

ALASKA

POWER

AUTHORITY

SUSITNA HYDROELECTRIC PROJECT PUBLIC MEETINGS

○ **INTRODUCTION**

○ **PROJECT DESCRIPTION, BACKGROUND AND SCHEDULE**

○ **ECONOMIC FEASIBILITY**

○ **ENVIRONMENTAL**

○ **FINANCING**

○ **SUMMARY**

INTRODUCTION

- **PURPOSE OF PUBLIC MEETINGS**
- **PARTICIPANTS IN SUSITNA PROJECT
PLANNING AND DEVELOPMENT**

PURPOSE OF PUBLIC MEETINGS

◦ INFORM PUBLIC OF

- CURRENT PROJECT STATUS**
- UPDATED PROJECT FEASIBILITY**
- UPDATED PROJECT ENVIRONMENTAL IMPACTS**
- FINANCING OPTIONS**

- RECEIVE PUBLIC COMMENT TO BE INCLUDED AS APPROPRIATE IN FINAL SUSITNA ECONOMIC AND FINANCIAL FEASIBILITY UPDATE REPORT**

PARTICIPANTS IN SUSITNA PLANNING AND DEVELOPMENT

- **ALASKA POWER AUTHORITY**
- **FEDERAL ENERGY REGULATORY COMMISSION**
- **RESOURCE AGENCIES**
- **ADMINISTRATION**
- **LEGISLATURE**
- **PUBLIC**

PROJECT DESCRIPTION, BACKGROUND AND SCHEDULE

- **PROJECT LOCATION AND DESCRIPTION**

- **BACKGROUND**

PREVIOUS STUDIES OF THE SUSITNA PROJECT

HISTORY

COST STATUS

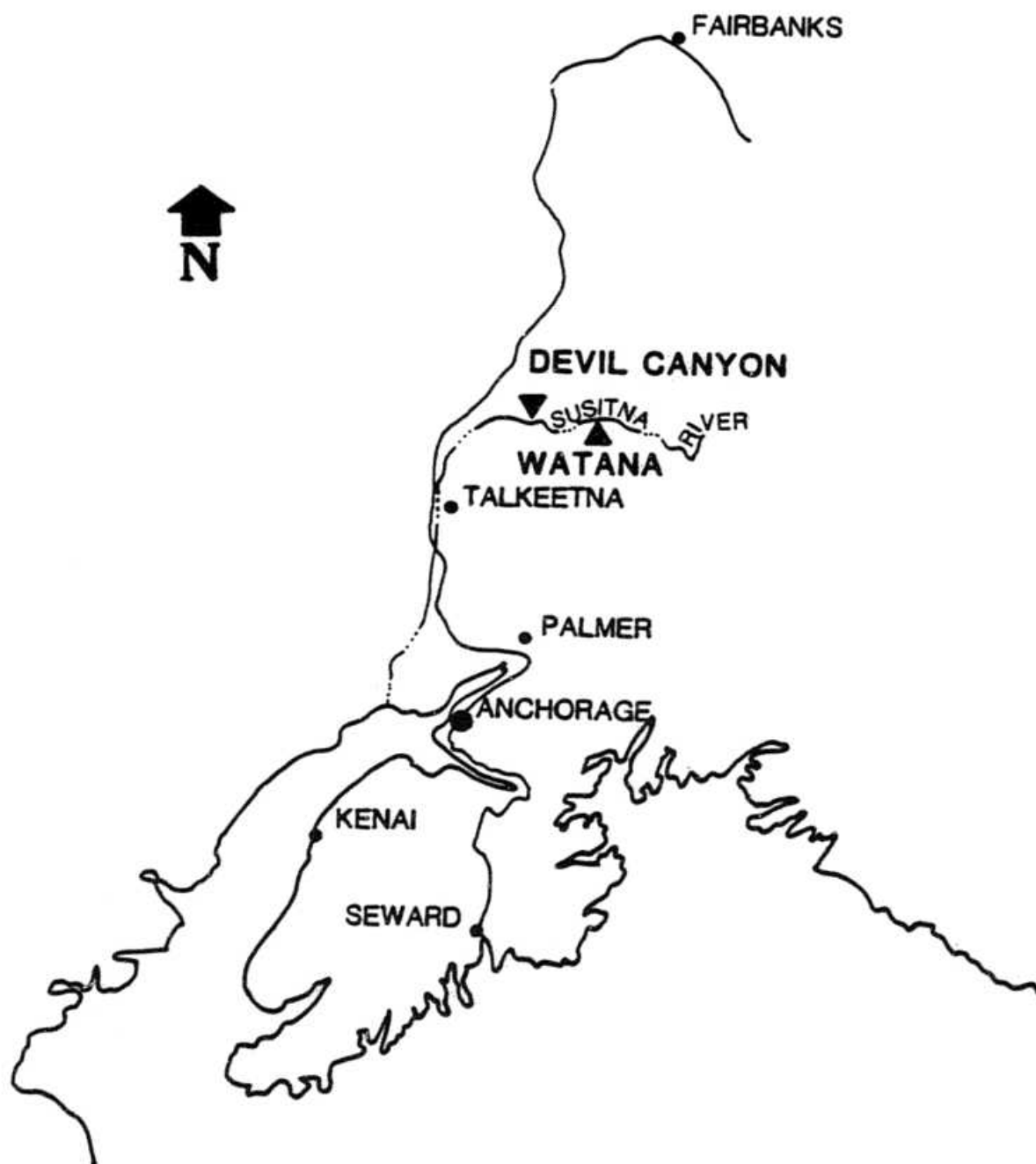
- **SCHEDULE**

PROJECT DEVELOPMENT

FEDERAL ENERGY REGULATORY COMMISSION

- **TOTAL PROJECT COSTS**

RAILBELT AREA MAP



PREVIOUS STUDIES OF THE SUSITNA PROJECT

ORGANIZATION	YEAR	TYPE OF STUDY
U. S. BUREAU OF RECLAMATION	1953	DAM SITE IDENTIFICATION
U.S. BUREAU OF RECLAMATION	1961	FEASIBILITY
ALASKA POWER ADMINISTRATION	1974	UPDATE USBR 1961
KAISER (FOR STATE OF ALASKA)	1974	PROPOSAL FOR DEVELOPMENT
U. S. ARMY CORPS OF ENGINEERS	1975	FEASIBILITY REPORT
U. S. ARMY CORPS OF ENGINEERS	1979	UPDATED 1975 REPORT

