through production and/or price reductions.

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3. 6 million barrels per day (BPD) is likely to be a floor that the Saudi's would be very reluctant to penetrate because it would cut into their five year development plan, result in imports exceeding exports, and not provide sufficient associated gas for new industries according to "Petroleum Intelligence Weekly", January 25, 1982 issue. It appears that the Saudis are, as promised, letting the market determine their production levels, at least within limits. It is believed that producing companies underlifted by as much as 700,000 BPD in January from the official Saudi production level of 8.5 million BPD. However, some experts feel Saudi production levels would have to drop to around 4 million BPD to soak up excess capacity and also change price expectations that are resulting in inventory drawdowns and short sales by oil speculators.

The possibility that OPEC would lower official prices probably is less likely than cuts in production. Given the short-run inelasticity of demand, cuts in prices would leave members with less revenue from selling the same amount of oil and only exacerbate tendencies towards cut-throat competition. Cuts in production could be disproportionately borne by countries with revenue surpluses.

There are indications that present price levels and expectations are already showing the desired effect on long-run demand for OPEC oil. Many synfuels projects are being dropped or shelved indefinitely and deep-water drilling plans are being cut back. Sales of coal reserves are showing softness.

In any event, OPEC's pricing behavior is expected to be of secondary importance in determining non-OPEC prices. Because of declining markets, price leadership has passed to non-OPEC producers. Some of the important ones like the U.S. and U.K. have strong incentives to meet market declines with reduced prices; U.S. producers can shift profits to refining and marketing and so avoid windfall profits taxes on production. For OPEC governments to reduce prices poses difficult budgetary and political problems each time it becomes necessary.

Thus, in the first two cases, it can be assumed that prices generally follow the market with OPEC serving only to prevent runaway competition.

It is conceivable that OPEC could become so alarmed about long-run demand that they decide to lower prices well below current market levels in order to discourage conservation and fuels substitution. The enormous pressures this would place on deficit-ridden members to cheat on prices, not to mention the difficulty of achieving consensus on such a decision, make such a scenario unlikely enough that it suffices to consider only one additional scenario. This is one of a precipitous decline in prices due to cut-throat competition among OPEC members.

Practically speaking, prices, and thus Alaska revenues, could fall anywhere between the higher cases and the low case of a shattered OPEC. These points in between can represent the basic uncertainty about where the bottom of the market is or they can even represent the possibility of OPEC making a drastic reduction in price and somehow being able to hold the line at that point.

The detailed assumptions as to price in the three scenarios are:

<u>High Case</u>- high demand, OPEC intact

1) January - June, 1982

The spot market remains depressed due to weak demand, some OPEC cheating, and speculators' short trading. Consequently, Sadlerochit delivered prices drop from $31.15 in December 1982 to $29 for this period. (By comparison comparable Mid-East grades in January are trading at and are valued by refiners at $27 to $28 a barrel). With roughly $10 in transportation costs subtracted from the delivered price, the Sadlerochit wellhead would be $19.

2) July - December, 1982

   a) Demand picks up a bit as inventories reach satisfactory levels. OPEC makes production cuts and cheating abates, firming up prices. Sadlerochit wellheads rise $1 a barrel.

   b) West Coast prices fall $1.25 relative to Gulf Coast prices, resulting in a 70¢ reduction in Sadlerochit wellhead. Kuparuk and royalty sales responsible.

3) January - June, 1983

   a) World economies pick up. OPEC possibly raises prices by some amount less than inflation. Sadlerochit wellhead rises $2 a barrel.

   b) Completion of the Panama pipeline raises Sadlerochit wellhead $1.00 a barrel.

<u>Medium Case</u>- low demand, OPEC intact

1) January - June, 1982

   a) Markets generally weaker than high case. Sadlerochit wellhead averages $18 a barrel for the period.

   b) West Coast prices fall $1.25 relative to Gulf Coast, reducing Sadlerochit wellhead 70¢ further. Kuparuk responsible.

2) July - December, 1982

   Even though inventories have been worked off, demand remains flat. OPEC production reductions help stabilize markets. No change in prices.

3) January - June, 1983

   a) Upward pressure on prices from gains in world economic activity, if any, is more than offset by continued conservation and fuel switching. OPEC continues price freeze. Sadlerochit prices decline $2 a barrel.

   b) Completion of Panama pipeline raises Sadlerochit wellhead $1.00 a barrel.

Low Case- demand irrelevant, OPEC shattered

The question here is "where is the bottom?". No one knows. William Brown of the Hudson Institute in a well-known article in "Fortune" suggested $20 a barrel or conceivably $15. Others have suggested $22-$28. This case arbitrarily picks $20 in 1981 dollars and assumes the decline to that level occurs by the end of FY 83. A higher or lower bottom reached more or less quickly is just as defensible in the face of OPEC's demise.

With inflation at roughly 10% per annum, $20 in 1981 dollars would be $24 in 1983. Assuming the $24 figure refers to Arabian Light, Sadlerochit might fetch only $22 because of its lesser quality. This would be [illegible]nd $12 at the wellhead. Roughly speaking, wellheads might t[illegible] average $17, $15, and $13 a barrel for the next three six month periods.

The wellhead prices implied by these three scenarios for Sadlerochit and Kuparuk are shown in Tables VI and VII.

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Medium Estimate	III
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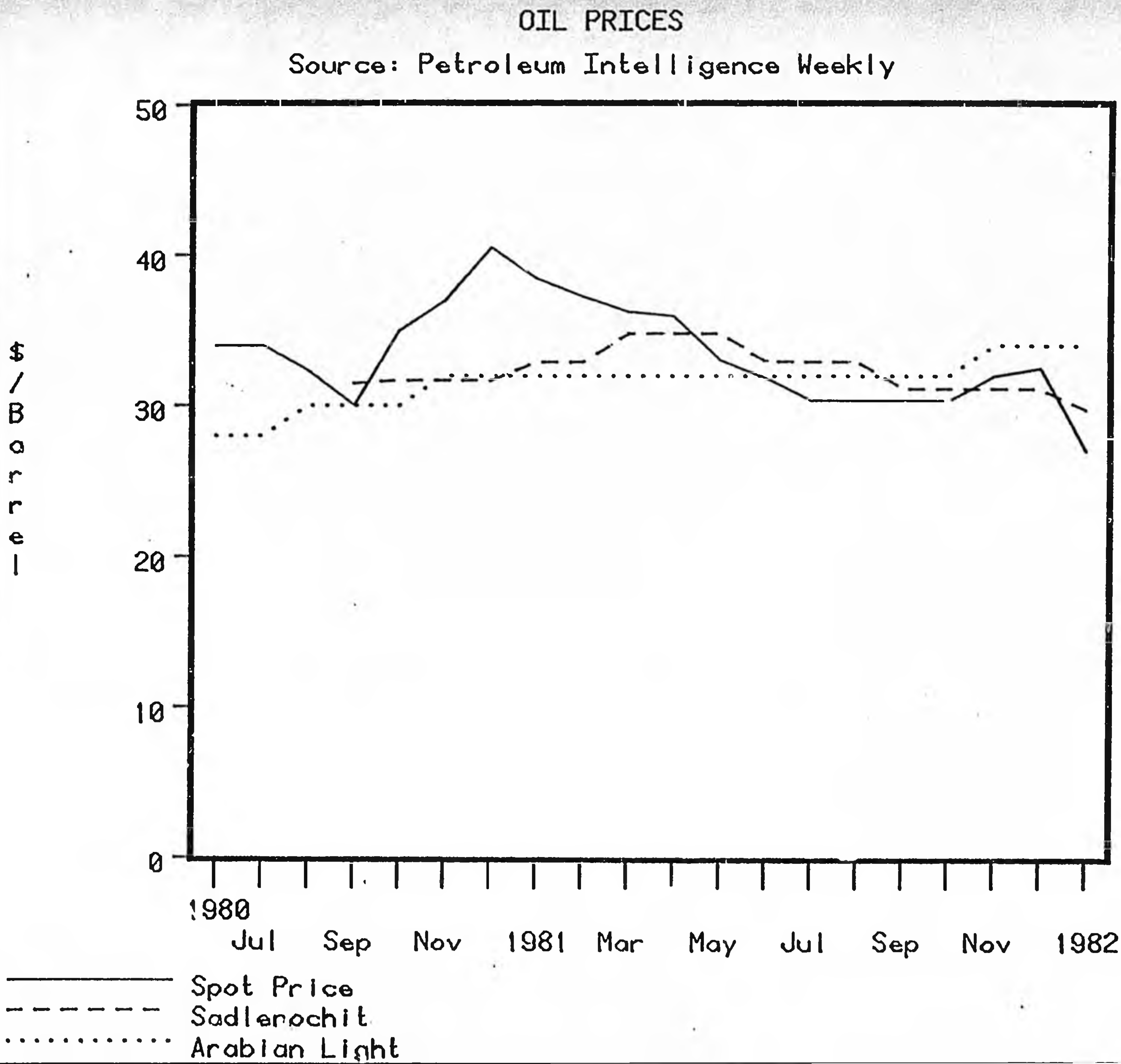

OIL PRICES
Source: Petroleum Intelligence Weekly
$/Barrel
0
10
20
30
40
50
1980
Jul
Sep
Nov
1981
Mar
May
Jul
Sep
Nov
1982
Spot Price
Sadlerochit
Arabian Light

Table I

General Funds Available for Appropriation

($ Millions)

	High Estimate		Medium Estimate		Low Estimate	
	Liquid General Funds	Total General Funds	Liquid General Funds	Total General Funds	Liquid General Funds	Total General Funds
General Fund Balance 6/30/81[1]	490.8	891.6	490.8	891.6	490.8	891.6
FY 82						
Revenue[2]						
Royalty (Net of Permanent Fund)	1157.8	1157.8	1108.0	1108.0	1098.9	1098.9
Severance	1585.5	1585.5	1519.2	1519.2	1507.1	1507.1
Petroleum Corporate Income Tax	442.9	442.9	434.7	434.7	432.8	432.8
Property Tax	155.0	155.0	155.0	155.0	155.0	155.0
Other	506.0	506.0	506.0	506.0	506.0	506.0
Total Revenue	3847.2	3847.2	3722.9	3722.9	3699.8	3699.8
Lapse and Loan Repayments[1]	74.0	50.0	74.0	50.0	74.0	50.0
Appropriations[3]	(5609.1)	(5609.1)	(5609.1)	(5609.1)	(5609.1)	(5609.1)
General Fund Balance 6/30/82	(1197.1)	(820.3)	(1321.4)	(944.6)	(1344.5)	(967.7)
FY 83						
Revenue[2]						
Royalty (Net of Permanent Fund)	1211.3	1211.3	983.9	983.9	822.1	822.1
Severance	1655.5	1655.5	1320.5	1320.5	1132.9	1132.9
Petroleum Corporate Income Tax	393.9	393.9	372.6	372.6	337.7	337.7
Property Tax	157.7	157.7	157.7	157.7	157.7	157.7
Other	527.8	527.8	527.8	527.8	527.8	527.8
Total Revenue	3946.2	3946.2	3362.5	3362.5	2978.2	2978.2
Loan Repayments[1]	24.0	-	24.0	-	24.0	-
Appropriations[4]	(209.2)	(209.2)	(209.2)	(209.2)	(209.2)	(209.2)
General Fund Available for Appropriation	2563.9	2916.7	1855.9	2208.7	1448.5	1801.3

TABLE I

NOTES:
1. "Executive Budget, FY 83", Budget & Management, Office of the Governor
2. From Table II-IV except property tax and "other" from "Revenue Sources", Alaska Department of Revenue, January 1982 with $15.0 in NPRA bonus revenue added to "other" for FY 82.
3. This is the figure in "Executive Budget, FY 83" increased by $400 million in Permanent Fund appropriations that had been deleted and reduced by $50 million that had been included for supplementals.
4. $100 million for energy and $101.2 million for municipal aid in Ch. 92, SLA 81 and 8.0 for senior citizen housing in Ch. 76, SLA 81.

TABLE II
PROJECTED PETROLEUM REVENUES
HIGH ESTIMATE
($ Millions)

	(1) Sadlerochit	(2) Field Cost Settlement	(3) "Exhibit B" Price for In-Kind Oil	(4) Bonus from Royalty Auction	(5) Alaska Oil Co. Price Dispute	(6) Kuparuk	(7) Cook Inlet	(8) TAPS	(9) Total (Accrual Basis)	(10) Retro "Warts" & Windfall Deductions	(11) Total (Cash Basis)
FY 81											
Royalty	1414.7	30.0	(Not used	--	--	--	60.7	--	1505.4	--	1491.3
Severance	1153.3	--	in this	--	--	--	26.8	--	1180.1	--	1169.9
Petroleum Corporate Income Tax	618.6	(2.8)	analysis)	--	--	--	18.3	203.0	837.1	--	860.1
FY 82											
Royalty	1402.2	--	17.0	35.0	(60.0)	37.3	112.3	--	1543.8	--	1543.8
Severance	1518.8	--	--	--	--	33.1	33.6	--	1585.5	--	1585.5
Petroleum Corporate Income Tax	421.0	--	--	--	--	13.7	19.7	144.5	598.9	(215.5)	442.9
FY 83											
Royalty	1423.7	--	5.1	--	--	83.8	102.5	--	1615.[illegible]	--	1615.1
Severance	1545.3	--	--	--	--	74.4	35.8	--	1655.5	--	1655.5
Petroleum Corporate Income Tax	224.2	--	--	--	-	14.3	6.7	80.4	325.6	--	393.9

TABLE III
PROJECTED PETROLEUM REVENUES
MEDIUM ESTIMATE
($ Millions)

	(1) Sadlerochit	(2) Field Cost Settlement	(3) "Exhibit B" Price for In-Kind Oil	(4) Bonus from Royalty Auction	(5) Alaska Oil Co. Price Dispute	(6) Kuparuk	(7) Cook Inlet	(8) TAPS	(9) Total (Accrual Basis)	(10) Retro "Warts" & Windfall Deductions	(11) Total (Cash Basis)
FY 81											
Royalty	1414.7	30.0	(Not used	--	--	--	60.7	--	1505.4	--	1491.3
Severance	1153.3	--	in this	--	--	--	26.8	--	1180.1	--	1169.9
Petroleum Corporate Income Tax	618.6	(2.8)	analysis)	--	--	--	18.3	203.0	837.1	--	860.1
FY 82											
Royalty	1343.3	--	17.0	35.0	(60.0)	32.8	109.3	--	1477.4	--	1477.4
Severance	1457.0	--	--	--	--	29.3	32.9	--	1519.2	--	1519.2
Petroleum Corporate Income Tax	413.3	--	--	--	--	11.8	18.3	144.5	587.9	(215.5)	434.7
FY 83											
Royalty	1150.0	--	5.1	--	--	66.5	90.3	--	1311.9	--	1311.9
Severance	1257.8	--	--	--	--	59.5	32.3	--	1320.5	--	1320.5
Petroleum Corporate Income Tax	206.0	--	--	--	--	10.4	4.0	80.4	300.8	--	372.6

TABLE IV
PROJECTED PETROLEUM REVENUES
LOW ESTIMATES
($ Millions)

	(1) Sadlerochit	(2) Field Cost Settlement	(3) "Exhibit B" Price for In-Kind Oil	(4) Bonus from Royalty Auction	(5) Alaska Oil Co. Price Dispute	(6) Kuparuk	(7) Cook Inlet	(8) TAPS	(9) Total (Accrual Basis)	(10) Retro "Warts" & Windfall Deductions	(11) Total (Cash Basis)
FY 81											
Royalty	1414.7	30.0	(Not used	--	--	--	60.7	--	1505.4	--	1491.3
Severance	1153.3	--	in this	--	--	--	26.8	--	1180.1	--	1169.9
Petroleum Corporate Income Tax	618.6	(2.8)	analysis)	--	--	--	18.3	203.0	837.1	--	860.1
FY 82											
Royalty	1333.7	--	17.0	35.0	(60.0)	30.7	108.9	--	1465.3	--	1465.3
Severance	1446.9	--	--	--	--	27.4	32.8	--	1507.1	--	1507.1
Petroleum Corporate Income Tax	412.0	--	--	--	--	10.8	18.1	144.5	585.4	(215.5)	432.8
FY 83											
Royalty	958.3	--	5.1	--	--	51.4	81.4	--	1096.2	--	1096.2
Severance	1056.5	--	--	--	--	46.5	29.9	--	1132.9	--	1132.9
Petroleum Corporate Income Tax	165.8	--	--	--	--	7.0	1.9	80.4	255.1	--	337.7

NOTES TO TABLES II - IV:

1. Royalty = production X in-value price X .125; source: Table VI.
FY 81 Severance = production X (invalue + field cost) X .875 working interest X .1225 tax X ELF; source: Table VI, except ELF from Col. 6, Table 5 "Fiscal Analysis of the Proposed Backstop Tax Legislation", Gregg Erickson, May 1981.
FY 82-83 Severance = production X (in-value price + field costs) X .875 X .15 tax; source: Table VI.
FY 81 Income Tax = (production X (in-value price + field costs) from Table VI less royalty and severance from above less windfall profits tax from Table V less other deductions from "Erickson" Table 9) X (.11 + .094)/2 average tax rate.
FY 82 Income Tax = FY 81 formula X (1.0 + .39)/2 average apportionment tax collections relative to AS 43.21.
FY 83 Income Tax = FY 82 formula with substitution of .094 tax rate and .39 apportionment factor.

2. Field cost settlement at 42¢ per barrel on 979 million barrels of pre-1980 production and 55¢ per barrel on 277 million barrels of production for first half of calendar 1980 compared to company charges of 64¢ per barrel.

3. 50¢ surcharge on in-value price for June 1981 applied to 28,000 BPD of in-kind sales to Golden Valley/North Pole for FY 82 and FY 83 and on 75,000 BPD to Alaska Oil Co. and 55,000 of royalty auction crude for first half of FY 82.

4. Average bonus of $2.39 on 55,000 BPD for first half of FY 82 plus $11 million in settlements from companies failing to take 30,000 BPD.

5. "Revenue Sources", Department of Revenue, January 1982.

6. Royalty = production X in-value Kuparuk price from Table VII X .125.
Severance = production X (in-value price + field costs) X .1225 tax rate X .875 working interest.
Income Tax = (production X (in-value price + field costs) less severance and royalty from above less other deductions from "Erickson" Table 10) X (.11 + .094)/2 tax rate X (1.0 + .39)/2 apportionment factor for FY 82 or .094 tax rate and .39 apportionment factor for FY 83.

7. Royalty = oil production from Col. 2, Table 12 "Erickson" X (Sadlerochit in-value price plus $10 per barrel for FY 82 and FY 83 and controlled price of $13.59 for FY 81) X .125 plus gas royalties from "Petroleum Production Revenue Forecast", Department of Revenue, December 1981.
Severance = oil production X prices X .1225 for FY 81 or .15 for FY 82 or FY 83 X .875 working interest X (ELF factors of .36 for FY 81, .23 for FY 82, and .27 for FY 83 as calculated from data in "Petroleum Production Revenue Forecast") plus (gas severance taxes from "Petroleum Production Revenue Forecast").
Income Tax = (Oil production X price plus gas production X gas price from Table 12 "Erickson" less royalty and severance from above less additional deductions from Table 12 "Erickson" less windfall profit tax derived from Line 5, Table 17 "Erickson") X (.11 + .094)/2 tax rate for FY 81 and X (1.0 + .39)/2 apportionment factor for FY 82 or X .094 tax rate and .39 apportionment factor for FY 83.

8. Income Tax = net income from Col. 8, Table 11, "Erickson", except FY 83 estimates which use $2193.7 million net income based on a tariff of $6.08 to account for Exxon's reduced tariff X (.11 + .094)/2 tax rate for FY 81 and X (1.0 + .39)/2 apportionment factor for FY 82 or X .094 tax rate and .39 apportionment factor for FY 83.

(CONTINUED)

NOTES TO TABLES II - IV (CONTINUED):

9. Sum of columns 1 through 8.

10. Windfall profits tax of $2.016.2 million for FY 81 at an average tax rate of (.11 + .094)/2 = $205.7 FY 81 tax benefit for this deduction. This is lagged one quarter of a year to put the benefit on a collections basis using $18.9 million from "Erickson" Table 17, Note 2 as the value of windfall deductions for the last quarter of FY 80.
"Warts" deductions for FY 81 and prior years have a value of $83 million according to the Department of Revenue fiscal note for FCCS SB 524 which is adjusted by (.11/.094) for 1/2 year at .11 tax rate.
In addition, there is a retroactive assessment of the .11 tax rate against the first quarter of calendar 1981's collections of $280.3 million which would not otherwise be picked up by lagging collections one quarter = (.11/.094) X 280.3 - 280.3.
All three items are [illegible] adjustments to FY 82 because the FY 81 cash totals in col. 11 are actual collections.

11. FY 81 = actual collect[illegible]
FY 82 and FY 83 royalty and severance = Col. 9.
FY 82 and FY 83 income tax = Col. 9 income tax lagged one quarter plus Col. 10.

TABLE V
SADLEROCHIT WINDFALL PROFIT TAX ESTIMATES

	(1)	(2)			(3)	(4)			(5)		
	WORKING INTEREST PRODUCTION (Millions of Barrels)	WELLHEAD PRICE PER BARRELL			WINDFALL BASE PRICE	NET WINDFALL ($ MILLIONS)			WINDFALL PROFITS TAX ($ MILLIONS)		
		HIGH	MEDIUM	LOW		HIGH	MEDIUM	LOW	HIGH	MEDIUM	LOW
FY 81	479.2	$20.50	$20.50	$20.50	$13.69	2880.2	2880.2	2880.2	2016.2	2016.2	2016.2
FY 82	479.2	20.27	19.42	19.28	14.92	2162.8	1818.8	1762.1	1514.0	1273.1	1233.5
FY 83	479.2	20.80	16.80	14.00	16.65	1680.4	60.6	--	1176.2	42.5	--

NOTES:

1. Assumes production of 1.5 million BPD less 1/8 royalty exempt from windfall profits tax.

2. From Table VI.

3. Table 7, Col. 3 "Fiscal Analysis of the Proposed Backstop Tax Legislation," Gregg Erickson, May 1981.

4. (Col. 1 X (Col. 2 - Col. 3)) - (Severance taxes from Tables II - IV) (Col. 2 - Col. 3)/Col. 2.

5. Col. 4 X .7.

TABLE VI
SADLEROCHIT CRUDE
ACTUAL AND PROJECTED PRODUCTION AND PRICES
FY 81 - 83

	ACTUAL			PROJECTED				
	Production (Millions of Barrels)	In-Value Royalty Price	Field Costs Per Barrel	Production (Millions of Barrels	In-Value Royalty Price High	In-Value Royalty Price Medium	In-Value Royalty Price Low	Field Costs
FY 81	552.1	$ 20.50	$ .58					
FY 82								
July	47.1	21.99	.62					
August	47.1	21.63	.62					
September	45.8	21.25	.62					
October	46.9	21.52	.62					
November	46.0	21.42	.62					
December	46.7	21.24	.62					
First Half FY 82	279.6	21.51	.62					
Second Half FY 82				273.8	$19.00	$17.30	$17.00	.67
Total Production				553.4				
Average Prices					20.27	19.42	19.28	.64
FY 83								
First Half FY 83				273.8	19.30	17.30	15.00	.67
Second Half FY 83				273.8	22.30	16.30	13.00	.72
Total Production				547.6				
Average Prices					20.80	16.80	14 00	.70

TABLE VII
KUPARUK CRUDE
PROJECTED PRODUCTION AND PRICES
FY 82-83

	Production (Millions) of Barrels	In-Value Royalty Price			Field Costs
		High	Medium	Low	
FY 82					
Total Production	15.70				
Average Prices		$19.00	$16.75	$15.63	$ .64
FY 83					
First Half FY 83	14.60	18.75	16.75	13.63	
Second Half FY 83	18.25	21.75	15.75	11.63	
Total Production	32.85				
Average Prices		20.42	16.19	12.52	$ .70

NOTES: See text sections on "West Coast Market" and "Oil Price Scenarios". These numbers assume Kuparuk is sold at West Coast prices and are related to Sadlerochit as follows:

1) equal to Sadlerochit with no change in West Coast price differential;
2) 55¢ less than Sadlerochit if West Coast prices drop $1.25 since Sadlerochit drops 70¢ and Kuparuk $1.25; Panama pipeline does not change the differential between the markets;
3) $1.37 less than Sadlerochit in the low case on the assumption that distressed markets eliminate any wellhead price differential for the West Coast market.

PREPARED BY:

Legislative Finance
2/24/82

Alaska Ruralite®

POSTMASTER: Change of address & PO Form 3579 to be sent to GHEA, Inc., PO Bx 115, Auke Bay, AK 99821.

February 1982 Glacier Highway

Dave Hutchens
executive director,
Alaska Rural Electric
Cooperative Association

The Alaska Scene

"Hydro Reform"?

A recent editorial in an Anchorage newspaper endorsed "hydro reform." Their endorsement was based on a great deal of misinformation. The legislature enacted an excellent program last year for hydroelectric development. This program has not yet had time to be implemented. Rather than amending the present program, advocates for change should take the time to understand how it would work.

Before a hydro project can be built under the present law, it has to be proved to be the least costly alternative available to the public, on a life cycle analysis using real world interest costs. Only then can the project be included in the Energy Program for Alaska. The fact that consumers will pay lower rates because of this financing program has no part at all in the feasibility analysis.

The "hydro reform" proposal the newspaper endorsed would greatly increase the cost of electricity to consumers. Using Terror Lake on Kodiak Island as the example, this proposal would add 3.3¢ per KWH to consumers' bills in the first year. This amount increases each year until it reaches a final level of more than 20¢ per KWH, in addition to the costs the consumers would pay under the present law.

Relative freedom from inflation in rates is the greatest natural benefit of a hydro project. Requiring rates to increase with inflation makes certain that this benefit will never be realized.

The most destructive feature of this proposal is the regional competition and animosity it would bring. Whoever gets to the public trough first would get the exclusive benefits of the state money that is appropriated for their project. If there isn't enough money to pay for later projects, people in those areas would get no benefit from state money invested in earlier projects.

The present law is fair because the costs are averaged among all projects in the statewide system. Consumers served by later projects will share in the benefits of the money appropriated to earlier projects. Consumers served by earlier projects will help pay the debt service on later projects financed by bonds after state money is no longer available for that purpose.

The present law provides the opportunity to finance new projects as they are needed, indefinitely into the future. Under the new proposal, only those communities getting state money now will be able to finance the next generation of projects 30 years from now.

Industry Comparative Data

	Rural Electric Co-op	Publicly Owned	Investor-Owned
Federal Assistance ($ Millions)	85[1]	331	3,000[2]
Financial Assistance per consumer (annual $)	$9.46	$40.45	$42.48
Average Interest Rate	13.50%	12.00%	15.25%
Effective Capital Cost[3]	13.5%	12.0%	12.9%
Borrowed Capital, % of Total[4]	94%	85%	48%
Investment in Distribution Plant per Consumer	$1,337	$648	$825
Consumers per Mile of Line	4.6	NA	35.8
Revenue per Mile of Line	$2,887	NA	$36,652

1. OMB calculation of REA insured rate less market rate times loan level.
2. Retained tax benefits (prel. data).
3. Reflecting federal assistance.
4. Proportion of capital financed and not internally generated (from depreciation, retained earnings, tax benefits).

Resa King
Rm 211 c

3/2/82

Department Of Energy
Alaska Power Administration
P.O. Box 50
Juneau, Alaska 99802

February 26, 1982

Mr. Kurt Dzinich
Senator J.M Kerttula
Capitol Building
Pouch V MS 3100
Juneau, AK 99811

Dear Mr. Dzinich:

Alaska Power Administration has developed a general computer program for comparing revenue requirements of power projects under various sets of repayment criteria. This program allows a user to look at any number of projects scheduled to be built in the next twenty years and calculates the annual revenue requirements and energy rates needed to meet these requirements.

We are enclosing an abstract of the program and analyses for projects which may be developed in the State during the next twenty years. The data for the projects was obtained from the latest information available to APA, however, there may be changes that we are not aware of. This should not affect the outcome ,f the analyses since the main purpose was to compare the different sets of repayment criteria and the same data was used in all the alternatives examined.

The output presented here includes analyses of revenue criteria in existing and proposed legislation as well as one representing a standard method of financing. Firm energy was used in each case and the rates listed for firm energy cost should not be construed to represent the actual energy cost when the projects are built. Additional costs such as administration and overhead have not been considered and they would be included in any actual rate determination.

This program was developed for APA studies, however, we would welcome its use by anyone interested in making comparisons of various methods of financing power projects. Please feel free to contact this office if you have any questions.

Sincerely,

for Robert J. Cross
Administrator

Enclosures

PROGRAM ABSTRACT

This program allows the user to calculate the future revenue requirements and energy costs for power projects financed under a broad range of financing criteria. The following methods may be selected.

1. Standard Financing (e.g. 7% for 25 years)
2. Annual Return on Investment (e.g. 10%)
3. Repayment of Investment Only (e.g. over a 20-year period)

The program reads input data on any number of projects expected to come on-line through the year 2005. This input data consists of project name, construction costs, OM&R costs, energy output, and on-line date. Projects may be fully loaded when brought on-line or they may have staged output. All costs are assumed to be January 1982

Output consists of a schedule of projects showing on-line dates, costs, energy, and a yearly tabulation of the revenue requirements and energy costs. A summary of the repayment methods follows.

STANDARD FINANCING - this method allows the user to specify any interest rate and any period of repayment. Revenue requirements would include the repayment of investment based on these rates plus the costs of OM&R.

ANNUAL RETURN ON INVESTMENT - this method allows the user to specify any return on investment desired. The user has the option of including OM&R costs in the annual revenue requirements or using the greater of a.)the annual return on investment or b.)the OM&R costs as the value to use for the annual revenue requirement. The latter option represents existing Alaska legislation.

REPAYMENT OF INVESTMENT ONLY - this method allows the user to specify any period for repayment of investment interest-free. An option allows the user to adjust future payments for inflation based on the Consumer Price Index -- representative of proposed legislation. Annual revenue requirements are based on the repayment costs plus OM&R costs.

A future inflation rate may be specified. This rate would inflate the construction costs for the projects to the mid-point of construction while the OM&R costs would increase at this annual rate thoughout the project life.

The user may use firm or average energy in the input as long as all projects are treated in the same manner. Using average energy will result in lower energy rates, however, the results are for comparison purposes only and are not meant to show the exact cost of energy. Administrative and overhead costs are not included in in these calculations and they would increase the cost of energy. The energy from the projects can also be at full load at project start or it may be built up over a period of years. Transmission facilities do not contribute to the overall production of energy therefore the energy associated with them is always zero.

The user also has the option of performing a present-worth study of the above financing methods. This analysis should only be completed if the period of study is extended through the life of the projects.

