Existing Generating Facilities And Planned Additions for the Railbelt Region of Alaska

Volume VI

September 1982

Prepared 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

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PREFACE

The State of Alaska commissioned Battelle to investigate potential strategies for future electric power development in Alaska's Railbelt region. The results of the study will be used by the Office of the Governor to formulate recommendations for electric power development in the Railbelt.

The primary objective of the study is to develop and analyze several alternative long-range plans for electric energy development in the Railbelt region. Each plan is based on a general energy development strategy representing one or more policies that Alaska may wish to pursue. The analyses of the plans will produce forecasts of electric energy demand, schedules for developing generation and conservation alternatives, estimates of the cost of power, and discussions of the environmental and socioeconomic characteristics for each plan.

This report (Volume VI of a series of seventeen volumes, listed below) describes electric generating facilities currently existing and scheduled to be added in the Railbelt region. Several sources were used to develop the lists of current generating facilities presented in this report. In most cases, the utilities themselves furnished the data on the number of units and their nameplate capacities. Other information, such as the retirement date, forced outage rate, and maximum capacity factor, was assumed on the basis of national operating statistics.

RAILBELT ELECTRIC POWER ALTERNATIVES STUDY

√ Volume I - Railbelt Electric Power Alternatives Study: Evaluation of Railbelt Electric Energy Plans

Volume II - Selection of Electric Energy Generation Alternatives for Consideration in Railbelt Electric Energy Plans

Volume III - Executive Summary - Candidate Electric Energy Technologies for Future Application in the Railbelt Region of Alaska

Volume IV - Candidate Electric Energy Technologies for Future Application in the Railbelt Region of Alaska

√ Volume V - Preliminary Railbelt Electric Energy Plans

Volume VI - Existing Generating Facilities and Planned Additions for the Railbelt Region of Alaska

√ Volume VII - Fossil Fuel Availability and Price Forecasts for the Railbelt Region of Alaska

√ Volume VIII - Railbelt Electricity Demand (RED) Model Specifications

Volume IX - Alaska Economic Projections for Estimating Electricity Requirements for the Railbelt

Volume X - Community Meeting Public Input for the Railbelt Electric Power Alternatives Study

Volume XI - Over/Under (AREEP Version) Model User's Manual

Volume XII - Coal-Fired Steam-Electric Power Plant Alternatives for the Railbelt Region of Alaska

Volume XIII - Natural Gas-Fired Combined-Cycle Power Plant Alternative for the Railbelt Region of Alaska

Volume XIV - Chakachamna Hydroelectric Alternative for the Railbelt Region of Alaska

Volume XV - Browne Hydroelectric Alternative for the Railbelt Region of Alaska

Volume XVI - Wind Energy Alternative for the Railbelt Region of Alaska

Volume XVII - Coal-Gasification Combined-Cycle Power Plant Alternative for the Railbelt Region of Alaska

SUMMARY

The total nameplate generating capacity for each of the Railbelt utilities by type of generating capacity is presented in Table S.1. As shown in this table, the Anchorage-Cook Inlet area had a total of 621.5 MW of capacity, and the Glennallen-Valdez area had 303.65 MW of capacity in 1980. Of the total 944.05 MW capacity, the majority is simple-cycle combustion turbine (520.45 MW or 55%). The relative mix of technologies is shown in Figure S.1. The total nameplate generating capacity for the military installations is summarized in Table S.2.

TABLE S.1. Total Nameplate Generating Capacity - Railbelt Utilities (1980) - MW

	CCCT[a]	Diesel	Hydro	RCCT	SCCT	ST	Total
Anchorage - Cook Inlet Area							
Alaska Power Administration	0	0	30	0	0	0	30
Anchorage Municipal Light and Power	139	0	0	0	74.5	0	213.50
Chugach Electric Association	0	0	16	111	244	0	371.50
Homer Electric Association	0	1.5	0	0	0	0	1.5
Matanuska Electric Association	0	0	0	0	0	0	0
Seward Electric System	0	5.5	0	0	0	0	5.5
Subtotal	139	7.0	46	111	318.5	0	621.5
Fairbanks - Tenana Valley Area							
Fairbanks Municipal Utilities System	0	8.25	0	0	28.35	29.0	65.6
Golden Valley Electric Association	0	23.75	0	0	170.80	25.0	219.55
University of Alaska - Fairbanks	0	5.50	0	0	0	13.0	18.50
Subtotal	0	37.50	0	0	199.15	67.0	303.65
Glennallen - Valdez Area							
Copper Valley Electric Association	0	16.10	0	0	2.8	0	18.9
TOTAL	139	60.6	46	111	520.45	67.0	944.05

(a) CCCT - Combined-Cycle Combustion Turbine
Diesel - Diesel Cycle
Hydro - Hydraulic Turbine
RCCT - Regenerative Cycle Combustion Turbine
SCCT - Simple Cycle Combustion Turbine
ST - Steam Turbine