PROJECT HISTORY

POWER AUTHORITY ASSUMED PROJECT	1979
FEASIBILITY STUDY STARTED	1980
FEASIBILITY STUDY COMPLETED	1982
FERC LICENSE FILED	FEB 1983
REVISED LICENSE INFORMATION FILED	JUL 1983
LICENSE APPLICATION ACCEPTED	JUL 1983
STARTED SETTLEMENT PROCESS	NOV 1983
AGENCY COMMENTS RECEIVED	DEC 1983
POWER AUTHORITY RESPONSE TO COMMENTS FILED	JAN-FEB 1984

COST STATUS - WHAT ?

	FY80-FY84 <u>\$000</u>	FY85 BUDGET <u>\$000</u>
MANAGEMENT	15,608	8,812
ENVIRONMENTAL	42,186	15,367
ENGINEERING STUDIES & FERC SUPPORT	33,590	7,968
CONTINGENCY	<u>1,280</u>	<u>—</u>
TOTAL	<u><u>92,664</u></u>	<u><u>32,147</u></u>

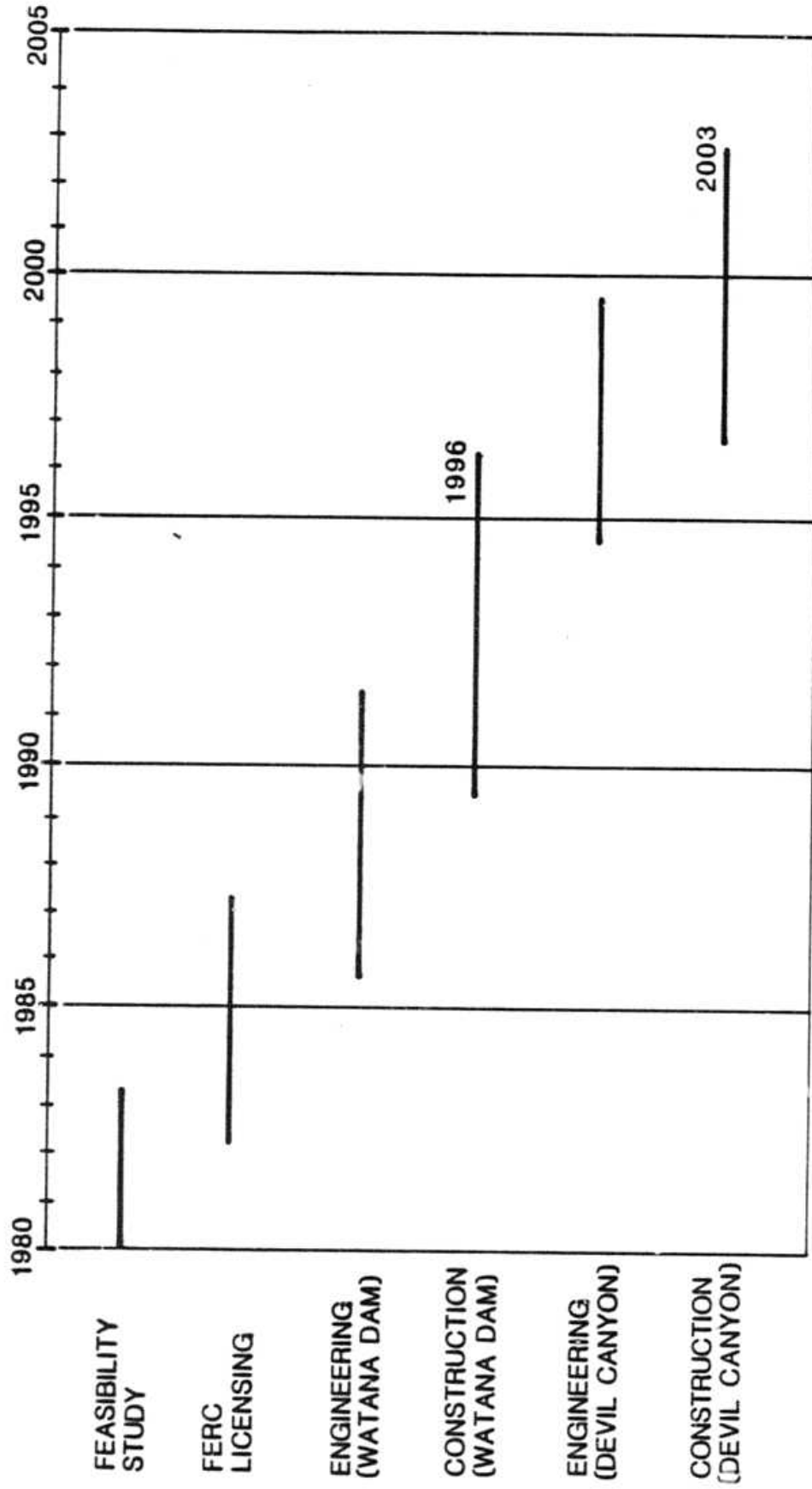
COST STATUS - WHO ?

	FY80-84 <u>\$000</u>	FY85 BUDGET <u>\$000</u>
FEDERAL AGENCIES	1,041	330
STATE AGENCIES	16,340	5,900
CONTRACTORS	74,023	25,917
CONTINGENCY	<u>1,280</u>	<u>—</u>
TOTAL	<u>92,664</u>	<u>32,147</u>

COST STATUS - WHEN ?

