

SB

246

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FILE

FISCAL NOTE

STATE OF ALASKA
2008 LEGISLATIVE SESSION

Fiscal Note Number: _____
Bill Version: CSSB 246 (RES)
() Publish Date: _____

Identifier (file name): SB246CS(RES)-CED-AEA-03-10-08 Dept. Affected: DCCED
Title Susitna Hydro Working Group; Renort RDU AEA (453)
Component Statewide Project Development
Sponsor Thomas et al
Requester Senate Finance Component Number 2888

Expenditures/Revenues (Thousands of Dollars)

Note: Amounts do not include inflation unless otherwise noted below.

	Appropriation Required	Information						
		FY 2009	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014
OPERATING EXPENDITURES								
Personal Services								
Travel								
Contractual								
Supplies								
Equipment								
Land & Structures								
Grants & Claims								
Miscellaneous								
TOTAL OPERATING	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CAPITAL EXPENDITURES	2,750.0		1,500.0					
CHANGE IN REVENUES ()								

FUND SOURCE (Thousands of Dollars)

	FY 2009	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014
1002 Federal Receipts							
1003 GF Match							
1004 GF	2,750.0		1,500.0				
1005 GF/Program Receipts							
1037 GF/Mental Health							
Other Interagency Receipts							
TOTAL	2,750.0	0.0	1,500.0	0.0	0.0	0.0	0.0

Estimate of any current year (FY2008) cost: _____

POSITIONS

	FY 2009	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014
Full-time							
Part-time							
Temporary							

ANALYSIS: (Attach a separate page if necessary)

This legislation directs the Alaska Energy Authority (AEA) to analyze the hydroelectric potential of the Susitna River. AEA will consult with various government agencies, railbelt utilities, native corporations, other landowners, and various regional economic development councils.

The legislation requires the Governor to submit AEA's report of the findings to the legislature by June 1, 2010. The following pages detail the estimated cost of the report.

Prepared by: Sara Fisher-Goad, Deputy Director - Operations
Division: Alaska Energy Authority
Approved by: Emil R. Notti, Commissioner
Agency: Commerce, Community, and Economic Development

Phone 907 771 3012
Date/Time 3/10/08 5 06 PM
Date 3/10/2008

FISCAL NOTE

STATE OF ALASKA
2008 LEGISLATIVE SESSION

BILL NO. CSSB 246(RES)

ANALYSIS CONTINUATION

The work tasks and goals are envisioned to complete the objectives of SB 246, the timeline is provided for each task to illustrate work tasks that could be done in parallel rather than sequential.

SB 246 objectives 2,3,5,9,13

Work Task 1: Feasibility Study and Estimate of Plant and of Generated Power Costs

The 1984 estimates for construction of the Susitna Hydro project will be updated for current costs as well as current construction and design technology. Constructability and logistics will be key components of this update. Additionally a review of engineering and technical risks including seismic design will be identified. The design of this facility is such that there are minimal size reductions that can be done. While there may be a need for 700 MW of generating capacity the constraints of the Susitna site may allow for options of 300 MW, 1000 MW, and 1,620 MW only. The study therefore will examine the possible size options that are inherent in the 1984 estimate and provide capital, operating and maintenance costs and subsequent costs of power over the lifetime of the facility for those options. Additionally, modifications and estimates for upgrades of the Railbelt Electrical Grid to allow use of this new generation capacity will be developed. Timelines for design, permitting, and construction for each option will be developed.

Estimated Cost: \$1,500,000

Schedule: 30 June 2008 – 30 September 2009

SB 246 objectives 1,2,3,12

Work Task 2: Integrated Systems Energy Plan for the Railbelt

A strategic energy plan for the Railbelt area will be developed. This will examine projected energy demands under a variety of different future scenarios that will examine growth in population, potential new industrial demands, changes in air and water regulations, fuel costs, development of new energy technologies, as well as risks of the variety of generating options. The objective of this plan is to provide balanced view of energy needs and opportunities to allow for informed decisions on energy projects.

Estimated Cost: \$1,000,000

Schedule: 30 June 2008 – 30 January 2010

SB 246 objective 6

Work Task 3: Financing Options

The size of this single generation will be in excess of \$5 billion and while it may provide a competitive cost of power, the ability to finance the costs may be the limiting factor. An analysis of potential financing options will be developed.

Estimated Cost: \$200,000

Schedule: 30 January 2009 – 30 September 2009

SB 246 objective 4

Work Task 4: Cost of Power for Selected Alternatives

An estimate of approximate costs of alternative power generation that would be accessible to the Railbelt will be made. Options will consider the appropriate use of coal, natural gas, wind, geothermal, tidal and an alternate source of hydro. These estimates will be used to compare the reasonability of power generation from Susitna as well as the displacement opportunity of other fuels this project will enable. An important outcome of this activity will be the determination of the costs/values of emissions each generating option will provide, this will include such things as carbon emissions/capture and mercury emissions.

Estimated Cost: \$800,000

Schedule: 30 March 2009 – 31 December 2009

ANALYSIS CONTINUATION

SB 246 objectives 7,8,10,11

Work Task 5: Environmental/Socio-economic Impact Study

Environmental permitting and the socio-economic impact on the affected area is a key component of this study and will have the most impact on the feasibility of this study. A review of necessary permits, licenses and an analysis of potential impacts to the area will be done. Economic impacts and opportunities, including construction and operation jobs, which will result from a project of this size and generating capacity will be determined.