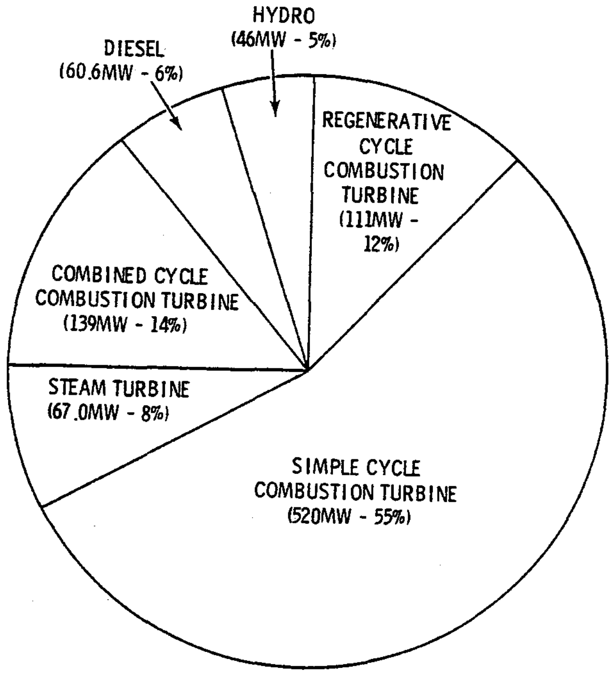

FIGURE S.1. Relative Mix of Electrical Generating Technology - Railbelt Utilities - 1980

TABLE S.2. Total Nameplate Generating Capacity - Railbelt Military Installations (1980) - MW

	CCCT[a]	Diesel	Hydro	RCCT	SCCT	ST	Total
Anchorage - Cook Inlet Area							
Elmendorf AFB	0	2.1	0	0	0	31.5	33.6
Fort Richardson	0	7.2	0	0	0	18.0	25.2
Subtotal	0	9.3	0	0	0	49.5	58.8
Fairbanks - Tenana Valley Area							
Eielson AFB	0	0	0	0	0	8.75	8.74
Fort Greeley	0	5.5	0	0	0	0	5.5
Fort Wainwright	0	0	0	0	0	22.0	22.0
Subtotal	0	5.5	0	0	0	30.75	36.25
TOTAL	0	14.8	0	0	0	80.25	95.05

(a) CCCT - Combined-Cycle Combustion Turbine
Diesel - Diesel Cycle
Hydro - Hydraulic Turbine
RCCT - Regenerative Cycle Combustion Turbine
SCCT - Simple Cycle Combustion Turbine
ST - Steam Turbine

1.0 INTRODUCTION

The Railbelt area currently consists of three noninterconnected load centers; the Anchorage-Cook Inlet area, the Fairbanks-Tenana Valley area, and the Glennallen-Valdez area.[a] In the Anchorage-Cook Inlet and Fairbanks-Tenana Valley areas several utilities and military installations are interconnected. The Glennallen-Valdez area has only a single utility, the Copper River Electric Association, Inc. The utilities and military installations for which data are included in this report are shown below:

Anchorage-Cook Inlet Area

Utilities

Alaska Power Administration
Anchorage Municipal Light and Power
Chugach Electric Association, Inc.
Homer Electric Association, Inc.
Matanuska Electric Association, Inc.

Military Installations

Elmendorf AFB
Fort Richardson

Fairbanks-Tenana Valley Area

Utilities

Fairbanks Municipal Utilities System
Golden Valley Electric Association, Inc.
University of Alaska-Fairbanks

Military Installations[b]

Eielson AFB
Fort Greeley
Fort Wainwright

(a) Glennallen and Valdez were scheduled to be interconnected in 1981 and are considered as a single load center for the purpose of this analysis.
(b) Clear Air Force Station generates its own power but is not connected to the other systems. Due to the mission of this station, future connection is not anticipated.

Glennallen-Valdez Area

Utility

Copper Valley Electric Association, Inc.

Industries having their own generating facilities were not considered in this analysis since they typically do not market power.

2.0 EXISTING GENERATING FACILITIES AND PLANNED ADDITIONS FOR THE RAILBELT AREA

As mentioned earlier, the Railbelt area has three noninterconnected load centers: the Anchorage-Cook Inlet Area, the Fairbanks-Tenana Valley area; and the Glennallen-Valdez area. In the following section, the existing generating facilities and planned additions for each of these areas are presented and briefly discussed.