<u>FY</u>	<u>\$ 000</u>
80	15,328
81	5,636
82	18,100
83	25,600
84	<u>28,000</u>
TOTAL	<u><u>92,664</u></u>
FY 85 BUDGET REQUEST	32,147

SUSITNA PROJECT SCHEDULE



PROJECT LICENSE SCHEDULE

o FERC DRAFT EIS ISSUED	MAY	1984
o NEED-FOR-POWER HEARINGS	JULY	1984
o FERC FINAL EIS ISSUED	DEC	1984
o ENVIRONMENTAL & DAM SAFETY HEARINGS	APRIL	1985
o SIGN INITIAL POWER SALES AGREEMENTS	JUNE	1985
o INITIATE DETAILED DESIGN	JULY	1985
o FERC LICENSE ISSUED	MAR	1987 ¹

¹ COULD BE EARLIER DEPENDING ON LENGTH OF HEARINGS

TOTAL PROJECT COSTS (MILLIONS - 1983 \$)

○ WATANA - \$3,750

○ DEVIL CANYON - 1,620

○ TOTAL PROJECT

\$5,370

○ POSSIBLE COST REDUCTION
FROM DESIGN REFINEMENTS - \$292
(NOT CONSIDERED IN FEASIBILITY)

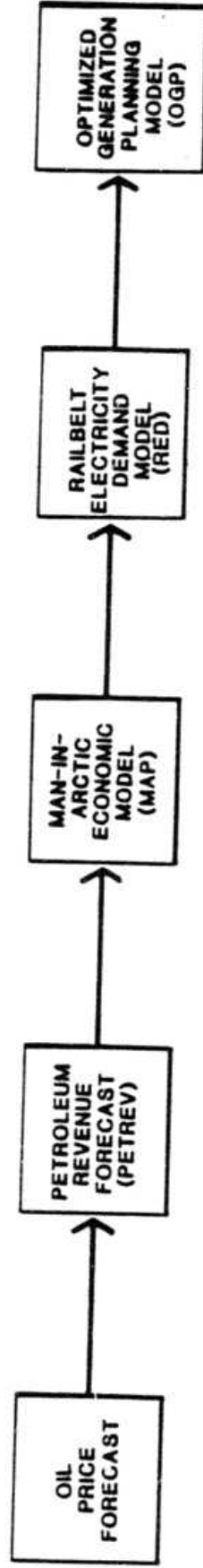
ECONOMIC FEASIBILITY

- **DEMAND FORECAST**
- **EXISTING GENERATION**
- **ALTERNATIVES TO MEET DEMAND**
 - GAS**
 - COAL**
 - HYDROELECTRIC**
 - OTHER**
- **OPTIMUM GENERATION PLANNING**
 - SUSITNA**
 - NON-SUSITNA**
- **CONCLUSIONS**