INFLATION

0%

ALASKA POWER ADMINISTRATION
FINANCIAL ANALYSIS PROGRAM

SCHEDULE FOR PROJECTS EXAMINED

YEAR	PROJECT NAME	1982 CONSTRUCTION COST ($1000)	ANNUAL OM&R\1 ($1000)	FIRM ENERGY (MWH)
1982	SOLOMON GULCH	49,500	280	40,780
1983	SWAN LAKE	90,000	690	85,000
1984	TYEE	99,000	1,050	127,000
	RAILBELT INTERTIE	131,000	4,700	0
	KAKE/PETERSBURG INTERTIE	8,000	28	0
	WEST CREEK	57,500	750	26,540
	PRESSURE REDUCING TURB.	10,900	225	52,000
1985	TERROR LAKE	174,000	830	129,000
1986	KENAI PENINSULA T/LINE	79,000	850	0
	JUNEAU-HOONAH INTERTIE	21,000	585	0
	TAZIMINA I	58,600	102	78,000
	CORDOVA INTERTIE	12,800	140	0
1988	BRADLEY LAKE	363,600	825	317,500
1990	TAKATZ	153,000	3,000	93,200
	BLACK BEAR	31,000	133	23,700
	ALLISON CREEK	38,400	224	37,250
	TAZIMINA II	52,000	128	110,000
1993	SUSITNA - WATANA	3,700,000	10,000	533,000
1994	WATANA LOAD INCR.	0	0	634,000
1995	WATANA LOAD INCR.	0	0	712,000
1996	WATANA LOAD INCR.	0	0	541,000
2002	SUSITNA - DEVIL CANYON	1,500,000	5,400	559,000
2003	DEVIL CANYON LOAD INCR.	0	0	665,000
2004	DEVIL CANYON LOAD INCR.	0	0	747,000
2005	DEVIL CANYON LOAD INCR.	0	0	569,000

\1 - First year cost only; future years increased by inflation

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ALASKA POWER ADMINISTRATION
FINANCIAL ANALYSIS PROGRAM

FUTURE INFLATION - 0%

ANNUAL REVENUE REQUIREMENTS:
0% ANNUAL RETURN ON INVESTMENT
ANNUAL OM&R COSTS

YEAR	INVESTMENT PAYMENT ($1000)	OM&R ($1000)	ANNUAL REVENUE REQUIREMENT\1 ($1000)	FIRM ENERGY (MWH)	FIRM ENERGY COST\2 (c/kWh)
1982	0	280	280	40,780	.7
1983	0	970	970	125,780	.8
1984	0	7,723	7,723	331,320	2.3
1985	0	8,553	8,553	460,320	1.9
1986	0	10,230	10,230	538,320	1.9
1987	0	10,230	10,230	538,320	1.9
1988	0	11,055	11,055	855,820	1.3
1989	0	11,055	11,055	855,820	1.3
1990	0	14,540	14,540	1,119,970	1.3
1991	0	14,540	14,540	1,119,970	1.3
1992	0	14,540	14,540	1,119,970	1.3
1993	0	24,540	24,540	1,652,970	1.5
1994	0	24,540	24,540	2,286,970	1.1
1995	0	24,540	24,540	2,998,970	.8
1996	0	24,540	24,540	3,539,970	.7
1997	0	24,540	24,540	3,539,970	.7
1998	0	24,540	24,540	3,539,970	.7
1999	0	24,540	24,540	3,539,970	.7
2000	0	24,540	24,540	3,539,970	.7
2001	0	24,540	24,540	3,539,970	.7
2002	0	29,940	29,940	4,098,970	.7
2003	0	29,940	29,940	4,763,970	.6
2004	0	29,940	29,940	5,510,970	.5
2005	0	29,940	29,940	6,079,970	.5
			444,336	55,739,000	.8

\1 - Excludes Administrative and overhead costs
\2 - If energy sales are less than firm energy available
cost will be higher

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ALASKA POWER ADMINISTRATION
FINANCIAL ANALYSIS PROGRAM

FUTURE INFLATION - 0%

<u>ANNUAL REVENUE REQUIREMENTS:</u>
THE GREATER OF:
10% ANNUAL RETURN ON INVESTMENT
OR ANNUAL OM&R COSTS

YEAR	INVESTMENT PAYMENT ($1000)	OM&R ($1000)	ANNUAL REVENUE REQUIREMENT\1 ($1000)	FIRM ENERGY (MWH)	FIRM ENERGY COST\2 (c/kWh)
1982	4,950	280	4,950	40,780	12.1
1983	13,950	970	13,950	125,780	11.1
1984	44,590	7,723	44,590	331,320	13.5
1985	61,990	8,553	61,990	460,320	13.5
1986	79,130	10,230	79,130	538,320	14.7
1987	79,130	10,230	79,130	538,320	14.7
1988	115,490	11,055	115,490	855,820	13.5
1989	115,490	11,055	115,490	855,820	13.5
1990	143,010	14,540	143,010	1,119,970	12.8
1991	143,010	14,540	143,010	1,119,970	12.8
1992	143,010	14,540	143,010	1,119,970	12.8
1993	513,010	24,540	513,010	1,652,970	31.0
1994	513,010	24,540	513,010	2,286,970	22.4
1995	513,010	24,540	513,010	2,998,970	17.1
1996	513,010	24,540	513,010	3,539,970	14.5
1997	513,010	24,540	513,010	3,539,970	14.5
1998	513,010	24,540	513,010	3,539,970	14.5
1999	513,010	24,540	513,010	3,539,970	14.5
2000	513,010	24,540	513,010	3,539,970	14.5
2001	513,010	24,540	513,010	3,539,970	14.5
2002	663,010	29,940	663,010	4,098,970	16.2
2003	663,010	29,940	663,010	4,763,970	13.9
2004	663,010	29,940	663,010	5,510,970	12.0
2005	663,010	29,940	663,010	6,079,970	10.9
			8,212,880	55,739,000	14.7

\1 - Excludes Administrative and overhead costs
\2 - If energy sales are less than firm energy available cost will be higher

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ALASKA POWER ADMINISTRATION
FINANCIAL ANALYSIS PROGRAM

FUTURE INFLATION - 0%

ANNUAL REVENUE REQUIREMENTS:
REPAYMENT OF INVESTMENT ONLY IN 33.33 Years
(Adjusted for Inflation)
ANNUAL OM&R COSTS

YEAR	INVESTMENT PAYMENT ($1000)	OM&R ($1000)	ANNUAL REVENUE REQUIREMENT\1 ($1000)	FIRM ENERGY (MWH)	FIRM ENERGY COST\2 (c/kWh)
1982	1,485	280	1,765	40,780	4.3
1983	4,251	970	5,221	125,780	4.2
1984	13,627	7,723	21,350	331,320	6.4
1985	19,411	8,553	27,964	460,320	6.1
1986	25,344	10,230	35,574	533,320	6.6
1987	26,365	10,230	36,595	533,320	6.8
1988	38,336	11,055	49,391	855,820	5.8
1989	39,861	11,055	50,916	855,820	5.9
1990	49,704	14,540	64,244	1,119,970	5.7
1991	51,663	14,540	66,203	1,119,970	5.9
1992	53,682	14,540	68,222	1,119,970	6.1
1993	166,764	24,540	191,304	1,652,970	11.6
1994	172,796	24,540	197,336	2,286,970	8.6
1995	179,017	24,540	203,557	2,998,970	6.8
1996	185,433	24,540	209,973	3,539,970	5.9
1997	192,080	24,540	216,620	3,539,970	6.1
1998	198,891	24,540	223,431	3,539,970	6.3
1999	205,943	24,540	230,483	3,539,970	6.5
2000	213,182	24,540	237,722	3,539,970	6.7
2001	220,677	24,540	245,217	3,539,970	6.9
2002	273,419	29,940	303,359	4,098,970	7.4
2003	281,551	29,940	311,491	4,763,970	6.5
2004	289,760	29,940	319,700	5,510,970	5.8
2005	298,110	29,940	328,050	6,079,970	5.4
			3,645,690	55,739,000	6.5

\1 - Excludes Administrative and overhead costs
\2 - If energy sales are less than firm energy available cost will be higher

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ALASKA POWER ADMINISTRATION
FINANCIAL ANALYSIS PROGRAM

FUTURE INFLATION - 0%

ANNUAL REVENUE REQUIREMENTS:
STANDARD FINANCING For 40 Years at 7%
ANNUAL OM&R COSTS

YEAR	INVESTMENT PAYMENT ($1000)	OM&R ($1000)	ANNUAL REVENUE REQUIREMENT\1 ($1000)	FIRM ENERGY (MWH)	FIRM ENERGY COST\2 (c/kWh)
1982	3,713	280	3,993	40,780	9.8
1983	10,464	970	11,434	125,780	9.1
1984	33,447	7,723	41,170	331,320	12.4
1985	46,498	8,553	55,051	460,320	12.0
1986	59,355	10,230	69,585	538,320	12.9
1987	59,355	10,230	69,585	538,320	12.9
1988	86,628	11,055	97,683	855,820	11.4
1989	86,628	11,055	97,683	855,820	11.4
1990	107,271	14,540	121,811	1,119,970	10.9
1991	107,271	14,540	121,811	1,119,970	10.9
1992	107,271	14,540	121,811	1,119,970	10.9
1993	384,804	24,540	409,344	1,652,970	24.8
1994	384,804	24,540	409,344	2,236,970	17.9
1995	384,804	24,540	409,344	2,998,970	13.6
1996	384,804	24,540	409,344	3,537,970	11.6
1997	384,804	24,540	409,344	3,539,970	11.6
1998	384,804	24,540	409,344	3,539,970	11.6
1999	384,804	24,540	409,344	3,539,970	11.6
2000	384,804	24,540	409,344	3,539,970	11.6
2001	384,804	24,540	409,344	3,539,970	11.6
2002	497,318	29,940	527,258	4,098,970	12.9
2003	497,318	29,940	527,258	4,763,970	11.1
2004	497,318	29,940	527,258	5,510,970	9.6
2005	497,318	29,940	527,258	6,079,970	8.7
			6,604,747	55,739,000	11.8

\1 - Excludes Administrative and overhead costs
\2 - If energy sales are less than firm energy available cost will be higher

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INFLATION

7%

ALASKA POWER ADMINISTRATION
FINANCIAL ANALYSIS PROGRAM

PROJECT COSTS UNDER
7% INFLATION

YEAR	PROJECT NAME	CONSTRUCTION COST ($1000)	ANNUAL OM&R\1 ($1000)
1982	SOLOMON GULCH	49,500	280
1983	SWAN LAKE	90,000	738
1984	TYEE	99,000	1,202
	RAILBELT INTERTIE	135,507	5,381
	KAKE/PETERSBURG INTERTIE	8,560	32
	WEST CREEK	57,500	859
	PRESSURE REDUCING TURB.	11,663	258
1985	TERROR LAKE	179,987	1,017
1986	KENAI PENINSULA T/LINE	96,778	1,114
	JUNEAU-HOONAH INTERTIE	25,726	767
	TAZIMINA I	67,091	134
	CORDOVA INTERTIE	15,681	184
1988	BRADLEY LAKE	445,426	1,238
1990	TAKATZ	229,612	5,155
	BLACK BEAR	46,523	229
	ALLISON CREEK	57,628	385
	TAZIMINA II	79,239	220
1993	SUSITNA - WATANA	6,357,289	21,049
2002	SUSITNA - DEVIL CANYON	4,738,223	20,896

\1 - OM&R will continue to increase at inflation rate

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ALASKA POWER ADMINISTRATION
FINANCIAL ANALYSIS PROGRAM

FUTURE INFLATION - 7%

ANNUAL REVENUE REQUIREMENTS:
0% ANNUAL RETURN ON INVESTMENT
ANNUAL OM&R COSTS

YEAR	INVESTMENT PAYMENT ($1000)	OM&R ($1000)	ANNUAL REVENUE REQUIREMENT\1 ($1000)	FIRM ENERGY (MWH)	FIRM ENERGY COST\2 (c/kWh)
1982	0	280	280	40,780	.7
1983	0	1,038	1,038	125,780	.8
1984	0	8,642	8,842	331,320	2.7
1985	0	10,478	10,478	460,320	2.3
1986	0	13,409	13,409	538,320	2.5
1987	0	14,348	14,348	538,320	2.7
1988	0	16,591	16,591	855,820	1.9
1989	0	17,752	17,752	855,820	2.1
1990	0	24,982	24,982	1,119,970	2.2
1991	0	26,731	26,731	1,119,970	2.4
1992	0	28,602	28,602	1,119,970	2.6
1993	0	51,653	51,653	1,652,970	3.1
1994	0	55,269	55,269	2,286,970	2.4
1995	0	59,138	59,138	2,978,970	2.0
1996	0	63,277	63,277	3,539,970	1.8
1997	0	67,707	67,707	3,539,970	1.9
1998	0	72,446	72,446	3,539,970	2.0
1999	0	77,517	77,517	3,539,970	2.2
2000	0	82,944	82,944	3,539,970	2.3
2001	0	88,750	88,750	3,539,970	2.5
2002	0	115,858	115,858	4,098,970	2.8
2003	0	123,968	123,968	4,763,970	2.6
2004	0	132,646	132,646	5,510,970	2.4
2005	0	141,931	141,931	6,079,970	2.3
			1,296,158	55,739,000	2.3

\1 - Excludes Administrative and overhead costs
\2 - If energy sales are less than firm energy available cost will be higher

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ALASKA POWER ADMINISTRATION
FINANCIAL ANALYSIS PROGRAM

FUTURE INFLATION - 7%

ANNUAL REVENUE REQUIREMENTS:
THE GREATER OF:
10% ANNUAL RETURN ON INVESTMENT
OR ANNUAL OM&R COSTS

YEAR	INVESTMENT PAYMENT ($1000)	OM&R ($1000)	ANNUAL REVENUE REQUIREMENT\1 ($1000)	FIRM ENERGY (MWH)	FIRM ENERGY COST\2 (c/kWh)
1982	4,950	280	4,950	40,780	12.1
1983	13,950	1,038	13,950	125,780	11.1
1984	45,173	8,342	45,173	331,320	13.6
1985	63,172	10,478	63,172	460,320	13.7
1986	83,699	13,409	83,699	538,320	15.5
1987	83,699	14,348	83,699	538,320	15.5
1988	128,242	16,591	128,242	855,820	15.0
1989	128,242	17,752	128,242	855,820	15.0
1990	169,542	24,982	169,542	1,119,970	15.1
1991	169,542	26,731	169,542	1,119,970	15.1
1992	169,542	28,602	169,542	1,119,970	15.1
1993	805,271	51,653	805,271	1,652,970	48.7
1994	805,271	55,269	805,271	2,286,970	35.2
1995	805,271	59,138	805,271	2,998,970	26.9
1996	805,271	63,277	805,271	3,539,970	22.7
1997	805,271	67,707	805,271	3,539,970	22.7
1998	805,271	72,446	805,271	3,539,970	22.7
1999	805,271	77,517	805,271	3,539,970	22.7
2000	805,271	82,944	805,271	3,539,970	22.7
2001	805,271	88,750	805,271	3,539,970	22.7
2002	1,279,093	115,858	1,279,093	4,098,970	31.2
2003	1,279,093	123,968	1,279,093	4,763,970	26.8
2004	1,279,093	132,646	1,279,093	5,510,970	23.2
2005	1,279,093	141,931	1,279,093	6,079,970	21.0
			13,423,564	55,739,000	24.1

\1 - Excludes Administrative and overhead costs
\2 - If energy sales are less than firm energy available cost will be higher

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ALASKA POWER ADMINISTRATION
FINANCIAL ANALYSIS PROGRAM

FUTURE INFLATION - 7%

ANNUAL REVENUE REQUIREMENTS:
REPAYMENT OF INVESTMENT ONLY IN 33.33 Years
(Adjusted for Inflation)
ANNUAL OM&R COSTS

YEAR	INVESTMENT PAYMENT ($1000)	OM&R ($1000)	ANNUAL REVENUE REQUIREMENT\1 ($1000)	FIRM ENERGY (MWH)	FIRM ENERGY COST\2 (c/kWh)
1982	1,485	280	1,765	40,780	4.3
1983	4,251	1,038	5,289	125,780	4.2
1984	13,807	8,842	22,649	331,320	6.8
1985	19,825	10,478	30,302	460,320	6.6
1986	26,872	13,409	40,282	538,320	7.5
1987	28,090	14,348	42,439	538,320	7.9
1988	42,728	16,591	59,319	855,820	6.9
1989	44,744	17,752	62,496	855,820	7.3
1990	59,247	24,982	84,230	1,119,970	7.5
1991	62,135	26,731	88,866	1,119,970	7.9
1992	65,193	28,602	93,795	1,119,970	8.4
1993	259,198	51,653	310,851	1,652,970	10.8
1994	274,101	55,269	329,370	2,286,970	14.4
1995	290,005	59,138	349,143	2,998,970	11.6
[illegible]	306,996	63,277	370,273	3,539,970	10.5
1997	324,984	67,707	392,690	3,539,970	11.1
1998	344,375	72,446	416,821	3,539,970	11.8
1999	364,925	77,517	442,442	3,539,970	12.5
2000	387,023	82,944	469,967	3,539,970	13.3
2001	410,463	88,750	499,213	3,539,970	14.1
2002	577,546	115,858	693,405	4,098,970	16.9
2003	618,741	123,968	742,709	4,763,970	15.6
2004	663,191	132,646	795,837	5,510,970	14.4
2005	711,008	141,931	852,940	6,079,970	14.0
			7,197,091	55,739,000	12.9

\1 - Excludes Administrative and overhead costs
\2 - If energy sales are less than firm energy available cost will be higher

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ALASKA POWER ADMINISTRATION
FINANCIAL ANALYSIS PROGRAM

FUTURE INFLATION - 7%

ANNUAL REVENUE REQUIREMENTS:
STANDARD FINANCING For 40 Years at 7%
ANNUAL OM&R COSTS

YEAR	INVESTMENT PAYMENT ($1000)	OM&R ($1000)	ANNUAL REVENUE REQUIREMENT\1 ($1000)	FIRM ENERGY (MWH)	FIRM ENERGY COST\2 (c/kWh)
1982	3,713	280	3,993	40,780	9.8
1983	10,464	1,038	11,502	125,780	9.1
1984	33,884	8,842	42,726	331,320	12.9
1985	47,385	10,478	57,862	460,320	12.6
1986	62,782	13,409	76,192	538,320	14.2
1987	62,782	14,348	77,130	538,320	14.3
1988	96,193	16,591	112,784	855,820	13.2
1989	96,193	17,752	113,945	855,820	13.3
1990	127,172	24,982	152,154	1,119,970	13.6
1991	127,172	26,731	153,903	1,119,970	13.7
1992	127,172	28,502	155,774	1,119,970	13.9
1993	604,027	51,653	655,680	1,652,970	39.7
1994	604,027	55,269	659,296	2,206,970	28.8
1995	604,027	59,138	663,164	2,998,970	22.1
1996	604,027	63,277	667,304	3,539,970	18.9
1997	604,027	67,707	671,733	3,539,970	19.0
1998	604,027	72,446	676,473	3,539,970	19.1
1999	604,027	77,517	681,544	3,539,970	19.3
2000	604,027	82,944	6[illegible],970	3,539,970	19.4
2001	604,027	88,750	692,776	3,539,970	19.6
2002	959,437	115,858	1,075,295	4,098,970	26.2
2003	959,437	123,968	1,083,405	4,763,970	22.7
2004	959,437	132,646	1,092,083	5,510,970	19.8
2005	959,437	141,931	1,101,368	6,079,970	18.1
			11,365,058	55,739,000	20.4

\1 - Excludes Administrative and overhead costs
\2 - If energy sales are less than firm energy available cost will be higher

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CSSSSB 608 (Res)

LEGISLATIVE SUMMARY

CSSSSB 608(Res) "An Act making special appropriations to the Alaska Power Authority for power projects; and providing for an effective date."

Sec. 1 Appropriates $25,600,000 from the general fund to the Alaska Power Authority for the Susitna River Hydroelectric Project.

Sec. 2 Appropriates $500,000 from the general fund to the Alaska Power Authority for design and right-of-way activities for a possible Kake-Petersburg intertie.

Sec. 3 Appropriates $2,000,000 from the general fund to the Alaska Power Authority for installation of waste heat facilities in rural villages.

Sec. 4 Appropriates $2,000,000 from the general fund to the Alaska Power Authority for the Lower Kuskokwim power plan.

Sec. 5 Appropriates $4,000,000 from the general fund to the Alaska Power Authority for feasibility studies in rural villages.

Sec. 6 Appropriates $300,000 from the general fund to the Alaska Power Authority for feasibility analysis of alternatives to lower the cost of power for Angoon.

Sec. 7 Appropriates $2,500,000 from the general fund to the Alaska Power Authority for an electric generation unit for Cordova.

Sec. 8 These are capital projects.

Sec. 9 Effective date: Immediately.

ALASKA POWER AUTHORITY

334 WEST 5th AVENUE - ANCHORAGE, ALASKA 99501

Phone: (907) 277-7641
(907) 276-0001

March 12, 1982

The Honorable Vic Fischer
Alaska State Legislature
Pouch V
Juneau, Alaska 99811

Dear Senator Fischer:

In a recent letter you asked for clarification of the timing of legislative review with regard to the proposed Susitna Hydroelectric Project. Specifically, you voiced concern about the implication of delaying the application for license until September 30, 1982.

In approaching the issue, it is important to clearly distinguish between two aspects of the developmental process: the feasibility study and report on the one hand, and the license application on the other. The former is essential, and sufficient, for a responsible decision on continuing developmental activities (ie, initiation of design and continuation of environmental studies) and on filing a license application. The draft feasibility report will be delivered to you during the week of March 15. Appendices and supporting documents will be available in Juneau if you desire to delve into great detail. I firmly believe that the information contained in the feasibility report will be sufficient for a prudent person to reach a conclusion on the economic viability of the Susitna project, on the soundness of its design, on the general magnitude of environmental and socioeconomic impact and on the implications for financing the project. I believe you and your fellow legislators will have ample information to decide whether to file the license application and initiate design work. At the same time, I believe you would be prudent to stop short of any irrevocable decision to construct the project. That decision should be reviewed as continuing site investigations give us increased confidence in the project's estimated cost and as environmental impact predictions are confirmed.

Extensive public and agency review and comment are programmed between March 15 and April 22 to insure that the issues are fully aired before the Power Authority Board of Directors provides the Legislature and the Governor a recommendation on submitting a license application. The Board's intent is to meet the April 30, 1982 legislatively mandated deadline for that recommendation.

The decision to defer submitting the license application is unrelated to the April decision. The additional refinement of mitigation plans and additional opportunity for agency consultation on those plans are not essential to the Legislatures's decision on project feasibility. The feasibility report will identify impacts and present a menu of mitigation options available to avoid or compensate for those impacts. The precise combination of mitigation measures to be employed is a matter that will be negotiated during the FERC licensing process and, in my opinion, would simply be a distraction to the Legislature in attempting to grapple with the key issues of technical, economic, environmental and financial feasibility.

Thus, from the point of view of the Legislature's decision on the project, the program remains precisely on schedule, and the delayed submittal of a license application is not pertinent.

In response to your specific request for a suggestion on the appropriate timing and process for "legislative review and determination", I suggest the following:

1) Legislative review of the draft feasibility reports beginning the week of March 15; this would be concurrent with Power Authority, public, agency, and administration review;

2) A briefing by the consultant on feasibility study results in Juneau for interested legislators and staff on March 26;

3) Attendance by interested legislators and staff at selected public participation events and Power Authority meetings, especially (a) the oral report by the Susitna External Review Panel to the Board of Directors on April 15 and (b) advice and comment by utilities and resource agencies to the board on April 16. Both sessions will be held in Anchorage; and

4) Passage of legislation prior to adjournment either in response to the Power Authority's recommendation or, if adjournment promises to precede April 30, authorization for design and license application submittal, subject to a favorable Power Authority recommendation.

It would be my hope that your review of the feasibility report and your observation of the Power Authority's decision making process would instill enough confidence in the ultimate Power Authority recommendation that the latter course would be acceptable in the event of early adjournment.

Thank you for the opportunity to express my views on this matter.

Sincerely,

Eric P. Yould

Eric P. Yould
Executive Director

cc: Senator Jalmar Kerttula, Senate President
Senator Bettye Fahrenkamp
Senator Ed Dankworth
Representative Joe Hayes, Speaker of the House
Charles Conway, Chairman, Alaska Power Authority
Ron Lehr
Ernst Mueller

LEGISLATION SUMMARY

SSSB 608: "An Act making a special appropriation to the power development fund of the Alaska Power Authority for the Susitna River hydroelectric project and other hydroelectric projects; and providing for an effective date."

PRIME SPONSOR: Kerttula

CO-SPONSOR(S): Dankworth

Sec. 1: Appropriates $1 billion from the general fund to the APA power development fund for planning, design and construction of the Susitna River and other hydroelectric projects (the 'other projects' are not specified).

Sec. 2: Immediate effective date.

SB 608

LEGISLATION SUMMARY

SB 608: "An Act making a special appropriation to the Alaska Power Authority for the Susitna River hydroelectric project; and providing for an effective date."

Sec. 1: Appropriates $1,000,000,000 from the general fund to the APA power development fund for planning, design and construction of the Susitna River hydroelectric project.

Sec. 2: Effective date--immediately.

PRIME SPONSOR: Kerttula

CO-SPONSOR(S): Dankworth

file 608
passed out

Alaska State Legislature

BETTYE FAHRENKAMP, CHAIRMAN
VIC FISCHER, VICE-CHAIRMAN
BRAD BRADLEY
DICK ELIASON
DON GILMAN
BOB MULCAHY
ARLISS STURGULEWSKI

POUCH V
STATE CAPITOL
JUNEAU, ALASKA 99811
(907) 465-3834
(907) 465-3835

Senate

Committee on Resources

March 24, 1982

To: Senator Don Bennett, Co-Chairman
Senator Ed Dankworth, Co-Chairman
Senate Finance Committee Members

From: Senator Vic Fischer

Re: Resources Committee Substitute for SB 608 - Backup information

The Senate Resources Committee passed Senate Bill 608 out last week after a significant change from the original legislation. It is currently before you in the Senate Finance Committee. Being out of town, I didn't have a chance to provide background information on the changes made to the bill. This information is provided here.

The Resources Committee substitute on SB608 appropriates $92.2 million for specific energy projects and programs. Originally appropriating $1 billion for Susitna hydroelectric projects only, the bill now addresses a wide range of statewide energy needs.

Enclosed is a sectional analysis of the Resources substitute on SB 608. Reference documents explaining each appropriation are attached for your information and review. They include:

Document #1 - Explanation of scope and intent of appropriations not requested through the Governors Capital Budget. (misc.)

Document #2 - Letters from Perry Lovett, City Manager of Cordova, Cordova Electric Cooperative, Stone & Webster Engineering Corporation and constituent letters. (Sec.10).

Document #3 - Amendment from Senator Gilman regarding the Bradley Lake hydroelectric project. (Sec. 13).

Document #4 - Amendment from Senator Eliason for a new power distribution system in Tenakee Springs. (Sec. 14).

Document #5 - Letter from Rural Alaska Community Action Program, Inc. regarding feasibility and reconnaissance studies, weatherization and regional energy planning and education. (misc.)

Document #6 - Letter from Eric Yould of the Alaska Power Authority outlining need for appropriations to continue, finish or initiate various statewide power projects. (misc.) (Sec. 11).

Document #7 - Letter from Ahtna, Inc. outlining the need to obtain funds for construction of a substation and distribution system for the community of Cantwell. (Sec. 11).

I have not commented on all sections of the bill. Individual sponsors of portions of this legislation may wish to provide you with their own information. If you have any questions, I would be glad to provide additional information, where I have it, or to direct you to other sources.

Vic Fischer

CC Senator Bettye Fahrenkamp
Chairman, Senate Resources Committee

Section	Project Description	Amount	To	Cap. Budget Gov. Request	Reference Documents
SEC.1	Ongoing-Susitna River Hydro Project	$25,600,000.	A.P.A.	YES	Doc. #6 (14)
SEC.2	Assessment/Susitna Fisheries Enhancement	200,000.	A.D.F.&G.		Doc. #1
SEC.3	Study-Alternative energy sources	600,000.	Gov/Office		Doc. #1
SEC.4	Study-Railbelt windpower development	200,000.	A.P.A.		Battelle * &Doc.#1
SEC.5	Ongoing-Chakachama fisheries and habitat study	500,000.	A.P.A.		Doc. # 1 & 6 (19)
SEC.6	Assessment-Economic and Engineering feasibility/gas-fired power from the North Slope.	1,200,000.	Gov/Office		DOE Rep. & Doc. #1
SEC.7	Design-Kake/Petersburg Intertie	500,000.	A.P.A.	YES	Doc. #6 (9)
SEC.8	Study/Design-Hoohah Intertie	1,100,000.	A.P.A.		Doc. #6 (21)
SEC.9	Analysis-Lower Power costs/Angoon	300,000.	A.P.A.	YES	Governor's Req.
SEC.10	Grant payment-Cordova Electric Power Generation Unit	2,500,000.	Cordova		Doc. #2
SEC.11	Construction-Substation and Distribution system/Cantwell	1,250,000.	A.P.A.		Doc. #
SEC.12	Planning-lower Kuskokwim Power Plan	2,000,000.	A.P.A.	YES	Doc. #6 (18)
SEC.13	Construction-Bradley Lake Project	35,000,000.	A.P.A.		Doc. #3&6 (3)
SEC.14	Construction-New power distribution project/Tenakee springs	200,000.	A.P.A.		Doc. #4
SEC.15	Installation-Waste heat facilities	2,000,000.	A.P.A.	YES	Doc. #6 (13)
SEC.16	Feasibility studies/rural villages	2,000,000.	A.P.A.	YES	Doc. #6 (20)
SEC.17	Reconnaissance studies/rural villages	1,600,000.	D.E.P.D.	YES	Doc. #1
SEC.18	Residential energy conservation and weatherization programs	14,600,000.	D.E.P.D.	YES	Doc. #5
SEC.19	Village Energy planning and education	1,200,000.	D.E.P.D.		Doc. #5
SEC.20	Cost Benefit Analysis/of energy conservation and weatherization	100,000.	Gov/Office		Doc. #1
SEC.21	Ongoing-Long term energy planning	150,000.	D.E.P.D.	YES	Doc. #1

SEC.22 Appropriations in Section 10 and 19 shall be disbursed in accordance with AS37.05.315-37.05.319

SEC.23 Appropriations in Sections 1-9,11-18, and 20-21 are capital projects or related and do not lapse in accordance with AS 37.25.010.

SEC.24 Effective Date AS01.10.070(c).

*Battelle Study (1980) "Preliminary Evaluation of Wind Energy Potential in Cook Inlet".

**"Update of 1972 study of North Slope Transportation Study",February 1982,U.S.D.O.E.(for Ak.Power Admin.)

Alaska State Legislature

BETTYE FAHRENKAMP, CHAIRMAN
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Senate

Committee on Resources

March 24, 1982

To: Finance Committee Members

From: Senator Vic Fischer V.F.

Re: , SB608 (Resources) background information

The following is a brief explanation of the purpose of specific appropriations included in the Resources Committee substitute for SB 608 that are not included in the Governor's Capital budget.

Section 2 - Provides funding for the Alaska Department of Fish and Game to assess the fisheries enhancement potential of the entire Susitna River system. Fisheries studies conducted by Acres America included existing fisheries only -- not the enhancement potential of the whole system. The $200,000 appropriation is at minimal level and assumes that data and support services currently available to ADF&G and the Susitna fisheries study team would be extended for this additional purpose. This appropriation is of high interest to commercial, sport and subsistence fishermen in Cook Inlet.

Section 3 - This section appropriates $600,000 to the Governor's office to contract for work in addition to that previously done by Battelle. Identified areas include: (1) a review of recent information about Cook Inlet oil and gas, (2) preparation of price and availability projections of oil and gas as a power source, (3) an evaluation of energy demand in the commercial sector, (4) consideration of cogeneration and waste heat, (5) quantified resource assessment of energy alternatives, (6) consideration of waste oil as a supplementary fuel and (7) an assessment of incremental timing.

Section 4 - Appropriates $200,000 to build on preliminary work in identifying wind potential in the Cook Inlet region. By funding site-specific studies of wind electrical generation at seven sites along the railbelt, this one-year study would allow a detailed analysis necessary to precede wind farm generation at production levels. This appropriation would include purchase and installation of test equipment, maintenance of monitoring stations, data analysis, and final reporting .

Section 5 - Provides funding to continue feasibility work on the Chakachamna hydro project. $500,000 would purchase an additional season of habitat and fisheries study, keeping the project on-track instead of halting it in the middle.

Section 6 - Provides for assessing the economic and engineering feasibility of providing gas-fired power from the North Slope to the railbelt. An earlier study by the Alaska Power Administration would provide a useful base to build on, but is flawed by severely outdated information and unrealistic assumptions. New developments -- economically, politically, and technologically -- suggest that this possibility should be carefully re-evaluated. It may involve transmission of gas to Fairbanks, and generation of power there to supply the railbelt; or, generation on the North Slope and transmission of electricity south. Feasibility will depend on non-construction of ANGTS.

Section 17 - In accordance with the Governor's budget, the $1.6 million appropriation provides funding to complete reconnaissance studies in rural Alaska, leading to determining feasibility of specific energy projects and then implementing the best choices. D.E.P.D. should involve local residents to the greatest extent possible in this last round of studies, including an initial village visit by the study contractor and at least one follow-up visit after release of the study draft to educate local people about energy options and to solicit input. These visits should be done with assistance from peopole familiar with local energy situations and able to assist the educational portion of the visit. In addition, D.E.P.D. should require all study contractors to address all sources of energy, including energy conservation.

Section 20 - Provides $100,000 to perform a cost/benefit analysis of on-going energy conservation programs. This analysis could determine how large a role conservation plays in <u>immediately</u> affecting the high cost of energy throughout the state.

Section 21 - provides $150,000, instead of the requested $350,000, to continue work on the long-term energy plan. By law, the plan must be updated yearly. D.E.P.D. should begin to develop an in-house capability for doing so and for responding to local and regional energy planning needs.

Phase II Feasibility study star...

Phase I done on 21 June, will result in best alternative

1 million left for Phase II

26 $ previous appropriations

GRANT or LOAN / COOP

~~LOAN~~

DOCUMENT #2

d Avenue
99574
3237
3238

al

e:

Donna M. Sherby,
Clerk / Treasurer

uncil Members
in Nettance
y Bynum
rhard Groff
J. Kopchak
rry Purvis
e Gunderson

March 4, 1982

RE: Cordova Alternate Energy

Dear Mr. Kerttula:

The purpose of this letter is to provide you with additional backup for Cordova's number one priority - lower cost power. Enclosed is a copy of the letter from Stone and Webster discussing the Palmer/Glennallen/Valdez/Cordova Intertie. The funding requirements estimated for FY 83 is $4.5 million and $3 to 4 million for FY 84. It is imperative to our community and seafood industry that these funds be made available to continue the design of this vital project. We are aware of your sensitivity to our power problem, so I won't dwell on the urgency of our request to have these funds included in the Alaska Power Authority budget.

A second attachment is a copy of a letter in your files from Doug Bechtel, General Manager, Cordova Electric Cooperative, supporting the need for a standby generator and building in the amount of $2,400,000 which is a part of the overall plan outlined by Stone and Webster. The combination of engineering and standby generator funding for FY 83 is $7.9 million.

We request your support for a funding level sufficient to provide the design for an alternate energy source for Cordova.

Very truly yours,

Perry D. Lovett
City Manager

Attachment: Stone & Webster letter dated 2/22/82
D. Bechtel letter dated 3/2/82

cc: Representative B. Cato
Senator Ed Dankworth
Senator Don Bennett
Representative Al Adams

CORDOVA ELECTRIC COOPERATIVE

Box 20 • Cordova, Alaska 99574 • 424-3131

March 2, 1982

Mr. Perry Lovett
City Manager
Box 1210
Cordova, AK 99574

Dear Perry:

Here are the cost estimates for our immediate generation needs. These generators must be on line by the 1983 fishing season (May 15, 1983). The figures have been checked with Stone & Webster Engineering Corporation and are in substantial agreement with their figures.

Item	Cost
2500 KW Unit	$1,300,000.
Building	575,000.
Tanks, Mechanical	100,000.
Engineering	100,000.
Administrative	112,000.
Contingency	213,000.
TOTAL	$2,400,000.

I realize that $575,000. appears to be very expensive for a building. As I am sure you are aware, our power house is currently full of generators and does not have the room to expand. At one end we have the sub-station, at the other end we have the City Shops. Due to the road on one side and Eyak Lake on the other side, we cannot expand in that direction either. The funds provided in this letter for a building are to provide equivalent space for the City at another location so that we may take over the City Shop space or to build a new facility for us at Ocean Dock which would house this one engine.

The building costs are for either the existing or the Ocean Dock site. There are some advantages to the Ocean Dock site, but EPA Air Quality Sandards may not permit it.

Sincerely,

Darcy

W. D. Bechtel
General Manager

WDB:vjc

STONE & WEBSTER ENGINEERING CORPORATION

DENVER OPERATIONS CENTER

GREENWOOD PLAZA, DENVER, COLORADO

ADDRESS ALL CORRESPONDENCE TO P.O. BOX 5406, DENVER, COLORADO 80217

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DESIGN
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REPORTS
EXAMINATIONS
CONSULTING
ENGINEERING

City of Cordova
Mr. Perry Lovett
City Manager
P.O. Box 1210
Cordova, Alaska 99574

February 22, 1982

J. O. No. 14101
Letter No. SWEC/CC-01

Dear Mr. Lovett:

PALMER-GLENNALLEN INTERTIE
CORDOVA FEASIBILITY STUDY - PHASE I
ALASKA POWER AUTHORITY

This is in response to your comments and questions concerning the data provided in our letter report of February 10, 1982, and confirms the information provided you in our telephone conversation of February 19.

While our analysis of alternative solutions to meet Cordova's power needs is far from complete, you are correct in noting that, at this stage of our investigations, two specific alternatives appear to offer the most promise. These are hydroelectric development at Silver Lake (near Valdez) and a transmission intertie between Palmer and Glennallen.

Preliminary conceptual design of Silver Lake is complete and we estimate that construction costs including the requisite transmission line to Cordova would be approximately $78 million. Using Power Authority economic analysis guidelines, the life cycle cost (present worth) for this alternative would be in the order of $110 million. This would be reduced to less than $100 million if the life of transmission lines were increased from the present guideline of 20 years to 40 years. Our major concern with the Silver Lake alternative is the lack of definitive hydrologic, geotechnical and environmental data. Certainly, a comprehensive field investigation and data collection program would have to be undertaken before a final decision could be made on development of Silver Lake. Such an effort is not scheduled to be accomplished during this phase of our study.

Since investigation of the Palmer-Glennallen intertie has only recently been added to the scope of our study, our analysis has not progressed sufficiently to allow a detailed comparison of this alternative with others under investigation. Development of life cycle costs will require our quantifying both the amount and cost of power available for purchase in the Anchorage area and the regional demands for that power over the next 20 years. While we have proposed a scope change which would allow us to develop that data by mid-April, the Power Authority has not had ample opportunity to approve the initiation of that effort. Further, we have not attempted to quantify the costs of real estate acquisition associated with this line, nor would we be in a position to do so until Phase II of our study. Not withstanding the early stage of our investigation, we do expect the construction cost of the Palmer-Glennallen intertie to be less than $70 million for a line sized to meet our initial estimates of total regional needs.

At your request, we have calculated the life cycle cost (present worth) of a transmission system running from Palmer to Glennallen, then over CVEA lines to Valdez, and finally to Cordova over the proposed coastal route. The total new construction cost of this system would be about $97 million. The life cycle cost (exclusive of real estate) would be less than $110 million based on your estimate of purchased power costs in the Anchorage area of 1.6 cents per kWhr, a fourty year system life and an assumed 30 percent Cordova share of Palmer-Glennallen capital costs. Of course, all these assumptions will need to be confirmed as proposed in our Phase I scope revisions.

At this stage of our analysis, both Silver Lake and the Palmer-Glennallen intertie appear to be competitive and need to be pursued. Unquestionably, given the availability of inexpensive purchased power in the Anchorage area, the Palmer-Glennallen intertie has the added advantage of providing regional benefits to consumers in both the MEA and CVEA service areas.

Finally, you asked several questions concerning schedules and costs for design of the Palmer-Glennallen - Valdez-Cordova transmission system. Assuming we did not conduct a formal Phase II study, our analysis indicates that with a July 1, 1982 start on preparation of license/permit applications, Environmental Impact Statements, field data collection and preliminary designs, we could begin construction in July 1984 and the system would be operable by December 1985. Meeting that schedule would require engineering expenditures of about $4.5 million in FY 83 and 3-4 million in FY 84.