2.1 ANCHORAGE-COOK INLET AREA

The Anchorage-Cook Inlet area has three rural electric cooperative associations (REAs), two municipal utilities, a Federal Power Administration, and two military installations. They are listed below:

Alaska Power Administration (APA) - U.S. Department of Energy
Anchorage Municipal Light and Power (AML&P) - Municipal Utility
Chugach Electric Association (CEA), Inc. - REA
Homer Electric Association (HEA), Inc. - REA
Matanuska Electric Association (MEA), Inc. - REA
Seward Electric System (SES) - Municipal Utility
Elmendorf AFB - Military
Fort Richardson - Military

All of these organizations, with the exception of MEA, have electrical generating facilities. MEA buys its power from the Chugach Electric Association. HEA and SES have relatively small generating facilities that are used for standby operation only. They also purchase their power during normal operations from the Chugach Electric Association. Total nameplate generating capacity for these utilities is presented in Table 2.1. Total nameplate generating capacity for the two military installations in the Anchorage-Cook Inlet area, Elmendorf AFB and Fort Richardson, are presented in Table 2.2.

Further information about specific generating plants and units for each of the utilities and military installations discussed in this report is contained in Appendix A.

TABLE 2.1. Total Nameplate Generating Capacity - Railbelt Utilities (1980) - MW

	CCCT[a]	Diesel	Hydro	RCCT	SCCT	ST	Total
Alaska Power Administration	0	0	30.0	0	0	0	30.0
Anchorage Municipal Light and Power	138.9	2.2	0	0	89.5	0	230.6
Chugach Electric Association	0	0	16.5	120.10	287.31	19.0	442.91
Fairbanks Municipal Utility System	0	8.25	0	0	28.35	28.5	65.10
Golden Valley Electric Association	0	17.95	0	0	163.4	25.0	206.35
Homer Electric Association	0	2.095	0	0	0	0	2.095
Seward Electric System	0	5.5	0	0	0	0	5.5
TOTAL	138.9	35.995	46.5	120.10	568.56	72.5	982.555

(a) CCCT - Combined-Cycle Combustion Turbine
Diesel - Diesel Cycle
Hydro - Hydraulic Turbine
RCCT - Regenerative Cycle Combustine Turbine
SCCT - Simple Cycle Combustion Turbine
ST - Steam Turbine

TABLE 2.2. Total Nameplate Generating Capacity Anchorage-Cook Inlet Area Military Installations (1980)

	CCCT[a]	Diesel	Hydro	RCCT	SCCT	ST	Total
Elmendorf AFB	0	2.1	0	0	0	31.5	33.6
Fort Richardson	0	7.2	0	0	0	18.0	25.2
TOTAL	0	9.3	0	0	0	49.5	58.8

(a) CCCT - Combined-Cycle Combustion Turbine
Diesel - Diesel Cycle
Hydro - Hydraulic Turbine
RCCT - Regenerative Cycle Combustion Turbine
SCCT - Simple Cycle Combustion Turbine
ST - Steam Turbine

Presently, three additional generating facilities are planned for the Anchorage-Cook Inlet area. The Bradley Lake hydroelectric facility will have a rated capacity of 90 MW with an expected average annual energy production of 347,000,000 kWh. It is presently anticipated to come on-line in 1988. Under current plans, it is to be a Federal project built by the Corps of Engineers and operated by the Alaska Power Administration.

AML&P is planning to add a 73.6-MW combustion turbine unit at Station 2 in 1982. CEA is planning to add a waste heat recovery steam turbine at the Beluga plant in 1982. This unit will have a generating capacity of approximately 54 MW.

2.2 FAIRBANKS-TENANA VALLEY AREA

The Fairbanks-Tenana Valley area has one REA cooperative, one municipal utility, a university generation system, and three military installations. They are listed below:

Fairbanks Municipal Utilities System (FMUS) - Municipal Utility
Golden Valley Electric Association (GVEA), Inc. - REA
University of Alaska, Fairbanks - University
Eielson AFB - Military
Fort Greeley - Military
Fort Wainwright - Military

Clear Air Force Station is located in this area but is not interconnected with the distribution grid.

Total nameplate generating capacity for the utilities is presented in Table 2.3 and capacity for the military installations is presented in Table 2.4

There are no firm plans for capacity additions in the Fairbanks-Tenana Valley Area.

2.3 GLENNALLEN - Valdez Area

The Glennallen-Valdez area has a single REA, the Copper Valley Electric Association, Inc. Their capacity as of 1980 is shown in Table 2.5. The Copper Valley Electric Association has a hydroelectric generating project under construction at Solomon Gulch. This facility is expected to come on-line in 1981 with a capacity of 12 MW.