Estimated Cost: \$500,000

Schedule: 30 January 2009 – 30 September 2009

SB 246 objectives 8,10,11

Field Work

Limited field work is envisioned; however there may be need for helicopter access to the location of the proposed dam sites as well as limited amount of field work including terrain, river conditions and potential construction camp sites and lay down areas.

Estimated Cost: \$250,000

Schedule: 30 June 2008 – 30 September 2009

Proposal Summary

Total Estimated Susitna Study Cost: \$3,250,000

Total Estimated Cost with Railbelt Energy Plan: \$4,250,000

FY 09 - \$2,750,000

FY 10 - \$1,500,000

It is anticipated that this work will take approximately two years, with the draft report available in January 2010 and a final report including a Railbelt energy plan available in June 2010. Over the course of the project interim reports will be issued and specific decision gates on proceeding with phases of the project will be developed. If at anytime the feasibility of the Susitna Dam project becomes non-viable the project will be curtailed.

ALASKA STATE LEGISLATURE



SENATOR JOE THOMAS

Sponsor Statement – SS for SB 246

An act directing the Alaska Energy Authority to analyze the potential of a hydroelectric power project on the Susitna River.

Senate Bill 246 will direct the governor to have the Alaska Energy Authority analyze the hydroelectric potential of the Susitna River. The AEA will review and update the studies done in the past, evaluate cost analysis, financing options, current and future demand and other critical issues to determine the feasibility of the project. The governor will submit a final report to the legislature no later the July 1st, 2010.

In recent years, Alaskans have seen their energy costs skyrocket. These ever rising costs and uncertain supplies not only make it difficult for Alaskans across the state to make ends meet, but also have an adverse impact on economic growth.

The energy produced by a hydroelectric facility is predictable, stable, clean and low cost. Currently, the Bradley Lake hydroelectric dam produces energy for the Railbelt at just \$.05 per kWh, far below the \$.176 per kWh that the Interior is currently paying.

In addition to these factors, the majority of our combustion turbine power plants along the Railbelt are over 30 years old and all will need retrofitting and replacement that will cost between \$1 billion and \$2.5 billion over the next ten years. Once these replacements begin, we will continue with the same rising energy costs, fluctuating operating expenses and high polluting facilities that the citizens of the state have experienced in the past.

Twenty five years ago, when a dam along the Susitna River was last looked at, Cook Inlet Gas cost \$.21 per million cubic feet, the population and energy demand along the Railbelt was substantially less then today, and energy costs were no where near what they are today. I believe all these factors, along with the environmental and long term energy considerations merit a reopening of the Susitna discussion.

Nothing is as comprehensive of an approach to reducing costs, emissions and dependence on finite, non-renewable energy production for the Railbelt and adjacent areas as a Susitna Dam project.

I urge you to support the passage of SB 246.

Sectional Analysis for SS for Senate Bill 246

Section 1: Legislative Findings

This bill states that the legislature finds several critical issues regarding energy and economic environment in Alaska today requesting re-opening and re-evaluating the Susitna Dam studies.

These findings include increasing energy costs for Alaskans and Alaskan businesses, Railbelt combustion turbine replacement costs, operational lifetime of a hydroelectric project, energy and operating costs for a hydroelectric project and its stable and predictable nature.

Section 2: Working Group Established by the Governor

Senate Bill 246 directs the Governor to charge the Alaska Energy Authority with analyzing the hydroelectric potential of the Susitna River.

The AEA will consult with representatives from departments within the Administration including the Departments of Natural Resources, Environmental Conservation, Fish and Game, Labor and Workforce Development, and Commerce Community and Economic Development.

The AEA will also consult with the Railbelt electric utilities, native corporations, the Mat-Su Resource, Conservation and Development Council, the Fairbanks and Anchorage Economic Development Corporations and private land owners in the affected areas. The Army Corps of Engineers may also be consulted with due to their experience with the original studies and knowledge of large scale hydroelectric projects.

Section 2 further outlines what the AEA will evaluate in order to reach a conclusion on the feasibility of the project.

Section 2 details 13 different issues to be incorporated in the report. These include, but are not limited to, the projected midrange and long range energy supply and demand along the Railbelt, appropriate size and design of a hydroelectric project to meet these needs, to what extent hydroelectric power can be substituted for power generated by other means, financing options, permitting requirements, timeline, environmental concerns and a review of previous studies on Susitna Hydro electric power.

These 13 points allow the AEA an outline and general direction of what the legislature wants to see. They do not supply a restrictive or exclusionary list.

Lastly, this section sets the January 1st, 2010 date for reporting back to the legislature on the working group's findings; with a date of July 1st, 2010 for final study