DEMAND FORECAST

- **METHODOLOGY USED TO DETERMINE FORECAST**
- **FACTORS AFFECTING FORECAST**
- **CONCLUSION (FORECAST)**

METHODOLOGY OF DEMAND FORECASTING



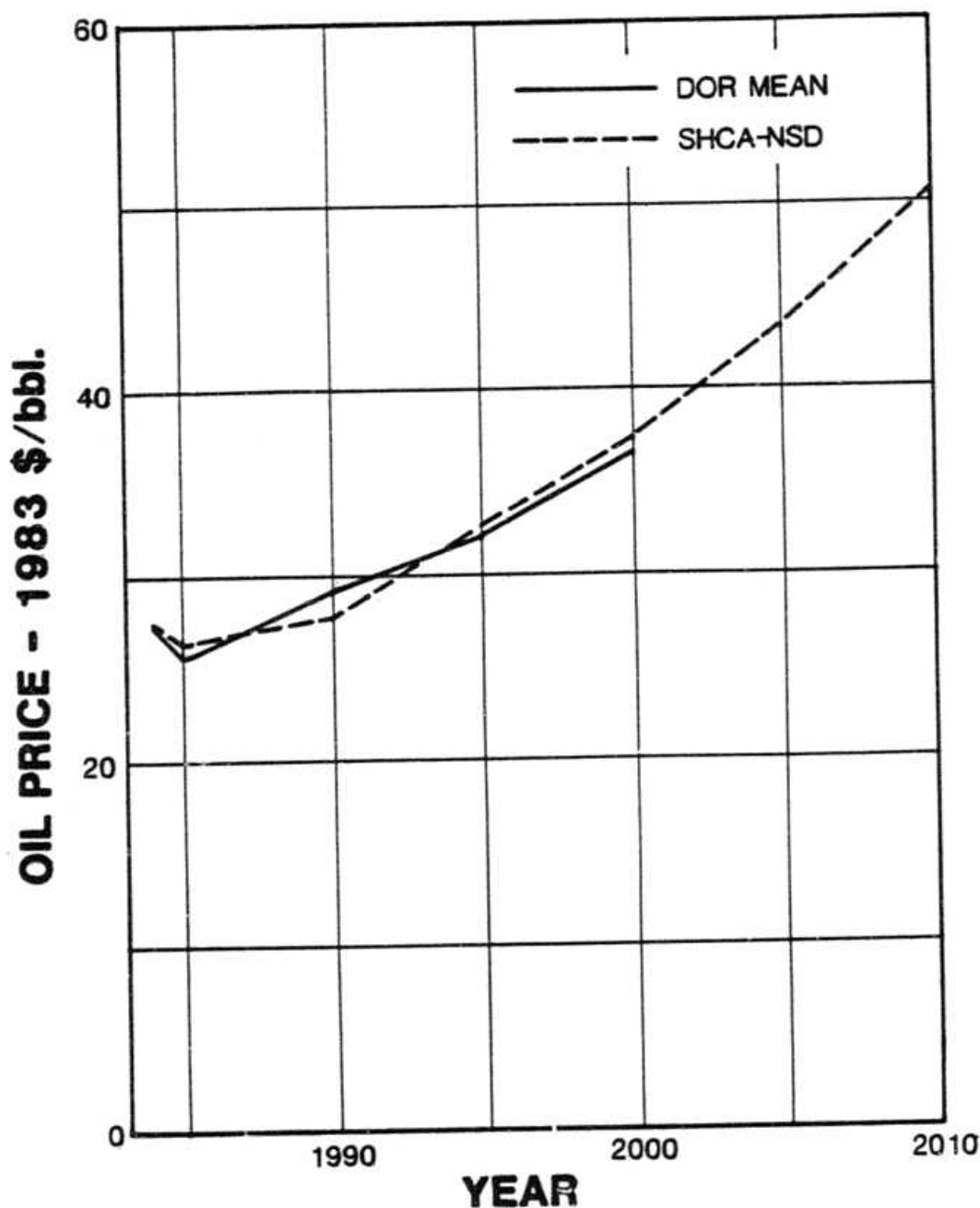
FACTORS AFFECTING DEMAND FORECAST

- **OIL PRICE FORECAST**
- **PETROLEUM REVENUE FORECAST**
- **GROWTH FORECAST**

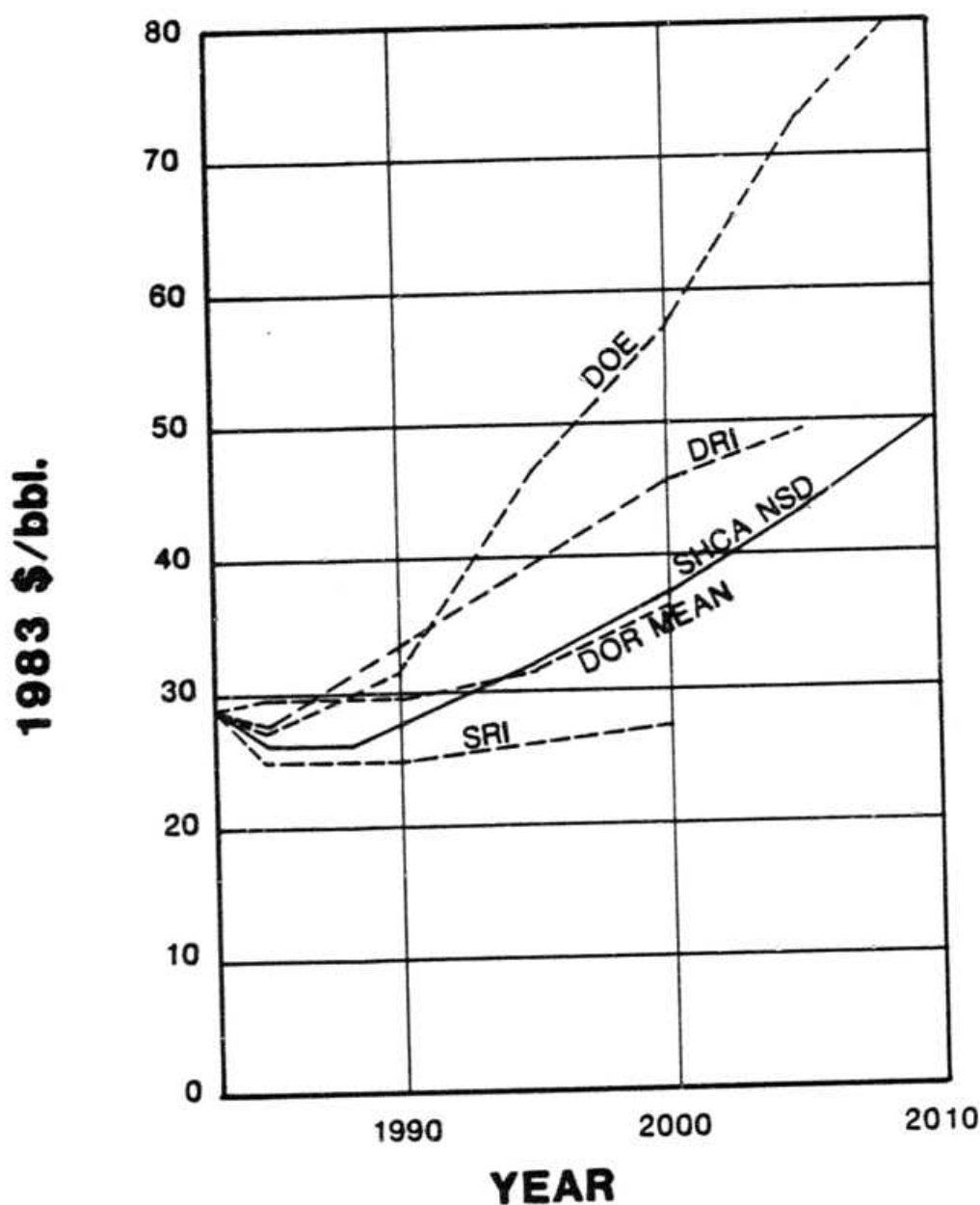
OIL PRICES

- **SHERMAN H. CLARK - NO SUPPLY DISRUPTION
(REFERENCE CASE)**
- **ALASKA DEPARTMENT OF REVENUE - DOR DECEMBER
1983 MEAN**