TABLE 2.3. Total Nameplate Generating Capacity Fairbanks-Tenana Valley Area Utilities (1980)

	CCCT[a]	Diesel	Hydro	RCCT	SCCT	ST	Total
Fairbanks Municipal Utilities System	0	8.25	0	0	28.35	29.0	65.6
Golden Valley Electric Association	0	17.95	0	0	170.80	25.0	213.75
University of Alaska	0	5.50	0	0	0	13.0	18.50
TOTAL	0	31.70	0	0	199.15	67.0	297.85

(a) CCCT - Combined-Cycle Combustion Turbine
Diesel - Diesel Cycle
Hydro - Hydraulic Turbine
RCCT - Regenerative Cycle Combustion Turbine
SCCT - Simple Cycle Combustion Turbine
ST - Steam Turbine

TABLE 2.4. Total Nameplate Generating Capacity, Fairbanks-Tenana Valley Area Military Installations (1980)

	CCCT[a]	Diesel	Hydro	RCCT	SCCT	ST	Total
Eielson AFB	0	0	0	0	0	8.75	8.75
Fort Greeley	0	5.5	0	0	0	0	5.5
Fort Wainwright	0	0	0	0	0	22.0	22.0
TOTAL	0	5.5	0	0	0	30.75	36.25

(a) CCCT - Combined-Cycle Combustion Turbine
Diesel - Diesel Cycle
Hydro - Hydraulic Turbine
RCCT - Regenerative Cycle Combustion Turbine
SCCT - Simple Cycle Combustion Turbine
ST - Steam Turbine

TABLE 2.5. Total Nameplate Generating Capacity Glennallen-Valdez Area (1980)

	CCCT[a]	Diesel	Hydro	RCCT	SCCT	ST	Total
Copper Valley Electric Association, Inc.	0	16.10	0	0	2.8	0	18.9

(a) CCCT - Combined-Cycle Combustion Turbine
Diesel - Diesel Cycle
Hydro - Hydraulic Turbine
RCCT - Regenerative Cycle Combustion Turbine
SCCT - Simple Cycle Combustion Turbine
ST - Steam Turbine

APPENDIX A

EXISTING AND PLANNED GENERATING FACILITIES FOR RAILBELT UTILITIES AND MILITARY INSTALLATIONS

APPENDIX A

EXISTING AND PLANNED GENERATING FACILITIES FOR RAILBELT UTILITIES AND MILITARY INSTALLATIONS

Tables A.1 through A.11 present the existing and planned capacity data for the utility and military installations in the Anchorage-Cook Inlet area, the Fairbanks-Tenana Valley area and the Glennallen-Valdez area. Matanuska Electric Association, Inc. has no existing or planned generating facilities, so it has not been included in the following tables.

NOTES FOR EXISTING AND PLANNING CAPACITY DATA TABLES

1. Prime Mover:

   The power source for the generating unit.

   Diesel - Diesel Cycle
   SCCT - Simple Cycle combustion Turbine
   RCCT - Regenerative cycle Combustion Turbine
   ST - Steam Turbine
   CCCT - Combined-Cycle Combustion Turbine
   Hydro - Hydraulic Turbine

2. Fuel Type:

   The primary fuel type used by the generating unit.

   Dist. - Distillate Fuel Oil (Includes diesel fuel oil and turbine fuel)
   NG - Natural Gas
   Coal - Coal
   Resid - Residual Fuel Oil

3. Fuel Supply:

   The company or field supplying the fuel.

   NEN - Nenana Coal Field
   AGAS - Alaska Gas and Service Co.
   NP - North Pole Refinery

Prod - Direct Purchase from Beluga Producers

LS - Local Suppliers

4. Installation Date:

   The year the generating unit was installed/came on-line.

5. Retirement Date:

   The year the unit is planned to be retired. The following lifetimes have been assumed for the various types of generating units. These lifetimes are the same as those assumed by Acres American Inc. (1981), with the exception of the lifetime for natural-gas-fired gas turbines. Acres uses a 30-year lifetime, while a 20-year lifetime will be assumed in this analysis. This reduced lifetime was selected to more accurately reflect the current Alaska Public Utilities Commission ruling that the useful depreciated life of a simple-cycle gas turbine is 16 2/3rds years.

Large Steam Turbines (>100MW)	=	30 years
Small Team Turbines (<100MW)	=	35 years
Oil-Fired Gas Turbines	=	20 years
Natural-Gas-Fired Gas Turbines	=	20 years
Diesels	=	30 years
Combined-Cycle Units	=	30 years
Conventional Hydro	=	50 years

6. Nameplate Capacity (MW):

   The rated or nameplate capacity of the unit.

7. Generating Capacity at 0°F (MW):

   Actaul generating capacity at 0°F. In most cases this is essentially the same as the nameplate capacity. However, generating capacity for combustion turbine capacity increases as the ambient temperature decreases. Since the system load also increases with decreases in ambient temperature, this increased capacity can be used to meet peak system load. In most cases the nameplate capacity is given for a standard temperature of 60°F. The increase in generating capacity from 60°F to 0°F is approximately 25%. In other cases, the nameplate capacity is given for a standard temperature of 35°F. The increase in generating capacity from 35°F to 0°F is approximately 15%. These factors were used to compute the generating capacity of combustion turbine capacity at 0°F given the nameplate capacity if utility data have not been obtained or if they were not available.