Information on the Potential of a Susitna Hydroelectric project

- Nothing is as comprehensive an approach to reducing costs, emissions and dependence on finite, non-renewable energy production for the Railbelt and adjacent areas as a Susitna Dam project.
- Because of the nature of hydroelectric projects, there is always a substantial upfront capital cost. While daunting, when looking at hydro projects long term, they are the single most cost effective and reliable generation source available. Hydro power is far cheaper and more consistent than any fossil fuel generation source.
- Since no purchase of fuel is necessary for generation, the operating costs of a hydro project, estimated at \$.008 per kWh for a Susitna Dam, are essentially nonexistent and have been coined "flat power."
- Hydroelectric projects have a potential lifespan of over 100 years. Because they have few moving parts, and rely only on the water behind the dam to activate the turbines, these projects have predictable maintenance costs and payoff schedules. Alaska still has hydroelectric projects in use dating from the Gold Rush days.
- **Generating electricity from gas turbines is extremely inefficient.** Chugach Electric Association's natural gas turbines have efficiency ratings between 15%-35%. A new turbine to go in around 2012 will be approximately 50% efficient. **Hydroelectric turbines are consistently in the neighborhood of 90% efficiency.**
- **The current power sources along the Railbelt are aging rapidly.** Chugach Electric Association's Beluga plant's natural gas turbines are all between 30 and 40 years old while their Bernice Lake plant's turbines are 27 to 37 years old. GVEA's largest power plant was built in 1975, and the Healy Clean Coal Plant is not in operation.
- **With a hydroelectric project there are no emissions, waste or hazardous byproducts.** The energy source is completely free and available as long as the river is running.
- **Eliminating the use of fossil fuels allows utilities and their customers a stable, low cost source of electricity.** Chugach has seen their natural gas prices increase over 2000% since Susitna was last studied. GVEA has seen their kWh charges increase over 100% in just the last 8 years.

- The estimated per kWh cost to the customers from a Susitna project is \$.05 for the lifetime of the project. AEL&P, here in Juneau, has seen only a 30% increase to their customers since 1989.
- By utilizing hydroelectric power as a significant energy source for the Railbelt's needs, other non-renewable energy sources could be sold or used more efficiently around the state. This could result in increased revenue to the state making money available for other necessary services and economic development or cheaper fuel costs off of the Railbelt.
- Senator Joe Thomas' Senate Bill 246 proposes a feasibility study of a Susitna River hydroelectric project. This bill would designate the Alaska Energy Authority to study a broad range of aspects involved in making a decision about the achievability of such a project, and returning to the legislature with a report in January 2010.
- Currently on record in support of Senate Bill 246 are:
 - The Palin Administration
 - Golden Valley Electric Association
 - Matanuska Energy Association
 - Chugach Electric Association
 - Mat-Su Resource, Conservation and Development Council, Inc.
 - Fairbanks Economic Development Co.

Fairbanks Energy

November 2007

Strategic Business Plan

This document contains confidential and proprietary information
belonging exclusively to:

Fairbanks Economic Development Corporation
301 Cushman Street, Suite 301
Fairbanks, Alaska 99701
U.S.A.
(907) 452-2185

The best time to plant a tree was 20 years ago. The second best time is today.
-Chinese Proverb-

Hydroelectric Subsection of the Energy Task Force

Participants: John Davies, Mike Wright, Karl Monetti, Dave Van Den Berg

Hydroelectric Workgroup Proposal

Consider the installation of a 600-megawatt Susitna Hydroelectric project that would supply the electrical needs of the Railbelt. Construction of multiple transmission lines to Fairbanks and Anchorage would also be required for the reliable "firm" delivery of the Susitna energy.

Delivery of electrical power from Susitna to rural Alaska would likely not be economic, but Susitna energy could augment or power the production of Fischer-Tropsch liquid fuels for delivery to rural Alaska that would be used in existing infrastructure.

In the long-term, a 20 to 50-year timeframe, once the technology is commercially available, electricity from Susitna could be used to power electrolyzers for the creation of hydrogen. Hydrogen would be delivered locally for use in home fuel cells for heat and electric cogeneration and car fuel cells for transportation. This is idealistic; zero-emission renewable energy used in a technology that only produces energy and distilled water.

Discussion

Hydroelectric power has been an important source of electrical power throughout the World for decades. Regions have developed and grown from the construction of hydro projects, many of which were constructed with Federal governmental support.

Hydroelectric projects typically have very high initial capital costs to construct the original dams and generators. The operations and maintenance costs that typically are predictable with increases linked to inflation. The predictability of the very stable hydroelectric costs, over 100-year plus project lives, has coined the phrase "flat power".

In the 1930's through the 1950's, when most of the large federal projects were built, the National Environmental Policy Act (NEPA) was not in existence. The goal of these projects was to provide jobs, abundant and cheap power to regions for economic growth. After the passage of NEPA, the rules governing the evaluation of projects and their effects on the environment were developed and clarified into the current day, Environmental Impact Statement (EIS).

All the legacy combustion turbines in the Railbelt are over thirty years old, and will need to be replaced within the next ten years. The cost of replacing these aging electric generators is approximated to be in the range of \$1.5 billion to \$2.5 billion. The general approach to the aging generation situation will be the replacement of the combustion turbines with new more efficient combustion turbines or with low cost fuel options such as coal power plants. Financially, once the new turbines have been installed and the investment has been made the turbines are expected to be operated and emit some level of pollutants and carbon dioxide for their economic life of about thirty years. Fuel

switching or changing to hydroelectric is a only viable option before commitment to the construction of the replacement turbines. Environmentally, the carbon-based power plants will emit varying amounts of oxides of sulfur, oxides of nitrogen, particulate matter and carbon dioxide. Hydroelectric generation will provide a renewable alternative to combustion technology that will emit near zero emission. Hydroelectric emissions are considered near zero rather than zero due to recent discussions of methane released from submerged biomass due decomposition from the creation of the lake behind the dam. There is little data on this topic in northern regions but it is suspected that the potential release of the quantity of methane released would have much less impact as a green house gas than the carbon dioxide release from even the most efficient combustion turbine using natural gas as a fuel. In addition, logging and clearing the area to be inundated prior to filling the reservoir can greatly reduce the quantities of methane released after the reservoir is completed.

Cost of hydroelectric Construction and Operation

The capital cost of a 600,000-kilowatt Susitna project was estimated at \$5,000/kilowatt for a hydroelectric capital cost of \$3,000,000,000. The electrical transmission lines for inclusion were 20 miles and 300 miles if line at a cost of \$1,000,000 and \$1,500,000., respectively, for a total transmission line cost of \$470,000.