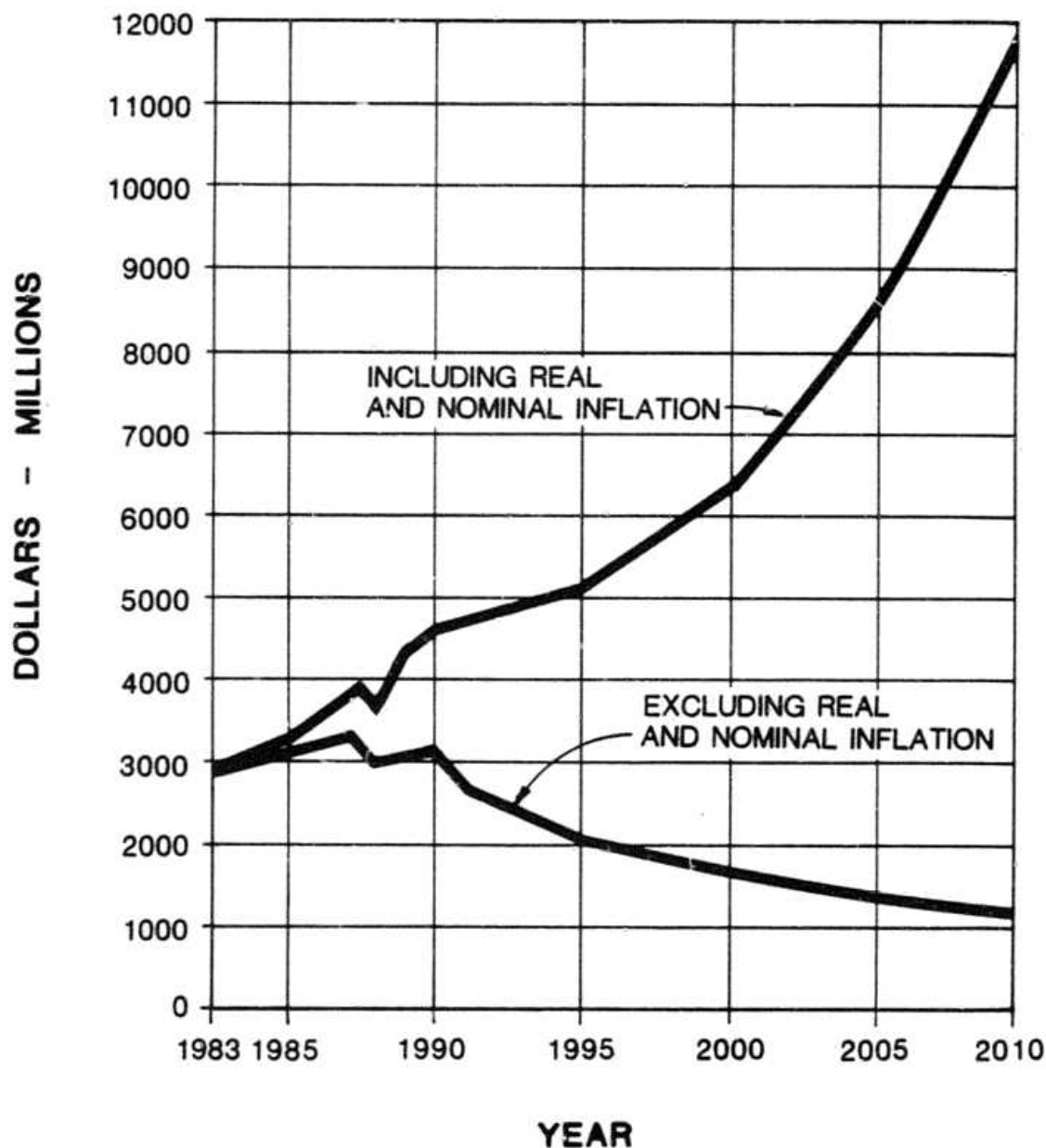
ALTERNATIVE OIL PRICE PROJECTIONS



ALTERNATIVE OIL PRICE PROJECTIONS

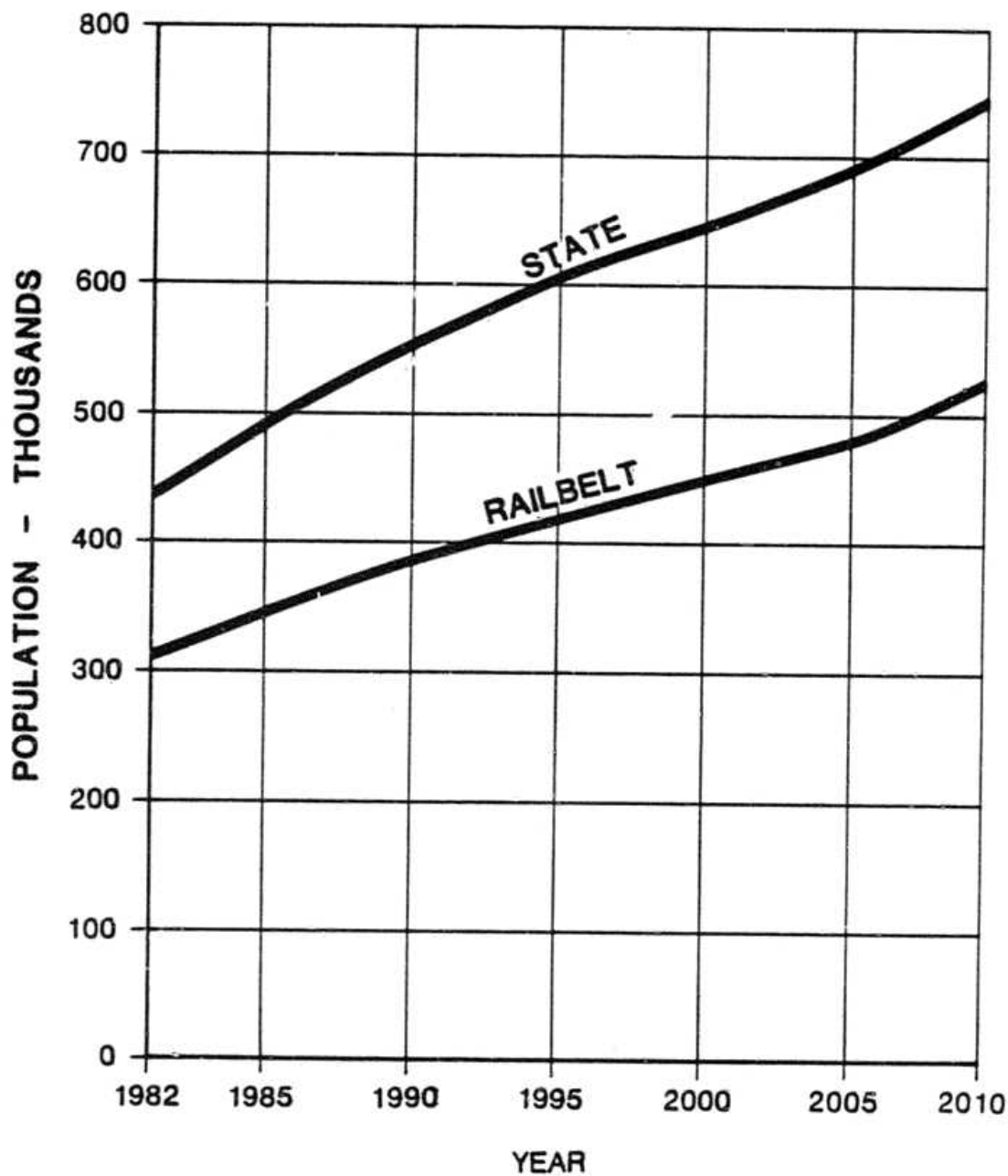


STATE PETROLEUM REVENUES FORECAST OF ANNUAL CONTRIBUTION TO GENERAL FUND



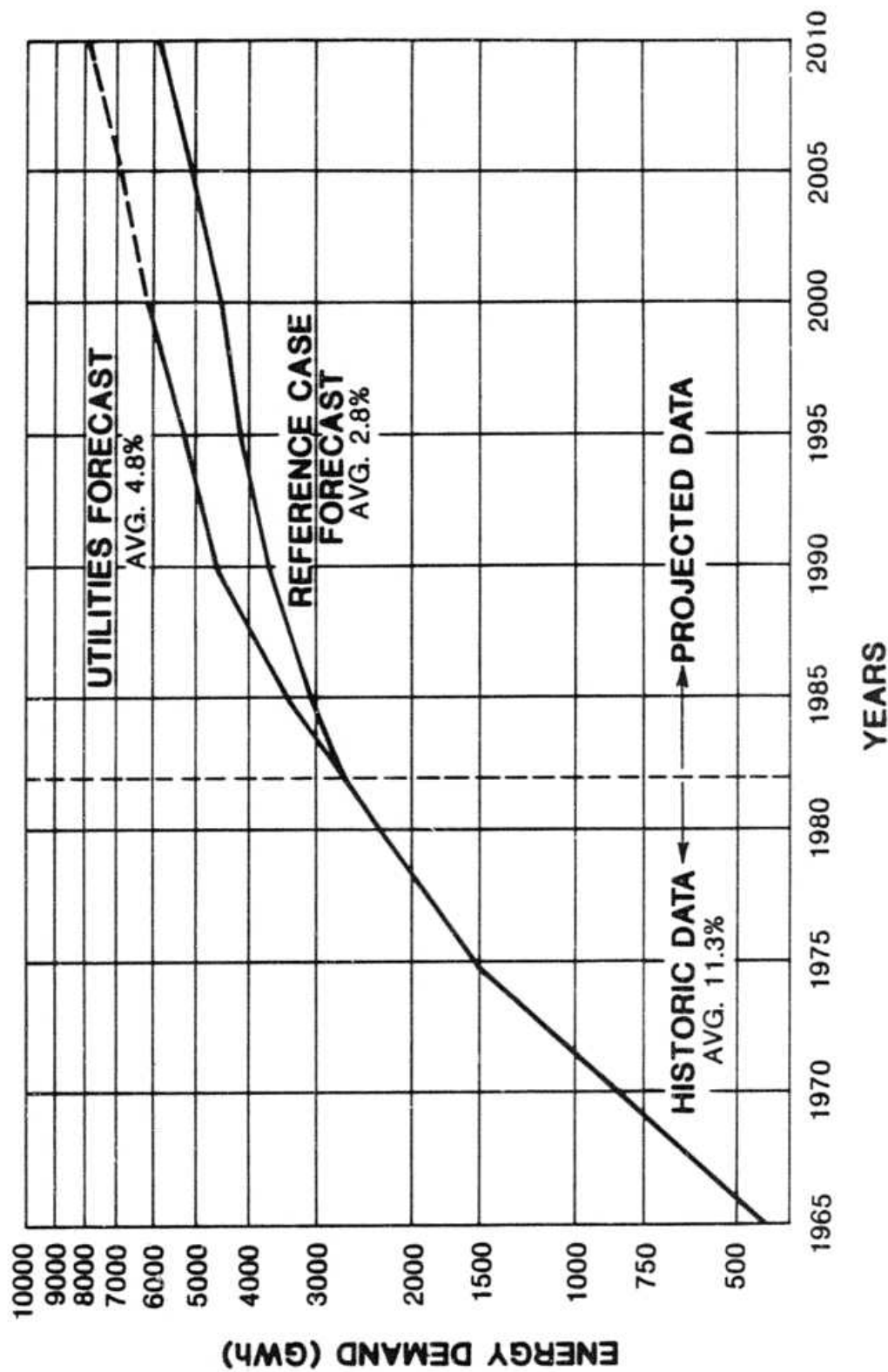
SOURCE: MAP MODEL

POPULATION GROWTH FORECAST



SOURCE: MAP MODEL

ENERGY DEMAND FORECAST



EXISTING GENERATION

- **RAILBELT CAPACITY (RETIREMENT)**
- **LOCATION**
- **DEMAND VS RESOURCES**

EXISTING RAILBELT CAPACITY / AFTER RETIREMENT

	1984	1993
SIMPLE CYCLE GAS ^①	664	373
COMBINED CYCLE GAS ^②	317	317
COAL-STEAM ^③	70	60
HYDRO ^④	46	46
TOTAL	1097	796

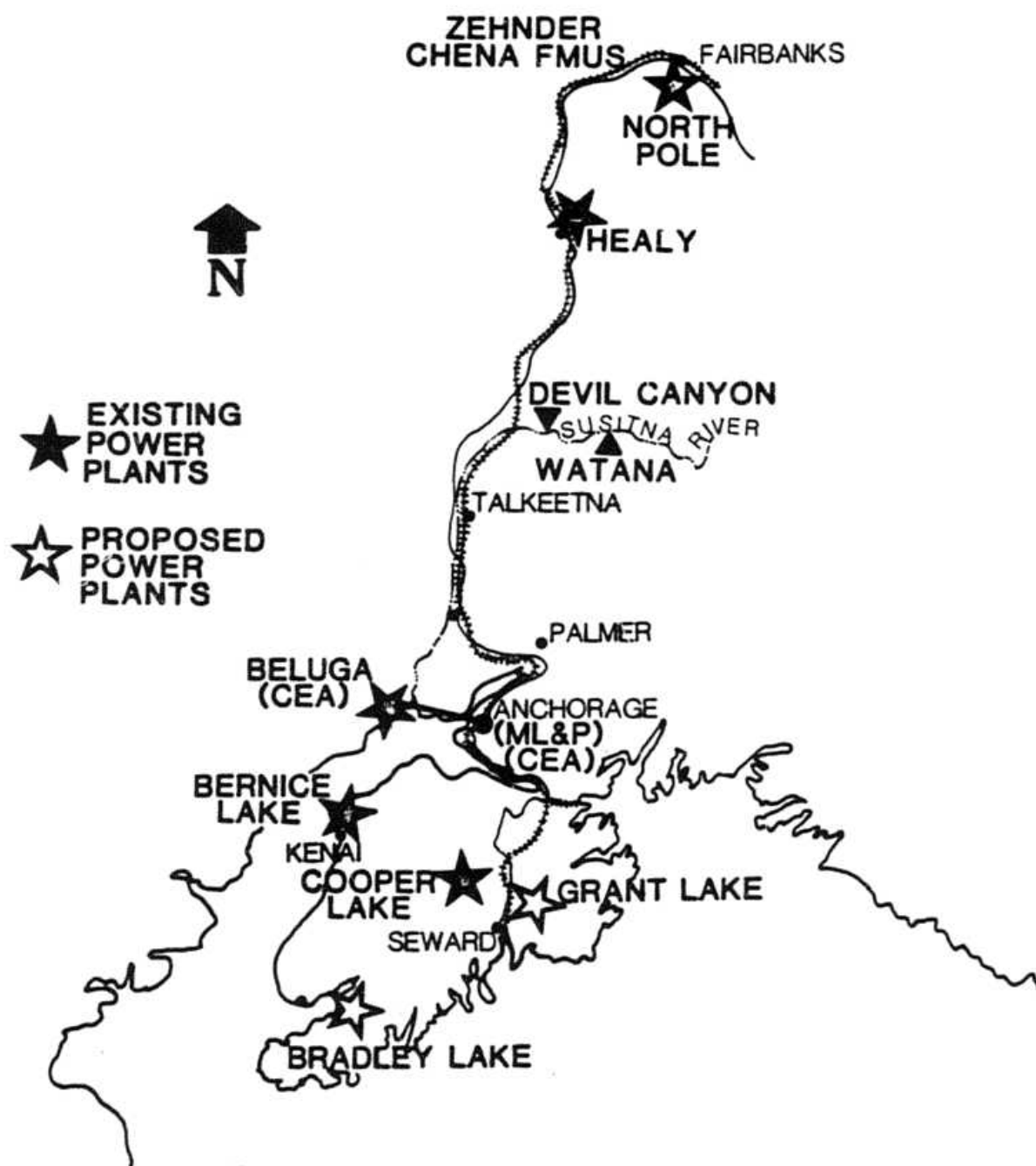
① 20 YEAR LIFE

② 30 YEAR LIFE

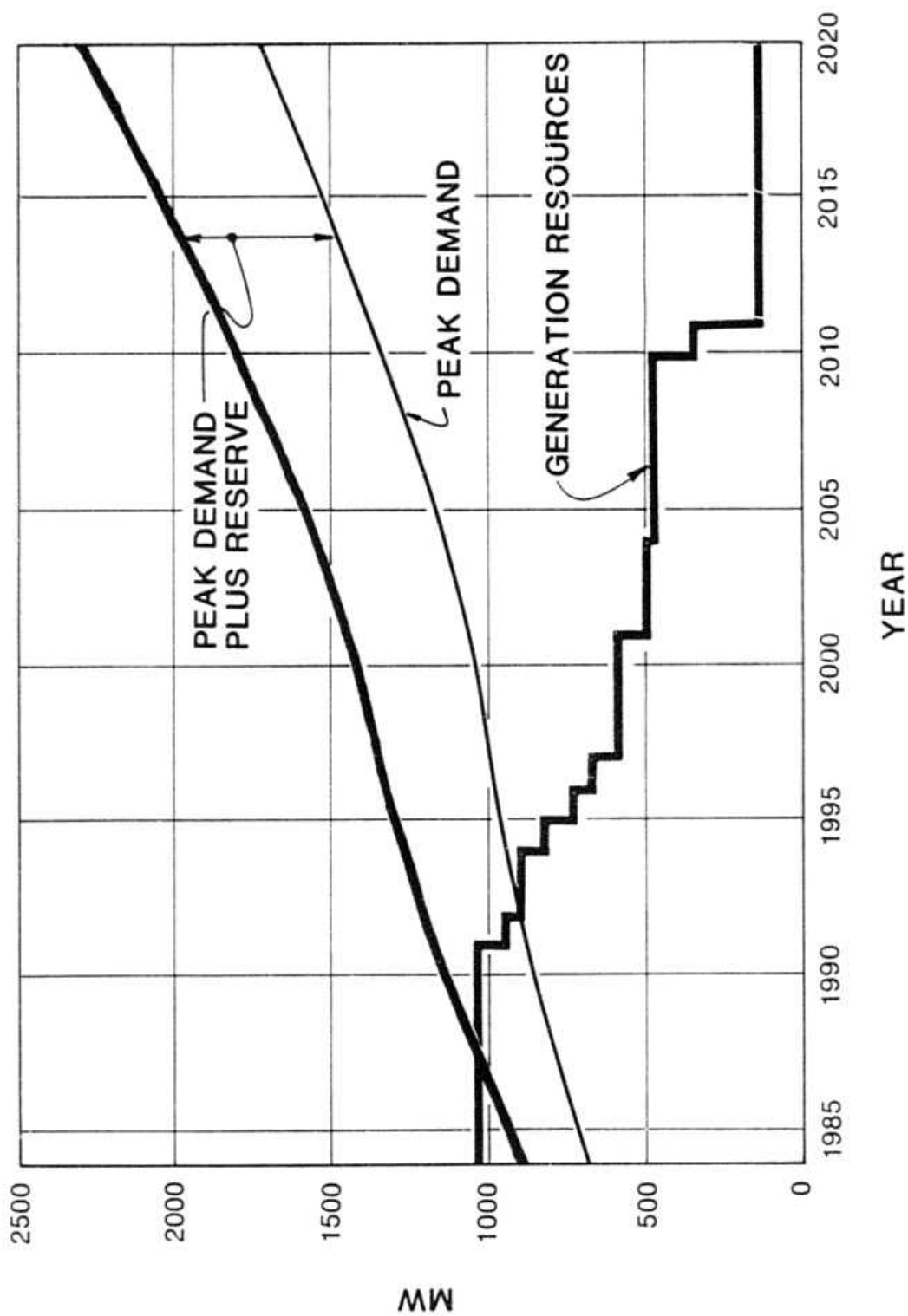
③ 30 YEAR LIFE

④ 50 YEAR LIFE

RAILBELT GENERATION RESOURCES



PEAK POWER DEMAND / GENERATION RESOURCES