8. Heat Rate (Btu/kWh):

Average annual heat rate for the unit based upon typical operation. The following heat rates have been tentatively assumed for the various types of prime movers if utility data have not been obtained or if they were not available.

Diesel Cycle	10,500
Simple Cycle Combustion Turbine	15,000
Regenerative Cycle Combustion Turbine	10,000
Combined-Cycle Combustion Turbine	8,500
Steam Turbine (less than 20 MW)	12,000
Steam Turbine (greater than 20 MW)	10,000

9. Forced Outage Rate:

This is the probability that a plant will not operate when called upon to generate power. The forced outage rate does not include scheduled maintenance. The following forced outage rates have been tentatively assumed:

Diesel	0.10
Simple Cycle Combustion Turbine	0.10
Regenerative Cycle Combustion Turbine	0.10
Combined-Cycle Combustion Turbine	0.10
Steam Turbine	0.10
Hydro	0.05

10. Maximum Annual Capacity Factor:

The maximum annual capacity factor is the percent of time the generating unit is available. This includes both maintenance and forced outages. For purposes of this project, the following equation should be satisfied.

$$MACF = (1 - FOR)\ (1 - AMR)$$

where

MACF = maximum annual capacity factor
FOR = forced outage rate
AMR = annual maintenance rate.

The following maximum annual capacity factor and annual maintenance rates have been assumed:

	AMR	MACF
Diesel	0.10	0.81
Simple Cycle Combustion Turbine	0.10	0.81
Regenerative Cycle Combustion Turbine	0.10	0.81
Combined-Cycle Combustion Turbine	0.10	0.81
Steam Turbine	0.10	0.81
Hydro	0.05	0.95

Maximum annual capacity factors for hydroelectric plants vary depending upon site hydrologic conditions.

11. Loading Order/Operating Mode:

The typical loading order or operating mode for the generating unit (peaking, intermediate, base, load following, etc.).

TABLE A.1. Existing and Planned Capacity Data

UTILITY: Alaska Power Administration

Plant/Unit	Prime Mover	Fuel Type	Fuel Supply	Installation Date	Retirement Date	Nameplate Capacity (MW)	Generating Capacity @ 0°F (MW)	Average Annual Heat Rate (Btu/kWh)	Forced Outage Rate	Maximum Annual Capacity Factor	Comments
EXISTING											
Eklutna	Hydro	--	--	1955	2005	30.0	--	--	0.01	0.95[a]	--
PLANNED											
Bradley Lake	Hydro	--	--	1988	2038	90	90	--	0.01	0.95[b]	--

(a) Average annual energy production for Eklutna is approximately 147,875,000 kWh. This is equivalent to an annual load factor of 0.56.
(b) Average annual energy production from Bradley Lake is expected to be approximately 347,000,000 kWh. Of this total, 315,000,000 kWh will be firm energy and 32,000,000 kWh will be secondary. The equivalent annual load factor is 0.44.

TABLE A.2. Existing and Planned Capacity Data

UTILITY: Anchorage Municipal Light and Power

Plant/Unit	Prime Mover	Fuel[a] Type	Fuel Supply	Installation Date	Retirement Date	Nameplate Capacity (MW)	Generating Capacity @ 0°F (MW)	Average Annual Heat Rate (Btu/kWh)	Forced Outage Rate	Maximum Annual Capacity Factor	Comments
EXISTING											
Station #1											
Unit #1	SCCT	NG/Dist	AGAS/LS	1962	1982	14.0	16.25	14,000	0.10	0.81	Reserve/ Peaking
Unit #2	SCCT	NG/Dist	AGAS/LS	1964	1984	14.0	16.25	14,000	0.10	0.81	Reserve/ Peaking
Unit #3	SCCT	NG/Dist	AGAS/LS	1968	1988	18.0	18.0	14,000	0.10	0.81	--
Unit #4	SCCT	NG/Dist	AGAS/LS	1972	1992	28.5	32.0	12,500	0.10	0.81	--
Diesel 1[b]	Diesel	Dist	LS	1962	1982	1.1	1.1	10,500	0.10	0.81	Black Start Unit
Diesel 2[b]	Diesel	Dist	LS	1962	1982	1.1	1.1	10,500	0.10	0.81	Black Start Unit
Station #2											
Unit #5	SCCT	NG/Dist	AGAS/LS	1974	1994	32.3	40.0	12,500	0.10	0.81	--
Unit #6[c]	CCST	--	--	1979	2009	33.0	33.0	--	0.10	0.81	--
Unit #7	SCCT	NG/Dist	AGAS/LS	1980	2000	73.6	90.0	11,000	0.10	0.81	--
PLANNED											
Station #2											
Unit #8	SCCT	NG/Dist	AGAS/LS	1982	2002	73.6	90.0	12,500	0.10	0.81	--