The State of Alaska provided a September 13, 2005 memo on an update of the cost estimate for the Susitna project, from the 1984 Update Study adjusted to 2005, at a cost of \$10.5 billion. The reason for this 3 fold increase in price are not known, but needs to be examined and evaluated. The scope of this project is not known and needs to be verified to ensure the proper cost estimate. The full 1,600-kilowatt project was referenced in the FERC application but in the later stages of the project there were discussions of a reduced scope Susitna Project. More research needs to be conducted on the project scope. A former Alaska Power Authority employee involved in the project estimated the Watana dam to be 4/5 of the project costs.

Operation and maintenance cost were estimated at \$0.008/kWh, based on a DOE Large Hydro report.

Recommendations for next steps:

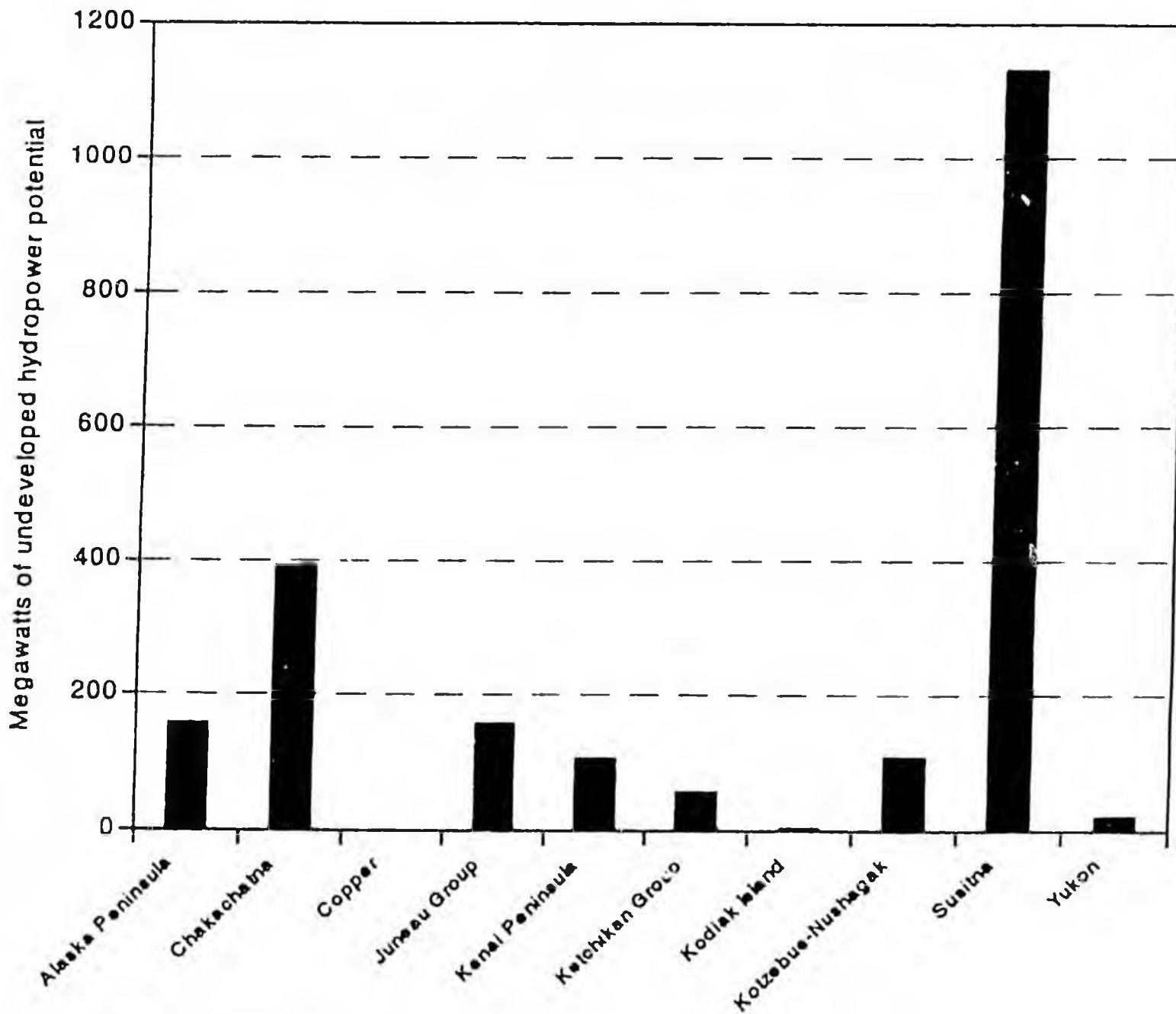
Analysis should be done on the appropriate sizing of the dam to power both the mid-term and long-term energy of the Railbelt.

The hydrological design should be reviewed once the sizing has been completed.

System security should also be analyzed to ensure power supplies in the Railbelt would continue following any common mode failure or natural disaster. Peaking units could be maintained at each load center to ensure continuity of energy supply if the hydroelectric was unavailable. The existing aging generators may provide many years of emergency power at a realistic price. Delivery of the electric energy of high-voltage transmission lines can be secured through multiple transmission lines, which are separated by distance to reduce one cause removing multiple lines from service.