I apologize for the preliminary nature of this information, but hope it meets your immediate needs. We will keep you informed as our study progresses and we validate these initial estimates. In the interim, please do not hesitate to contact me if I can be of further service.

Very truly yours,

NK Whitcomb

N. K. Whitcomb
Project Manager

BJR/NKW/jam

DOCUMENT #3

SENATE AMENDMENT

BY Senator Gilman

To: CSSS SENATE BILL No. 608 (Resources)

To: HOUSE BILL No.

PAGE: 1 LINE 27

Sec. 7. The sum of $35,000,000 is appropriated from the general fund to Alaska Power Authority for construction of Bradley Lake hydroelectric project.

S 70

Document #7

SENATE AMENDMENT

BY Senator Dick Eliason

To: Senate Resources Committee SENATE BILL No. CSSSSB 606

To: HOUSE BILL No.

PAGE:	LINE:	
1	27	Add new Section 7 The sum of $200,000 is appropriated from the general fund to the Alaska Power Authority for a new power distribution system in Tenakee Springs. Renumber subsequent sections accordingly.

+ #21 Hoonah

+ #3 Bradley Lake

continuation of ongoing or initiated

Document #5

Rural Alaska Community Action Program, Ir

March 16, 1982

Honorable Vic Fischer
Alaska State Senate
Pouch V
Juneau, Alaska 99811

Dear Senator Fischer:

We have prepared a summary sheet on two energy proposals which could be incorporated into SB 608. It is our opinion that the State should have a Comprehensive Rural Energy Policy. This Policy would contain at least four components:

1. Conservation (Weatherization)

2. Regional Energy Planning and Education

3. Reconnaissance to include weatherization

4. Feasibility Studies and appropriate projects.

For the purposes of this immediate bill, SB 608, we recommend that two of these components be included, Conservation and Regional Energy planners. The total funding would be $6.2 million (see attached). We believe the proposed financial commitments are not unreasonable in light of the State's changed revenue picture and the past geographical imbalances in state spending on energy.

We appreciate your interest in these issues

Sincerely,

James R. Ayers
Executive Director

Enclosures: (1) Proposal for Comprehensive Statewide Low-Income Weatherization

(2) Proposal for Rural Energy Planning and Education

PROPOSAL FOR COMPREHENSIVE STATEWIDE
LOW-INCOME WEATHERIZATION

The Need

Nowhere is the need for help with the energy crisis more desperate than in rural Alaskan villages. Heating fuel prices are between one-and-a-half and three times the cost in Anchorage. Unemployment hovers around 50%. Poorly constructed, drafty houses require large amounts of fuel to provide minimal comfort against the bitter climate. Residents spend over 30% of their income on heating fuel and electricity.

Nearly every village energy reconnaissance study by the Alaska Power Authority has recommended weatherization to reduce heating fuel use. Yet the existing state audit/grant program and the federal low-income weatherization program offer too little money to too few people to make more than a slight dent in the problem for either rural or urban low-income residents.

The Program

The program would offer grants to any municipality or non-profit corporation in the State for installing cost-effective weatherization and energy conservation improvements in residential units. Eligible units would be those which are occupied by low-income persons <u>or</u> which are located in a community which as a population of less than 700, which does not have year-round surface transportation <u>and</u> which lacks the goods and services necessary to install weatherization and energy conservation improvements. The program-wide average grant per unit should not exceed $3,000. A reasonable per unit maximum which allows major necessary conservation improvements should be established. The primary factor in determining the grant per unit should be the cost-effectiveness of the improvement. Other factors should include the cost of materials and transportation, local energy costs, severity of climate, and availability of other financial resources for non-low-income households. Income standards should be based on Federal Office of Management and Budget guidelines adjusted to Alaska's state and regional variations by cost of living indices.

Proposed FY83 funding is $5 million, with 50% reserved for villages of less than 700 and the remainder split equally between urban areas and regional centers.

The Results

Energy cost savings should average 30-40%, up to $900 per year for a typical rural unit, depending on its condition and local fuel costs, for a payback within 4 or 5 years. Each house would require just over 4 person days of labor, which often can (and should) be locally provided.

The Results - Continued

A typical village of 300 would save about $54,000/year, which would stimulate the village economy. Direct labor for the project would create over 12 weeks' work for a four-man crew as well as a local supervisor/administrator.

With 15% miscellaneous costs beyond direct labor, freight and materials, each $1 million spent would do an average of 290 houses, for a savings of over $250,000 each year, creating full-time summer construction jobs for 23 local residents and an additional half-year supervisory job in each village.

Urban units will generally require smaller expenditures to gain similar energy savings (30%). Since urban energy costs are lower, annual dollar savings would be lower and payback would be somewhat longer. Because materials and transportation costs are lower in urban areas, each dollar spent in urban areas would create even more local construction jobs.

The Request

$5,000,000.

RURAL ENERGY PLANNING AND EDUCATION

The Need

The benefits of oil for heating and electricity, and resulting economic crisis are recent phenomena in rural areas. Fuel oil use generally dates back less than 30 years. In those areas that do have electricity, it has come within the last 5-10 years. The shocks of the recent escalations in fuel prices are still shaking depressed village economies. Local residents are unfamiliar with contemporary energy technologies and strategies, including techniques of more efficient energy use. Imported bureaucrats and contractors mean well but often fail to appreciate cultural barriers to educate and serve local residents on energy matters and to involve local people in solving their own energy problems. The result is a reliance on outside experts to try to run complex projects and programs in villages. They often fail.

The Program

To allow regional non-profit corporations to hire an energy educator/coordinator who is familiar with energy strategies and local conditions, the educator/coordinator would conduct village workshops on village energy strategies and help residents decide what they can do about their energy problem. The Program would involve a thorough local evaluation of village energy reconnaissance studies and would produce energy recommendations determined by the village instead of by bureaucrats and outside consultants. A budget of $100,000 per region would allow adequate travel and technical materials for each village, for a total FY83 cost of $1.2 million.

The Results

Results would include an educational workshop (in conjunction with village-wide weatherization where possible) in each village on efficient energy use and other fuel-saving local energy projects. This education, with continuing technical help from the regional coordinator, would lead to local proposals for village-based or multi-village energy projects or programs. Energy use will fall as education on energy conservation takes effect. Villages begin to work toward their own solutions to energy problems.

The Request

$1,200,000.

DocumeNT #6

ALASKA POWER AUTHORITY

334 WEST 5th AVENUE · ANCHORAGE, ALASKA 99501

March 5, 1982

The Honorable Bettye Fahrenkamp
Alaska State Legislature
Pouch V
Juneau, Alaska 99811

Dear Senator Fahrenkamp:

At your 3 March 1982 Senate Resources Committee hearing on SB-608, you requested that I identify the minimum funding requirements needed to insure that the energy development program proceeds unimpeded. Last year the Legislature appropriated both funds and interest to be earned on those funds to construct a number of projects. The Attorney General has made a preliminary funding that interest was improperly appropriated and thus is not available. In addition, construction costs of some of the projects have risen while the cost of others decreased.

The Power Authority has provided tax exempt interim financing for two of the projects and is prepared to do the same for others if necessary. This technique must be construed only as a temporary solution, however, as it will ultimately be necessary to provide long term financing through state appropriations or Revenue Bonds. Please also be aware that this is my perceptions of funding needs that would maintain the current program, but it has not been endorsed by Governor Hammond or his staff. The Governor's Budget Review Committee has a much broader view of the state's program priorities and should be consulted when reviewing this input. Finally, I have identified for Senator Dankworth those funds previously appropriated which are excessive to specific project needs and thus are available for reappropriation. Following is the information which you requested:

1. Swan Lake - It appears that it will cost up to $16 million to complete the acquisition and construction of this project through December 1983. However, interim financing is in place. Therefore it is possible to defer subsequent appropriations of these amounts to the future, or long term bonds could be issued sometime prior to the maturity of the interim financing. Therefore the appropriation request could be reduced to zero for the current fiscal year.

2. Lake Tyee - Interim financing has also been accomplished for this project, however, $40 million in state funding may be necessary to complete the construction financing of this project if the state is going to directly fund the full costs of this project. It is possible that the FY 83 appropriation for this project could be deferred to FY 84.

3. Bradley Lake - The Power Authority is currently preparing its recommendations to the Governor and the Legislature for this project. $15 million has been appropriated to date for the project and it has been indicated by the Corps of Engineers that in order to enter into an agreement to proceed with construction of the project in FY 83, it would be necessary for an additional $35 million to be appropriated in FY 83. In addition, the Legislature must authorize the Power Authority to proceed with design and construction of the project.

4. Anchorage/Fairbanks Intertie - Since interest earnings may not be available, unless the law is changed for funds appropriated for projects to be financed from the Power Development Fund, it would be necessary to appropriate $57 million to complete construction of the project through FY 84. The Power Authority would need authorization to issue bonds to complete construction of the project if appropriations were not available in FY 83. For this project it is also necessary to amend or repeal Sec. 14, Ch. 118, SLA 1981, which is special legislation which could jeopardize efforts of the Power Authority to proceed with construction of the project.

5. Terror Lake - The estimated cost to complete construction of this project for the low dam scheme is $174 million. The Power Authority will receive bids in mid-April for the major Civil Construction Contract associated with this project. It will only be at that time that we'll have a more definitive cost to complete construction of this project. The Power Authority can interim finance this project with the existing bond authorization of $120 million and the $81.5 million in appropriated funds if the civil construction bids come in reasonably close to the estimated cost of the project. The reason the existing $120 million bond authorization would be insufficient, if the construction cost increase by from $5 to $15 million, is because the interim financing mechanism requires that all interest during construction be capitalized out of note proceeds. Therefore it would be advisable to obtain an approximately $20 million appropriation in FY 83 for the Terror Lake project or receive an increased authorization to issue bonds for the project of $20 million.

6. Rural Electrificaton Loan Fund - This appropriation request could be reduced to zero for FY 83 since no utility has applied to date for our FY 82 funds. However restructuring of the fund may generate instant demands for existing funds.

7. Power Cost Assistance Fund - This capital appropriation was shifted into the operating budget request of the Power Authority by the Budget Review Committee and by knowledge has been included in the Governor's request for funding.

8. Black Bear Lake - The Power Authority does not have to initiate construction with funds to be appropriated in FY 83 and the Power Authority could be prepared to proceed with construction in FY 84 if $3 million was appropriated in the current fiscal year to proceed with design of the project. It would also be advisable to authorize the Power Authority to issue bonds in the amount not to exceed $60 million for the project which would also include capitalized interest. The actual present pay cost of the project is roughly $35 million.

9. Kake/Petersburg Transmission Line Intertie - The Power Authority is still studying the feasibility of this project and there will not be a determination for approximately another 4 months. If the project is feasible, approximately $500,000 would be necessary in FY 83 to proceed with design and right-of-way activities.

10. Kotzebue District Heating Project - Funding request of $2.5 million would be necessary in FY 83 to proceed with the detailed engineering and design of the project. Feasibility study results may not be available for at least 2 months.

11. Chester Lake Hydroelectric Project - The Power Authority recommendations are currently being prepared on the feasibility of this project. If the project is authorized for construction approximately $14 million would be necessary in FY 83. A FERC license will not be required to initiate construction of this project. The Legislature would have to authorize the Power Authority to proceed with design and construction of the project, in addition to a bond authorization of $20 million if the project is not state funded.

12. Rural Small Hydro Construction - The $27 million request for this program represents $5 million in FY 83 and only the best of the projects currently being investigated would proceed with design and construction. Construction could begin this summer on some of the small projects.

13. Rural Waste Heat Construction - The full funding request of $2 million is necessary for FY 83 because the assessments demonstrate that waste heat recapture is very attractive for many rural communities.

14. Susitna Hydroelectric Project - The budget request of $25.6 million is what will be necessary to proceed with the detailed design and continued processing of the FERC license during FY 83. Authorization to proceed with engineering and design of the project is necessary.

15. West Creek Hydroelectric Project - The budget request of $2 million is what would be necessary to initiate the detailed design of this project if the determination of feasibility is made within the next 2 months. If the Power Authority is going to be appropriated funds and to proceed with design of this project once the determination of feasibility is made it would be necessary to receive an authorization to proceed with design of the project from the Legislature.

16. Grant Lake - The Power Authority is currently completing the feasibility study for this project. If the Power Authority were going to proceed with design of this project at least $2 million would have to be appropriated in FY 83. In addition, legislative authorization f construction would be required.

17. Bristol Bay Project Licensing and Final Design - The feasibility study is still proceeding, however, there will not be a final determination of feasibility of a project before the end of the legislative session. If the capital intensive alternative is determined to be feasible in the region it would cost approximately $4 million to complete the detailed design of the project. In addition the Power Authority would have to be authorized to proceed with detailed design in accordance with our statutes.

18. Lower Kuskokwim Power Plan - $2 million is necessary in FY 83 to complete the detailed feasibility study of the preferred alternatives which will be identified as a result of the studies currently underway. The $1 million in funding in FY 82 was sufficient to complete Phase I of the detailed feasibility study of the Lower Kuskokwim Region.

19. Chakachamna Hydroelectric Project - $2.2 million is necessary in FY 83 in order to complete the Chakachamna feasibility study which was funded for $1 million in FY 82.

20. Rural Village Feasibility Study - The budget request of $4 million for this project is necessary to address the severe problems in rural Alaska and to establish the feasibility of those alternatives which are identified in FY 81 as a result of the rural recon studies currently underway. If funding is reduced below $4 million, then feasibility studies will only be undertaken on the alternatives that showed the greatest potential as a result of the FY 82 reconnaissance studies in rural Alaska.

21. Hoonah Intertie - If a detailed feasibility study and initiation of design of this project is going to be initiated, Appropriation necessary in FY 83 will be $1.1 million.

22. Reynolds Creek Hydroelectric Project - Funding for the initial environmental studies associated with this project could be deferred to a later year since the Black Bear Lake Hydroelectric Project will be capable of addressing the near to mid term needs of the communities on Prince of Wales Island.

23. Emergency Maintenance Fund - This fund will be capitalized out of program receipts received from revenues from the sale of power. Since consumers will be paying in their rates the revenues derived to capitalize this fund, and since it is not known specifically when the emergency maintenance fund may be drawn on, it is requested that the $500,000 for this appropriation be appropriated with interest earnings so that the value of the revenues collected from consumers is not diminished overtime.

24. Renewal and Replacement Fund - The $750,000 requested in FY 83 would be again program receipts derived from revenues from the sale of power. The appropriation of these program receipts should be with interest earnings so that the value of the revenues collected from consumers will not be diminished from the period of time they are collected until they are actually utilized for renewal and replacement of components of the project.

If you have any questions or would like any additional information, please call upon me.

Sincerely,

Eric P. Yould
Executive Director

Attachment: s stated

cc: Chuck [illegible]
Ron Lehr
Jerry Reinwand
Commissioner Mueller

ALASKA POWER AUTHORITY

334 WEST 5th AVENUE - ANCHORAGE, ALASKA 99501

Phone: (907) 277-7641
(907) 276-0001

March 5, 1982

SB 608

The Honorable M. E. Dankworth
Alaska State Legislature
Pouch V
Juneau, Alaska 99811

Dear Senator Dankworth:

You have requested information on funds which have been appropriated to the Power Authority in recent years which may be available for reappropriation. I understand that this is necessary due to the fact that the state's revenue projections for FY 83 have been considerably reduced. In addition preliminary indications from the Attorney General's office on the law suit of the Trustees for Alaska are that interest earnings, which were appropriated with funds appropriated in FY 82 for the Power Development Fund, may not have been properly appropriated and may not accrue to the projects for which they are appropriated. The following is a listing of those appropriations which we feel are available for reappropriation for other projects and purposes.

1. Angoon Title - Original appropriation was for $250,000 in Ch. 120 SLA 1980. This project does not appear that it will proceed in any form and the total amount of the appropriation could be used for other purposes.

2. Akutan - Ch. 54 SLA 1980 appropriated $1.1 million for a small hydroelectric project at Akutan. $126,000 was loaned to the City of Akutan for the purchase of a turbine for the project. The balance of this appropriation or $974,000 could be used for other purposes. I recommend that the appropriated amount be reduced to $126,000, since the project will not proceed to construction.

3. Bethel - $2 million was approp iated in Ch. 54 SLA 1980. The purpose of the appropriation was for a loan to the City of Bethel to purchase the Bethel Utilities Corporation. $2 million is insufficient to purchase the utility and the effective interest rate for loans from the power project loan fund is unacceptable to the City of Bethel. The City of Bethel does not appear to be interested in pursuing an application for the loan of these funds for this purpose. These funds could be made available for reappropriation for other purposes.

4. Green Lake - Ch. 90 SLA 1981 appropriated $60 million for the Green Lake Project. Ch. 92 SLA 981 repealed and reenacted

Section 1 of Ch. 90 SLA 1981 to appropriate $50 million for Green Lake in FY 82 and $10 million in FY 83. If the City and Borough of Sitka determines that they want to participate in the Energy Program for Alaska, the Power Authority would have to acquire the Green Lake project with the appropriated funds. It is not clear as yet what the definitive cost would be for acquisition since the resolution of construction claims, and the method of defeasance of bonds issued by the City of Sitka to finance the construction of the project have not as yet been determined. If funds were to be made available for reappropriation I would advise that the FY 83 appropriation contained in Ch. 92 SLA 1981 be reduced from $10 million to $2 million. Remaining funds would be sufficient to acquire the project with no impact to Sitka.

5. Solomon Gulch - $68 million was appropriated in Ch. 90 SLA 1981 for the acquisition of this project. Ch. 92 SLA 1981 deferred $10 million of the $68 million appropriation to FY 83. The cost of acquisition of this project should be more definitively defined within the next 3 weeks. At that time it will be clearly established what the necessary costs will be to pay off certain loans from the Federal Financing Bank which had been made to the Copper Valley Electric Association and what it will cost to defease certain low interest loans from the Rural Electrification Administration. In addition, there are approximately $6 million in outstanding construction contract claims which will have to be resolved. It appears that it is possible to designate up to $15 million of the $68 million which had been appropriated for the project for reappropriation for other projects. I would suggest that the FY 83 appropriation contained in Ch. 92 SLA 1981 be reduced to zero and the FY 82 appropriation be reduced to $53 million.

6. Lake Elva - Ch. 90 SLA 1981, Sec. 11 appropriated $4.5 million for the Lake Elva project. The Power Authority is not going to proceed with this project and is still investigating the Lake Tazimina project and other alternatives for this region. Some funds have been expended or obligated from the original appropriation, therefore I recommend that the appropriated amount be reduced to $50,000. The funds should be reappropriated to the Bristol Bay project as funds will be needed there.

7. Petersburg - Ch. 90 SLA 1981, Sec. 20 appropriated $1.5 million for a loan to the City of Petersburg for local transmission and distribution lines. It does not appear that the City of Petersburg is prepared to borrow the funds for the specified purposes at the current interest rate which is available for loans from the power project loan fund. It is possible that these funds are available for reappropriation

for other projects including the Lake Tyee Hyroelectric Project.

8. Wrangell - Ch. 90 SLA 1981, Sec. 21 appropriated $1.5 million to the City of Wrangell for the same purposes as described in number 7 above. For the same reasons it is possible that the funds would be available for reappropriation for other projects, including the Lake Tyee project.

9. Akutan - Ch. 90 SLA 1981, Sec. 34 appropriated $127,000 for a loan to the City of Akutan for electrification. As indicated in item 2 above, the loan had been made prior to the appropriation referenced in this section from a prior appropriation. Therefore, the funds appropriated in section 34 of this act could be reappropriated for other purposes.

10. Ouzinkie - Ch. 90 SLA 1981, Sec. 46 appropriated $700,000 for the Ouzinkie Waste Heat Project. This appropriation could be reduced to the amount of $250,000 since it is possible to complete the project for that cost.

You also asked me to specify and justify for you what would be the minimum appropriations which may be necessary for FY 83 for the power development program. I was also asked this question by Senator Fahrenkamp at a recent Senate Resources Committee hearing on SB-608. Attached is my response to Senator Fahrenkamp.

If you have any questions or would like additional information, please call upon me.

Sincerely,

E. P. Yould

Eric P. Yould
Executive Director

Attachment: as stated

cc: Chuck Conway
Ron Lehr
Jerry Reinwand
Commissioner Mueller

Document # 7

Ahtna, Inc.

DRAWER G
COPPER CENTER, AK. 99573
907-822-3476

February 5, 1982

Alaska State Legislature
Senate
Pouch V
Juneau, AK 99811

Attention: Honorable Vic Fischer

Dear Senator Fischer:

Ahtna, Inc. is requesting your support and assistance for obtaining funds for a reliable source of electrical power to one of our small rural communities and villages. The State is providing funds for the construction of an electrical intertie between two of our large cities, Fairbanks and Anchorage, that would enable the cities to share power. This transmission line is also capable of providing power to the cities when Devels Canyon Dam is on line.

Ahtna feels that these resources should be made available to rural areas when feasible as in this instance with the intertie passing through the rural community of Cantwell. There are no plans to construct a substation or distribution system for Cantwell residents. Ahtna feels that there is a need for reliable electrical power to this expanding community. Last year, 12 new houses were completed at Cantwell through the Copper River Basin Housing Authority. All these homes were wired for electricity in the expectation of community electrical power. Many of the homes in Cantwell run their individual power plants that are expensive to operate because of the high cost of fuel and repairs.

Ahtna believes now is the time to provide funds for the construction of a substation and distribution system for the community of Cantwell. At the last Ahtna, Inc. Board Meeting held on January 30, 1982, the Board of Directors passed a resolution in support of this important project. (Copy enclosed.)

It is Ahtna's hope that you will support this project for the community of Cantwell. It is estimated that the amount that is required for the substation and distribution system would be $1,250,000. Also enclosed is a copy of a supportive letter from Golden Valley Electric Association and a current listing of residents and business establishments that would benefit from this project.

Sincerely,

Herbert Smelcer
General Manager

HS/sh

Enclosure

Ahtna, Inc.

DRAWER G
COPPER CENTER, AK. 99573

PHONE 907-822-3476

RESOLUTION 82-2

WHEREAS, the State of Alaska has funded the Alaska Power Authority to construct an electrical intertie transmission line between Fairbanks and Anchorage and,

WHEREAS, this intertie will pass through rural communities that presently have no reliable source of electrical power and,

WHEREAS, the intertie will cross over lands owned by Cantwell and Ahtna, Inc. and,

WHEREAS, Cantwell is in need of a reliable source of electrical power for their expanding community and,

WHEREAS, a reliable source of electricial power could be provided by this intertie through a substation at Cantwell, Alaska, and by a local electrical distribution system

THEREFORE, BE IT RESOLVED by the Ahtna, Inc. Board of Directors at their regular meeting on January 30, 1982 that it supports and strongly recommends that the State provides funding for the construction of a substation at Cantwell, Alaska, with facilities for distribution of electrical power and,

BE IT FURTHER RESOLVED, that Ahtna, Inc. requests the State to provide funding for a local electrical distribution system for Cantwell.

Dated this 30th day of January 1982.

Evelyn Beeter
Secretary

Nicholas Jackson
President

Seal

LDEN VALLEY ELECTRIC ASSOCIATION INC. Box 1249, Fairbanks, Alaska 99707 Phone 907-452-1151

November 23, 1981

Mr. Jim Wright
P.O. Box 9
Cantwell, AK 99729

Dear Jim,

We pledge our assistance in obtaining a tie-line substation for the community of Cantwell. Our chief lobbyist, Mr. Dave Hutchens, Executive Director of the Alaska Rural Electric Cooperative Association has placed this project on his list as one of high priority for this legislative session. In addition, Mr. Eric Yould, Executive Director of the Alaska Power Authority, assures me that his agency stands ready to assist your community in its attempt to receive central station service via the tie-line. You are welcome to contact both Dave and Eric for additional information.

You can help by supplying both of these gentlemen with the following data: population of general area, number of residences, number of business establishments, number of individual generation units now in service, cost of fuel, growth and development trends-both historical and projected, and other items that may be of significance.

Further, I would suggest that you form a Citizen Action Committee that would be willing to write individual letters, call, or send telegrams to legislators and the administration. These efforts should be coordinated through Dave Hutchens.

I personally will assist you with this project and with the distribution facilities required once the substation is secured. As stated previously, GVEA is willing to accommodate Cantwell with a relinquishment of our APUC Certificate as it applies to that area should this be desired. We will also assist with formation of your own utility or any other approach that is determined to be in your best interests.

Best regards,

Bob Hufman

R. L. Hufman
General Manager

RLH:es

6

cc: D. Hutchens
ARECA
6000 C Street, Suite C
Anchorage, AK 99502
276-3235

E. Yould
APA
334 W. 5th Street - 2nd Floor
Anchorage, AK 99501
276-0001

Vern Wickham
Cantwell Lodge

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Burney, Russ	2	5	X								
Bulard	3	4			8.8/12	293	2928	$ 381			
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Caress, Marty	5	2			4.4	108	1080	$ 140			
Carlson, Bud	6	4		X	5						
Cotter, Herman	7	5			5 gen 5,10,15	1000	10,000	$ 1,300			
Davis, Bernie	8	1		X							
Drashner, Dave	9	2	X								
Drashner, Everett	10	5			2/3.5 3.5	305	3050	$ 397			
Drashner, John	11	1	X								
Dementi, Gil	12	5	X								HUD
Ewan, Margie	13	5	X								HUD
Ellis, Roger	14	2		X							Tro
Flanigan, Roland (Griz)	15	4	X								
Folger, Gary	16	1	X								HUD
Gallentine, Walt	17	2			12/3.5	180	1800	$ 234			
Gilbertson, Bob	18	2		X	4.0						
Goble, George	19	3			.10	76	366	$ 99			Par Lim 5 mo
Gore, Ken	20	2			2.5/2.5	150	1500	$ 195			
Goldsworthy, John	21	1	X								
Herman, Nick	22	3		X							
Hollinrake, Jim	23	2			5.0/4.0	107	1068	$ 139			
Isern, Kurt	24	1	X								
Jamison, Lee	25	2	X								HUD
John, Alec	26	4	X								HUD
Kingsbury, Jim	27	3	X								
Lawson, Jack	28	5		X	20/35						
Loper, Butch	29	1			3.0	18	183	$ 23			3 Hr 7 da
Laughman, Al	30	5		X							Troo
Mayo, Leonard	31	5	X								HUD
Mayo, Scott	32	4	X								
Miller, Jim	33	4			7.0/7.0	243	2430	$ 316			
Miller Mike	34	4			5.0	18	183	$ 24			
Moberg, Jerry	35	2	X								
Nicholas, Jane	36	2	X								HUD
Nicklie, David	37	2	X								HUD

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Nicklie, Elsie Brenda	3	X								HUD
Nicklie, Rene	3	X								HUD
Nicklie, Tammany	1	X					0			HUD
Nord, Dale,	2		X							
Osborne, Don	1	X								
Pedro, Ron	3	X								
Peters, Jenny	1	X								
Peters, Henry	1	X								
Secondchief, Frank	1	X								
Sheldon, Bea	1	X		4.4						
Smith, Jessie	4		X							
Stadler, Gordon	2	X								
Sperry, Rachel	1	X								
Squire, Myrna	2	X								
Steinbrecher, Frank	4	X								
Stickivan, Nome	2	X								
Skravanek, Stacy	3	X								
Tansy, Jake	1		X							
Tyone, Sharon	2	X								HU
Wickham, Vern	2		X							
Wiebe, Ray	2			3/5/15	344	3435	$ 447			
Wright, James	3			4/12	177	1,764	$ 229			
Whittemore, Gary	2	X								
				33 GEN						
RESIDENTIAL	158	34	12	18 FAMIL	3202	31,617	4,162			
BUSINESS	30	1	18	18	12,709	127,092	16,455			
TOTAL	188	35	30	57	15,911	158,709	20,620			

	...of ...ersons in home or business	...ower ...n home	...wer / other source	...ower. & size of generator	...H ...el ...sed per month	...er month ...roduced ...WH	...st ...r month @ $1.30 per gallon			
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Atkins Guide Service	1		X							
ALASCOM	1		X	15KW						
Bobs Welding & Repair	1		X							
Cantwell Chevron	3		X	2ea 250						
Cantwell Lodge				2ea 90	3346	33,460	$ 4350	7 residential accts 4 commercial accts.		
Cantwell Trading Post	2		X							
Cantwell Bible Church	3			4.4	214	2140	$ 214			
Cantwell Native Village				4.0	250	2500	$ 325	Native Council Health Clinic		
Drashner bus Service			X							
Dept. of Public Safety	3		X							
Golden North Air Service	?		X							
H & b Equipment	3		X							
Jack River Inn	13			55.0	1891	18910	$ 2458			
Longhorn Saloon	2		X							
Matanuska Telephone	1			(2) 7.5	293	2930	$ 381			
Nordic Air Maintenance	2			7.0	36	360	$ 47			
Penticostal Church	2	X								
Railbelt School Distr				2ea 90 KW	2635	26352	$ 3426			
Reindeer Research			X							
State Highway Dept.				50 KW	1525	15250	$ 1983			
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U.S. Post Office	2			8.8	158	1580	$ 205			
Wind & Sun Enterprises	2		X							
M.O. Wright & Son	3		X							
CEA Inc			X							
Copper Acre Kennels	1		X							
Denali Kennels	1		X							
Designs by Pam	1		X							
National Weather Serv				(2) 18	897	8970	1,166			
Federal Aviation Agcy.		1	18	18	12,709	127,092	16,458			

PRIME SPONSOR: Resources

LEGISLATION SUMMARY

CSSSSB 608: "An Act making special appropriations for various power projects and energy-related purposes; and providing for an effective date."

Sec. 1: Appropriates $25,600,000 to the power development fund of the Alaska Power Authority (APA) for the Susitna River hydroelectric project.

Sec. 2: Appropriates $200,000 to the Department of Fish and Game for fisheries enhancement potential assessment of the Susitna River system.

Sec. 3: Appropriates $600,000 to the Governor's office to complete Susitna River hydroelectric project alternatives studies and necessary additional work for key decisions on construction.

Sec. 4: Appropriates $200,000 to the APA for railbelt windpower feasibility studies.

Sec. 5: Appropriates $500,000 to the APA to continue Chakachamna fisheries and habitat studies.

Sec. 6: Appropriates $1,200,000 to the Governor's office for economic and engineering feasibility assessment of generating and transmitting gas-fired power from the North Slope to the railbelt.

Sec. 7: Appropriates $500,000 to the APA for design and right-of-way activities for a possible Kake-Petersburg intertie.

Sec. 8: Appropriates $300,000 to the APA for feasibility analysis of alternatives to lower the cost of power for Angoon.

Sec. 9: Appropriates $2,500,000 as a grant to Cordova for an eletric generation unit.

Sec. 10: Appropriates $1,250,000 to the APA for a substation and distribution system for Cantwell.

Sec. 11: Appropriates $2,000,000 to the APA for the Lower Kuskokwim power plan.

Sec. 12: Appropriates $2,000,000 to the APA for installation of waste heat facilites in rural villages.

Sec. 13: Appropriates $2,000,000 to the APA for feasibility studies in rural villages.

Sec. 14: Appropriates $1,600,000 to the division of energy and power development (DCED) for reconnaissance studies in rural villages.

Sec. 15: Appropriates $14,000,000 to the division of energy and power development (DCED) for residential energy conservation and weatherization programs.

Sec. 16: Appropriatea $1,200,000 to the division to energy and power development (DCED) for grants to regional nonprofit corporations for village energy planning and education.

Sec. 17: Appropriates $100,000 to the Governor's office for a longitudinal cost-benefit analysis of energy conservation and weatherization programs.

Sec. 18: Appropraites $150,000 to the division of energy and power developemnt (DCED) to continue work on the long-term energy plan.

Sec. 19: The appropriations made in secs. 9 and 16 shall be disbursed in accordance with state law regarding state grants (AS 37.05.315 - 37.05.319).

Sec. 20: The appropriations made in secs. 1 - 8, 10 - 15, and 17 - 18 are for or related to capital projects.

Sec. 21: Immediate effective date.

Alaska State Legislature

Senate

Office of the President

Official Business

Pouch V
State Capitol
Juneau, Alaska 99811

MEMORANDUM

TO : Senate Resources Committee
Attention Tom Johnson

FROM : Senator Jay Kerttula

SUBJECT : Committee request for a statement of sponsor intent on SB 608

DATE : February 7, 1982

This bill is intended to provide continued funding to the Alaska Power Authority for those projects that come under the power development fund. The bill provides the money necessary for this year for the Susitna River hydroelectric project and other APA projects.

cc: Senator Dankworth

ALASKA STATE LEGISLATURE
HOUSE OF REPRESENTATIVES
RESEARCH AGENCY

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

February 9, 1982

MEMORANDUM

TO: Representative Brian Rogers
Attn: Nancy Lord

FROM: Jack Kreinheder JK
Research Staff

RE: Comparison of Hydro Power Costs Under Present Law and HB 655
Research Request 82-13

Nancy Lord of your staff requested that we provide information on power costs and other aspects of the following hydro projects: Black Bear Lake, Bradley Lake, Solomon Gulch, Susitna, Swan Lake, Terror Lake, and Lake Tyee. The specific information requested (with some modifications) was:

(1) Planned power generation capacity in megawatts and annual kilowatt hours.
(2) Estimated construction costs (1982 dollars);
(3) Current annual electric sales for area to be served;
(4) Current electric rate in area served;
(5) Expected power rate in area served, under three alternatives:
   A. Present law (AS 44.83.490) -- payment of operation and maintenance costs only.
   B. Present law, if $5 billion is not appropriated to power development fund by 1986 -- annual repayment of 10 percent of state investment in project.
   C. HB 655 -- annual repayment of 3 percent of state investment, adjusted for inflation.
(6) Expected power rate under (A), (B) and (C) based on low and high growth rates for power consumption in area served.

Table 1 summarizes the information for each project on power capacity, construction costs, and 1980 electric sales. The question on current electric rates is fairly complex, because of the need to determine wholesale rates or cost of power production, rather than retail rates. We will forward this information to you as soon as it is complete.

Table 2 compares estimated power costs under the six scenarios listed in (5) and (6) above. Because detailed design and feasibility studies have not been completed for all of these hydro projects, it was necessary to use general estimates for some of the important factors, including the costs for construction and operation and maintenance of the projects. Therefore, the figures in Table 2 should be viewed as general approximations of the likely power costs for these projects, rather than as specific projections. This caveat is most important for the Susitna project, because of its size and the large effect of minor changes in assumptions.

The power cost estimates for HB 655, except for Susitna, are from the hydroelectric project model developed by the Division of Budget and Management in the Office of the Governor. We have attached the Budget and Management model runs for HB 655, as they contain additional information on this alternative. The estimates for present law power costs were made by this agency, based on data from Budget and Management. An estimate of power costs for the Susitna project was not prepared by the Division of Budget and Management because of the uncertainties in construction and operation costs, the timing of development, and other factors. Nancy Lord asked that we make at least a general or "ballpark" estimate of Susitna power costs. We have done so, but it is important to bear in mind that the Susitna estimates are very sensitive to changes in the assumptions used, which are explained later in the memo.

Comparison of Power Costs

Table 2 displays estimated power costs for the six alternatives for the sample years 1986, 1990, 1995, 2000, 2010, and 2015. As shown by the table, wholesale power rates for all of the projects would be lowest under case (6)(A), that is present law as enacted last session by SB 25, assuming that the power rate would be based only on the payment of operations and maintenance expenses. Although we have listed power rates for each project for your information, under present law the Alaska Power Authority (APA) would establish a single statewide rate for all power projects under its administration. Additional costs which could increase power rates would be safety inspections by the Alaska Power Authority (APA) and the payment of debt service on power projects. At the present time, both the Swan and Tyee projects have interim construction financing which must either be converted to long-term debt or paid through appropriation by the legislature. Any debt service costs would increase the statewide power rate for all projects under the APA power program.