(a) All AML&P SCCTs are equipped to burn natural gas or oil. In normal operation they are supplied with natural gas from AGAS. All units have reserve oil storage for operation in the event gas is not available.
(b) These are black-start units only. They are not included in total capacity.
(c) Units #5, 6, and 7 are designed to operate as a unit combined-cycle plant. When operated in this mode, they have a generating capacity at 0°F of approximately 139 MW with a heat rate of 8500 Btu/kWh.

TABLE A.3. Existing and Planned Capacity Data

UTILITY: Chugach Electric Association

Plant/Unit	Prime Mover	Fuel Type	Fuel Supply	Installation Date	Retirement Date	Nameplate Capacity (MW)	Generating Capacity @ 0°F (MW)	Average Annual Heat Rate (Btu/kWh)	Forced Outage Rate	Maximum Annual Capacity Factor	Comments
EXISTING											
Beluga											
Unit #1	SCCT	NG	Prod.	1968	1988	14.0	16.1	15,000	0.10	0.81	--
Unit #2	SCCT	NG	Prod.	1968	1988	14.0	16.1	15,000	0.10	0.81	--
Unit #3	RCCT	ng	prod.	1973	1993	51.0	53.0	10,000	0.10	0.81	--
Unit #4	SCCT	NG	Prod.	1976	1996	9.3[a]	10.7	15,000	0.10	0.81	Jet Engine
Unit #5	RCCT	NG	Prod.	1975	1995	60.0	58.0	10,000	0.10	0.81	--
Unit #6	SCCT	NG	Prod.	1976	1996	62.0	68.0	15,000	0.10	0.81	--
Unit #7	SCCT	NG	Prod.	1977	1997	62.0	68.0	15,000	0.10	0.81	--
Bernice Lake											
Unit #1	SCCT	NG	AGAS	1963	1983	7.5	8.6	23,400	0.10	0.81	--
Unit #2	SCCT	NG	AGAS	1972	1992	16.5	18.9	23,400	0.10	0.81	--
Unit #3	SCCT	NG	AGAS	1978	1998	23.0	26.4	23,400	0.10	0.81	--
Cooper Lake											
Unit #1, 2	Hydro	--	--	1961	2011	16.0	16.0	--	0.05	0.95[b]	--
International											
Unit #1	SCCT	NG	AGAS	1964	1984	14.0	14.0	40,000	0.10	0.81	--
Unit #2	SCCT	NG	AGAS	1965	1985	14.0	14.0	40,000	0.10	0.81	--
Unit #3	SCCT	NG	AGAS	1970	1990	17.0	18.0	40,000	0.10	0.81	--

TABLE A.3. Existing and Planned Capacity Data (contd)

UTILITY: Chugach Electric Association

Plant/Unit	Prime Mover	Fuel Type	Fuel Supply	Installation Date	Retirement Date	Nameplate Capacity (MW)	Generating Capacity @ 0°F (MW)	Average Annual Heat Rate (Btu/kWh)	Forced Outage Rate	Maximum Annual Capacity Factor	Comments
Knik Arm[c]											
Unit #1	ST	NG	AGAS	1952	1987	0.5	0.5	--	0.10	0.81	--
Unit #2	ST	NG	AGAS	1952	1987	3.0	3.0	--	0.10	0.81	--
Unit #3	ST	NG	AGAS	1957	1992	3.0	3.0	--	0.10	0.81	--
Unit #4	ST	NG	AGAS	1957	1992	3.0	3.0	--	0.10	0.81	--
Unit #5	ST	NG	AGAS	1957	1992	5.0	5.0	--	0.10	0.81	--
PLANNED											
Beluga Unit 8[d]	CCST	--	--	1982	2012	54	54	--	--	--	--
Bernice Lake #4	SCCT	NG	AGAS	1982	2002	23.0	26.4	12,000	0.10	0.81	--

(a) Beluga Unit #4 is a jet engine used for peaking only. It is not included in total capacity.
(b) Average annual energy production for Cooper Lake is approximately 42,000,000 kWh. This is equivalent to an annual load factor of 0.30.
(c) Knik Arm units are old and have higher heat rates. They are not included in total.
(d) Beluga Units #6, 7, and 8 will operate as a unit combined-cycle plant in 1982. When operated in this mode, they will have a generating capacity of about 178 MW with a heat rate of 8500 Btu/kWh. Thus, Units #6 and 7 will be retired from "gas turbine operation" and added to "gas combined-cycle operations."