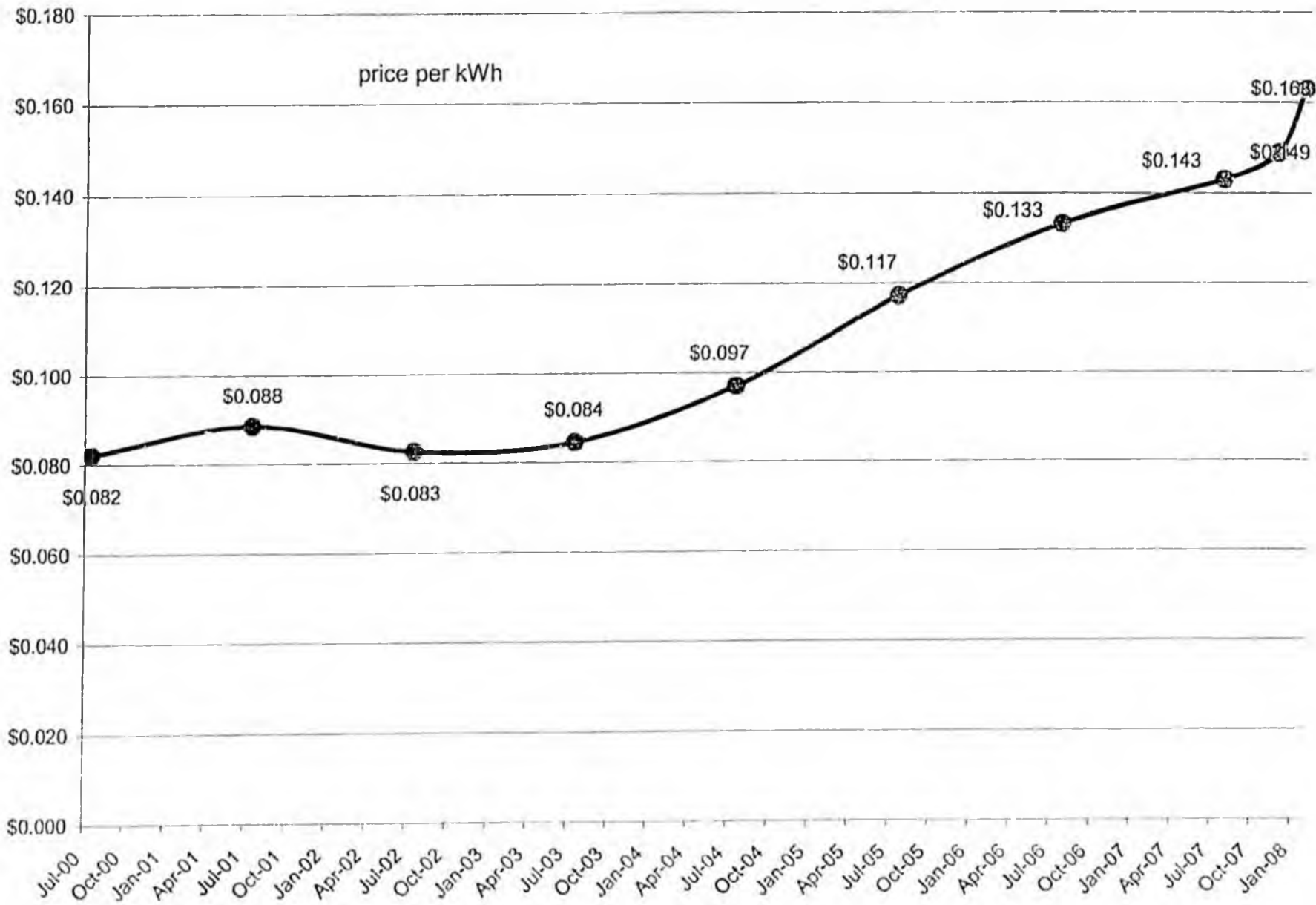
The timing of permitting and licensing should be reviewed to identify the effect of re-filing the existing FERC license for Susitna, or modifying the dam design, which may require additional environmental field studies.