The estimated individual power costs under present law in 1986 (low demand case) range from 1.4 cents/KWH for Terror Lake to 8.5 cents for Swan Lake. The statewide wholesale power rate in that year is estimated at 3.2 cents/KWH. Under the high demand case, the statewide rate would drop to 2.6 cents per KWH.

The highest power costs would be under present law, if $5 billion is not appropriated to the power development fund by July 1, 1986, and 10 percent of the State's investment in each power project were required to be returned each year. Under this alternative, power costs for the 1986 low demand case would range from 15.9 cents per KWH for Solomon Gulch to 77.2 cents for Black Bear Lake. The statwide power rate is estimated at 27.0 cents per KWH.

The Governor's proposed legislation, HB 655, would result in power rates between the two possible extremes under present law. Again for the 1986 low demand case, rates are estimated to range from 7 cents/KWH for Terror Lake to 26 cents for Black Bear Lake. Under HB 655, a separate power rate would be determined for each project, so there is no statewide rate as with present law.

Estimated power rates generally decline between 1986 and 1990 under both present law and HB 655, as more of the hydro generation capacity is used. After 1990, power rates under HB 655 and the O&M basis for present law increase because of inflation in O&M costs and the utilization of full capacity for some hydro projects. Under the 10 percent return present law alternative, power costs would continue to decrease through 2015, because the return is not affected by inflation and electric power consumption would continue to increase.

All of the power cost figures cited above are wholesale or busbar costs, that is, what local utilities would pay the APA for electric power where it enters the utility's distribution system. Retail or consumer rates would be considerably higher, and for most communities depend on the type of consumer (residential, business, industrial), and the amount of electricity used. For example, the Alaska Electric Light and Power Company (AEL&P) in Juneau pays about 1.56 cents per KWH to the Alaska Power Administration for power produced at the Snettisham hydro plant. AEL&P's retail rates range from 4.9 to 6.6 cents per KWH depending on the factors mentioned above.

Assumptions

The assumptions used in the calculation of the power cost estimates in Table 2 are as follows. Operation and maintenance expenses are inflated at 7 percent per year. The rate of inflation used in the estimates for HB 655, which involves a 33.3 year floating average, is 4 percent. The growth rates for electric demand are based on a combination of feasibility study estimates and historical growth rates from 1976 to 1980. The specific sources for the high and low demand projections are listed on the Budget and Management model run for each project.

The operating and maintenance (O&M) cost estimates for Black Bear Lake, Terror Lake, and Lake Tyee are from the feasibility studies for these projects. O&M costs for other projects were not available, and Budget and Management used an approximate O&M figure of 1.5 percent of capital costs, as suggested by the APA, for these projects in estimating power costs. Gordon Hallum of the federal Alaska Power Administration indicated that O&M costs are relatively fixed over a wide range of hydropower capacity, and would not actually vary in direct proportion to capital costs. Therefore, the O&M approximation of 1.5 percent of capital costs may overstate O&M expenses for larger projects, particularly Susitna.

For Susitna, we assumed that the first phase of the Watana dam (400 MW - 1.6 GWH per year) would be completed and on-line in 1993, the second 400 MW at Watana would be installed by 1997, and the Devil Canyon dam (400 MW - 3 GWH per year) would be on-line in 2000. These power capacities were taken from the APA Susitna project Mid Report released in March, 1981. An APA newsletter just received lists total Susitna capacity as 1600 megawatts and 6.7 GWH per year, rather than the 1200 MW and 6.2 GWH cited in the earlier report and used in this analysis. The higher power output would result in somewhat lower power rates for the Susitna project and the statewide rate than those listed in Table 2. Also, the construction time frame assumed above is fairly arbitrary and could differ substantially from the actual construction schedule.

The original Corps of Engineers plan was to have the full Watana project completed by 1993 and Devil Canyon by 1997. Lower demand forecasts have prompted the consideration of a longer construction time frame, but no firm plans have been released. It is possible that the scheduling of the Devil Canyon dam will not be decided until 1990 or later, when power demands can be more accurately estimated. The most recent APA cost estimate for Susitna of $5.174 billion was inflated at 7 percent per year to estimate actual construction costs. The total capacity of each phase was assumed to be utilized immediately upon completion.

I hope this information is useful. Please let me know if you have any questions or would like additional information.

JK/dp

Attachments

TABLE 1

SUMMARY INFORMATION FOR HYDROELECTRIC PROJECTS PLANNED OR UNDER DEVELOPMENT

HYDRO PROJECT	Planned Power Capacity: Megawatts	Planned Power Capacity: Annual KWH (millions)	Estimated Construction Cost (Millions of 1982 Dollars)	1980 Annual Electric Sales in Area Served (Millions of KWH)
Black Bear Lake	6	24	35	4.4
Bradley Lake	70	320	270	247.0
Solomon Gulch	12	55	68	36.5
Swan Lake	22	70	90	72.2
Terror Lake	20	145	150	77.7
Lake Tyee	20	110	100	29.8
Susitna	1,600	6,700	5,174	2,789.0

Sources: Power capacity and electric sales from the Division of Budget and Management, personal communication with George Matz and Elliot Wetzler. 1982 construction costs from the Division of Policy Development and Planning, Policy Analysis Paper No. 81-25, November 16, 1981.

TABLE 2 2/9/82

COMPARISON OF ESTIMATED WHOLESALE HYDROELECTRIC
POWER COSTS UNDER PRESENT LAW AND HB 655
(Cents per KWH)

1 9 8 6

	LOW DEMAND			HIGH DEMAND		
HYDRO PROJECT	Present Law (O&M Costs)	Present Law (10% return)	HB655	Present Law (O&M Costs)	Present Law (10% return)	HB655
Black Bear Lake	2.8	77.2	26.0	2.5	67.0	23.0
Bradley Lake	--	--	--	--	--	--
Solomon Gulch	3.1	15.9	8.0	2.4	12.4	6.0
Swan Lake	8.5	49.6	24.0	4.5	26.4	13.0
Terror Lake	1.4	20.1	7.0	1.2	17.6	6.0
Lake Tyee	6.3	42.2	19.0	5.5	36.9	17.0
Statewide Rate-Present Law	3.2	27.0	--	2.6	21.5	--

1 9 9 0

	LOW DEMAND			HIGH DEMAND		
HYDRO PROJECT	Present Law (O&M Costs)	Present Law (10% return)	HB655	Present Law (O&M Costs)	Present Law (10% return)	HB655
Black Bear Lake	3.0	63.0	26.0	2.4	49.8	20.0
Bradley Lake	2.2	14.9	6.0	Same	Same	Same
Solomon Gulch	3.7	14.3	9.0	3.2	12.4	8.0
Swan Lake	8.3	36.8	22.0	3.7	16.4	9.0
Terror Lake	1.7	18.8	8.0	1.3	15.1	6.0
Lake Tyee	7.1	36.6	20.0	5.8	29.6	16.0
Statewide Rate-Present Law	2.8	18.4	--	2.4	15.9	--

Sources: HB 655 estimates from Division of Budget and Management, based on information from the Alaska Power Authority. Present law estimates by the House Research Agency, based on Budget and Management data. See text of memorandum for assumptions and methodology used.

TABLE 2 (Continued)

COMPARISON OF ESTIMATED WHOLESALE HYDROELECTRIC
POWER COSTS UNDER PRESENT LAW AND HB 65
(Cents per KWH)

1 9 9 5

	LOW DEMAND			HIGH DEMAND		
HYDRO PROJECT	Present Law (O&M Costs)	Present Law (10% return)	HB655	Present Law (O&M Costs)	Present Law (10% return)	HB655
Black Bear Lake	3.3	48.9	24.0	2.3	34.4	17.0
Bradley Lake	3.1	14.9	8.0	Same	Same	8.0
Solmon Gulch	4.5	12.5	10.0	Same	Same	Same
Swan Lake	8.6	27.2	21.0	4.1	12.9	9.0
Terror Lake	2.1	17.3	9.0	1.5	12.4	7.0
Lake Tyee	8.4	30.9	22.0	6.2	22.8	16.0
Statewide Rate-Without Susitna	3.7	17.4	--	3.2	14.9	--
Susitna	4.9	32.4	15.4	Same	Same	Same
Statewide Rate-With Susitna	4.6	28.6	--	4.4	27.4	--

2 0 0 0

	LOW DEMAND			HIGH DEMAND		
HYDRO PROJECT	Present Law (O&M Costs)	Present Law (10% return)	HB655	Present Law (O&M Costs)	Present Law (10% return)	HB655
Black Bear Lake	3.6	37.9	24.0	2.2	23.7	15.0
Bradley Lake	4.4	14.9	11.0	Same	Same	Same
Solomon Gulch	6.3	12.4	13.0	Same	Same	Same
Swan Lake	9.4	21.2	21.0	5.7	12.9	12.0
Terror Lake	2.8	15.9	11.0	2.1	11.9	8.0
Lake Tyee	10.0	26.2	24.0	6.8	22.8	16.0
Statewide Rate-Without Susitna	5.0	16.6	--	4.3	14.4	--
Susitna	3.1	17.1	11.5	Same	Same	Same
Statewide Rate-With Susitna	3.2	17.1	--	3.2	16.8	--

TABLE 2 (Continued)

COMPARISON OF ESTIMATED WHOLESALE HYDROELECTRIC
POWER COSTS UNDER PRESENT LAW AND HB655
(Cents per KWH)

2 0 1 0

HYDRO PROJECT	LOW DEMAND Present Law (O&M Costs)	Present Law (10% return)	HB655	HIGH DEMAND Present Law (O&M Costs)	Present Law (10% return)	HB655
Black Bear Lake	4.2	22.9	22.0	3.6	19.2	18.0
Bradley Lake	8.7	14.9	18.0	Same	Same	Same
Solomon Gulch	12.3	12.4	23.0	Same	Same	Same
Swan Lake	12.2	14.0	23.0	11.2	12.9	21.0
Terror Lake	4.6	13.4	15.0	4.1	11.9	13.0
Lake Tyee	14.5	19.3	30.0	8.4	11.2	[illegible]
Statewide Rate-Without Susitna	8.9	14.9	--	8.1	13.6	--
Susitna	6.1	17.1	18.5	Same	Same	Same
Statewide Rate-With Susitna	6.3	16.9	--	6.3	16.7	--

2015

HYDRO PROJECT	LOW DEMAND Present Law (O&M Costs)	Present Law (10% return)	HB655	HIGH DEMAND Present Law (O&M Costs)	Present Law (10% return)	HB655
Black Bear Lake	5.0	19.2	23.0	Same	Same	Same
Bradley Lake	12.2	14.9	24.0	Same	Same	Same
Solomon Gulch	17.3	N.A*	21.0	Same	Same	Same
Swan Lake	15.7	N.A*	28.0	Same	Same	Same
Terror Lake	5.9	12.4	17.0	5.7	11.9	17.0
Lake Tyee	17.5	N.A*	34.0	9.5	N.A.	18.0
Statewide Rate-Without Susitna	11.9	14.3	--	11.0	13.2	--
Susitna	8.5	17.1	23.7	Same	Same	Same
Statewide Rate-With Susitna	8.8	16.8	--	8.2	16.7	--

*N.A. indicates that under present law, the 10% return would not apply because O&M costs are estimated to be higher than the 10% return would be.

JIM LAZAR CONSULTING ECONOMIST

spoke at SB 606 teleconference

Alaska Environ-
mental Lobby

MAR 0 4 1982

February 28, 1982

Sen. Bettye Fahrenkamp, Chairperson
Senate Resources Committee
113C State Capitol
Juneau, Alaska, 99811

Rep. Eric Sutcliffe, Chairperson
House Resources Committee
215 B State Capitol
Juneau, Alaska 99811

SB606

Dear Senator Fahrenkamp and Representative Sutcliffe:

I greatly appreciated the opportunity to appear before your committees last week, the courtesy extended to me by yours-lves, your fellow legislators and your staff, and the opportunity to escape from the Washington legislature (albeit to another legislature.)

The similarity between the situation Alaska is currently in and that which has evolved over the past four decades in the Pacific Northwest cannot be overemphasized. My appearance in Juneau, and this letter, are intended to sound the alarm, and urge that a more reasoned approach be taken in your state.

There are two fundamental issues facing the State of Alaska regarding the development of the Energy Program for Alaska. The first is the decision as to whether or not particular projects should be built. The second, and more important, is the determination of how selected projects will be financed, and how the power produced therefrom will be priced.

The decision to build, or not build, particular projects is primarily an economic decision. Generally speaking, projects should be undertaken if they are the least-cost option, and are cost-effective. These criteria are often confused. A least-cost option is an energy investment which will meet consumer's end-use energy needs at lower cost than available alternatives. A cost-effective project is one which will produce a higher return to the investor than available alternative investments. For example, a project could be cheaper than any alternative, but still not be cost-effective, if the output it produced was not more valuable than the inputs which make it up.

A classic example of this is the current construcion in the Pacific Northwest of three nuclear plants (formerly five), which will collectively produce about 2500 average megawatts of electricity. The projects are far enough along now that it is doubtful if alternatives could produceequal amounts of electricity at lower cost. Thus, they are "least-cost" alternatives. (The third plant may not be of this nature, but the first two almost assuredly are.) However, the output of the plants is needed in order to avoid curtailment of the region's aluminum smelters in times of low riverflow. The value of the aluminum which will be produced with this electricity simply does not merit the construction of powerplants of this expense. Specifically, the power will be produced at a cost of about 15¢/kwh; 8 kwh are needed to smelt a pound of aluminum; raw materials, transportation, and labor amount to about 40¢/lb.; thus the total cost of the aluminum to be produced is about $1.60/lb. The current price of aluminum on the free market is about 76¢/lb. Obviously, a poor investment is being made. Why does this happen?

317 East 17th Olympia, WA 98501 (206)357-8364

Sen. Bettye Fahrenkamp
Rep. Eric Sutcliffe
February 28, 1982
Page two

The reason is quite simple. the Aluminum companies will not bear the cost of this power themselves. Through an act of a legislative body (in this case, the U.S. Congress, enacting the Northwest Power Act, P.L. 96-501) these industries receive power at below-free market prices, primarily through the output of the federally subsidized hydroelectric projects on the Columbia River. In fact, they will be paying something less than 3¢/kwh for this power when it comes on line, not the full, unregulated price.

The result, of course, is that other customer's electric rates are rising to cover the difference. Power rates in the Northwest have historically been the lowest in the nation, with residential rates averaging about 1-1.5¢/kwh until 1979. At that time, rate increases to pay the costs of the nuclear construction program began to be included in wholesale power rates from the Bonneville Power Administration. By 1984, rates are expected to average about 5¢/kwh, or about 300% higher than five years earlier. The result has been ratepayer discontent and rebellion, displacement of industrial customers accustomed to low rates, and a severe impact on the national municipal bond market, from the extreme financing requirements of the nuclear projects.

A similar thing could easily happer in Alaska. If hydroelectric projects are built with appropriated cash, from petroleum royalty income, and the power from those projects offered for sale at below-market prices, the low prices will stimulate demand. As a result, more projects will be demanded by the subsidized market than is economically efficient. Too much capital will be invested in these projects, and too little left over for other needed and justified projects. Therefore, in the short run, the diversion of capital will result in sub-optimal public investment policies.

In the long run, of course, it will not be possible to sustain subsidized investment in power production. First, the capital will not be available; second, the sites for power facilities will eventually be exhausted (as has happened in the Pacific Northwest.) It will then be necessary to develop projects with conventional financing, with rates being sharply increases to pay the cost. You run the same risk as we have taken here in the Northwest, of having rates jump suddenly, with severe dislocative effect. It may also be necessary to turn to coal and/or nuclear projects, as hydroelectric sites which can be developed without unacceptable environmental impacts become scarce. There you face the problem of short lifetime facilities, with high fuel costs, unknown environmental impacts, and additional capital requirements. Not a very welcome alternative.

The option for energy pricing which makes the most sense is to have the state operate it's power system as a prudent business. This suggests that prices should be set equal to the long run incremental cost of output from new facilities. That cost should be determined as the value which would be received from an investment of the construction funds in an alternative, such as long-term government or corporate bonds; about 15% annually is approximatel- the return which the people of Alaska could receive, if their royalty funds were so invested. It is senseless to invest the public's money in any enterprise which gives the public a lower return than could otherwise be obtained.

For example, if the Susitna projects have a construction cost of $5 billion, they should generate $750 million in revenue per year, plus necessary operation and maintenance cost. Since the two dams together would produce about 6 billion kwh/year, the cost of that energy to Alaskans is about 12.5¢/kwh.

The cost of the energy does not necessarily have anything to do with it's price. The state is free (as is done in British Columbia) to sell the power above cost, and use the difference to subsidize other programs. Alternatively, the price can be set below cost, and the power thus sold at subsidized prices, with other public programs being cut short as a result. This is a political policy decision.

Even if the projects are built with cash, from oil royalties, the cost of the power remains at 12.5¢/kwh. That "cost" is the foregone income which the $5 billion, invested elsewhere, could have provided to the same Alaskans who instead find themselves as owners of a hydroelectric project.

If the power is sold at a price below the 12.5¢/kwh it costs to produce, those who consume the power will be subsidized by those who own the dam. These may be mostly the same people, but the difference is significant. If the power is sold below cost, the "benefits" of the oil royalty income is distributed proportionate to consumption. The more a consumer uses, the more of the benefit they receive. I receive more benefit by using more power; less benefit by using less. I have an inverse incentive to conserve.

If power is sold for 3¢/kwh, from the projects built with cash, I will have no incentive to install double (or triple) glazing, unless the amount of power saved is such that the average cost of the savings is less than 3¢/kwh. On the other hand, if the cost of the savings is 6¢/kwh, we collectively, as a society, would be better off making that investment instead. If a $2000 investment in storm windows will save 4000 kwh per year in an electrically heated home, the net cost of the savings is 7.5¢/kwh. This is calculated as the 15% return which could be obtained by investing the funds elsewhere, times the investment in storm windows, divided by the savings ($2000 X .15)/4000; If a project costing 12.5¢/kwh (Susitna) is developed, and these storm windows are not, then the money of the people of Alaska is being wasted.

The uneconomic pricing policies of the Northwest, however, have led to exactly this kind of mistake being made in the past. I urge the people of Alaska to learn from our mistakes.

The most sensible route, if hydroelectric projects are developed, is to price the energy at marginal cost, including escalation over time. If the projects are financed initially with cash, the resulting power sales will provide a steady source of income for state government operations. Taxes on business and individuals can be held down, with resulting gains of employment and diversity. The problem of the Northwest, with massive investments by energy-intensive industries, providing few jobs, but requiring massive subsidies through power rates, can be avoided. The result would be a conversion of a one-time royalty windfall into a steady source of income.

A few important comments on the current planning policies, particularly for the Susitna projects, is certainly in order. The primary apparent failure is in the sizing of the projects. One lesson the Northwest has learned deals with "planning for uncertainty." The future is not nearly as clear as it used to be, and the art of forecasting energy demands has deteriorated into an annual exercise in futility, in many cases.

The approach which more areas of the country are taking is to invest in high-capital cost resources sufficient to meet the lowest imaginable future demand. Since you are certain this demand will exist, you know the projects will be used, and thus generate revenue to repay their costs. Less certain demand scenarios justify only projects with lower capital costs, and higher operating costs. These include coal, oil, and gas fired projects. Finally, to meet peak demands, or unexpected economic growth, a decision must be made whether it is economic to plan for such growth at all, given the high uncertainty, and the low likelihood that facilities will operate sufficiently to repay their investment.

The Susitna projects alone would supply the entire anticipated peak demand, and annual energy requirements, of the entire Anchorage-Fairbanks corridor, under the "low demand" scenario identified by Battelle. This forecast has been severely questioned, in particular by Arlon Tussing, of ARTA, a Seattle consulting firm with an excellent record in forecasting. Even this "low demand" scenario anticipates a 150% growth in consumption, hardly a certain event.

Even if this growth did occur, other facilities, including those now existing, could meet much of that demand. Existing oil and gas fired plants can meet peak demands; there is no justification whatsoever for building expensive new capacity to meet peak loads. Even if new facilities are built, the existing facilities could provide needed reserves, and peak load capacity, so new facilities should be constructed only to meet baseload needs. Furthermore, such smaller projects, as Bradley Lake, Chakachamna, and others must be considered. The bottom line is that there is not a certainty that the output of Susitna will be needed, at prices sufficient to repay the investment. Given the high capital cost of the projects, that uncertainty must be weighed against the available alternatives.

For example, a strict building code is one alternative to expensive new projects. One benefit of the conservation which results from a strict building code is that the savings come into the system in lockstep with the incremental loads. If few new buildings are built, little conservation occurs, but there is little need for conservation. If growth occurs rapidly in building, the conservation savings, compared with conventional building practices, are very large. Basically, by insuring that all growth is efficient growth, the entire problem of providing adequate resources becomes more manageable.

For the Pacific Northwest, insulation levels much higher than current building practices are justified by the cost of new powerplants. For residential structures, R-65 attic insulation, R-27 wall insulation, R-38 floor insulation, and triple glazing are all cost-effective. In Alaska, with more extreme Winter temperatures, even stricter standards would likely be justified by cost.

Since much of the growth in Alaska has been sporadic, energy efficiency has not always received the attention which it deserves. Retrofitting of existing structures, including insulation, multiple-glazing, and lighting system improvements, may provide a higher rate of return than any new power projects. Where Alaskans can get a better return on their oil royalty dollar in this manner, it makes sense to do so. Rates of return of 25% to 35% are not uncommon for retrofit conservation measures. By reducing the cost of living, such measures can make a big difference in family budgets.

Perhaps a critical concern I have about the Susitna project is that it may not be fully financible. Smaller projects can be financed as a unit; sufficient financing can be obtained at the outset to insure completion. Large projects are more difficult. The WPPSS 4&5 nuclear plants became unfinancable AFTER $2.25 billion had been invested in them. The money was lost by the ratepayers of the Northwest. Susitna could be a similar situation, where an initial $1 billion or so might be appropriated by the Legislature, but sufficient financing for completion could not be subsequently obtained. Given the uncertainty of demand, the cost of the projects, and the uncertainty of future oil royalty revenues, the availability of future financing should be looked at very carefully.

It is interesting to note that the Acres-American study team has retained Solomon Brothers, a national investment banking firm, to determine the financibility of the project. They are among the largest in this business, and have experience with projects of this magnitude. In fact, Solomon Brothers was the lead underwriter for WPPSS nuclear plants 4&5 at the time that the projects were terminated, for lack of financibility.

It would be truly unfortunate if $1 billion or $2 billion were invested in Susitna, and the projects not completed for lack of financing, or for lack of need in the future. It would certainly make more sense to develop smaller projects, for which adequate financing could be lined up prior to the start of construction. Several of the other hydroelectric projects under current consideration meet that test. Combining the smaller scale (and certainty of need) of these projects with their more certain finacibility makes them more dependable investments for the limited financial resources of the Alaskans you represent.

This issue is far from insignificant. A list of abandoned major energy projects in the lower 48 is quite depressing. Dozens of nuclear projects have been terminated, with investments in the hundreds of million of dollars per projects written off in the process. The Tennessee Valley Authority has defereed work on 8 partially completed nuclear plants. Coal and hydroelectric projects have also been abandoned, some for lack of need, some for lack of financing, and some for lack of construction permits.

In several cases, utilities have been ordered by their state regulatory bodies to abandon projects, in an effort to save the utilities, or their ratepayers, from bankruptcy. In the Northwest alone, six nuclear plants have been set aside; WPPSS 4&5 had a total of about $2.25 billion invested in them at the time of termination. The Skagit projects have had $360 million poured into them (without actually pouring any concrete), while the Pebble Springs units consumed about $300 million. I believe it unlikely that any of these projects will ever be completed. Due to poor planning (which Alaska is in a position to avoid) the money will be totally lost.

The list goes on and on. In California, the Sundesert nuclear projects were terminated by San Diego Gas and Electric, after several hundred million dollars were invested. In Arizona, Palo Verde units 4&5 followed the same course. In Oklahoma, the Black Fox units; in Texas, Allens Creek 1&2, and so forth. The price of poor planning is too great for anyone to bear; it is certainly too great in Alaska, where future development could be slow, rapid, or possibly negative, as oil resources are depleted. To fail to plan for this uncertainty is the greatest risk you face.

I hope that the mistakes of the Northwest serve as a good lesson to the people of Alaska. Where electrical demand is spurred along by subsidized power rates, and scarcity of capital and resources eventually appears, serious problems of economic dislocation can occur. On the other hand, an economic approach to energy pricing can insure a strong economy, a stable source of income for state government, and simultaneously promote conservation.

This is not to suggest that the lessons which can be applied to the Anchorage-Fairbanks corridor are necessarily applicable in rural areas, where a project must be of some certain size to be technologically feasible. It does not suggest that pricing policies applicable to an urban area are appropriate for other areas. And it does not suggest that the general concept of attempting to translate a one-time nonrenewable energy resource (oil) into a long-time renewable resource system (hydro) is a bad policy. In fact, it is an excellent concept. But the concept must be well implemented, or scarce capital, belonging collectively to the people of Alaska, will be wasted.

As I stated to Rep. Sutcliffe's committee, the current policy, of constructing resources for cash, and then underpricing the output, will attract energy-intensive industry, with the result being an export of oil royalty income to industry stockholders in the lower 48. The entire output of the Susitna projects would support only about 1500 jobs in the aluminum industry. On the other hand, economic pricing of energy, with the revenues therefrom used to attract manufacturing industry, could result in many times the economic impact for Alaskans. The people deserve careful investment of their funds, to bring the greatest good to the greatest number. I do not envy your difficult situation, but can certainly offer this warning of one very unattractive option, based on the experience of the Northwest.

I thank you for your interest in the complex and challenging problem.

Sincerely,

Jim Lazar
Consulting Economist

Alaska State Legislature

BETTYE FAHRENKAMP, CHAIRMAN
VIC FISCHER, VICE-CHAIRMAN
BRAD BRADLEY
DICK ELIASON
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JUNEAU, ALASKA 99811
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Senate

Committee on Resources

February 22, 1982
1:30 p.m.

Butrovich Room
Capitol - Room 205

MEMBERS PRESENT

Senator Fahrenkamp
Senator Fischer (at Anchorage site)
Senator Bradley
Senator Gilman
Senator Mulcahy
Senator Sturgulewski

Hearing

SB 608 An Act making a special appropriation to the power development fund of the Alaska Power Authority for the Susitna River hydroelectric project and other hydroelectric projects; and providing for an effective date.

Jim Cheydleur (Anchorage) opposes 608. He spoke of impact on fisheries and wildlife, and the lack of information in several areas. He favors smaller size hydro projects and energy grants to aid conservation.

Rene Limeres (Anchorage) thinks the legislature is exceeding its authority to appropriate $1 billion when the wildlife and fisheries studies are incomplete. He thinks this should go before the voters.

Paul Lowe (Anchorage) urged that the bill be killed in Committee, stating that giving $1 billion to any one project was not in the public interest.

Urban Rahoi (Fairbanks) stated let's do it now.

Guy Schuman (Fairbanks) stated no funds should be appropriated until the studies are complete and alternatives are studied.

Brenda Theyers-Wilson (Kodiak) is dubious of SB 608 because of the effect it will have on salmon spawning and the lack of information on exactly how the money will be spent.

Floyd Heimbuch (Soldotna), Executive Director, Cook Inlet Aquaculture Association, urged the co-development of hydro projects and salmon habitat. He recommended that funding be provided in SB 608 for this purpose.

Matt Zencey (Anchorage), Rural Community Action Program, finds SB 608 unequitable as hydro can't meet the needs of the villages. He urged improved efficiency of energy currently being used.

Emil Portscheller (Anchorage), referred to environmental and economic drawbacks as reasons for opposing SB 608, along with the need to complete feasibility studies and to emphasize conservation measures and alternative energy sources.

Jeff Weltzin (Fairbanks), Northern Alaska Environmental Center, feels appropriating money now is premature because the studies are incomplete. He supports SB 608 to fund existing hydro projects around the state, but not to fund Susitna.

Robert Sutherland (Fairbanks) supports smaller hydro projects in local areas, in addition to alternative energy sources and conservation. He urged low interest loans rather than outright subsidy by the State.

Budd Goodyear (MatSu), Public Information Officer, Matanuska Electric, supports SB 608 as stable-priced electrical energy.

Eric Meyers (Anchorage), Alaska Center for the Environment, is concerned with the fiscal impact of SB 608; the uneven distribution of wealth; the incomplete fish and wildlife studies; and the fact that revenues are needed elsewhere.

John Durkin (Anchorage) stated that he supports SB 608.

Tom Stahr (Anchorage), General Manager, Alaska Municipal Light and Power Company, supports SB 608. He suggested the State direct the Alaska Power Authority to conduct salmon-hydro codevelopment studies.

Gary Friedmann (Anchorage) stated no funds of this magnitude should be appropriated without a public vote. Loans, rather than grants, should be considered.

Ron Wendte (Ketchikan), Southern Southeast Regional Aquaculture Association, urged consideration of codevelopment of salmon and hydro.

Torre Jorgenson (Fairbanks) said the first priority of dollar allocation should be energy conservation, and that SB 608 should be put up for a public vote.

Alexa Dvorson (Fairbanks) opposes SB 608 because of the impact on salmon and caribou.

David Finkelstein (Anchorage) urged that no funding be provided before studies are complete.

Leroy Fredrickson (Anchorage) stated that he supports SB 608.

Randy Rogers (Fairbanks) wants a public vote on Susitna, and assurance that any savings in energy cost will go to the consumer.

Nancy Webb (Fairbanks) inquired as to the employment possibilities Susitna would create as compared to smaller and alternative projects.

Mike Holloway (Anchorage) favors low or no-interest loans rather than grants.

The meeting was adjourned at 3:40 p.m.

Alaska State Legislature

BETTYE FAHRENKAMP, CHAIRMAN
VIC FISCHER, VICE-CHAIRMAN
BRAD BRADLEY
DICK ELIASON
DON GILMAN
BOB MULCAHY
ARLISS STURGULEWSKI

POUCH V
STATE CAPITOL
JUNEAU, ALASKA 99811
(907) 465-3834
(907) 465-3835

Senate

Committee on Resources

February 24, 1982
1:30 p.m.

Butrovich Room
Room 205 - Capitol

MEMBERS PRESENT

Senator Fahrenkamp
Senator Fischer
Senator Bradley
Senator Eliason
Senator Gilman
Senator Mulcahy
Senator Sturgulewski

Hearing - Statewide Teleconference, Part II

SB 608 An Act making a special appropriation to the power development fund of the Alaska Power Authority for the Susitna River hydroelectric project and other hydroelectric projects: and providing for an effective date.

Keith Stump, Anchorage supports SB 608.

Doug Stark, Anchorage, supports SB 608 because hydroelectricity is a renewable resource.

Richard Hebb, Anchorage, supports SB 608, stating it will benefit all Alaskans.

Bill Wood, Fairbanks, supports SB 608 with the understanding that the money will be fairly allocated.

Tom Owen, Greater Fairbanks Chamber of Commerce, stated the Chamber has passed a resolution supporting Susitna and other hydro projects.

Joe Killion, Golden Valley Electric Association, supports SB 608, and would like a portion of the money allocated for the completion of the Intertie.

Ray Menaker, Haines, opposes SB 608 stating the studies need to be completed first.

Scott Lamb, Homer, supports SB 608, and stated that the Bradley Lake project needs more money.

Chuck Smith, MatSu, Susitna Now, favors SB 608, stating that 40 years of study is sufficient. The minor detrimental effects are outweighed by the need.

William Alexander, Anchorage, supports SB 608, stating Alaska needs power and employment.

Peg Kehrer, Director, Alaska Public Interest Research Group, Anchorage, opposes SB 608 as an unequal distribution of wealth, and stated there has not been enough public participation in the planning process.

L.W. Jones, Anchorage, favors SB 608, stating that oil revenues must be used to tap renewable resources.

Robert Orr, Fairbanks, supports SB 608, with some of the funds going to the Intertie.

A.W. Baker, Fairbanks, favors SB 608 as the only long term plan that will assure an adequate energy supply at reasonable cost.

Tim Jennings, Fairbanks, opposes SB 608, preferring smaller hydro projects, and greater use of alternative energy sources.

Bill Schneider, Anchorage, supports SB 608 because hydro is a clean, infinite, dependable source of energy. The long term operational cost savings will offset the initial large output of funds.

Sara Juday, Anchorage, opposes SB 608 as premature since the feasibility studies are not complete. She wants it to go up for a public vote.

Clara Stahr, Anchorage, supports SB 608 as benefiting all Alaskans.

Ginny Howard, Anchorage, supports SB 608 because hydro does not harm air quality.

Andy Piekarski, Anchorage, favors SB 608 because current energy costs and unemployment are too high.

Austin Ward, Fairbanks, supports SB 608.

Ginny Wood, Fairbanks, opposes Susitna but favors smaller hydro projects.

Ellen Mannion, Fairbanks, supports SB 608.

John Froceskie, Teamsters Union, Anchorage, supports SB 608.

Dorothy Patterson, Anchorage, supports SB 608 as it will provide jobs.

Patricia Anderson, Fairbanks, opposes SB 608. She would rather the money go to individual Alaskans for use in developing small energy projects or increasing energy efficiency in their homes.

Michell Robert, Fairbanks, opposes SB 608, stating that one year of field studies is inadequate.

Celia Hunter, Fairbanks, opposes SB 608. She would like some of the money to go towards conservation, and wants SB 608 to be voted on by the people.

Liz Gilbert, Susitna Power Now, Anchorage, supports SB 608.

Norman Josten, Anchorage, supports SB 608.

Geoff Kennedy, Fairbanks, wants SB 608 put on the ballot.

Terry Reichardt, Fairbanks, opposes SB 608 as too great an expenditure of money. He prefers State energy conservation loans.

Richard Underkofler , City Manager, Petersburg, stated that the City of Petersburg supports SB 608.

John Pursley, Anchorage, is opposed to the funding method proposed by SB 608. He would prefer to see grants.

Cindy Marquette, Executive Director, Alaska Center for the Environment, Anchorage, opposes SB 608, stating the studies must be completed first.

John Hopkins, Anchorage, supports SB 608, stating that Susitna would provide jobs and the dam would provide recreation.

Pauline Hessing, Fairbanks, opposes SB 608 as it discourages the development and use of alternative energy sources.

Ross Hardwick, Fairbanks, opposes SB 608, stating it should be voted on by the peopl .

Alexa Dvorson, Fairbanks, opposes SB 608, expressing concern over cost overruns.

Bruce Apple, National Wildlife Federation, Anchorage, recommended that SB 608 be amended to include SB 646 and HB 758.

Herman Kaiser, Anchorage, supports SB 608.

Blaine Dove, Anchorage, supports SB 608, stating Alaska needs the jobs it would provide.

Dave DeLong, Fairbanks, supports hydro but opposes SB 608. He is concerned about the incomplete studies and how Susitna will be funded.

Leroy Cook, Fairbanks, supports SB 608, stating that hydro power is preferable to burning wood.

Marilyn Sigmund, Fairbanks, opposes SB 608 because of incomplete studies, and she thinks it should be voted on by the public.

Mike Elderzelt, Anchorage, opposes SB 608.

Michael Keich, Anchorage, supports Sb 608, stating hydro power is cheap both environmentally and economically.

Max Foster, Anchorage, expressed support for the Battelle Study.

Nancy Webb, Fairbanks, opposes any appropriation of funds before the studies are complete.

Jane Galvlim, Fairbanks, is not necessarily opposed to Susitna but thinks it is inappropriate to give so much money to any one project while ignoring alternative energy sources.

Susan Georgette, Anchorage, opposes SB 608, stating the State has many needs other than the Susitna hydro project.

Frank Van Zant, Anchorage Chamber of Commerce, supports Susitna.

Mialma Kaiser, Anchorage, supports SB 608, as it would disturb the environment only minimally and would not pollute the air.

Vivian Menaker, Haines, opposes SB 608, stating the studies must be completed first. She suggested alternatives of smaller hydro, wind power, and natural gas.