TABLE A.4. Existing and Planned Capacity Data

UTILITY: Homer Electric Association

Plant/Unit	Prime Mover	Fuel Type	Fuel Supply	Installation Date	Retirement Date	Nameplate Capacity (MW)	Generating Capacity @ 0°F (MW)	Average Annual Heat Rate (Btu/kWh)	Forced Outage Rate	Maximum Annual Capacity Factor	Comments
EXISTING											
Seldovia	Diesel	Dist.	LS	1957	1987	1.50	1.50	10,500	0.10	0.81	Standby
PLANNED	None										

TABLE A.5. Existing and Planned Capacity Data

UTILITY: Seward Electric Association

Plant/Unit	Prime Mover	Fuel Type	Fuel Supply	Installation Date	Retirement Date	Nameplate Capacity (MW)	Generating Capacity @ 0°F (MW)	Average Annual Heat Rate (Btu/kWh)	Forced Outage Rate	Maximum Annual Capacity Factor	Comments
EXISTING											
ALCO	Diesel	Dist.	LS	1965	1985	3.0	3.0	10,500	0.10	0.81	Standby
EMD	Diesel	Dist.	LS	1976	1996	2.5	2.5	10,500	0.10	0.81	Standby
PLANNED	None										

TABLE A.6. Existing and Planned Capacity Data

UTILITY: Military Installations - Anchorage Area

Plant/Unit	Prime Mover	Fuel Type	Fuel Supply	Installation Date	Retirement Date	Nameplate Capacity (MW)	Generating Capacity @ 0°F (MW)	Average Annual Heat Rate (Btu/kWh)	Forced Outage Rate	Maximum Annual Capacity Factor	Comments
EXISTING											
Elmendorf AFB											
Total Diesel	Diesel	Diesel	LS	1952	--	2.1	--	10,500	0.10	0.81	--
Total ST	ST	NG	AGAS	1952	--	31.5	--	12,000	0.10	0.81	--
Fort Richardson											
Total Diesel	Diesel	Diesel	LS	1952	--	7.2	--	10,500	0.10	0.81	Cold Start Units
Total ST	ST	NG	AGAS	1952	--	18.0	--	19,000-20,000	0.10	0.81	Cogeneration Used for Steam Heating
PLANNED	None										

TABLE A.7. Existing and Planned Capacity Data

UTILITY: Golden Valley Electric Association

Plant/Unit	Prime Mover	Fuel Type	Fuel Supply	Installation Date	Retirement Date	Nameplate Capacity (MW)	Generating Capacity @ 0°F (MW)	Average Annual Heat Rate (Btu/kWh)	Forced Outage Rate	Maximum Annual Capacity Factor	Comments
EXISTING											
Healy Coal	ST	Coal	NEN	1967	2002	25.0	25.0	13,200	0.01	0.92	--
Healy Diesel	Diesel	Dist.	LS	1967	1987	2.75	2.75	10,500	0.01	0.81	Peaking/ Black Start Unit
North Pole											
Unit #1	SCCT	Dist.	LS	1976	1996	64.7	65.0	14,000	0.022	0.81	--
Unit #2	SCCT	Dist.	LS	1977	1997	64.7	65.0	14,000	0.015	0.81	--
Zendher											
GT 1	SCCT	Dist.	LS	1971	1991	18.4	18.4	15,000	0.10	0.81	--
GT 2	SCCT	Dist.	LS	1972	1992	17.4	17.4	15,000	0.10	0.81	--
GT 3	SCCT	Dist.	LS	1975	1995	2.8	3.5	15,000	0.10	0.81	--
GT 4	SCCT	Dist.	LS	1975	1995	2.8	3.5	15,000	0.10	0.81	--
Combined Diesel	Diesel	Dist.	LS	1960-70	1995	21.0	21.0	10,500	0.10	0.81	--
PLANNED	None										

TABLE A.8. Existing and Planned Capacity Data

UTILITY: University of Alaska - Fairbanks

Plant/Unit	Prime Mover	Fuel Type	Fuel Supply	Installation Date	Retirement Date	Nameplate Capacity (MW)	Generating Capacity @ 0°F (MW)	Average Annual Heat Rate (Btu/kWh)	Forced Outage Rate	Maximum Annual Capacity Factor	Comments
S1	ST	Coal	NEN	--	--	1.50	1.50	12,000	0.10	0.81	--
S2	ST	Coal	NEN	1980	--	1.50	1.50	12,000	0.10	0.81	--
S3	ST	Coal	NEN	--	--	10.0	10.0	12,000	0.10	0.81	--
D1	Diesel	Dist.	LS	--	--	2.75	2.75	10,500	0.10	0.81	--
D2	Diesel	Dist.	LS	--	--	2.75	2.75	10,500	0.10	0.81	--