ALTERNATIVES TO MEET DEMAND

○ NATURAL GAS FIRED

○ COAL FIRED

○ HYDROELECTRIC

○ OTHER

NATURAL GAS FIRED UNITS

- **PLANT TYPES**
- **FUEL AVAILABILITY**
- **FUEL PRICE PROJECTIONS**
- **ENVIRONMENTAL IMPACTS**

GAS FIRED TURBINE - PLANT TYPES

○ **SIMPLE CYCLE - 85 MW - 29% EFFICIENCY**

○ **COMBINED CYCLE* - 237 MW - 41% EFFICIENCY**

* **DUAL SIMPLE CYCLE TURBINES DRIVING A THIRD
WASTE HEAT STEAM TURBINE**

GAS FIRED TURBINE - FUEL AVAILABILITY

- **PROVEN RESERVES (OGCC, 3.5 TCF) EXHAUSTED BY 1998**
- **RECOVERABLE UNDISCOVERED (DNR, 2.04 TCF) EXHAUSTED
BY 2007**
- **AFTER 2007 - COOK INLET GAS SUPPLIED BY TAGS OR
OTHER SOURCE**

NORTH SLOPE GENERATION

○ NORTH SLOPE GAS ELECTRIC GENERATION-TRANSMISSION TO RAILBELT

- REPORT BY EBASCO 1983**
- NOT ECONOMICALLY ATTRACTIVE**
- QUESTIONABLE RELIABILITY**