Emil Portscheller, Anchorage, opposes SB 608 until environmental studies are completed.

Deke Harris, Anchorage, is concerned about the large amount of money, stating there are other programs that need funding.

Alan Seegert, Anchorage, opposes SB 608, stating feasibility studies need to be completed first.

Wilmer Oines, Thomas Bay Power Authority, Petersburg, supports SB 608.

Jim Lazar, Consulting Energy Economist, speaking for the Alaska Environmental Lobby in opposition to SB 608. Lazar urged that further consideration be given to the financibility of Susitna, the need for its power, and the return it will provide to all Alaskans. He suggested the legislature provide money only to complete the studies and begin the permit application process.

The meeting was adjourned at 3:30 p.m.

Alaska State Legislature

BETTYE FAHRENKAMP, CHAIRMAN
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POUCH V
STATE CAPITOL
JUNEAU, ALASKA 99811
(907) 465-3834
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THE SEAL OF THE STATE OF ALASKA

Senate

Committee on Resources

March 3, 1982
1:30 p.m.

Beltz Room
Room 211 - Capitol

MEMBERS PRESENT

Senator Fahrenkamp
Senator Fischer
Senator Bradley
Senator Eliason
Senator Gilman
Senator Mulcahy
Senator Sturgulewski

Hearing: (Teleconference, Part 3)

SB 608 An Act making a special appropriation to the power development fund of the Alaska Power Authority for the Susitna River hydroelectric project and other hydroelectric projects; and providing for an effective date.

Dave Hutchins, Executive Director, Alaska Rural Electrical Cooperative Association, referred to the mitigation of environmental impacts as a "key component" of the Susitna project, but thinks the hydro/salmon compatibility studies should not be funded by the hydro project. He stated the 1982 cost estimate is only a 4% increase over 1981, called the 5¢ per kilowatt hour savings Susitna would provide "significant", and said Bradley Lake and Chaknachamna are not alternatives to Susitna. As regards SB 608, it proposes a savings account for if and when Susitna is built. Currently, the Alaska Power Authority operates with a system-wide pool of money for hydro projects. Present law mandates that appropriations are to be averaged throughout the system; SB 608 does not approach this issue. Hutchins suggested funding priorities for FY 83 of projects ready to commence development and projects currently under development. Money for Susitna should then be set aside if available. Hutchins concluded by urging an amendment to SB 608 to include interest earnings on money appropriated.

Eric Yould, Executive Director, Alaska Power Authority (APA), provided a brief history of the Susitna project, saying that the legislature appropriated funds to APA to investigate the economic, engineering, technical, and environmental aspects of the project, and to recommend to the legislature whether the Federal Energy Regulatory Commission (FERC) permitting process should be pursued. An interim report went to the legislature in March 1981; final recommendations will be presented in April 1982. The ensuing FERC permitting process could take from 18 months to 3 1/2 years, with the engineering and design work going on at the same time. FERC will do their own economic feasibility study and can require APA to do further studies. APA and FERC have been working closely on this project, and Yould is confident the current studies are adequate, except from the environmental aspect. APA plans to submit more environemntal data thoughout the permitting process. Yould concluded with a brief rundown on the status of the smaller hydro projects: he will be supplying the Resources Committee with detailed cost figures in a letter.

Rupe Andrews, Alaska Department of Fish and Game, considers Susitna a great opportunity to develop new fisheries technology. Field work began in May 1981 with 50 contract employees studying what comes into the system, what lives in the system, and the spawning and rearing needs of those fish. The goal is to get APA to the FERC process with data that will withstand any challenge. Andrews did mention that since the life cycle of the Chinook salmon is 5-6 years, studies will have to go that long to determine full impacts and that some issues (as yet unknown) will probably need mitigation.

Tom Cashen, International Brotherhood of Electrical Workers, spoke in support of SB 608 because of the employment opportunities it will provide.

Jean Kline, Associated General Contractors, spoke in support of SB 608, referring to hydro as clean, infinite, safe, and reasonably priced energy. She stated that Juneau electrical customers, who are paying 5¢ per kilowatt hour because of Snettisham hydro, would be paying 12-17¢ per kilowatt hour if diesel fired electricity was being used.

Bill Ashton, Civil Engineering Student, University of Alaska, encouraged a close look at APA's "track record", reasons for Susitna's increasing cost estimates, the project's cost effectiveness, whether State grants for hydro are the best use of our revenues, and the options of conservation and increased energy efficiency.

The meeting was adjourned at 3:00 p.m.

Alaska State Legislature

Official Business

SENATE
Resources Committee

465-3834

Pouch V
State Capitol
Juneau, Alaska 99811

March 12, 1982
1:35 p.m.

Beltz Room
Room 211 - Capitol

MEMBERS PRESENT

Senator Fahrenkamp
Senator Fischer
Senator Bradley
Senator Mulcahy
Senator Sturgulewski
Senator Kertulla
Representative Sutcliffe

Hearing:
Alaskan Agriculture Overview--by Bill Heim, Charles Logsdon, and Roland Snodgrass
SB 608 An Act making a special appropriation to the power development fund of the Alaska Power Authority for the Susitna River hydroelectric project and other hydroelectric projects: and providing for an effective date.

Agriculture Overview

Charles Logsdon stated that the overview establishes a philosophical base for agriculture actions, and defines the State's role as one of providing the proper climate for farming. He reviewed the report's 16 recommendations for legislative action:

1. Accelerate the disposal and production schedule of state agriculture lands.
2. Revamp the Agriculture Revolving Loan Fund, so that it is a development fund only, with no new loans to an agricultural enterprise after seven years.
3. Establish an office for market development and information for Alaska products with an "800" telephone number, to aid in the distribution phase of agriculture.
4. Establish a crop testing program for remote areas.
5. Fund the establishment of archives of all pertinent data related to State agricultural projects.
6. Fund the creation of an "Alaskan Agricultural Development" computer-simulation model in order to project future development feasibilities.
7. Assure research support for agricultural development by funding of the Agricultural Experiment Station with a separate budget.
8. Fund the development and service of an in-state agricultural data bank, available to the public through computer terminals.

9. Establish joint quarantine facility at the Palmer Plant Material Center.

10. Establish a gene bank of northern-adapted plants useful in Alaska.

11. Fund a joint weed control demonstration with the Province of Alberta in the Delta Junction region.

12. Fund a once-a-year barge service to the Aleutian Islands to bring feeder cattle to the mainland for finishing.

13. Appraise the world market possibilities for Alaska products.

14. Express willingness to work with Native corporations in development of the agricultural capabilities of their land.

15. Consider the development of limestone and phosphate resources in Alaska for fertilizer.

16. Develop a modest but firm-priced source of electricity, which can have a great impact on agricultural productivity.

Bill Heim recommended that the Agriculture Revolving Loan Fund have a separate account for land clearing, with no payback for three to four years to allow time to get land into production. Land clearing funds are important for the development of small farms. Small farms should be located near large farms to use the existing infrastructure. Since most small farmers work off the farm, too, small farms should be located near other employment opportunities.

SB 608

Senator Fischer prepared a Committee Substitute consisting of items already before the Senate Finance Committee in the Governor's budget. There is concern that the Governor may change his budget in view of the projected revenue shortfalls. The Committee Substitute assures that all projects would remain before the Finance Committee.

Senator Fahrenkamp prepared an amendment to page 1, line 27, appropriating $2.5 million for an electrical generation unit at Cordova.

Senator Fischer asked for more time to prepare an amendment dealing with alternative energy sources.

Senator Fahrenkamp stated SB 608 would be held until Wednesday.

Senator Fischer moved the Committee consider the Committee Substitute. He then moved the adoption of the amendment to page 1, line 27.

The meeting was adjourned at 2:40 p.m.

Alaska State Legislature

Senate

Resources Committee

Official Business

Pouch V
State Capitol
Juneau, Alaska 99811

March 17, 1982
1:35 p.m.

Beltz Room
Room 211 - Capitol

MEMBERS PRESENT

Senator Fahrenkamp
Senator Fischer
Senator Eliason
Senator Gilman
Senator Mulcahy
Senator Sturgulewski

Hearing:

Briefing - Resource Inventory Program - Department of Natural Resources

SSSB 608 - An Act making a special appropriation to the power development fund of the Alaska Power Authority for the Susitna River hydroelectric project and other hydroelectric projects; and providing for an effective date.

Briefing:

Jeff Haynes, Deputy Commissioner, Department of Natural Resources, explained that the Department received a capital appropriation last year to search for new resources, and would present a progress report today.

Ross Shaff, State Geologist, Department of Natural Resources, stated that a cooperative arrangement had been worked out with other state and federal agencies for collecting data for the Resource Inventory Program. An initial goal is compiling the existing information, which involves a literature search of everything collected in the state on resources, and putting it into a digitized format. Surface resources being studied include archeological sites, agriculture, and forestry, in coordination with the land disposal program. The water data collection program has been developed in conjunction with the United States Geological Survey, which matches the State dollar for dollar in funding the program. Subsurface studies include geothermal potential, minerals, coal, and petroleum. Areas selected for study are those in which development is most likely to take place. The State produces maps of areas inventoried, with detailed mapping in particular locations.

SSSB 608

Senator Fischer explained that he had prepared a Committee Substitute incorporating suggestions he had received from various people, and organized the bill to group related items.

The Committee discussed the adequacy of the amounts of the various appropriations. Senator Fischer stated the bill was designed to bring the ideas before the Finance Committee. Senator Fahrenkamp suggested a letter of intent be sent with the bill explaining that more analysis needs to be done on the amounts appropriated.

Senator Eliason moved and asked unanimous consent for the adoption of an amendment appropriating $200,000 for a new power distribution system in Tenakee Springs.

Senator Eliason moved and asked unanimous consent for the adoption of an amendment appropriating $1.1 million for the Hoonah Intertie.

Senator Gilman moved and asked unanimous consent for the adoption of an amendment appropriating $35,000,000 for construction of the Bradley Lake hydroelectric project.

Senator Fischer moved the Committee Substitute for SSSB 608 as amended, with individual recommendations.

The meeting was adjourned at 2:50 p.m.

ALASKA STATE LEGISLATURE
HOUSE OF REPRESENTATIVES
RESEARCH AGENCY

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

May 22, 1981

MEMORANDUM

TO: Representative Tony Vaska
Attn: Norman Cohen

FROM: Alexander Hoke and Jack Kreinheder
Research Staff
A.H. JK

RE: Analysis of SB 25 and SB 26 Hydro Legislation
Research Request No. 81-142

You asked that we provide the following information for each of the power projects included in SB 25 and SB 26: (1) net State contribution; (2) State contribution per electrical customer served; and (3) the State contribution per resident of the communities served by each project. Each of these state contributions was to be shown in terms of the expenditures in each fiscal year from 1982 to 1991, the annualized net cost for each fiscal year 1982 to 2001, and the present value of this annualized net cost as of 1981.

The analysis was to address five scenarios: the Senate version of SB 25 and SB 26, with and without funding for construction of the Susitna dams; the House Resources CS for SB 25 and SB 26, with and without Susitna funding; and the House Resources CS for HB 359, which amends the power cost assistance program.

We have prepared four computer printouts, which are enclosed, that provide the requested information for the House and Senate versions of SB 25 and SB 26. The power cost assistance program in HB 359 has been incorporated into the two printouts for the House version of the hydro legislation. The information on the printouts is divided into three groupings: total expenditures and costs, expenditures and costs per power consumer, and expenditures and costs per capita.

Column 1 of each printout shows the planned expenditures for each project by fiscal year. Column 2 displays the net annualized 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 Green Lake project in the House Resources version of SB 26 has an appropriation of $52.5 million. The net annualized cost of this appropriation over the period from FY 1982 to FY 2001 is about $3.97 million per year. This figure is the difference between the $6.59 million which the State could receive each year from a loan or bond investment at 11 percent interest, and the $2.62 million which the State would receive from the 5 percent "equity return" on hydro projects specified in the House Resources work draft version of SB 25.

You can see from the Green Lake example, as well as other non-grant projects, that the net annualized cost does not remain constant throughout the 1982 - 2001 period. These changes are a result of the linkages with the Susitna project which are incorporated in the House Resources version of SB 25. The draft Resources CS provides that when 500 megawatts of generation capacity have been developed, or in other words, when the first phase of Susitna has been completed, the return to the State from the power projects will be reduced from 5 percent to a level which covers operations and maintenance costs and other expenses.

The Watana dam which comprises the first phase of proposed Susitna development is scheduled for completion in 1993. Therefore, the net annualized cost for all the loan-financed power projects jumps in 1994 as a result of the termination of the 5 percent equity return. In the Green Lake expample, the net annualized cost increases in 1994 from $3.97 million to $6.6 million, because the $2.62 million equity return would not be received after 1993 if Susitna is constructed.

The opposite effect would occur under the Resources version of SB 25 if Susitna or another large hydro project is not constructed. The draft bill provides that if the legislature has not appropriated at least $5 billion to the power development fund by FY 1986, the equity return to the State shall increase from 5 percent to 10 percent. On the printout which excludes Susitna, the net annualized cost for Green Lake decreases from $3.97 million to $1.34 million in 1987, because of the doubling of the State's return from the project. Similar decreases occur for all loan-financed power projects.

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.

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. At the end of each computer listing is a summary table which shows the total expenditures and costs for all power projects from FY 1982 to FY 2001. The grand totals at the bottom of each summary table represent the total expenditures and costs for each of the four scenarios.

We hope this information is useful. Now that we have the program set up, we should be able to incorporate any changes or additions you might like fairly quickly. If you have any questions or comments, please let us know.

JK/dp

SUMMARY OF ALL POWER PROJECTS
SB 26 (HOUSE RESOURCES VERSION)

	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	301,666,000	35,256,900	31,646,593	2,220	259	232	818	95	85
FY 1983	113,570,000	47,064,173	37,918,934	835	346	279	308	127	102
FY 1984	61,438,000	55,041,459	39,805,077	452	405	292	166	149	108
FY 1985	1,354,000	44,220,826	28,705,044	9	325	211	3	120	77
FY 1986	1,308,000	44,398,082	25,868,927	9	326	190	3	120	70
FY 1987	1,277,000	28,279,668	14,785,402	9	208	108	3	76	40
FY 1988	1,254,000	28,450,276	13,355,692	9	209	98	3	77	36
FY 1989	1,240,000	28,633,983	12,065,477	9	210	88	3	77	32
FY 1990	1,234,000	28,824,053	10,901,861	9	212	80	3	78	29
FY 1991	1,236,000	29,023,199	9,853,118	9	213	72	3	78	26
FY 1992	0	29,023,199	8,844,159	0	213	65	0	78	24
FY 1993	0	29,023,199	7,938,517	0	213	58	0	78	21
FY 1994	0	29,023,199	7,125,613	0	213	52	0	78	19
FY 1995	0	29,023,199	6,395,950	0	213	47	0	78	17
FY 1996	0	29,023,199	5,741,005	0	213	42	0	78	15
FY 1997	0	29,023,199	5,153,126	0	213	37	0	78	13
FY 1998	0	29,023,199	4,625,446	0	213	34	0	78	12
FY 1999	0	29,023,199	4,151,800	0	213	30	0	78	11
FY 2000	0	29,023,199	3,726,656	0	213	27	0	78	10
FY 2001	0	29,023,199	3,345,046	0	213	24	0	78	9
TOTALS	485,577,000	659,415,615	281,953,452	3,573	4,853	2,075	1,317	1,789	765

SUMMARY OF ALL POWER PROJECTS - SB 26 (HOUSE RESOURCES VERSION)
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
GREEN LAKE	52,500	39,979	20,016	21,000	15,991	8,006	6,757	5,146	2,576
OUZINKIE	1,700	1,379	724	29,824	24,203	12,709	9,826	7,974	4,187
PORT LIONS	1,400	1,136	596	19,718	16,001	8,402	6,511	5,284	2,774
SNETTISHAM	4,500	3,651	1,917	548	445	233	230	187	98
SOLOMON GULCH	29,000	23,533	12,358	14,257	11,570	6,075	4,833	3,922	2,059
SWAN LAKE	65,000	55,309	28,310	17,195	14,632	7,489	5,728	4,874	2,494
TERROR LAKE	100,000	34,151	42,533	34,843	29,321	14,820	10,083	8,485	4,288
TYEE LAKE	55,000	46,633	23,779	26,908	22,814	11,633	8,967	7,603	3,877
AEL&P	7,000	5,680	2,982	952	772	405	400	325	170
ANCH-FBNKS INTERTIE	85,000	207,796	76,541	834	2,040	751	313	767	282
CRAIG-KLAWOCK INTERTIE	2,000	5,023	1,947	7,117	17,875	6,931	2,372	5,958	2,310
TYEE-KAKE INTERTIE	5,800	14,391	5,450	32,222	79,950	30,279	10,603	26,309	9,964
KOTZEBUE-SHUNGNAK	200	502	194	305	766	297	89	223	86
NAPASKIAK-OSCARVILLE	215	539	209	2,150	5,399	2,093	728	1,830	709
BETHEL-NAPASKIAK	215	539	209	157	395	153	57	144	55
BETHEL REG. STUDY	1,000	2,511	973	778	1,956	758	285	716	278
BLACK BEAR LAKE	2,000	5,023	1,947	5,000	12,557	4,869	1,666	4,185	1,623
BRADLEY LAKE	4,000	10,046	3,895	428	1,076	417	159	400	155
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
POWER CREEK	700	1,758	681	688	1,730	670	220	554	214
SUSITNA STUDY	18,100	45,458	17,627	177	446	173	87	218	84
TAKATZ LAKE	50	125	48	20	50	19	6	16	6
TAZIMINA LAKE	2,000	5,023	1,947	5,714	14,351	5,565	1,846	4,638	1,798
HOONAH-JUNEAU INTERTIE	996	2,501	969	3,112	7,817	3,031	1,471	3,694	1,432
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
VILLAGE ELECTRIFICATION	400	1,004	389	3,149	7,910	3,067	1,044	2,622	1,017
RURAL POWER LOANS	400	1,004	389	N/A	N/A	N/A	N/A	N/A	N/A
UNALASKA GEOTHERMAL	5,000	12,557	4,869	11,627	29,203	11,324	3,843	9,652	3,742
RURAL POWER GRANTS	5,000	12,557	4,869	N/A	N/A	N/A	N/A	N/A	N/A
RURAL VIL. RECONNAISSANCE	5,600	14,064	5,453	781	1,953	761	260	654	253
AVEC POWER COST ASSIST.	10,472	22,359	6,613	2,908	6,210	1,838	748	1,597	472
PORT LIONS COST ASSIST.	443	947	281	6,514	13,919	4,142	2,050	4,408	1,310
KOTZEBUE COST ASSISTANCE	286	639	257	484	1,185	435	139	342	126
TLINGIT-HAIDA COST ASSIST	1,744	3,851	1,206	2,412	5,327	1,668	826	1,824	571
UNALAKLEET COST ASSIST.	284	629	198	1,371	3,040	957	461	1,021	322
MCGRATH COST ASSISTANCE	274	603	188	2,382	5,252	1,639	771	1,701	531
NOME COST ASSISTANCE	156	388	148	205	512	195	68	170	65
TOTALS	485,577	699,415	201,953	3,573	4,853	2,075	1,412	1,789	765

SUMMARY OF ALL POWER PROJECTS
SB 26 (SENATE VERSION)

	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	337,800,000	42,419,450	38,075,698	2,407	302	271	882	110	99
FY 1983	121,400,000	57,905,538	46,653,667	865	412	332	317	151	121
FY 1984	72,500,000	67,319,146	48,684,098	516	479	347	189	175	127
FY 1985	0	67,319,146	43,698,846	0	479	311	0	175	114
FY 1986	0	67,319,146	39,224,084	0	479	279	0	175	102
FY 1987	0	67,319,146	35,207,538	0	479	250	0	175	92
FY 1988	0	67,319,146	31,602,286	0	479	225	0	175	82
FY 1989	0	67,319,146	28,366,212	0	479	202	0	175	74
FY 1990	0	67,319,146	25,461,512	0	479	181	0	175	66
FY 1991	0	67,319,146	22,854,253	0	479	162	0	175	59
FY 1992	0	67,319,146	20,513,977	0	479	146	0	175	53
FY 1993	0	67,319,146	18,413,346	0	479	131	0	175	48
FY 1994	0	67,319,146	16,527,819	0	479	117	0	175	43
FY 1995	0	67,319,146	14,835,371	0	479	105	0	175	38
FY 1996	0	67,319,146	13,316,229	0	479	94	0	175	34
FY 1997	0	67,319,146	11,952,647	0	479	85	0	175	31
FY 1998	0	67,319,146	10,728,698	0	479	76	0	175	28
FY 1999	0	67,319,146	9,630,077	0	479	68	0	175	25
FY 2000	0	67,319,146	8,643,957	0	479	61	0	175	22
FY 2001	0	67,319,146	7,758,816	0	479	55	0	175	20
TOTALS	531,700,000	1,312,069,620	492,149,138	3,789	9,352	3,507	1,389	3,429	1,286

SUMMARY OF ALL POWER PROJECTS - SB 26 (SENATE VERSION)
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
GREEN LAKE	46,000	115,529	44,798	18,400	46,211	17,919	5,920	14,870	5,766
PORT LIONS	1,400	3,516	1,363	19,718	49,522	19,203	6,511	16,354	6,341
SNETTISHAM	20,000	50,230	19,477	2,439	6,127	2,376	1,026	2,578	999
SOLOMON GULCH	62,000	155,713	60,380	30,481	76,555	29,685	10,333	25,952	10,063
SWAN LAKE	53,000	129,906	48,071	14,021	34,366	12,717	4,670	11,448	4,236
TERROR LAKE	81,500	198,983	73,075	28,397	69,332	25,461	8,218	20,064	7,368
TYEE LAKE	45,000	110,165	40,676	22,015	53,897	19,900	7,337	17,962	6,632
ANCH-FBNKS INTERTIE	85,000	207,796	76,541	834	2,040	751	313	767	282
BLACK BEAR LAKE	1,400	3,516	1,363	3,500	8,790	3,408	1,166	2,930	1,136
BRADLEY LAKE	60,000	145,008	52,194	6,429	15,538	5,593	2,399	5,783	2,081
CHESTER LAKE	6,000	15,069	5,843	18,181	45,663	17,706	6,066	15,236	5,908
GRANT LAKE	3,000	7,358	2,723	4,885	11,985	4,435	1,628	3,995	1,478
KISARALIK	1,000	2,511	973	778	1,956	758	285	716	278
KOTZEBUE	850	2,134	827	1,440	3,618	1,403	415	1,044	404
POWER CREEK	700	1,758	681	688	1,730	670	220	554	214
SCAMMON BAY	200	502	194	2,409	6,051	2,346	796	2,001	776
SUSITNA STUDY	15,000	37,672	14,608	147	370	143	72	181	70
TAKATZ LAKE	50	125	48	20	50	19	6	16	6
TAZIMNA LAKE	2,000	5,023	1,947	5,714	14,351	5,565	1,846	4,638	1,798
RURAL VIL. RECONNAISSANCE	5,600	14,064	5,453	2,641	6,634	2,572	880	2,211	857
SENATE DIST. M	10,000	25,115	9,738	1,920	4,823	1,870	640	1,607	623
SENATE DIST. N	10,000	25,115	9,738	1,715	4,307	1,670	571	1,435	556
SENATE DIST. P	10,000	25,115	9,738	1,891	4,750	1,842	630	1,583	614
OTHER AREAS	10,000	25,115	9,738	N/A	N/A	N/A	N/A	N/A	N/A
TAZIMNA LAKE	2,000	5,023	1,947	5,714	14,351	5,565	1,846	4,638	1,798
HOONAH-JUNEAU INTERTIE	995	2,501	969	3,112	7,817	3,031	1,471	3,694	1,432
PELICAN	42	105	40	552	1,387	538	273	586	227
LAKE ELVA	4,500	11,301	4,382	6,818	17,123	6,640	2,250	5,650	2,191
VILLAGE ELECTRIFICATION	400	1,004	389	3,149	7,910	3,067	1,044	2,622	1,017
RURAL POWER LOANS	400	1,004	389	N/A	N/A	N/A	N/A	N/A	N/A
UNALASKA GEOTHERMAL	5,000	12,557	4,869	11,627	29,203	11,324	3,843	9,652	3,742
RURAL POWER GRANTS	5,000	12,557	4,869	N/A	N/A	N/A	N/A	N/A	N/A
RURAL VIL. RECONNAISSANCE	5,600	14,064	5,453	781	1,963	761	260	654	253
AVEC POWER COST ASSIST.	10,472	22,359	6,619	2,908	6,210	1,838	748	1,597	472
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SUMMARY OF ALL POWER PROJECTS
SB 26 (SENATE VERSION)

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FY 1994	0	67,319,146	16,527,819	0	479	117	0	175	43
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FY 2000	0	67,319,146	8,643,957	0	479	61	0	175	22
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TOTALS	531,700,000	1,312,069,620	492,149,138	3,789	9,352	3,507	1,389	3,429	1,286

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 JK
Research Staff AH

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.

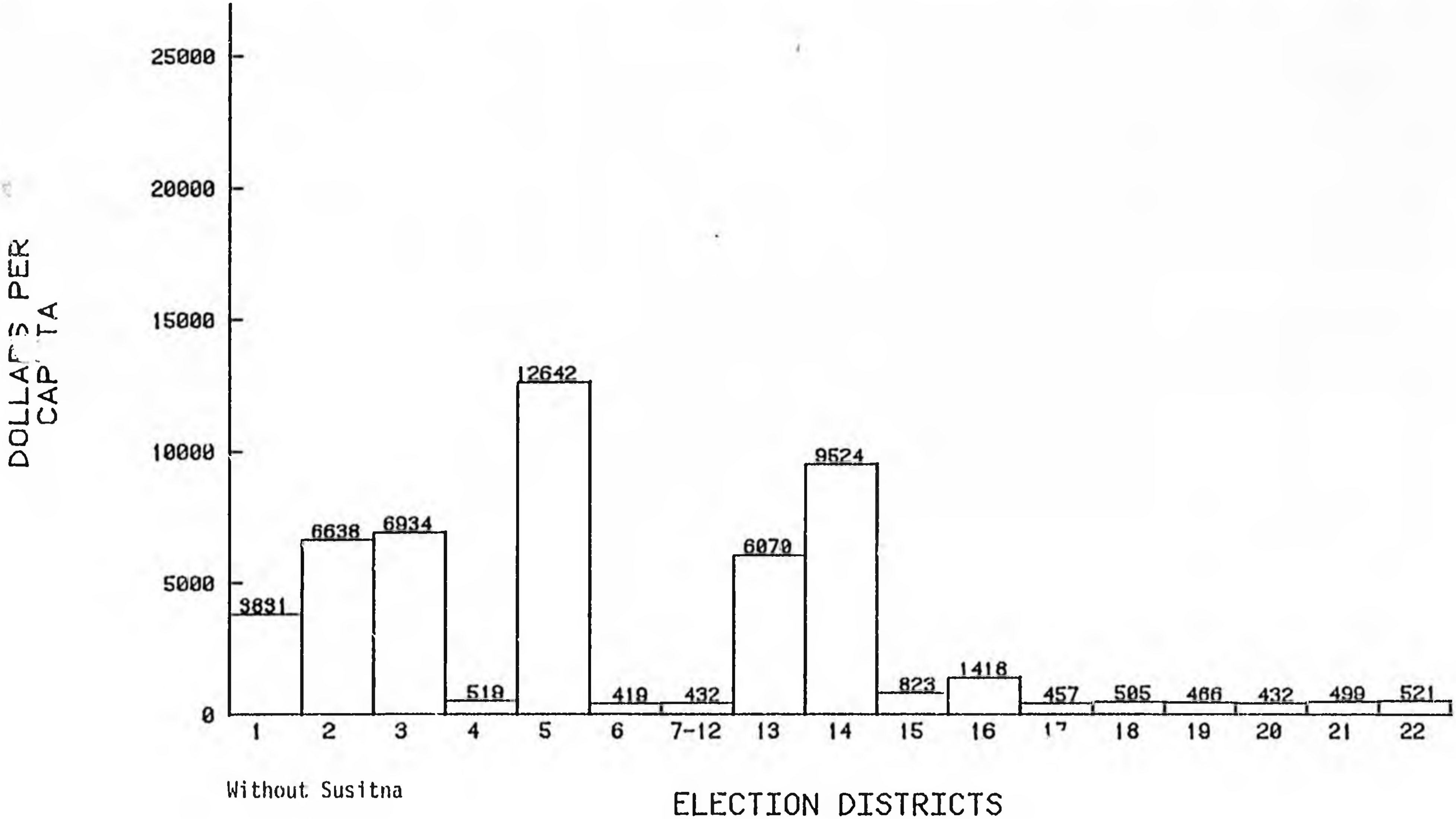
We hope this information is useful. If you have any questions or would like additional information, please let us know.

Enclosures

JK/bf

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

FIGURE 1

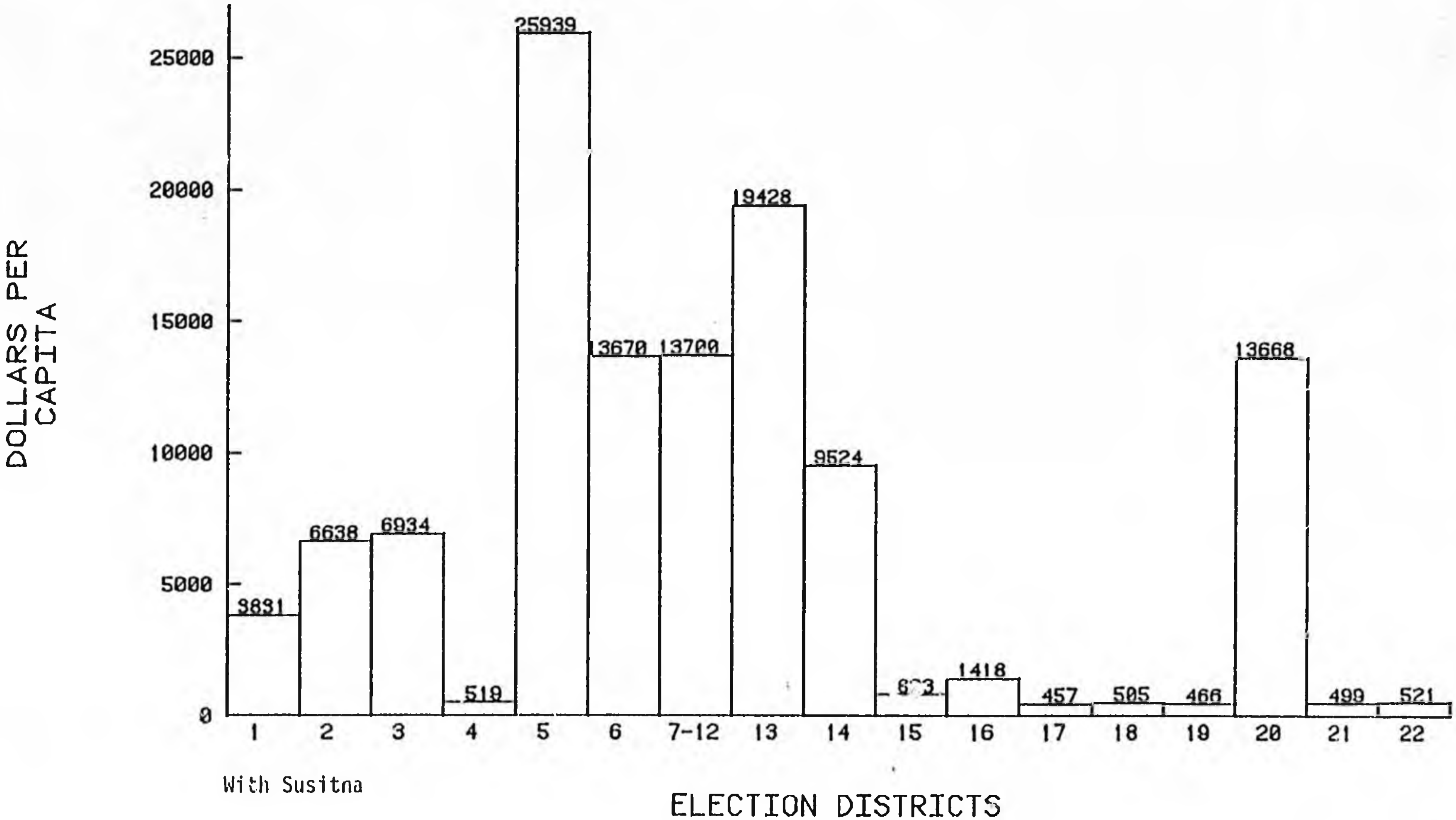


Without Susitna

PREPARED BY:
HOUSE OF REPRESENTATIVES
RESEARCH AGENCY

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

FIGURE 2

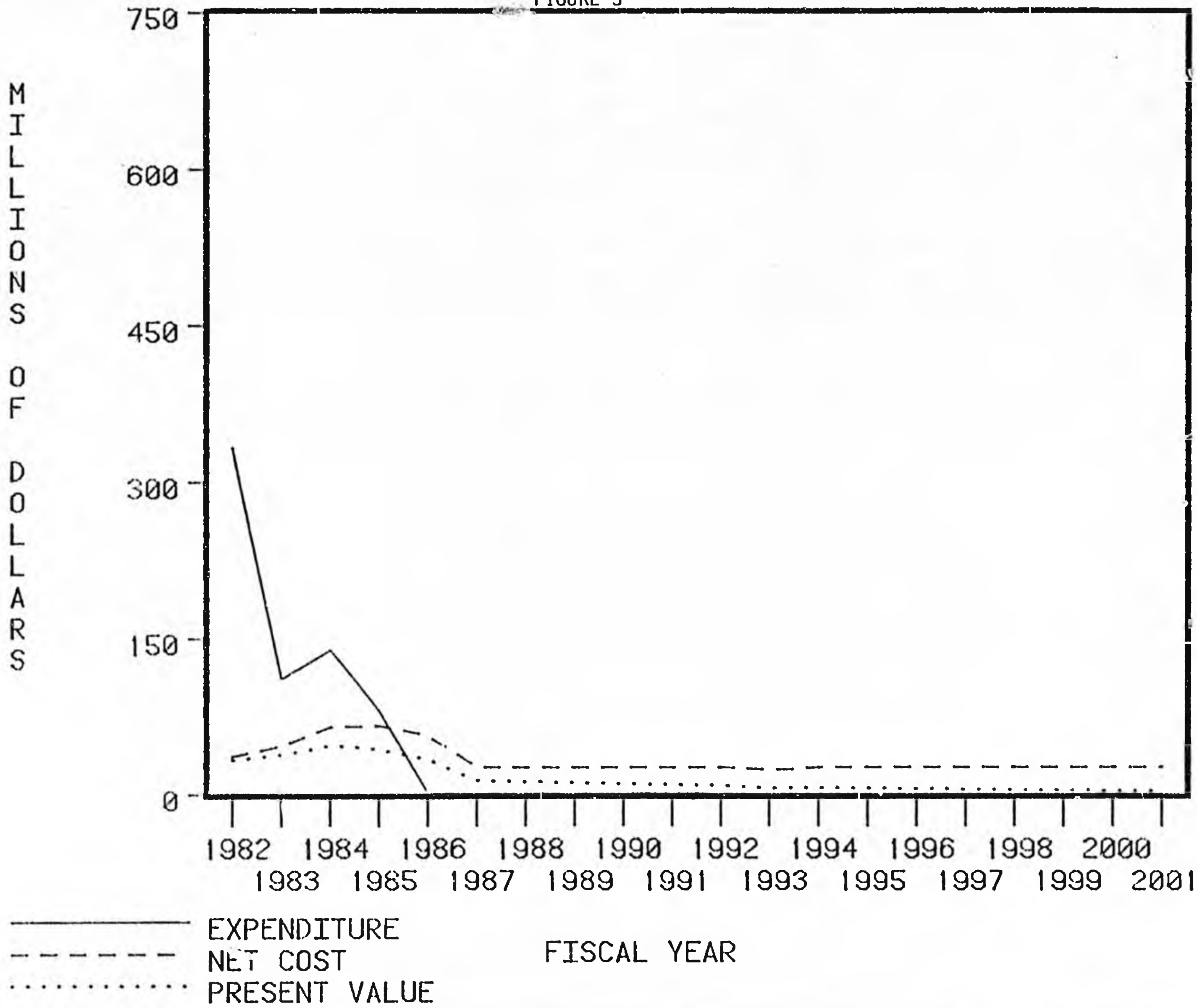


PREPARED BY:
HOUSE OF REPRE[illegible]NTATIVES
RESEARCH AGEN[illegible]