TABLE A.9. Existing and Planned Capacity Data

UTILITY: Fairbanks Municipal Utilities System

Plant/Unit	Prime Mover	Fuel Type	Fuel Supply	Installation Date	Retirement Date	Nameplate Capacity (MW)	Generating Capacity @ 0°F (MW)	Average Annual Heat Rate (Btu/kWh)	Forced Outage Rate	Maximum Annual Capacity Factor	Comments
EXISTING											
Chena											
Unit #1	ST	Coal	NEN	1954	1989	5.0	5.0	18,000	0.10	0.81	--
Unit #2	ST	Coal	NEN	1952	1987	2.0	2.0	22,000	0.10	0.81	--
Unit #3	ST	Coal	NEN	1952	1987	1.5	1.5	22,000	0.10	0.81	--
Unit #4	SCCT	Dist.	LS	1963	1983	5.25	6.6	15,000	0.10	0.81	--
Unit #5	ST	Coal	NEN	1970	2005	20.5	20.5	13,320	0.10	0.81	--
Unit #6	SCCT	Dist.	LS	1976	1996	23.1	28.8	15,000	0.10	0.81	--
Diesel 1	Diesel	Dist.	LS	1967	1987	2.75	2.75	12,150	0.10	0.81	--
Diesel 2	Diesel	Dist.	LS	1968	1988	2.75	2.75	12,150	0.10	0.81	--
Diesel 3	Diesel	Dist.	LS	1968	1988	2.75	2.75	12,150	0.10	0.81	--
PLANNED	None										

TABLE A.10. Existing and Planned Capacity Data

UTILITY: Military Installations - Fairbanks

Plant/Unit	Prime Mover	Fuel Type	Fuel Supply	Installation Date	Retirement Date	Nameplate Capacity (MW)	Generating Capacity @ 0°F (MW)	Average Annual Heat Rate (Btu/kWh)	Forced Outage Rate	Maximum Annual Capacity Factor	Comments
EXISTING											
Eielson AFB											
S1, S2	ST	Oil	LS	1953	--	2.50	--	--	0.10	0.81	--
S3, S4	ST	Oil	LS	1953	--	6.25	--	--	0.10	0.81	--
Fort Greeley											
D1, D2, D3	Diesel	Oil	--	--	--	3.0	--	10,500	0.10	0.81	Standby
D4, D5	Diesel	Oil	--	--	--	2.5	--	10,500	0.10	0.81	Standby
Ft. Wainwright											
S1, S2, S3, S4	ST	Coal	NEN	1953	--	20	--	19,000-20,000	0.10	0.81	Cogeneration Used for Steam Heating
S5	ST	Coal	NEN	1953	--	2	--	--	0.10	0.81	Standby
PLANNED	None										

TABLE A.11. Existing and Planned Capacity Data

UTILITY: Copper Valley Electric Association, Inc.

Plant/Unit	Prime Mover	Fuel Type	Fuel Supply	Installation Date	Retirement Date	Nameplate Capacity (MW)	Generating Capacity @ 0°F (MW)	Average Annual Heat Rate (Btu/kWh)	Forced Outage Rate	Maximum Annual Capacity Factor	Comments
EXISTING											
Glennallen											
Units #1, #2	Diesel	Dist.	LS	1959	1981	0.64	0.64	10,500	0.10	0.81	--
Unit #3	Diesel	Dist.	LS	1963	1983	0.56	0.56	10,500	0.10	0.81	--
Units #4, #5	Diesel	Dist.	LS	1966	1986	2.4	2.4	10,500	0.10	0.81	--
Unit #6, #7	Diesel	Dist.	LS	1975-76	1996	5.2	5.2	10,500	0.10	0.81	--
Valdez											
Units #1,#2,#3	Diesel	Dist.	LS	1967	1987	1.8	1.8	10,500	0.10	0.81	--
Unit #4	Diesel	Dist.	LS	1972	1992	1.9	1.9	10,500	0.10	0.81	--
Unit #5	Diesel	Dist.	LS	1975	1995	1.0	1.0	10,500	0.10	0.81	--
Unit #6,	Diesel	Dist.	LS	1975	1995	2.6	2.6	10,500	0.10	0.81	--
Unit #7,	SCCT	Dist.	LS	1976	1996	2.8	3.5	14,500	0.10	0.81	--
PLANNED											
Solomon Gulch	Hydro	--	--	1981	2031	12.0	12.0	--	0.01	0.95[a]	--

(a) Average annual energy production from Solomon Gulch is expected to be approximately 55,000,000 kWh. Of this total 39,000,000 kWh will be firm energy and 16,000,000 will be secondary. The equivalent annual load factor is 0.52.

REFERENCES

Acres American Incorporated. 1981. Susitna Hydroelectric Project Development Selection Report. Prepared for the Office of the Governor, State of Alaska, Juneau, Alaska.