Undeveloped Hydroelectric Potential in Alaska in MW



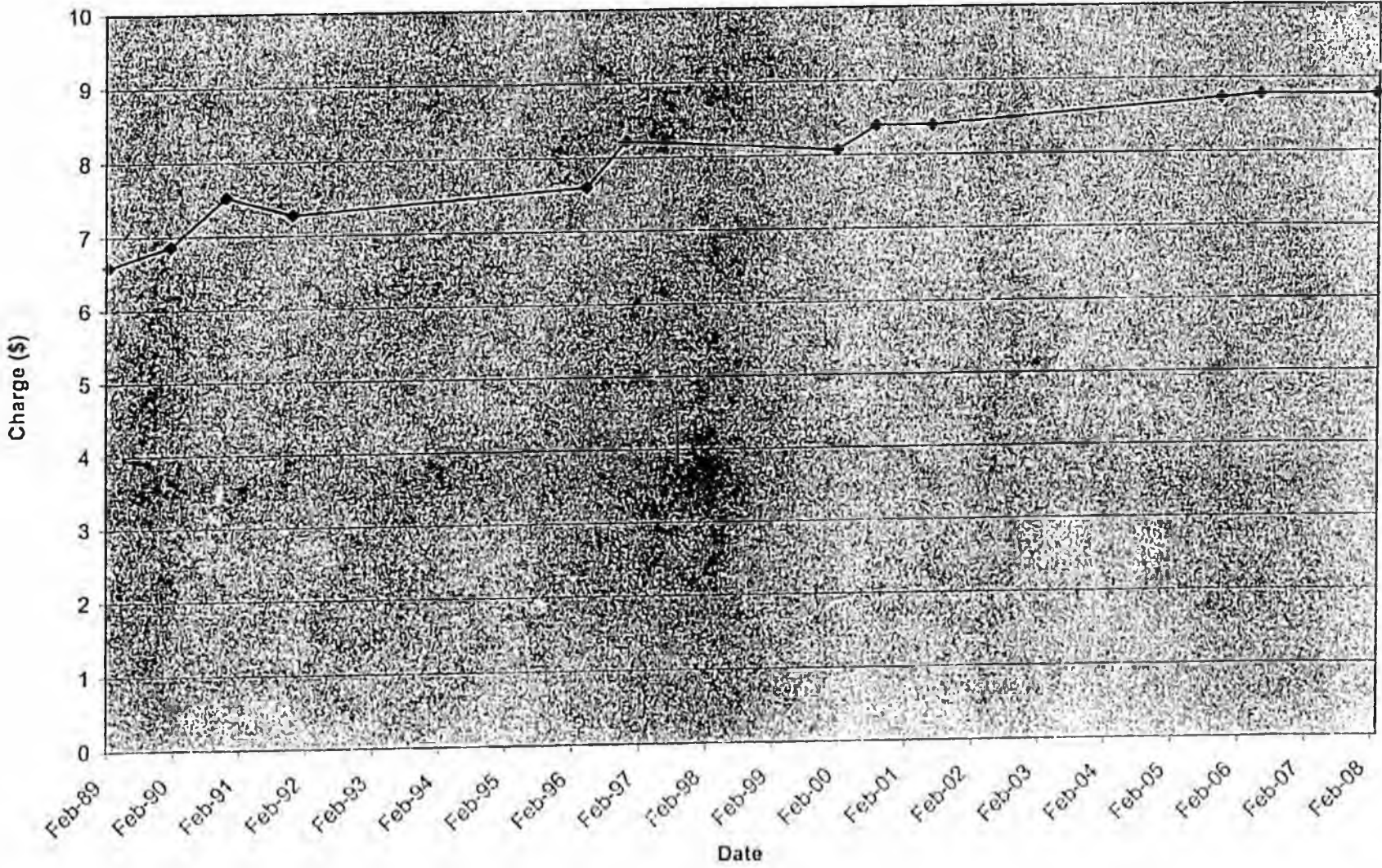
Data from U.S. Hydropower Resource Assessment for Alaska, November 1997 by Idaho National Engineering and Environmental Laboratory for the U.S. Department of Energy