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

ASSUMES NO FUNDING FOR SUSITNA PROJECT

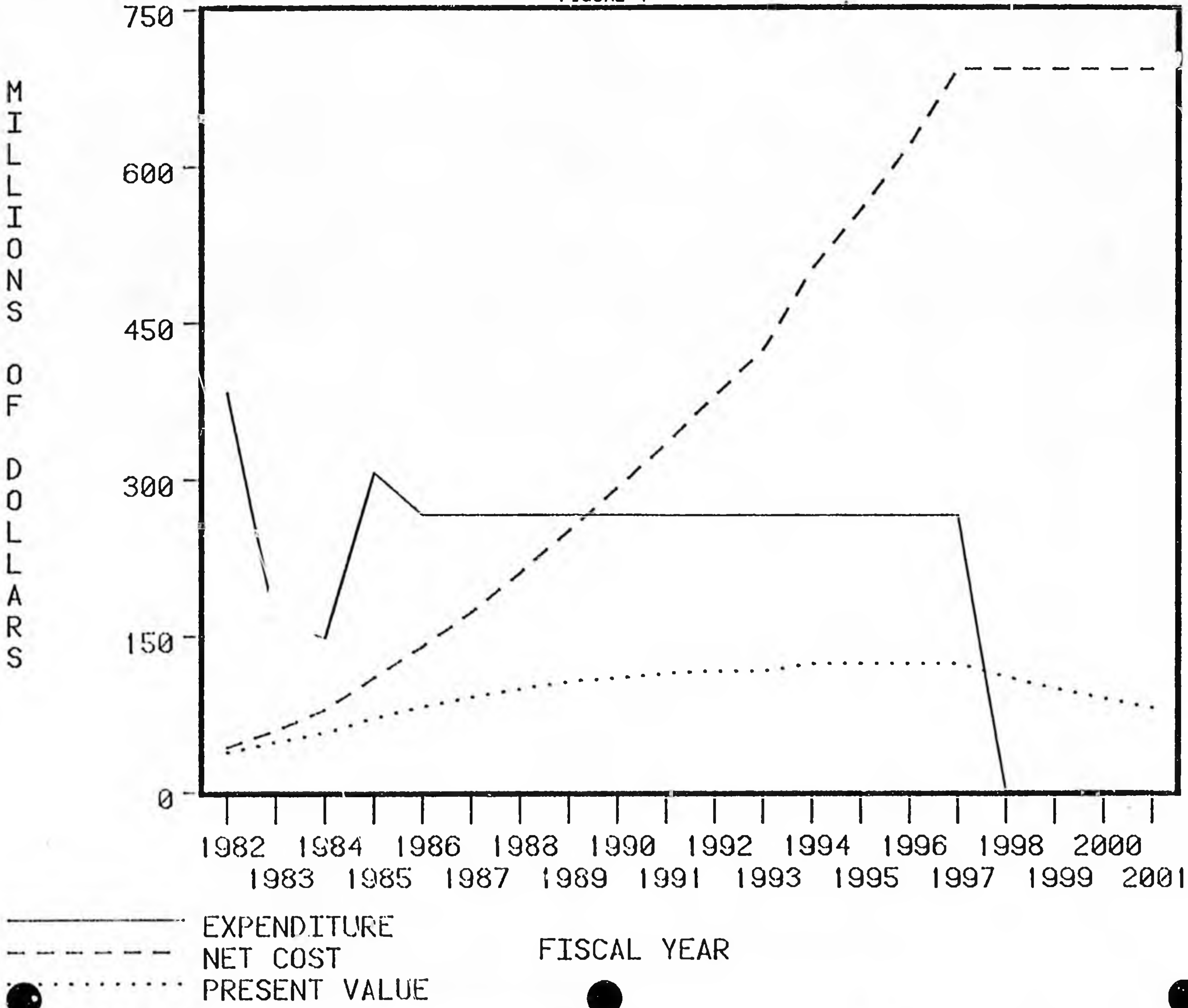
FIGURE 3



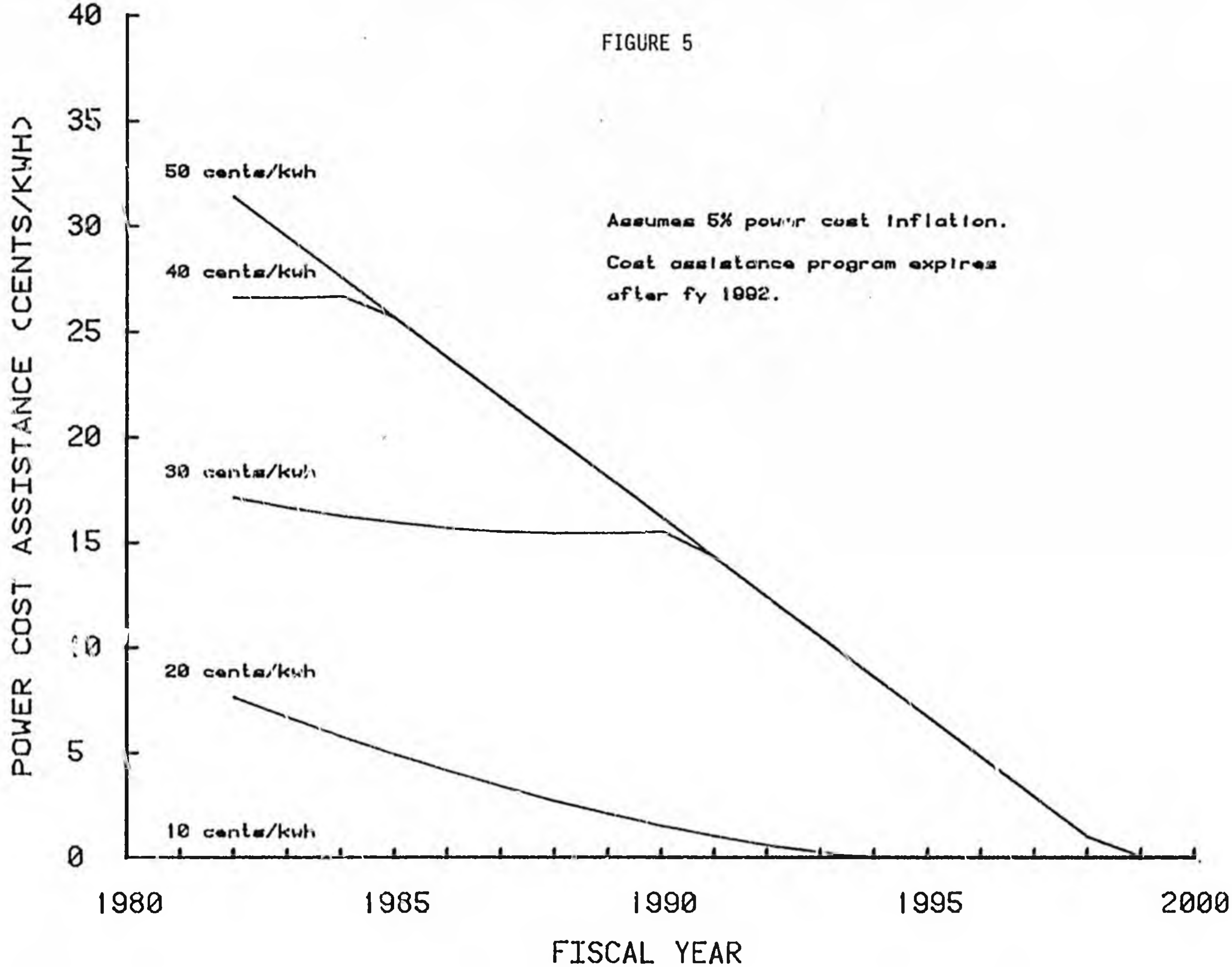
HYDRO FINANCING ANALYSIS - SB 26 (H. RESOURCES VERSION)

ASSUMES SUSITNA PROJECT FUNDING

FIGURE 4



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



ALASKA STATE LEGISLATURE
HOUSE OF REPRESENTATIVES
RESEARCH AGENCY

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

June 11 1981

MEMORANDUM

TO: Representative Russ Meekins, Jr.

FROM: Jack Kreinheder JK
Research Staff

RE Opportunity Costs for Hydro Investments
81-152

The attached graph shows the change in opportunity costs to the State for hydro investments under different financing alternatives, which we discussed at the Finance Committee hearing of June 4. I'm sorry I wasn't able to prepare this graph before you finished your work with the bill but I hope it is useful as a general example of the significance of opportunity costs in making decisions on legislative appropriations.

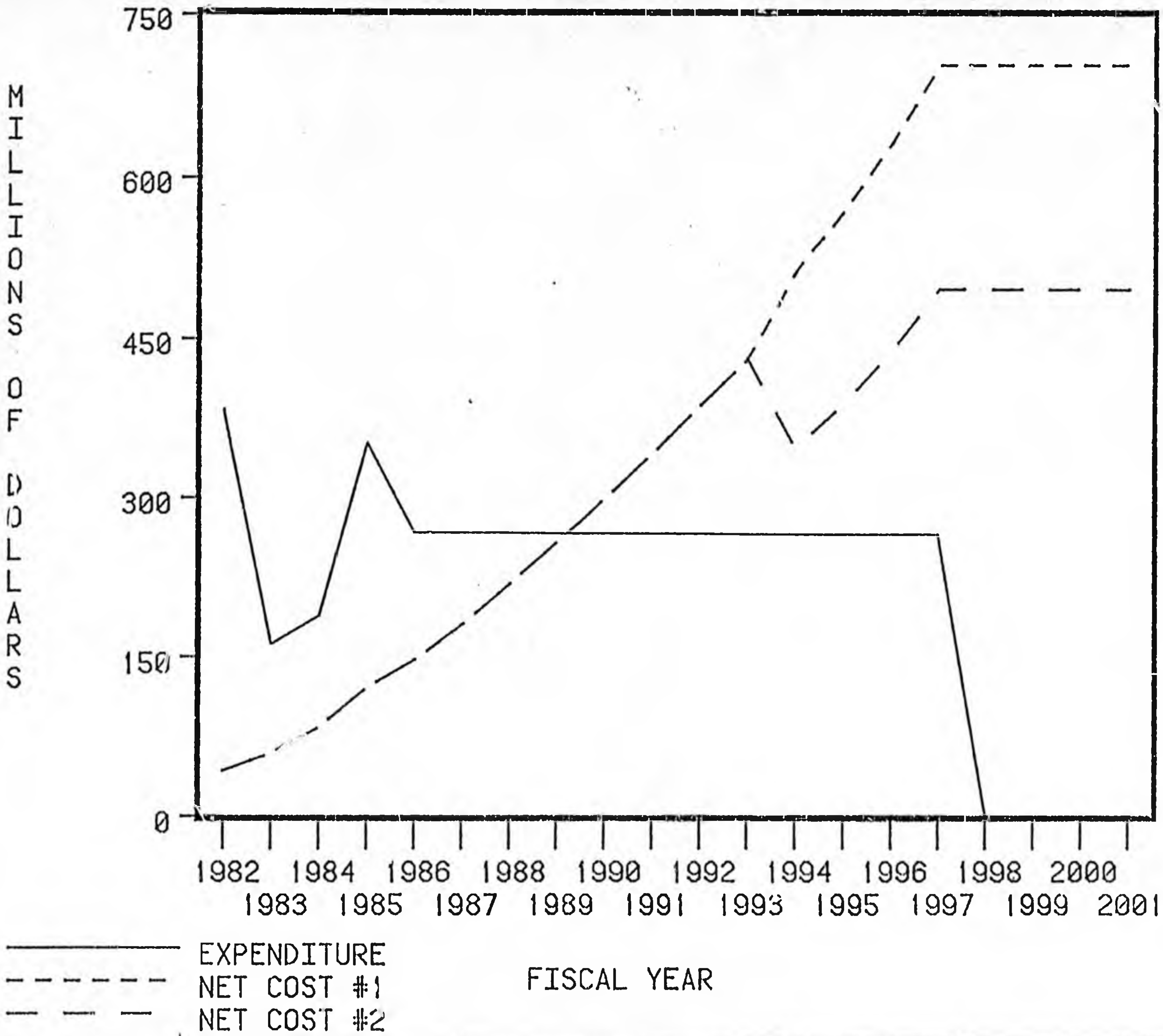
Two levels of opportunity costs are shown on the chart as Net Cost #1 and Net Cost #2. As I explained earlier we have considered the net cost of the hydro investments as the difference between the amount the State could receive from a market investment at 11 percent interest and the 5 percent equity return which was specified in the House Resources CS for SB 25. Net Cost #1 shows the opportunity cost to the State with Susitna construction funding and the termination of the 5 percent equity return upon completion of the Watana phase of the Susitna project in 1993 (when the 500 megawatt threshold specified in the bill would be reached).

The curve for Net Cost #2 (the lower dashed curve) shows how the opportunity costs to the State would be reduced if the provision terminating the 5 percent equity return when 500 megawatts are "on-line" were to be deleted. In other words, Net Cost #2 is based on a 5 percent equity return through the year 2001 rather than just until 1993. As the graph demonstrates the difference in opportunity costs between the two alternatives is about $180 million per year after 1993. The total difference in opportunity costs from 1993 until 2001 is about $1.28 billion.

In practical terms continuing the 5 percent equity return from 1993 until 2001 would provide the State with about $1.28 billion in additional revenues to be invested or appropriated for other purposes. Of course, these additional revenues would be at the expense of somewhat higher power costs to electricity consumers.

I hope this example helps to clarify the value of this type of analysis for expenditure decisions. Please let us know if we may be of further assistance to you.

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



Alaska State Legislature
Senate Advisory Council

MEMORANDUM

Pouch V
State Capitol
Juneau, Alaska 99811

Offical Business

TO: Senator Fahrenkamp
FROM: Kurt S. Dzinich KSD
SUBJECT: Susitna Hydroelectric Project
DATE: March 10, 1982

Following summary is provided for your information and reference in the upcoming deliberations on the Susitna Hydroelectric project.

Statutory Requirements. Enclosure 1 is a copy of AS 44.83.320, 44.83.325 and 44.83.330 and covers the essential requirements to be met on proceeding with the Susitna project. Some key provisions:

1 - APA must submit preliminary report to governor and legislature by 30 April 1982.

2 - APA may not enter into any contracts other than those necessary to complete feasibility studies and reports required by 44.83.320 until the legislature approves by law the preliminary report.

3 - Within one year after legislative approval of the preliminary report the Authority may initiate construction of the Susitna project.

Schedule of Events. Enclosure 2 is a chronological sequence of events between now and 30 April 1982. The APA recommendation will be based on:

- Battelle Study addressing demand and various alternatives of providing electric energy in the Railbelt.

- ACRES study addressing technical, economic and environmental feasibility of the project.

- External Review Panel review comments by experts on all aspects of the Susitna project.

With reference to the schedule of events please note the 26 March 1982 briefing session by APA in Juneau specifically for the legislators and other interested parties.

FERC Licensing Criteria. Enclosure 3 represents a summarized version of the factors considered by FERC in determining whether to issue a license.

Sec. 44.83.320. Preliminary reports. (a) By March 30, [illegible], the authority shall prepare and submit to the governor and to the legislature a preliminary report recommending whether work should continue on the Susitna River hydroelectric project, and, if the recommendation is to continue on the project, the report shall explain in detail

(1) economic evaluations and preliminary environmental impact assessments for the Susitna River hydroelectric project and all viable alternatives;

(2) the federal and state permits required to be obtained before construction can begin and the expected construction start date; and

(3) any other information the authority considers appropriate or necessary to adequately inform the governor and the legislature of the status of the Susitna River hydroelectric project.

(b) By April 30, 1982, the authority shall prepare and submit to the governor and to the legislature a preliminary report recommending whether work should continue on the Susitna River hydroelectric project, and other viable alternatives. If the recommendation is to continue on the Susitna River hydroelectric project, the report shall explain in detail

(1) the proposed conceptual design and phases of construction of the Susitna River hydroelectric project;

(2) the expected completion date of each phase of construction;

(3) the expected cost of each phase of construction;

(4) the costs to the state and consumers of the project under alternative methods of project financing, including revenue bonds, general obligation bonds, and general fund appropriations; and

(5) any other information the authority considers appropriate or necessary to adequately inform the governor and the legislature of the status of the Susitna River hydroelectric project.

(c) The preliminary reports required under (a) and (b) of this section are in addition to any reports required under AS 44.83.180 — 44.83.224. (§ 2 ch 169 SLA 1980)

Sec. 44.83.325. Restrictions on contracting. The authority may not enter into contracts under AS 44.83.300 — 44.83.360 other than those contracts necessary to complete (1) feasibility studies, (2) the preliminary reports required by AS 44.83.320, or (3) construction of the Anchorage-Fairbanks intertie, until the legislature approves by law the preliminary report required under AS 44.83.320(b). (§ 2 ch 169 SLA 1980)

Sec. 44.83.330. Construction, maintenance and operation of project. Within one year after approval of its preliminary report, submitted under AS 44.83.320(b), the authority may enter into a contract for the construction of the Susitna River hydroelectric project in a manner consistent with the purpose of the project as described in AS 44.83.310. (§ 2 ch 169 SLA 1980)

ENCLOSURE 1

SCHEDULE OF EVENTS

8-9 March 1982	Policy Review Committee reviews draft Battelle Railbelt Electric Power Alternatives Study in Juneau.
10 March 1982	Workshop on Susitna related wildlife in Anchorage.
11 March 1982	Workshop on Susitna related fishlife in Anchorage.
15 March 1982	Copies of the draft ACRES report distributed by APA.
23 March 1982	APA Board is briefed on Susitna by ACRES and Battelle staffs in Anchorage. That evening there is a public meeting on same subject in Anchorage.
24 March 1982	State and federal agencies are briefed on the ACRES report in the morning while in the afternoon there is a public meeting on the same report and site access in the Susitna High School.
25 March 1982	Evening public meeting in Fairbanks on ACRES report.
26 March 1982	1982 Briefing session in Juneau on Battelle and ACRES studies for legislators and other interested parties.
15 April 1982	External Review Panel meeting with APA Board in Anchorage in the morning. After 3 p.m. APA Board will accept public testimony.
16 April 1982	From 9 a.m. to 4 p.m. APA Board will accept testimony from various agencies and utilities.
19 April 1982	APA Board holds a public meeting in Talkeetna to accept testimony.
20 April 1982	Same as above in Fairbanks.
22 April 1982	APA Board meets in Anchorage to deliberate and formulate a recommendation.
30 April 1982	APA and Board must submit preliminary report to the Governor and Legislature by this date.
- ? -	The Governor and Legislature reach a decision on whether to proceed with Susitna. (APA Board has authority under existing legislation to apply for a FERC license. If SB 826 is passed, APA will be able to proceed with engineering, design and further studies concurrenetly with the processing of the FERC license thereby allowing the project to remain on the critical path that would insure power-on-line by 1993.) As long as the approval is given at about the same time as when the FERC license is received there would be no delays in initiating the construction of the project.

ENCLOSURE 2.

Figure 4-1

FERC LICENSING CRITERIA

1. Adequacy of design
2. Economic feasiblity
3. Environmental impacts
4. Financial capability of applicants
5. Availability of power market
6. Dam safety
7. Project's adaptability to comprehensive development of the river basin
8. Potential for federal development
9. Water rights and
10. Other pertinent matters

The application is initially reviewed for completeness and compliance with FERC regulations. If the application is found sufficient, copies are circulated to appropriate federal, state, and local agencies. Agency comments are requested within a 60 to 90 day period. Once agency comments are received, the applicant is given an opportunity to comment on agency responses. At this point, the FERC staff renders a final determination as to whether an environmental impact statement is required. If an EIS is required, a draft EIS must be prepared. A 45 day comment period is required by FERC regulations. After comments have been received, a final EIS is prepared and circulated. The FERC technical staff then prepares its recommendations for Commission action. FERC's legal staff also prepares an order for final Commission consideration.

ENCLOSURE 3

DEPD-82-530-R4

STATE OF ALASKA

LONG TERM ENERGY PLAN

1982 REPORT

PRELIMINARY DRAFT
PUBLIC REVIEW COPY

Prepared For

Jay Hammond
Governor

By

Department of Commerce and Economic Development
Division of Energy and Power Development

Charles Webber
Commissioner

Lloyd M. Pernela
Director

FEBRUARY 1982

STATE OF ALASKA

LONG TERM ENERGY PLAN

1982 REPORT

PRELIMINARY DRAFT
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BY

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FOREWORD

Each year the Department of Commerce and Economic Development, Division of Energy and Power Development, with the assistance of the Alaska Power Authority, is required to prepare a report on the Long Term Energy Plan for Alaska. This year's report documents the evolution of the State's energy program and the associated long term planning process. It builds upon the initial Long Term Energy Plan to provide on indication of the relative importance of the energy problems and potential solutions facing Alaska in the near, mid, and long term.

The report addresses the following topics:

- An "end-use" study examining and reporting on the nature and amount of energy used and the purposes of its use

- An energy development component for meeting projected thermal, electrical and transportation energy needs in the state at the lowest reasonable cost

- An energy conservation component, including regional conservation goals and measures to achieve those goals

- A component for emergency energy conservation measures applicable during times of emergency

- A report on areas or subjects of energy research, development and demonstration projects involving alternative energy systems, local energy sources, and energy conservation.

In addressing each of these topics the report focuses existing energy information to support current decision making needs. The types of energy problems facing the different regions are highlighted, along with the most attractive technical solutions to the problems. Based upon an understanding of the least cost technical alternatives, recommendations are made regarding existing and future state energy programs and policies.

This report must be viewed as part of the evolution of the long term energy planning process. As such, it establishes a regional framework and focus for addressing energy problems. While current regional information is incomplete, the report attempts to provide as much regional detail as possible in its discussion of energy problems and solutions. Additionally, specific recommendations are provided regarding how regional information and energy planning can be improved.

The Long Term Energy Plan should not be viewed as a tool for policy development, but rather as the initial step in policy implementation. Its role then is to provide a bridge between the overall energy policies and goals established by the Governor and the legislative and the detailed energy projects and activities undertaken by individual state agencies. Reviews by the Governor's office and agencies with energy related responsibilities, and the acceptance and transmission of the report to the Legislature by Governor Hammond, provide an annual means of focusing debate on the State's energy policies and goals.

Refinement of energy goals and objectives and the development of measures of performance is a critical step in the long term energy planning process. Without clearly stated objectives and measures of performance it is impossible to provide an adequate evaluation of existing or proposed state projects or programs. Without effective evaluation, it will be difficult to upgrade the State's energy activities and modify them to respond effectively to the constantly changing energy situation.

Annually, this report documents changes in the current energy situation and provides an updated view of the future. State energy projects are reviewed and evaluated in terms of their contribution to overall energy goals, and recommendations are made to modify existing programs or initiate new ones. By providing a comprehensive statewide overview of Alaska's energy situation, the plan will provide the necessary visibility to ensure that existing programs are effective in meeting state objectives and that the most cost effective energy alternatives are chosen for the state.

OVERVIEW AND SUMMARY

OVERVIEW AND SUMMARY

With all of its indigenous energy resources, its large revenues from energy production, and with many of its citizens depending on high-priced fuels, the state of Alaska has a responsibility to involve itself in energy planning. The state legislature recognized this responsibility in 1980 by requiring the development of an annual state long term energy plan*. The 1980 Act required that the plan and its annual revisions include:

- An "end-use" study examining and reporting on the nature and amount of energy used and the purposes of its use

- An energy development component for meeting projected thermal, electrical nd transportation energy needs in the state at the lowest reasonable cost

- An energy conservation component, including regional conservation goals and measures to achieve those goals

- A component for emergency energy conservation measures applicable during times of emergency

- A report on areas or subjects of energy research, development and demonstration projects involving alternative energy systems, local energy sources, and energy conservation.

By addressing the required elements presented above, the plan provides an overview of the statewide energy situation, and helps the state legislature develop just and equitable solutions to Alaska's energy problems. The overall purpose of this year's report is to focus existing energy information to support current decision making needs and provide a sense of priority across state projects and programs. To this end, the plan report describes the current and future energy situation, the least cost energy alternatives for different regions, and the consequences of pursuing these different alternatives.

The 1982 report on the long term energy plan builds on the initial 1981 long term energy plan, as well as other recent and ongoing studies, including: the Susitna

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*State Statute HCS CCSB 438 (Finance) amH, section 44.56.224

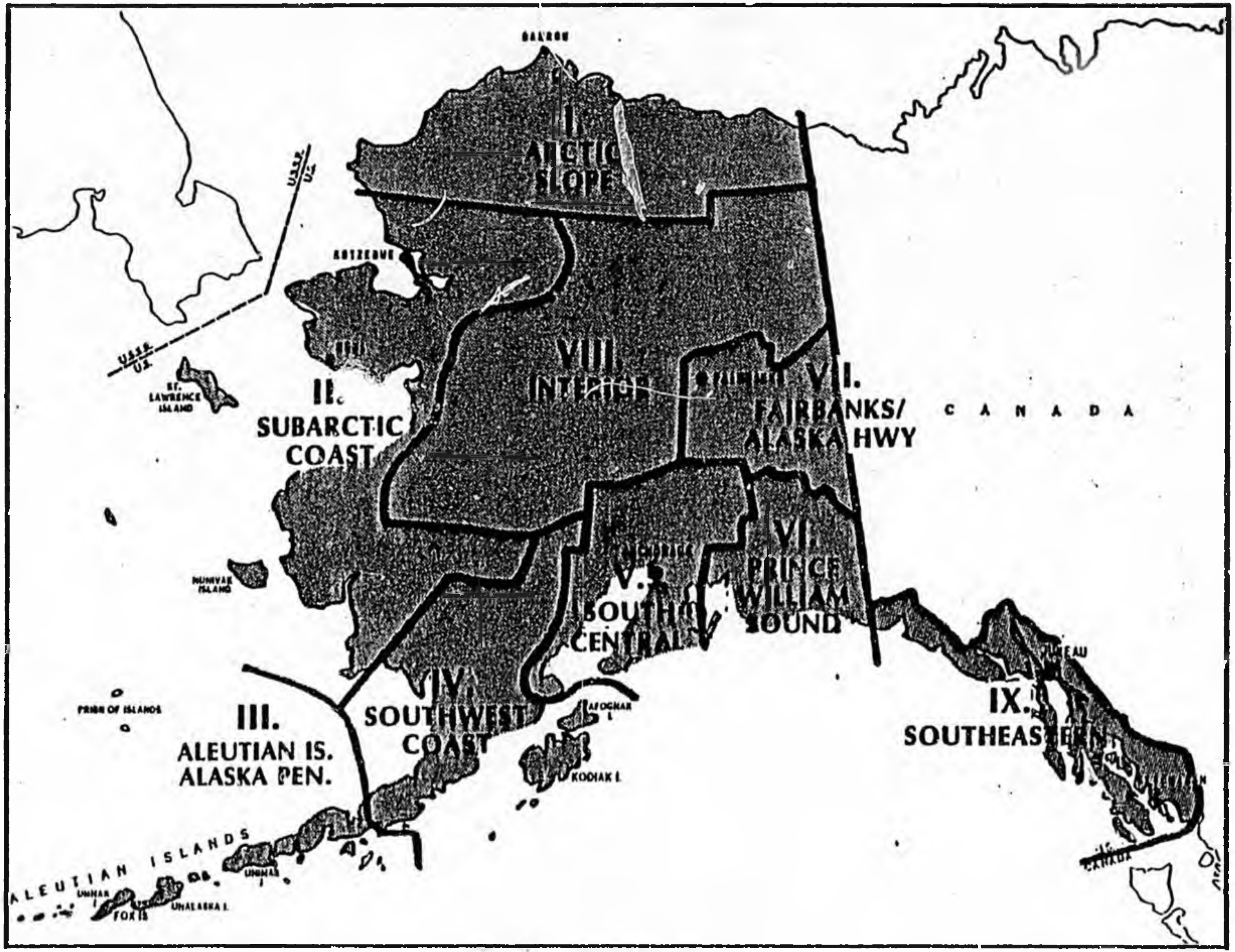
feasibility study by Acres American; the Railbelt Electrical Power Alternatives study, and the Historical and Projected Oil and Gas Use studies by Battelle Northwest Laboratories. Only the Historical and Projected Oil and Gas Use study had been completed in time to support the development of this year's plan. However, information from interim reports, working papers and draft reports from the other studies was incorporated wherever possible. This information may differ slightly from that contained in the final reports for those studies.

The primary policy objective (or question) addressed by the 1982 plan is (how) "to use Alaskan resources to meet, at the lowest reasonable cost, Alaska's current and future in-state residential, commercial, industrial and transportation energy needs." While it is recognized that there are other state social, environmental and economic objectives that must be considered in energy planning, this "least cost" objective was chosen to provide an analytical framework for the plan. The quantitative estimates of energy costs and benefits provided in the plan can be viewed as a basis for broader policy decisions involving energy and non-energy decisions.

While currently available energy data are limited, particularly at the regional and subregional levels, a regional perspective is critical to state energy planning efforts. To provide the necessary regional energy perspective the state was first divided into these major regions and ultimately into nine regions, as shown in Exhibit 1 and described in Appendix A. Three major regions are used for discussion purposes since existing data do not support analysis at a nine region level. The three aggregate regions and their components are:

- Extended Railbelt Area
  - South Central Region (Region V)
  - Prince William Sound (Region VI)
  - Fairbanks/Alaska Highway (Region VII)
- The "Bush"
  - Arctic Slope (Region I)
  - Subarctic Coast (Region II)
  - Aleutian Islands/Alaska Peninsula (Region III)
  - Southwest Coast (Region IV)
  - Interior (Region VIII)

EXHIBIT 1
ENERGY PLANNING REGIONS



- Southeast Area

  - Southeast (Region IX)

These regions were developed by aggregating Alaska's census regions to produce geographical areas having similar energy use patterns, energy problems and energy resources.

The importance of a regional disaggregation to analyze Alaska's energy situation is illustrated in the following example. Average per capita residential electricity use in the state is only slightly higher than that in the lower 48 states - approximately 3,275 kilowatt hours (KWH) in 1980, compared with the U.S. average of 3,250 KWH. Average electricity costs are also similar: Alaska's weighted average cost is approximately 6 cents per KWH, compared with 5.5 cents in the lower 48 states. However, as shown in Exhibit 2, these prices vary substantially across the state.

To illustrate these differences and evaluate their implications for energy planning, this plan provides as much detail as possible at a regional level given existing energy data. It is recognized that these data are often incomplete and different sources are likely to be inconsistent. Because of the current data problems, this year's report should be viewed as a preliminary description of detailed regional energy problems. However, the plan does provide an operational regional framework that can be utilized as a basis for energy planning from the state level all the way down to the local community level.

In conducting the analysis to support this year's report three basic questions are used to provide a means for focusing the existing information and to provide a better understanding of the options available to the state. These questions are:

- What type of energy problem does Alaska face (where, when, why, how severe)?

  - An energy price problem

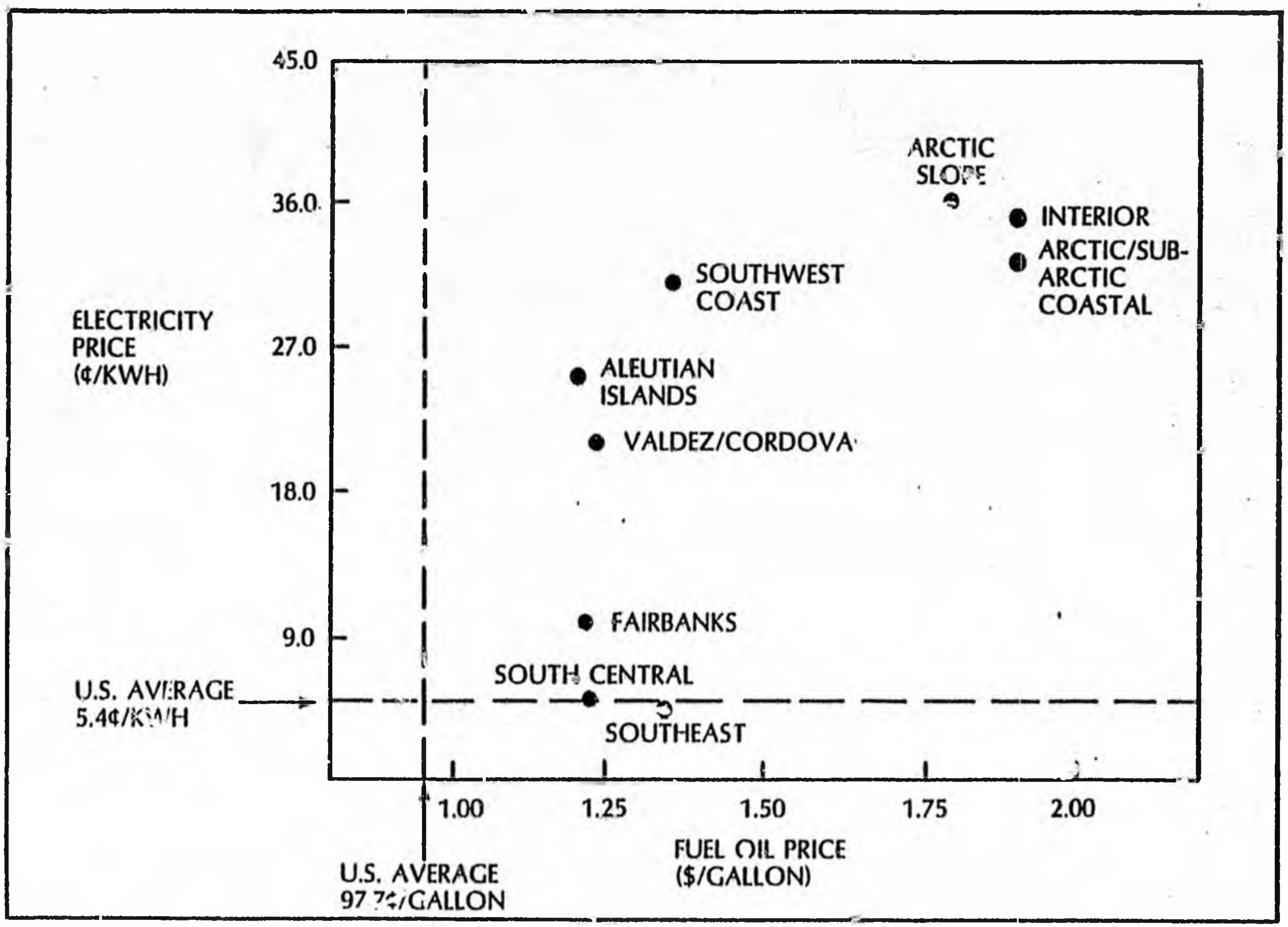
  - A resource exhaustion problem or energy production constraints

  - An energy vulnerability/reliability problem?

- What technology options are most attractive for reducing each problem?

EXHIBIT 2

COMPARISON OF RESIDENTIAL OIL AND ELECTRIC PRICES IN ALASKA: 1980



SOURCE. DEPD COMMUNITY ENERGY SURVEY
ALASKA PUC ANNUAL REPORT
EIA 1980 ANNUAL REPORT TO CONGRESS

- What is the most effective set of state energy projects and programs?