- SERIOUS TECHNICAL UNCERTAINTIES**

NATURAL GAS FUEL PRICE FORECASTS

(\$ PER MILLION BTU)

	①	
	1983	1993
COOK INLET GAS	2.32	3.02
NORTH SLOPE GAS		② 4.22

① BASED ON CURRENT ENSTAR CONTRACT

② BASED ON DELIVERY TO FAIRBANKS (ANGTS)
OR KENAI (TAGS)

ENVIRONMENTAL IMPACTS

- **GAS FIELD-LOCATION AND DEVELOPMENT**

- **TRANSMISSION OF GAS**

- **POWER PLANT**

- **TRANSMISSION OF ENERGY**

COAL FIRED UNITS

- **PLANT TYPES**
- **FUEL AVAILABILITY**
- **FUEL PRICE PROJECTIONS**
- **ENVIRONMENTAL IMPACTS**

COAL FIRED STEAM PLANTS- PLANT TYPE

- **OPTIMUM CAPACITY IS 200 MW AT 35% EFF.**

COAL FIRED STEAM PLANTS - FUEL AVAILABILITY

- **NENANA MINEABLE BASE IS 457 MILLION TONS**
- **BELUGA RESOURCE IS 1.8 - 2.4 BILLION TONS**
- **MODEST QUALITY 7500 - 7800 BTU/LB**

COAL PRICE FORECAST

(\$ PER MILLION BTU)

REAL INCREASE

	1983	1993	1993 - 2050