GVEA Residential kWh charges

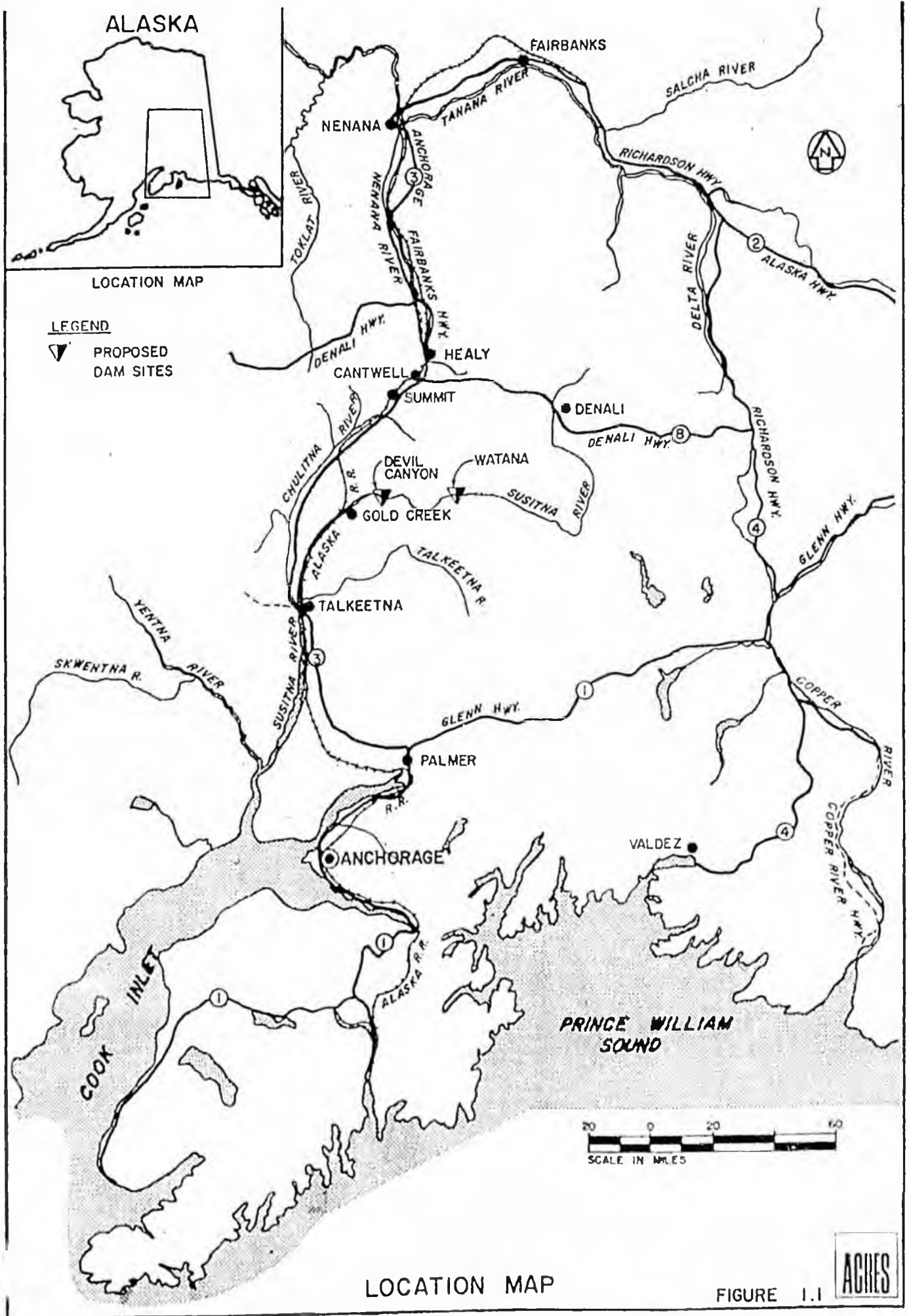


Courtesy of Todd Hoener, GVEA Energy Efficiency Specialist

AEL&P Average Residential kWh Charge



Courtesy of AEL&P



ALASKA

LOCATION MAP

LEGEND

▼ PROPOSED DAM SITES

LOCATION MAP

FIGURE 1.1



Generation Resources

Chugach uses various generation resources to ensure reliable, affordable power. Chugach has 530.10 megawatts of installed capacity. The unit ratings shown are taken at 30 degrees Fahrenheit. Chugach also takes power from the state-owned Bradley Lake hydroelectric project near Homer. In 2006, 90 percent of the kilowatt-hours Chugach sold came from natural gas units and the other 10 percent from hydroelectric resources.

Beluga

Located on the west side of Cook Inlet near Tyonek, combustion turbines; unit Nos. 1-3 and 5-7 are fueled by natural gas; Unit 8 is a steam turbine.

Units	Commissioned	Power Rating (megawatts)
No. 1	1968	19.6
No. 2	1968	19.6
No. 3	1972	64.8
No. 5	1975	68.7
No. 6	1975	79.2
No. 7	1978	80.1
No. 8	1981	53.0

TOTAL 385.0

Cooper Lake

Located near Cooper Landing on the Kenai Peninsula; units are hydro-turbines

Units	Commissioned	Power Rating (megawatts)
No. 1	1960	9.6
No. 2	1960	9.6

TOTAL 19.2

Bernice Lake

Located near Nikiski on the Kenai Peninsula; units are natural gas combustion turbines

Units	Commissioned	Power Rating (megawatts)
No. 2	1971	19.0
No. 3	1978	26.0
No. 4	1981	22.5