By focusing directly on existing and potential energy problems it is possible to establish a close link between the energy needs of Alaskans and the potential technological solutions and state programs that address these needs. This process will provide a basis for determining whether or not individual projects are directed towards the most pressing problems. The remaining portions of the Overview and Summary describe the most pressing existing and potential energy problems, the most attractive technological alternatives and provide recommendations for future state activities.

1. HIGH PRICES REPRESENT ALASKA'S MAJOR NEAR AND MID TERM ENERGY PROBLEM

Energy prices vary substantially throughout the state (illustrated in Exhibit 2, above). The most populated areas--the South Central and Southeast--currently pay relatively low electricity prices. Much of the natural gas used to generate electricity in the South Central region, is purchased under long-term contracts negotiated in the early 1960s. The Southeast region benefits from hydropower facilities which were built prior to recent large cost increases.

Similarly, fuel oil prices in the South Central and Southeast regions are only 25 to 30 percent higher than the U.S. average. These cost differentials are not out of line with many consumer goods, which also cost more in Alaska than in the lower 48 states.

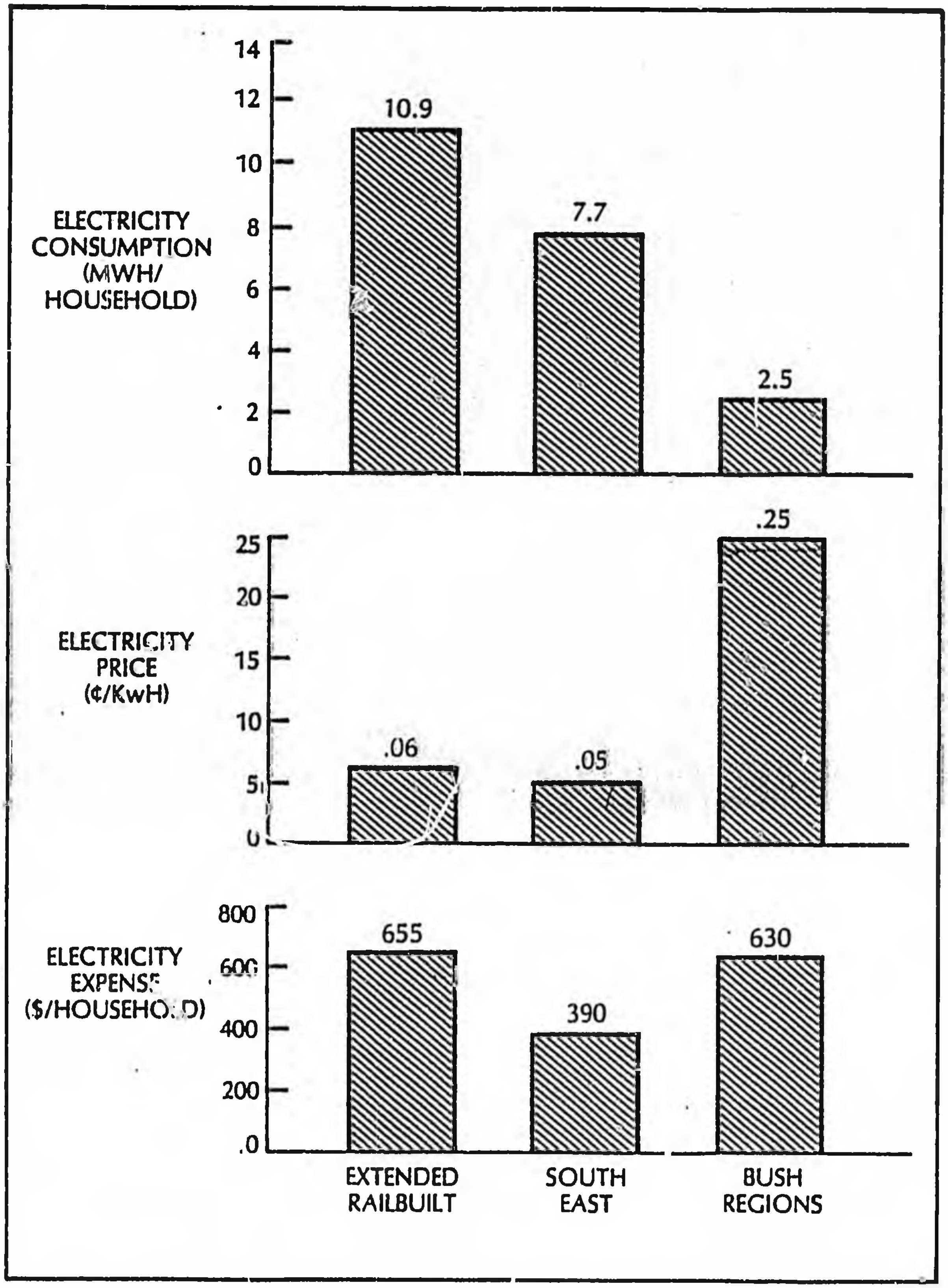
This is not the case for Alaska's rural consumers--with almost total reliance upon petroleum products--who are hit the hardest by high energy prices. Based on regional averages, they pay up to 8 times more for electricity than urban Alaskans and up to double for fuel oil. These high costs are a result of two key factors:

- <u>High Petroleum Distribution Costs</u>--In the bush, small volumes of diesel fuel must be shipped long distances between communities. The product changes hands many times, driving up its cost. Large inventories must be financed and kept on hand, especially during the winter, when the waterways are icebound.

- <u>Low Conversion Efficiencies</u>--In many communities, generating equipment has a conversion efficiency of only 12 to 18 percent. Larger bush communities such as Kotzebue have diesel generating efficiencies approaching 32 percent, and correspondingly lower electricity costs.

EXHIBIT 3

HOUSEHOLD RESIDENTIAL ELECTRICITY EXPENSE



SOURCE: DEPD COMMUNITY ENERGY SURVEY APPENDIX I-A, STATE ENERGY BALANCE

Since bush region consumers pay high energy prices, they use substantially less energy to meet electrical and thermal energy needs than do consumers in the Extended Railbelt and Southeast region, for several reasons:

- Higher electricity and fuel oil prices mandate conservation

- Dwellings ~~or~~ are of a smaller size

- Fewer electrical appliances are used.

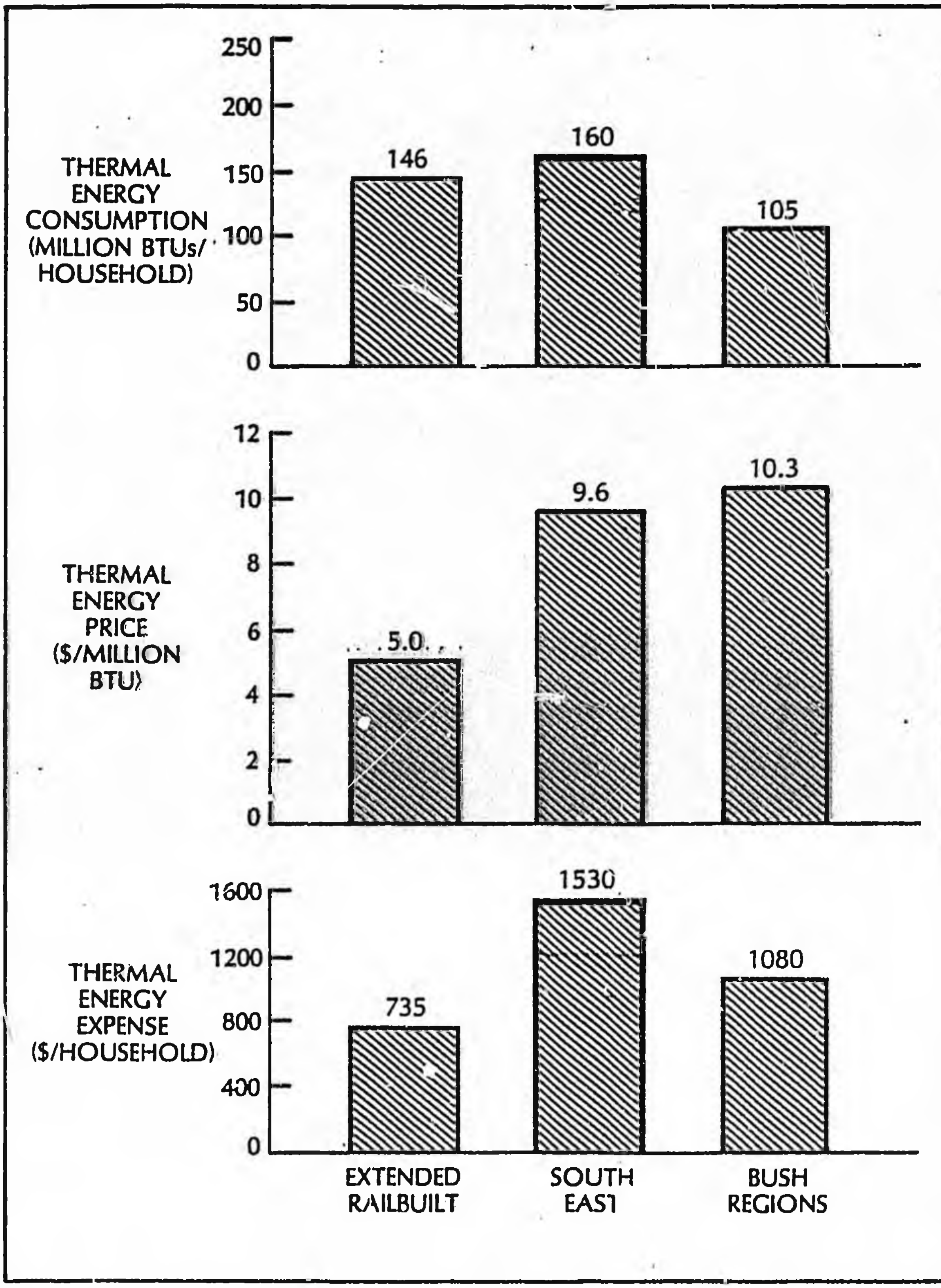
Even though substantially less electrical and thermal energy is used in the bush regions, bush households spend approximately the same annual amount for electricity and spend substantially more to meet their thermal needs. Electricity and thermal energy consumption patterns for the three regions are shown in Exhibits 3 and 4.

All Alaskans, urban and rural, will be affected by oil and natural gas price trends in the coming years. It appears that crude oil prices will remain level or even decline during the next few years. Current world economic conditions coupled with a substantial increase in energy use efficiency have greatly reduced world oil demand. Worldwide economic recovery, which would stimulate oil demand, is not likely to take place for at least a year. An excess demand for oil, which would push prices upward, may not be felt in the world oil markets until after 1985. These conditions suggest that excess oil supplies will continue until the late 1980s.

During the late 1980s and 1990s, world energy prices can be expected to increase, but at a more moderate rate than that experienced during the 1970s. Alaskan oil prices can be expected to track this more moderate real annual growth rate of about 2.5 percent through the year 2000.

High oil prices mean that Alaskan's also pay more for transportation fuels than residents of the lower 48 states. Even though approximtely 50 percent of transportation fuel is used for international and domestic jet aviation, high prices for highway gasoline and diesel have a substantial impact on individual energy expenditures. If a household used 1,000 gallons of fuel annually, their expenditures would range between $1,400 and $1,700 depending upon exact fuel prices. This is roughly equal to the amount spent on thermal energy and not quite twice the amount spent on electricity.

EXHIBIT 4
HOUSEHOLD RESIDENTIAL THERMAL ENERGY EXPENSE



SOURCE: DEPD COMMUNITY ENERGY SURVEY
APPENDIX I-A, STATE ENERGY BALANCES

Alaskan natural gas prices are expected to stay relatively level through the early 1980s, for a special reason. Currently the Anchorage area relies primarily on Cook Inlet natural gas to meet its thermal and electrical needs. Many 20 year contracts for this gas were initiated in the 1960s. The gas purchased today under these contracts is very low-priced (e.g., 18¢ to 25¢/mcf) compared with other energy sources. When these contracts expire in the mid-1980s, prices should rise to $2.00 to $2.68 per MCF.

2. ELECTRICITY AND THERMAL ENERGY USE PROVIDE THE GREATEST OPPORTUNITY FOR NEAR AND MID TERM ENERGY COST SAVINGS

Electricity use currently represents the smallest portion of total state energy use. However, it represents one of the fastest growing uses, approximately 10 percent annually over the last decade. The commercial/industrial sector was the dominant user of electricity in each of the three regional groups (see Exhibit 5). That sector accounted for over half of the states total electricity consumption.

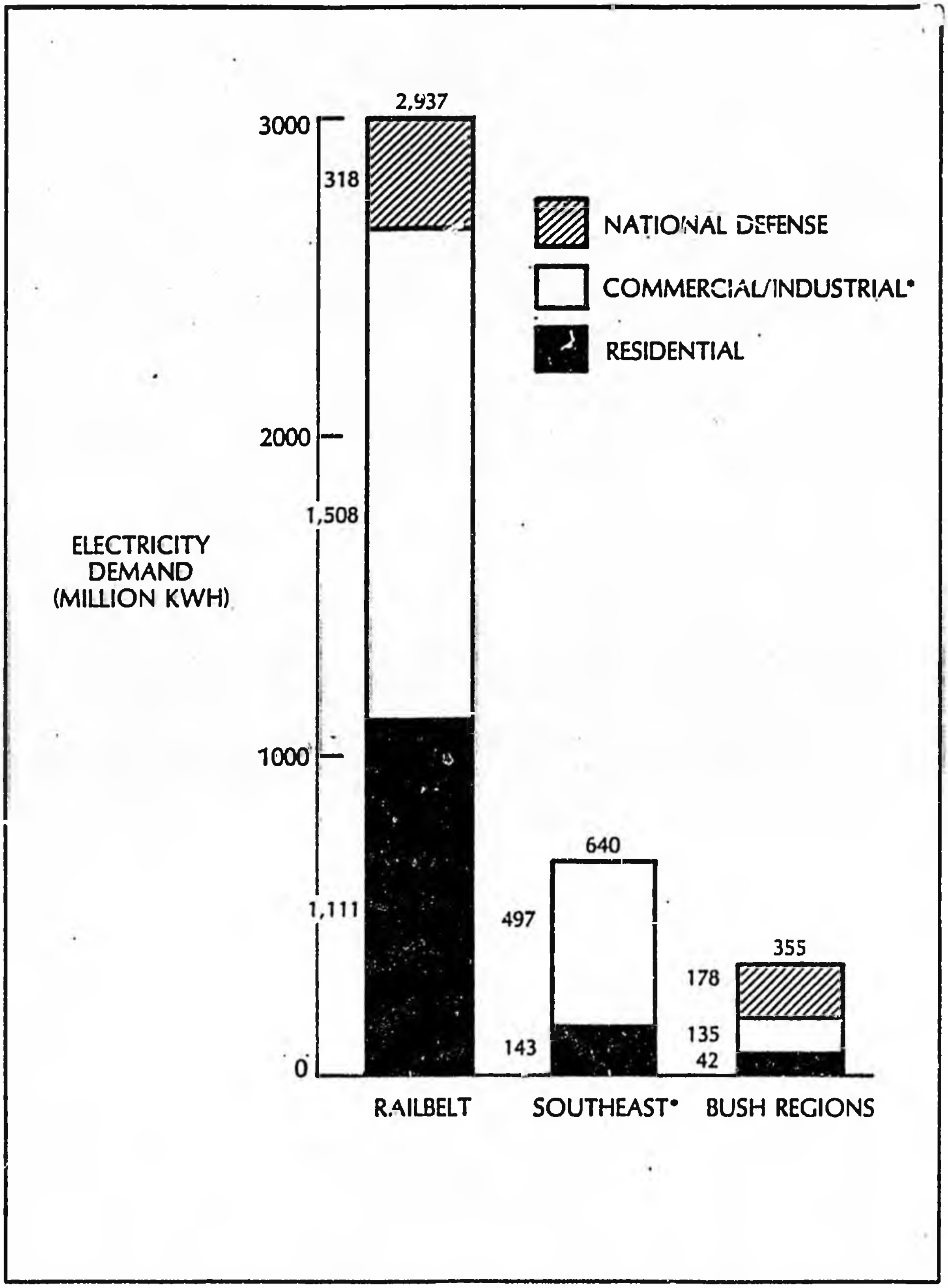
Although electricity costs for most Alaskans are low, bush region residents have very high power costs. Substantial improvements can be made in the efficiency of electricity generation in the bush regions. There are two ways that these high costs can be mitigated:

- Fuel Substitution--Wind power, hydropower, and fossil fuels have the potential to generate electricity at a lower cost
- Increased Generation Efficiency--costs can be reduced by improving maintenance and operating procedures and more efficiently matching generator size to electricity demand.

There is substantial incentive to explore fuel substitution possibilities, since many technologies look to be attractive even under modest fuel escalation assumptions (Exhibit 6). As the exhibit illustrates, small wind machines with installed costs of $5,000 per KW, running at a capacity factor (C.F.) of 25 percent, would be competitive with diesel generators today. Despite the initial attractiveness of fuel substitution options, the feasibility of substituting alternative fuels and technologies for diesel oil are severely limited by resource availability and the small scale of village electricity demand. The actual cost effectiveness of these alternatives must, therefore, be determined on a community by community basis.

Diesel generator efficiency can be increased by improved maintenance and by matching generator size with electrical demand. Exhibit 7 shows the wide variation in electrical generator efficiency in the bush regions. Achievement of effi-

EXHIBIT 5
ELECTRICITY USE BY SECTOR



* COMMERCIAL/INDUSTRIAL SECTOR INCLUDES NATIONAL DEFENSE PURCHASES
SOURCE: APPENDIX I-A, STATE ENERGY BALANCES

EXHIBIT 5
INDIFFERENCE PRICES
CAPITAL COST OF ALTERNATIVE TECHNOLOGIES TO COMPETE WITH DIESEL GENERATION IN THE BUSH REGIONS

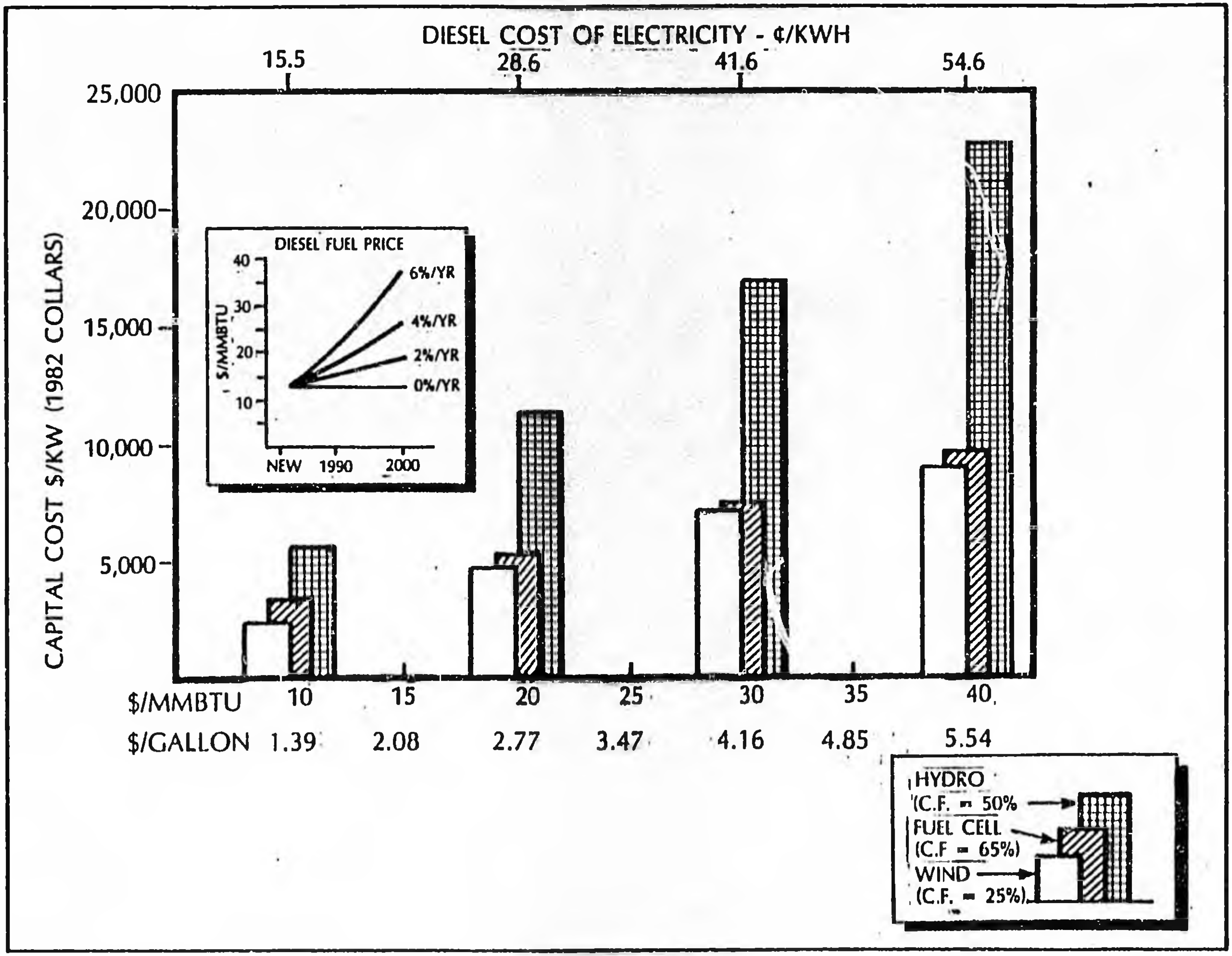
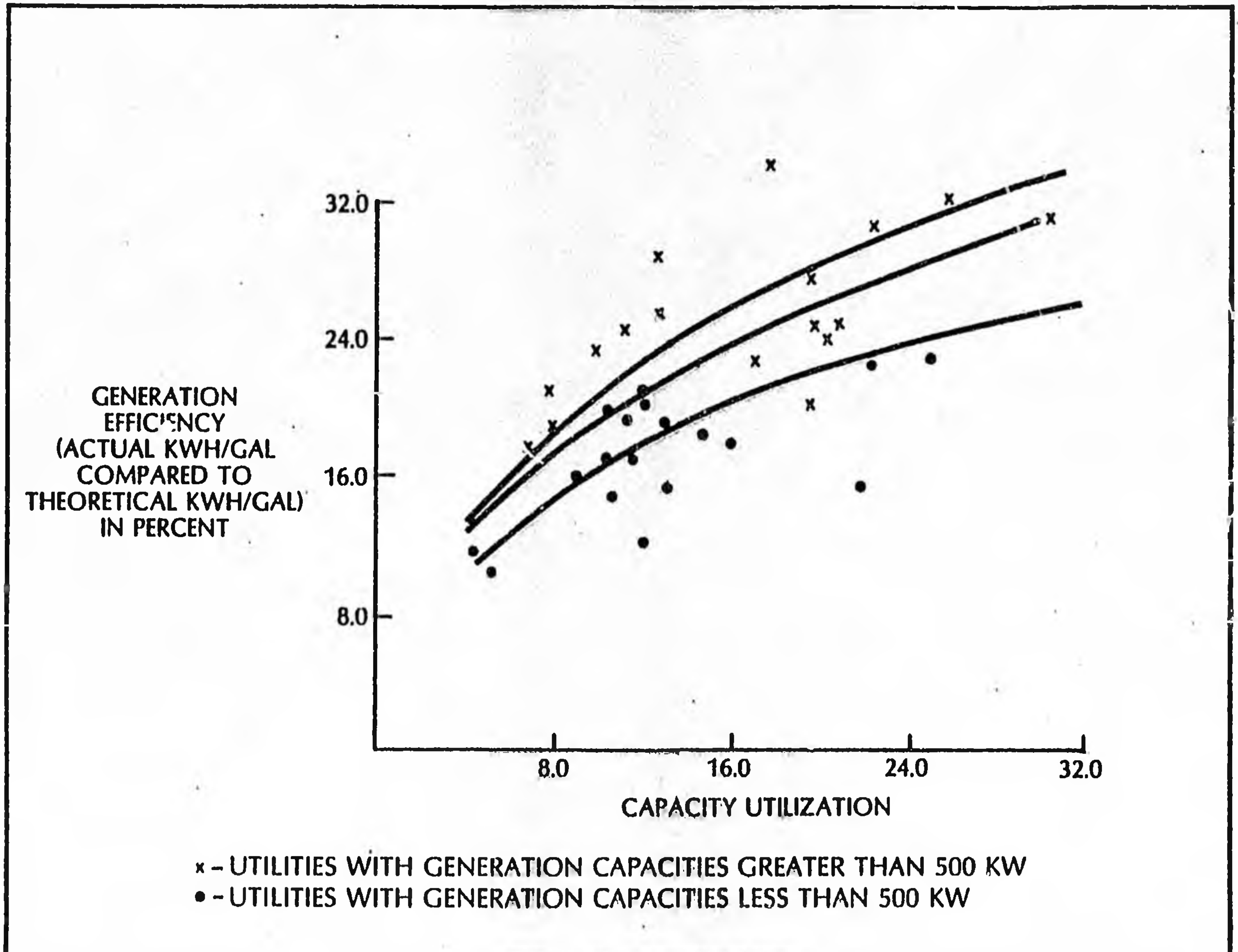


EXHIBIT 7
CAPACITY UTILIZATION IN BUSH REGIONS



ciencies above 30 percent would be an ambitous, but beneficial, ~~the~~ goal for all local utilities. For those utilities with operating efficiencies below 20 percent, such improvements could result in fuel cost reductions of up to 50 percent. Commensurate consumer savings would follow. Generator maintenance may be improved through state sponsored training and outreach programs. The state can also help in matching generator size with demand. Two options are available:

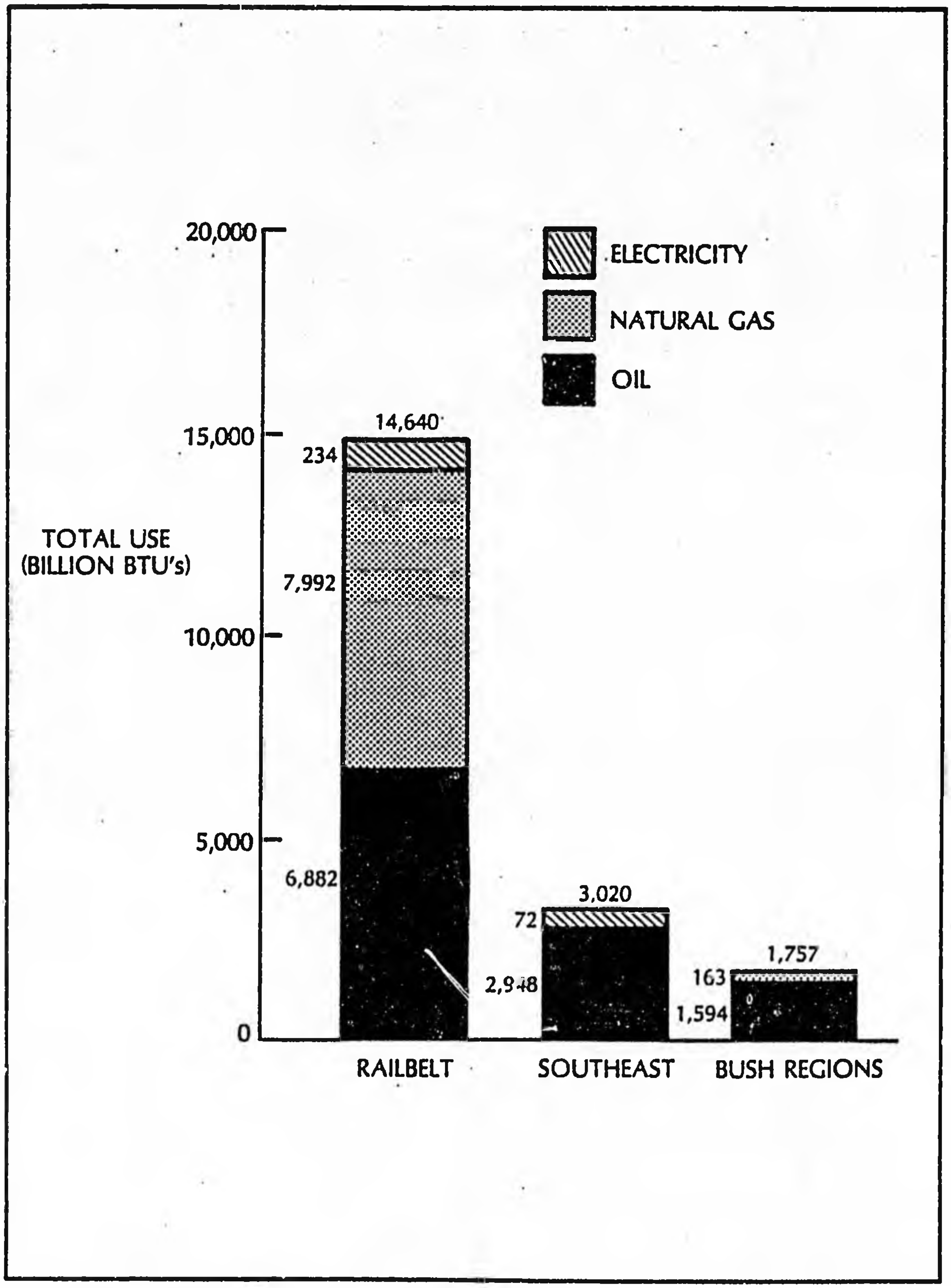
The most cost effective method of matching generator size with demand is to down size the diesel generators. This option, where feasible, will be more economical than construction of an expensive intertie system -- costs range from $40,000 to $90,000 per mile depending upon system type and location. This results from the fact that the maximum efficiency of a small intertie system, before transmission losses, is not significantly better than a set of well run independent diesels.

The state's thermal energy needs are met principally by oil and natural gas. Both the quantity of energy used and the mix of fuels differs substantial by region (see Exhibit 8). The Southeast and bush regions rely primarily on oil for meeting thermal energy needs, while oil, natural gas and electricity are all used in the Extended Railbelt Region.

Thermal energy efficiency in Alaska's existing buildings is low relative to today's construction practice. Three elements affect the overall cost of meeting thermal energy needs in residential and commercial buildings:

- The fuel--cost and energy content
- The building shell integrity--thermal gain and loss characteristics

EXHIBIT 8
RESIDENTIAL THERMAL DEMAND BY ENERGY SOURCE



SOURCE: APPENDIX I-A, STATE ENERGY BALANCES

- The fuel conversion unit (e.g., furnace)--cost and efficiency.

Where fuel is expensive, as it is in the bush regions, there is substantial incentive to substitute fuels and/or improve conversion efficiency and building shell integrity. For those consumers who use low-cost natural gas or low cost electricity--primarily in the Railbelt and Southeast regions--the incentive to substitute fuel sources or increase efficiency is low. As energy prices rise in the late 1980s and early 1990s, however, more efficient technologies such as heat pumps--which have proven successful during a year demonstration in Juneau and Ketchikan--will be introduced, particularly as diesel costs rise in the Southeast.

Thermal losses in Alaska's buildings can be reduced from 10 to 30 percent or even more in rural areas. In many cases an expenditure of $300 will result in a 10 percent reduction in building energy use and savings of $180 annually; while a reduction of 30 percent and savings over $500 annually, can be achieved with expenditures of $1000-$2500 per building. The relative effectiveness of a variety of conservation and atternative energy measures is shown in Exhibit 8A. Information from current state audit programs will be used to confirm and refine these estimates for use in next year's plan.

Substantial advances have been made in furnace and heating technologies during the last decade. For Alaskans, improved oil furnaces, natural gas furnaces, and wood stoves can result in immediate cost savings. For example, a 30 percent improvement in furnace efficiency, offered by advanced natural gas and fuel oil furnaces can save $500-$1000 per residence.

3. <u>WHILE ALASKA'S ENERGY SUPPLIES ARE PLENTIFUL IN THE NEAR TERM, PROJECTED GROWTH IN ELECTRICITY CONSUMPTION DICTATES IMMEDIATE CONSIDERATION OF SUPPPLEMENTAL ELECTRICAL SUPPLIES</u>

In light of the projected price trends and regional energy use patterns discussed above, Alaska's overall energy demand is expected to grow moderately during the coming years. The projected growth rates vary by region:*

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*Source: Battelle, "Historic Oil and Gas Consumption and Projections through the Year 2000," for the Department of Natural Resources.

EXHIBIT 8A

COMPARISON OF EQUIVALENT ENERGY COST FOR SELECTED CONSERVATION/END-USE TECHNOLOGIES

TECHNOLOGY	EXAMPLE LOCATION	TYPICAL INITIAL INSTALLED COST	EXPECTED LIFETIME (Years)	ANNUAL PRIMARY ENERGY SAVINGS (Mil. Btu/Yr.)	BASIS OF ENERGY SAVINGS	LEVELIZED ANNUAL ENERGY COST $/Mil Btu
Attic insulation and weather stripping owner	Anchorage	$ 300	25	20	10% of base 200 MCF gas/yr.	$1.90
Insulation/storm windows, etc. (high level)	Anchorage	$2,500	25	82	30% of base 200 MCF gas/yr.	$5.20
Weatherization package for rural housing projects	Small, remote village	$1,000/house	15	42	25% of base 1,200 gal oil/year	$3.50
Advanced oil fired boiler for a house	Juneau	$1,000 (incremental cost over std. unit)	15	36	20% of base 1300 ga. oil/yr.	$4.10
Wood stove using free wood	Skagway/ Southeast	$ 900	10	137	75% of base 1300 gal. oil/yr.	$1.20
Wood stove using purchased wood @ $50 cord	Skagway/ Southeast	$ 900	10	137	75% of base 1300 gal. oil/yr.	$6.20
Passive solar (250 sq. ft. direct gain system	Fairbanks	$3,750	20	28	20% of base 1500 gal. oil/yr. (assumes a super insulated house)	$17.90
Generator waste Heat recovery	Small rural village with 100K diesel generator	$100,000	20	1400	Supplies 100% of heat for local 20,000 sq. ft. school (or 10,000 gal. oil/yr. savings	$9.60

Notes:

1. Discount rate assumed is 12%.
2. Maintenance and other operating expenses assumed to be small compared to cost savings.

- <u>In the Extended Railbelt</u> - electricity demand is projected to grow at 3.5 percent annually; thermal energy demand will increase about 2 percent per year. Transportation fuel demand will increase at slightly less than 0.5 percent per year and feedstock demand is projected to remain constant, since no new projects are assumed to be built.

- <u>The Southeast</u> - should experience slow thermal energy demand growth (less than 1 percent per year), and strong growth in electricity demand (about 4 percent per year) and transportation fuel demand (about 1.5 percent per year).

- <u>In the Bush</u> - thermal energy demands will grow by less than 1 percent per year, while demand for electricity should increase by 7 percent per year and transportation fuel demand should increase by about 1 percent per year.

Electricity consumption is expected to grow more rapidly in the bush and Southeast regions than in the Extended Railbelt, because less electricity is currently used per capita in those regions, and even small increases in population growth and appliance usage will result in significant percentage increases.

Electricity consumption in the Extended Railbelt is projected to increase modestly in the absence of major economic develop- ments. Yet even under this condition, major capacity additions will be required in the early 1990s, unless effective load management can be undertaken to increase capacity utilization rates.

Alaska's total energy resources are sufficient to easily meet projected needs well into the 21st century. However, it is not yet clear how these resources will be used to satisfy future needs. During recent years, growth in natural gas use has far outstripped growth in petroleum use. During the last decade, petroleum use has grown at 5 - 6 percent annually, while natural gas use has grown substantially faster--averaging 9-10 percent annually during the decade. These figures reflect the rapid population and energy use growth in the South Central region, where natural gas is the leading fuel.