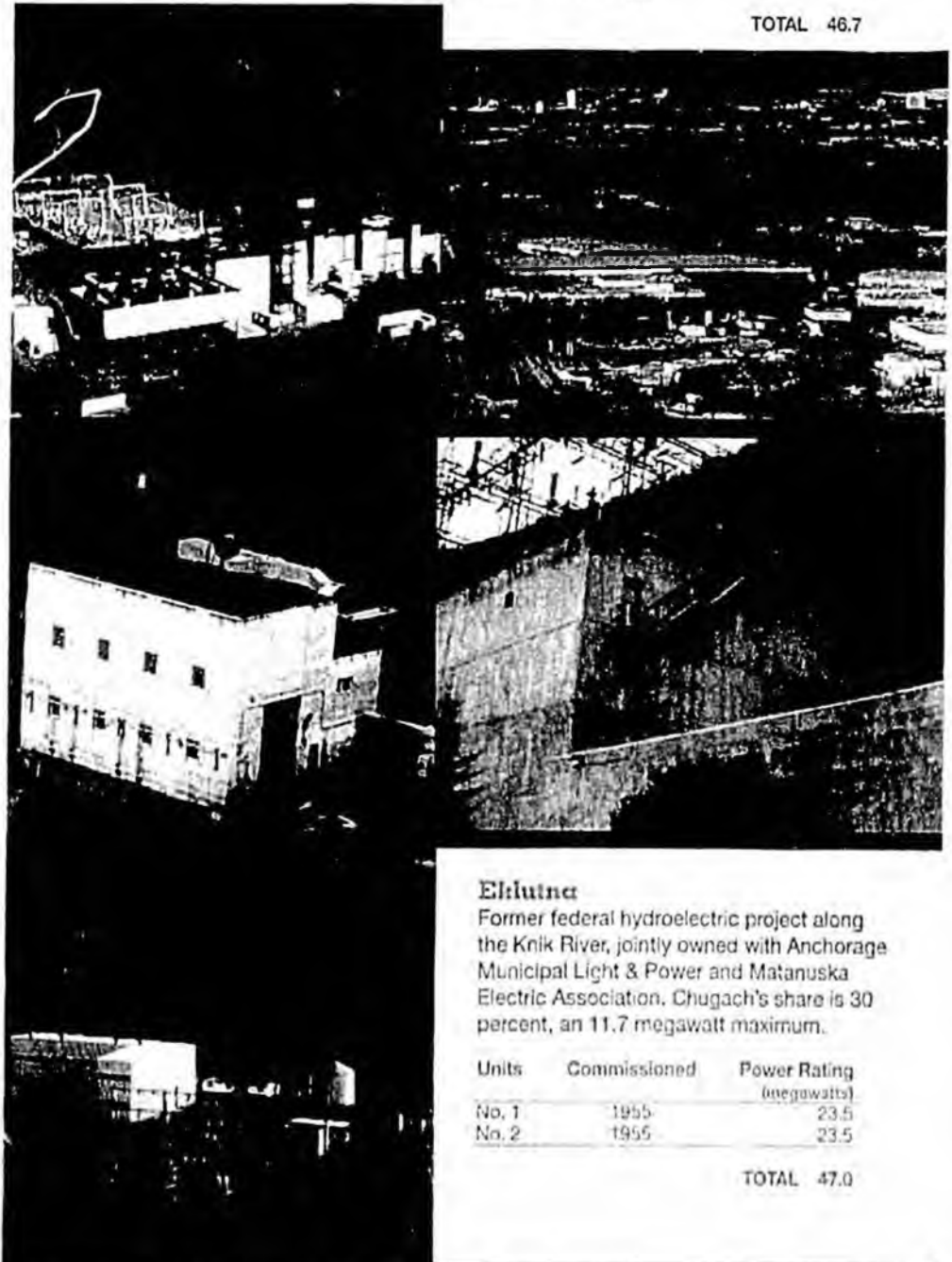
TOTAL 67.5

International

Located off International Airport Road in Anchorage; units are natural gas combustion turbines

Units	Commissioned	Power Rating (megawatts)
No. 1	1964	14.1
No. 2	1965	14.1
No. 3	1969	18.5

TOTAL 46.7



Eliutna

Former federal hydroelectric project along the Knik River, jointly owned with Anchorage Municipal Light & Power and Matanuska Electric Association. Chugach's share is 30 percent, an 11.7 megawatt maximum.

Units	Commissioned	Power Rating (megawatts)
No. 1	1955	23.5
No. 2	1955	23.5

TOTAL 47.0



**Matanuska Electric
Association, Inc.**

P.O. Box 2929
Palmer, Alaska 99645-2929
Telephone: (907) 745-3231
Fax: (907) 761-9368

February 20, 2008

Senator Charlie Huggins
State Capitol
Juneau, AK 99801

Dear Senator Huggins:

Thank you for the opportunity to provide comments in support of SB 246, **Susitna Hydro Working Group; Report.**

Matanuska Electric Association (MEA) is the oldest and second largest electric utility cooperative in the state. MEA serves more than 53,000 customers in the Matanuska-Susitna Valley and Chugiak-Eagle River areas of Alaska.

On February 11, MEA's Board of Directors unanimously passed a resolution supporting a similar piece of legislation, HB 336. As soon as a formal, signed copy is available, I will forward it to you.

Similarly, MEA supports SB 246 and your efforts to encourage the development of renewable energy projects in our service territory that would benefit the entire Railbelt. Last year, MEA expressed its desire to see the remaining balance of the Railbelt Energy Fund be dedicated to Southcentral Railbelt renewable energy projects.

Reviewing existing studies on the Susitna Hydro Project will spark important conversations about long-term energy policy for Alaska. While the actual development of a Susitna hydro project may take decades to complete, MEA is encouraged by the forward thinking laid out in SB 246.

Sincerely,

A handwritten signature in cursive script, appearing to read "Lorali M. Carter".

Lorali M. Carter
Manager of Government & Corporate Communications

cc: Senator Joe Thomas, Sponsor, SB 246

Enclosure: MEA Press Release on Railbelt Energy Fund Dedication



Mat-Su Resource Conservation & Development

*"Fostering Responsible Resource Conservation and
Economic Development in the Matanuska-Susitna Borough"*

Resolution 001-08

A RESOLUTION OF THE MAT-SU RESOURCE CONSERVATION AND DEVELOPMENT COUNCIL, INC. TO SUPPORT THE STUDY OF A SUSITNA HYDRO ELECTRIC PROJECT.

WHEREAS, the Mat-Su Resource Conservation & Development Council, Inc. is a Nonprofit Corporation in the State of Alaska; and

WHEREAS, the Mat-Su Resource Conservation & Development Council, Inc recognizes that renewable energy plays an important role in the future development of the State of Alaska; and,

WHEREAS, the Matanuska Susitna Borough and surrounding areas rely heavily on fossil fuels, whose pricing is highly volatile in today's market; and,

WHEREAS, the electric production of hydro electric projects emit no CO₂; and,

WHEREAS, substantial progress has been made on the Susitna Hydro Electric project since it was first studied in the 1970s; and

WHEREAS, the size and financing of this project is yet to be determined:

HEREBY BE IT RESOLVED that on this day February 5, 2008.

The Mat-Su Resource Conservation & Development Council, Inc supports the further advancement of the Susitna Hydro Electric Project.

Attest:

Roger Purcell

Roger Purcell, Vice-President

Darcie Salmon

Darcie Salmon, President



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FAIRBANKS
Economic Development
CORPORATION

301 Cushman St., Suite 301, Fairbanks, AK 99701

February 11, 2008

Senator Joe Thomas
Alaska State Legislature
State Capitol
Juneau, Alaska 99801

Alaska is facing a growing and unanswered energy crisis. Within the next 10 years Alaska's Railbelt communities will need to replace 100% of their current power generation. In Rural Alaska the energy crisis is threatening to close communities that have existed hundreds of years.

Finding affordable, sustainable and environmentally friendly energy solutions for Alaska is the right investment in Alaska's future. Moving beyond an economy dependent on Federal spending and the price of oil will require leadership from both the State of Alaska Legislature and our Governor. We must make investments in Alaska that will contribute to our more self-dependent economic future.

We urge the Alaska State Legislature and the Governor of the State of Alaska to support Senate Bill 246 and create a task force to analyze the potential

Sincerely,

Jim Dodson
President & CEO
Fairbanks Economic Development Corporation