Despite substantial future price increases, such as those discussed above, natural gas is likely to remain the fuel of choice in the Scuth Central region to meet thermal needs and provide for peak load electricity generation. Hydropower and coal-fired power plants are the most attractive options for baseload power generation in this region due to the long term availability of coal and hydro resources. Natural gas prices would have to rise to at least $10 per MCF before power generation alternatives such as hydropower become more attractive, or before fuel oil or coal-generated electricity replace natural gas for space heating. Wood at nominal prices may be competitive with natural gas for home heating; commercially sold wood may be competitive if wood prices can be kept below $40 - $50 per cord as natural gas prices rise in real terms.

Given the economic attractiveness and convenience of natural gas for meeting thermal and electrical needs, there is only one factor that may inhibit its future use: the adequacy of Cook Inlet reserves. The Alaska Department of Natural Resources conducts an annual forecast of the likely future trends in oil and natural gas demand and supplies. Results of that study indicate that sufficient Cook Inlet reserves exist to supply the South Central region until the year 2000, provided that:

- New coal or hydropower generation plants are used to meet future electricity demands
- No additional Cook Inlet reserves are used commercially except for ammonia/urea production at historic levels, Tokyo LNG at existing production levels, and Pacific LNG Phase I at planned levels.

If these conditions are met, current reserves could very well exceed demand through the year 2000. A shortfall of approximately 13 percent--about 500 billion cubic feet or approximately 2 1/2 years consumption--of current reserves will occur, however, if natural gas is used for expanded electric power generation. While Cook Inlet reserve production ratios are declining rapidly, there may be substantial additional reserves in the region. Estimates of undiscovered recoverable reserves in the South Central region range from 7 to 50 TCF.

These factors lead to the conclusion that the major pressure to reduce natural gas use will be to mitigate the impact of price increases, rather than the need to extend supply through the year 2000. Such price pressure may not be severe when compared to natural gas prices in the lower 48 states, or to the costs of thermal energy alternatives in the South Central region and the rest of Alaska. However, efforts must be undertaken now to assure that alternatives to natural gas exist for electricity generation and to encourage residential natural gas users to anticipate the price shocks through conservation.

Oil production on lands where the state has a royalty interest is expected to decline more than 50 percent by 1997. Total statewide oil production averaged 1.6 million barrels per day (BPD) in 1980. North Slope production accounted for 1.5

million BPD; while the remainder was produced in the Upper Cook Inlet. Overall, oil production on those/North Slope lands in which the state holds at least a partial royalty interest is expected to peak at about 1.7 million BPD in 1990. At the peak, production from the Lisbourne, Flaxman Island and Point Thompson reservoirs will offset declines in the Sadlerochit Reservoir. After this peak, production is expected to decline to about 725 thousand BPD in 1997. At the same time, Cook Inlet production will decline to 14,000 BPD by 1997. The major impact of the decline in oil production will be felt in state revenues, rather than on the availability of petroleum products in the state. Sufficient west coast refinery capacity and the likelihood of increased oil production on non-state lands will likely assure sufficient supplies.

In addition to oil and gas, Alaskans use solid fuels such as coal, wood and peat, as well as renewable energy sources such as hydropower and wind. Vast amounts of the resources exist in Alaska; however, together they supply only six percent of Alaska's current energy needs. This percentage will increase as the costs of existing energy supplies increase.

The transition to alternative energy sources is hampered by a number of factors:

- Not enough is known about regional resource quantity, quality and expected extraction and delivery costs
- Distances between known energy sources and centers of use may be substantial
- Limited, small-scale demand makes economical large-scale resource development unfeasible

The importance of these factors varies dramatically by region.

- In the Bush regions, where less costly energy alternatives are badly needed, little is known about the quantity, quality and costs associated with alternative energy sources. In addition, there is a mismatch between the scale of energy demand and the scale required for local commercial development of alternatives.
- In contrast, the Railbelt regions has abundant supplies of coal, hydropower, and peat as well as demand sufficient to support the large-scale extraction, delivery and conversion. However, the economic attractiveness of these alternatives are not fully determined.

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- In the Southeast region, where current energy costs vary dramatically, the costs of extracting, delivering, converting and transmitting alternative energy sources are high.

Making these resources economically viable require an understanding of the range of technologies available to meet Alaska's energy needs. This subject is addressed in the following section.

4. ANALYSIS OF ALASKA'S CURRENT AND FUTURE ENERGY SITUATION POINTS TO A NUMBER OF STATE-SPONSORED ACTIVITIES THAT COULD HELP ALASKANS MEET FUTURE ENERGY NEEDS AT THE LOWEST POSSIBLE COST

Given current data limitations and the limited operating experience of many research development and demonstration projects, it is impossible to chart an all-encompassing long-term course at this time. There is sufficient information available, however, to support a number of low-risk, high-payoff activities. In addition to these activities the state can seek additional information to estimate the benefits and costs of other programs more accurately. Six specific recommendations are highlighted to help the state determine how Alaska's vast energy resources can be most effectively used to meet future needs.

(1) Determine The Attractiveness of Hydropower Projects and Fossil Fuel Power Plants for Satisfying Future Electrical Generating Requirements

In the Extended Railbelt and in some Southeast communities, electricity demand is projected to increase enough to require the addition of substantial new electrical genertion capacity. The major generation alternatives are:

- Hydropower projects
- Coal-fired steam power plants
- Residual oil-fired steam power plants.

Hydropower projects and fossil fuel power plants represent two fundamentally different types of long-term generation alternatives:

- Hydropower Projects--have high construction costs but no fuel costs and relatively low operating and maintenance requirements, as a percentage of installed capital cost.

- Fossil Fuel Power Plants--have lower construction costs but substantial fuel costs and relatively high operating and maintenance costs.

Three major factors drive the variability of hydroelectricity prices, as shown in Exhibit 9:

- The size and location of the project. The upper panel of Exhibit 9 shows the variability in the price of hydroelectricity for four randomly selected hydroelectric projects. The prices shown assume the Governor's proposal for capital recovery of the initial investment.* Some projects (e.g., Tyee Lake) have high prices in the early years, but prices remain relatively flat as demand for electricity keeps pace with inflation adjusted operating costs. Other projects (e.g., Terror Lake) have very competitive electricity prices in the early years, but prices escalate rapidly in later years as growth in demand lags the inflation rate.

- Policies regarding recovery of capital. The middle panel of Exhibit 9 illustrates the variability in electric prices over time as a function of the financing assumptions used. In the example, electricity prices are relatively flat over time under the Governor's capital recovery proposal, but they increase dramatically if the state decides to earn a real return on the money invested.** If the state demands a real return on the capital invested in hydro projects, the price of electricity could triple over 30 years--which would double the price of electricity in later years compared to the Governor's proposal.

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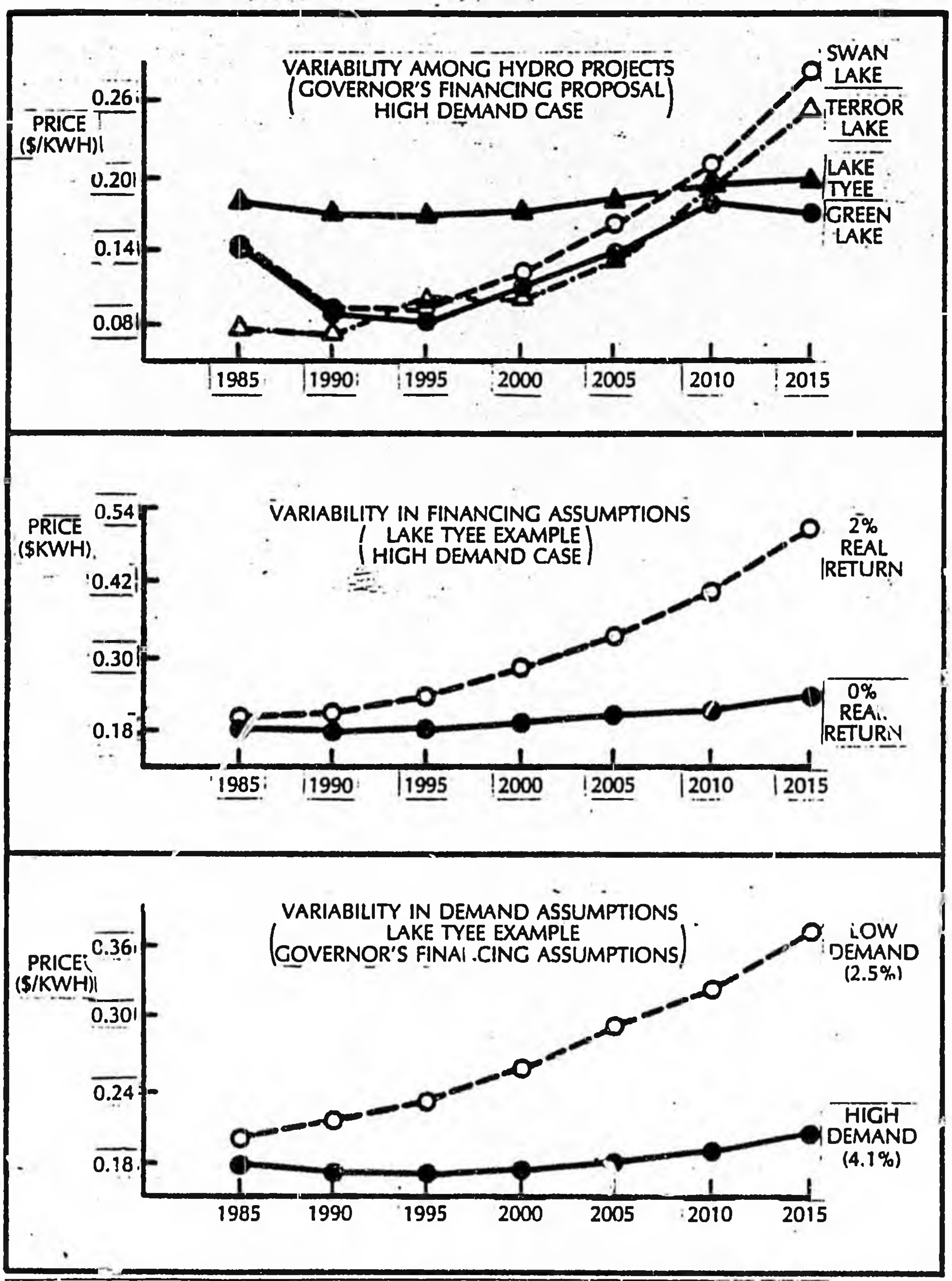
*The Governor's proposed capital recovery approach is a 33 year repayment of the initial investment, plus an inflation adjusted annual repayment of capital based upon the average inflation rate during the preceding 20 years, plus repayment of O&M expenses.

**For example, the state may decide to require a return on hydroelectric projects that equals the return achieved by investing the money in market securities. In today's markets, even "riskless" securities (e.g., Treasury Bills) provide a return greater than inflation.

EXHIBIT 9
FACTORS THAT DRIVE HYDROELECTRICITY IN ALASKA*



*BASED UPON DATA PROVIDED BY THE DIVISION OF BUDGET AND MANAGEMENT, OFFICE OF THE GOVERNOR

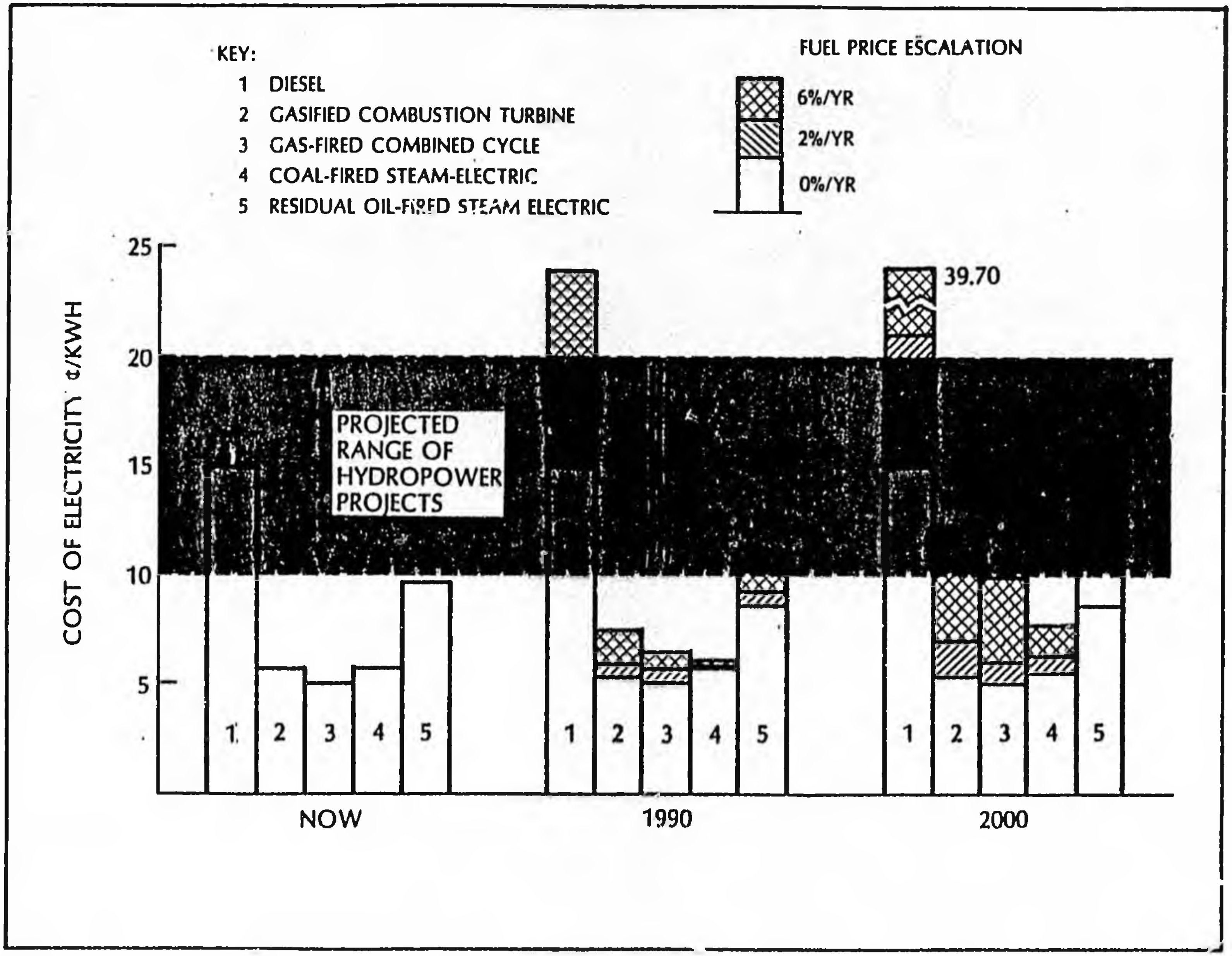
- Assumptions about growth in demand. The lower panel of Exhibit 9 shows the effect of demand growth rates on the price of electricity. The high demand case (4 percent annual growth through the year 2015) reflects the historic growth in demand from 1976 through 1980. The high demand case produces lower prices because the greater volume of KWH hours is spread over the same fixed costs. The low demand case (2.5 percent annual growth) reflects the projections of demand growth provided in the feasibility study of Lake Tyee. As can be seen from the lower panel of Exhibit 9, the price of electricity could double by the year 2015, should demand for Lake Tyee hydroelectricity grow at 2.5 percent rather than 4 percent.

Thus, hydropower projects may reduce the risk of escalating fossil fuel prices, but they reduce planning flexibility and are more costly in the mid-term. Even though hydropower projects insulate future consumers from the possibility of high future fossil fuel prices, they represent a substantially higher cost alternative in the near- and mid-term. This situation is illustrated in Exhibit10.

For comparison purposes, hydro electricity prices are assumed to range between 10¢/KW and 20¢/KW--similar to the range for the four projects shown in Exhibit 4--between now and the year 2000. The range is shown as a shaded band in Exhibit10. Currently, all of the fossil-fired generation alternatives, except diesel, compare favorably with projected hydro electricity prices. The relative attractiveness of the fossil-fuel alternatives diminishes by the year 2000, if substantial real rates of price escalation are assumed. However, as shown, coal-fired, steam-electric plants are likely to remain an attractive alterntive to hydropower plants even with substantial price increases.

Viewed from the present, conventional power plans alternatives represent a less risky investment for the state, because less current money is spent and near-term electricity costs can be reduced to a level below both the diesel and hydro alternatives. However, if one believes that conventional fuel costs will escalate rapidly for a substantial period of time, the conventional options may be riskier, because they would expose Alaskans to the risk of escalating fuel prices.

EXHIBIT 10
COMPARATIVE COST OF ELECTRICITY FOR CONVENTIONAL TECHNOLOGY OPTIONS ¢/KWH IN CONSTANT 1982 DOLLARS



SOURCE: BOOZ, ALLEN & HAMILTON ESTIMATES

(2) <u>The State Must Move Quickly to Determine the Economic Viability of Alternative Energy Resources to Lower Energy Costs in the Bush Regions</u>

Energy costs in the bush are high and likely to escalate even higher during the late 1980s. Many resource options appear to offer lower costs than diesel fuel. The state is already moving to develop these alternatives. However, the state should focus more precisely on:

- Determining the costs of extracting and delivering alternative fuels to bush communities, in order to establish economic distances and quantities for resource development

- Determining the quantity and quality of the energy resources within economic distances of the rural communities.

The purpose of these efforts should be to determine the viability of energy resources for individual communities or groups of communities, rather than to simply document the statewide energy resource base.

(3) <u>The State Should Increase Energy Conservation and Energy Efficiency Activities to Meet Near-Term Energy Needs</u>

Over the next five years, substantial reductions in energy use with corresponding reductions in energy expenditures can be achieved through relatively simple energy conservation actions. These improvements are applicable to meeting thermal and electrical needs in all regions of the state. The cost-effectiveness of the measures differs substantially among climate and fuel types.

Specific programs and types of activities include:

- <u>Energy audit and conservation programs</u> can reduce residential thermal losses by up to 40 percent. Average household savings would range between $400 and $800 annually. It is estimated that total energy savings of between $10 and $20 million could be achieved with a state investment of less than $100 million in state funds (assuming the state purchases and installs the conservation measures).

- <u>Increased Generating Efficiency of Small Diesel Power Plants</u> can reduce fuel use by as much as 35 percent. Estimated savings for a typical rural household range from $200 to $400 annually, assuming all reductions in fuel costs were passed on to consumers.

• Substitution of advanced fuel oil and kerosene heaters. These heaters can be up to 95 percent efficient, compared with currently popular "drip" oil furnaces which have efficiencies below 50 percent. Shifting to the advanced furnaces can reduce fuel use by 25 to 50 percent and reduce total fuel costs in the average home by roughly $900 per year. If other conservation measures are incorporated in the home first, a new furnace would save only $600, but the total heating bill would be reduced from approximately $2300 to below $1000 as a result of both energy conservation and improved furnace efficiency.

State sponsored demonstration projects must focus on establishing the expected economic performance of those alternative technologies with the greatest promise for meeting mid-term energy needs. At present many efforts are underway to demonstrate the feasibility of alternative technologies in the unique Alaskan environment. These efforts must be viewed as a test of the potential economic attractiveness of the technologies, in addition to demonstrating their technical feasibility. Economic performance criteria must be met or exceeded before technologies and projects receive further emphasis.

(4) Existing State Energy Policies and Programs Must be Assessed to Assure That They Effectively Address the Most Critical State Energy Problems

Alaska has greatly expanded its energy policies and programs over the past few years. Major emphasis has been placed on establishing programs and providing funds for specific energy projects and to directly minimize the impacts of rising prices. The intent of most of these actions is clear; to develop renewable energy resources--primarily hydropower, to assist in the electrification of rural Alaska and to equalize the burden of higher energy prices for all Alaskans.

In many cases the impacts of these programs have not been felt, since most have been in existence for less than two years. The lack of experience makes it difficult to assess the relative effectiveness of the different policies in encouraging the use of Alaskan resources to meet at the lowest reasonable cost, Alaska's thermal, electric and transportation energy needs. However, it is possible to establish a framework for this assessment to provide insights into how effective alternative policies are likely to be.

As highlighted earlier, the types of energy problems facing Alaskans can be reduced to basically three types:

- High costs and/or prices--resulting in high levels of energy expenditures
- Resource exhaustion and capacity constraints--leading to future energy shortages
- Supply vulnerability and reliability--causing short-term emergencies.

Given this structure, it is possible to identify the existence, location, timing, cause and severity of energy problems. For example, the major energy problems identified in Chapters I and II include:

- <u>High costs and/or prices which are:</u>
  - Current electricity costs in the bush
  - Current fuel oil prices in the bush
  - Current electricity costs in rural Southeast Communities
  - Mid to long term natural gas prices in the South Central region
- <u>Resource exhaustion and/or capacity constraints, which are:</u>
  - Cook inlet natural gas in the long term
  - Long-term electrical generation capacity in the Extended Railbelt
  - Long-term electrical generation capacity in the urban areas of the Southeast
- <u>Supply vulnerability and reliability, which are:</u>
  - Current fuel supplies to bush communities
  - Reliability of current electrical generation and distribution in the bush.

Existing and proposed state polices can be quickly assessed to see which type of problem they address, and their relative effectiveness in solving specific energy problems can utilimately be evaluated.

For example, the Power Cost Assistance Program subsidizes 95 percent of the price of electricity above 12¢/KWH but not exceeding 45¢/KWH. This program was initiated to minimize the hardship of transition from expensive diesel generated electricity to cheaper alternatives. In so doing, however, the symptom is being treated rather than the cause--which in itself is not an improper policy goal--but the likely outcomes of this program may not encourage the required increased generation efficiency or the subsitution of lower cost generation alternatives. As illustrated in Exhibit 11 and explained more fully in Chapter IV, a consumer's electrical bill may in fact rise as a result of this subsidy program. Because of the substantially lower effective price faced by the consumer, demand may increase significantly and the state would end up with an expense of over $2000 annually.

Clearly, this is an expensive way for the state to mitigate the impacts of higher diesel fuel prices and encourage increased electricity use in the bush, since inefficiencies develop when consumers do not base their decisions on actual costs of production.* Because of the state's third party payment, consumers will not see the total electricity consumption and utilities would see little decline in sales if they raised prices up to 45¢/KWH. In that sense the test of the marketplace is removed from the transaction between utilities and their customers. Less pressure exists for utilities to be productive and for consumers to be efficient in their electricty consumption.

Similarly, inefficiencies may result, and the state would not achieve the lowest costs possible, when one electrical generation source--hydropower--is given favorable financial treatment over another alternative--coal. As was discussed above, a coal-fired steam power plant may be the lowest cost near term alternative source of electricity. However, if hydropower projects received subsidized financing--i.e., less than the market rate of return--hydroelectricity may actually be "priced" more cheaply than electricity generated from coal. This lower "price" results not from lower "costs" of generation, but rather, from the subsidy being given to electricity consumers by the state.

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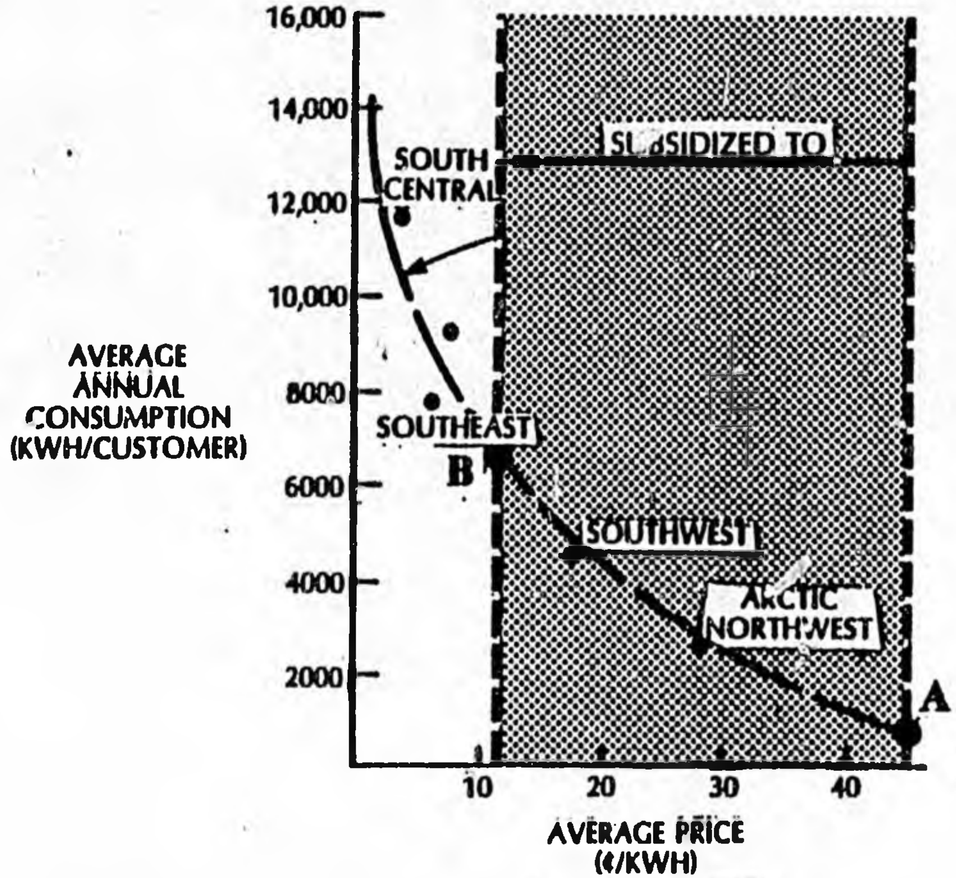
*It must be noted that increased electricity sales may result in improved diesel utilization which would have a beneficial impact on unit costs. However, this impact is expected to be very small relative to the total state subsidy.

EXHIBIT 11

COMPARISON OF RESIDENTIAL ELECTRICITY PRICES AND USE



FOR A "TYPICAL" COMMUNITY

PRICE (¢/KWH)	QUANTITY (KWH/COST.)	ANNUAL COST ($/CUSTOMER)
5.0	10,280	515
10.0	7,300	730
12.0	6,500	780
15.0	5,560	830
20.0	4,320	860
30.0	2,580	770
[illegible]	840	380

AFTER SUBSIDY APPLIED:

- CUSTOMER BILL INCREASES FROM $380 TO $780
- SUBSIDY PAID BY STATE EQUALS $2015 ($0.31/KWHX6500 KWH)

REGRESSION EQUATION: $Y = 17{,}200 - 4300 \text{ LN } (P)$; $R^2 0.71$

SOURCE: AP ADMIN.; REGRESSION BASED UPON DATA FROM OVER 70 COMMUNITIES

As discussed above, if the probem being addressed is the lack of future electrical generation capacity in the Extended Railbelt and Southeast regions, all options should be evaluated on a consistent basis. If substantially different financing assumptions are used for each alternative, their true relative costs may not be fully understood and the state may undertake projects that do not provide the lowest energy costs.

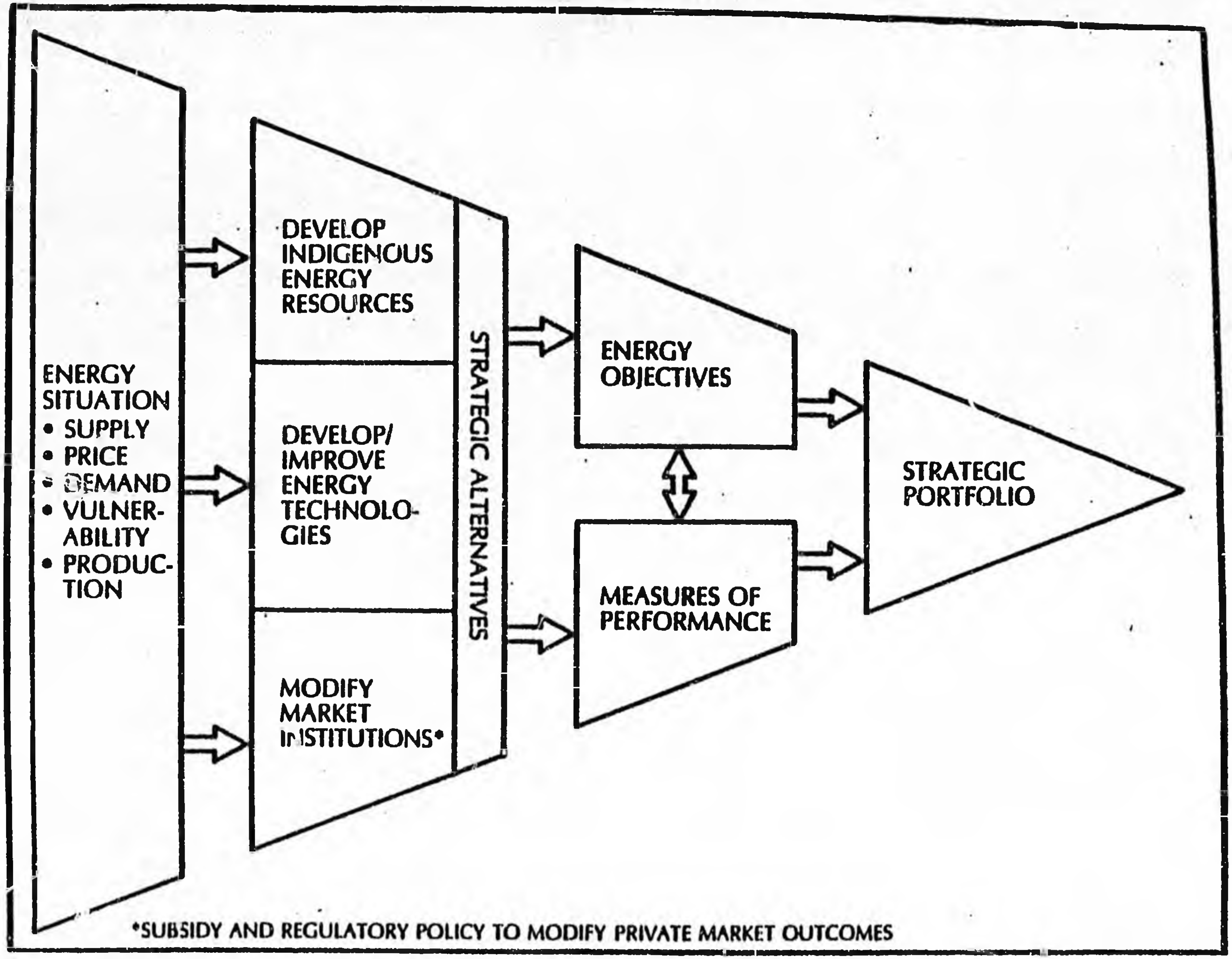
(5) <u>Next Year's Long Term Energy Plan Report Must Provide the Strategic Context for Energy Planning in the State</u>

Many of the items addressed above emphasize the need for a statewide strategic energy plan. This years report addressed many of the requirements of a strategic plan, but it did so in an uneven manner due to data limitations and time constraints. Exhibit 12 illustrates the key elements of a strategic energy planning process for the state. The elements and their roles include:

- <u>Energy Situation</u>--which highlights the types of energy problems facing the state in the near, mid and long term
- <u>Strategic Alternatives</u>--which respresent the basic program and policy alternatives available to the state
- <u>Energy Objectives</u>--which represent the consensus of Alaskans regarding the most desirable energy future for the state and are used to evaluate strategic alternatives
- <u>Measure of Performance</u>--which can be used as a basis for evaluating the performance of strategic alternatives
- <u>Strategic Portfolio</u>--which represents the "best" set of energy energy resource and technology development activities, as well as the most attractive subsidy and regulatory policies.

While each of these elements have been addressed to the extent possible in this year's report, substantial refinements are needed to produce a definitive 1983 report. The requirements for refining each of these elements during the next year are discussed more fully below.

EXHIBIT 12
STRATEGIC ENERGY PLANNING PROCESS



- <u>Analysis of Alaska's Energy Situation is Critically Dependent Upon the Development of a "Bottoms-up" Picture of Regional Energy Needs.</u> Because of the variability in energy problems across the state it is necessary to define the energy problems and available strategic alternatives on a regional or community basis. Reliable regional data are necessary for the estab- lishment of sound and effective programs which address the specific energy needs of each region. To date, much of the states energy use data has been collected independently within many private and government agencies and compiled at the statewide level, in turn, with regional estimates often derived from the aggregate state data.

  Regional data fabricated from statewide data are of limited usefulness when policy and program decision making requires a higher level of understanding as to what is actually taking place within each region. For example, to set reasonable program objectives for subsidizing rural electricity rates or for assisting in the purchase of bulk fuel storage capacity for rural communities, the state should have better information on the current energy needs of each rural community. Currently this information is sketchy at best.

  These village specific and regional data needs could be vastly improved through the upgrading and expansion of DEPD's Rural Community Energy Survey. This survey could be modified slightly and supplemented by a regular field sur- vey conducted by state energy personnel. The modified/supplemented DEPD survey would form the nucleus of a comprehensive state regional energy data base.

- <u>Strategic Alternatives Must be Accurately Characterized</u>. This year's, report provides estimates of the cost and energy savings for many of the resources and technologies under consideration. Actual data based on Alaskan experience is incomplete and needs to be improved. In addition, specific evaluations of the impacts of subsidy programs such as the Power Cost Assistance Program, discussed earlier in this chapter, should be undertaken to better understand actual program impacts.

- <u>Greater Emphasis Must Be Placed on Clearly Specifying Energy Objectives and Developing Measures of Performance</u>. Collectively, existing state energy programs implicitly define Alaska's energy objectives. However, without a more explicit definition of the State's economic and energy development objectives, a basis for resolving policy and program conflicts will not exist. Furthermore, without this definition the measure of whether or not a particular policy best meets the state's energy resource development and use needs are by definition impossible to measure. The net result is an under directed approach to program implementation with a high likelihood for misallocation of state resources.

- A Formal Evaluation Process Must be Undertaken To Establish the Relative Importance of the Strategic Alternatives. Currently, the state lacks a systematic approach for the review and prioritization of all energy programs and technology projects. To ensure the state funds are spent most effectively, it should develop and implement a consistent and economically rational methodology for evaluating and comparing energy programs and projects. The evaluation of energy programs, such as energy conservation grants, should take into account the following:

  - Program costs or expenditures including administration costs

  - Program benefits or impacts either qualitative -- number of home receiving assistance and type or assistance received of quantitative -- the actual level of reduction in energy use

  Technical evaluations of projects such as wind machine demonstrations should include the following:

  - Total costs of the project and the state's share

  - Construction, operating, and maintenance costs

  - Data on the project's performance and reliability.

  Given this type of information, it will be possible to calculate expected energy costs and expected total energy impacts for different programs and projects. Their relative benefits and cost can be compared and they can be matched explicitly with state energy objectives.

The strategic planning process outlined above will provide the state with an objective system for assessing likely program benefits and evaluating program results. This planning process should involve an independent review of major programs and projects and should measure progress against clear quantifiable objectives.

The state's energy policy and program activities appear comprehensive -- covering all functional aspects of energy program planning and development. However, given the recent rapid increase in energy policy and program activities the state should undertake a consistent and economically rational approach for an evaluation of existing energy programs and projects with the objective of modifying them to more effectively meet overall state energy goals.

* * * * *

This section has presented the key findings and recommendations of the 1982 Report on the State of Alaska Long Term Energy Plan. The main body of the 1982 report follows. It addresses each of the areas required in the legislation and is organized in the following manner:

- Chapter I - Current and Projected Energy Use--w. examines the amount and purpose of energy use in the state and the prices of different energy sources.

- Chapter II - Energy Supplies and Resources--Which documents existing and projected energy supplies and their potential applicability for meeting projected energy needs and lowering energy costs

- Chapter III - Regional Technology Options--which presents an analysis of the potential energy savings for those technology options including conservation measures, that have the lowest costs for meeting near, mid and long term state energy needs

- Chapter IV - State Energy Programs and Policies--which reports on current state energy activities and provides recommendations for program modifications and additions, including those dealing with the possibility of energy emergencies.