NENANA COAL ^②	1.72	2.17 ^①	1%
BELUGA COAL ^③	1.86	2.17 ^①	1%

^① ASSUMES WORLD MARKET (1983 \$ / MMBTU)

^② BASED ON CURRENT CONTRACTS (ADJUSTED) *

^③ BASED ON 5 - 10 MILLION TPY EXPORT

* ADJUSTED FOR PRODUCTION LEVELS AND TRANSPORTATION COSTS

ENVIRONMENTAL

- **COAL FIELD-LOCATION**
- **MINE DEVELOPMENT**
- **POWER PLANT**
- **TRANSMISSION OF ENERGY**

HYDROELECTRIC

- STUDIES
- SELECTION OF HYDRO ALTERNATIVES TO SUSITNA
 - NON - SUSITNA ALTERNATIVES
 - TEN SELECTED SITES
 - SELECTED DEVELOPMENT
 - CHAKACHAMNA DETAIL REPORT
 - FINDINGS
- THE SUSITNA ALTERNATIVE

STUDIES OF HYDROELECTRIC SITES IN RAILBELT

ORGANIZATION	YEAR	TYPE STUDY
U. S. BUREAU OF RECLAMATION	1967	INVENTORY
FEDERAL POWER COMMISSION	1969	INVENTORY
U. S. ARMY CORPS OF ENGINEERS	1975	FEASIBILITY
ALASKA POWER ADMINISTRATION	1980	INVENTORY
ALASKA POWER AUTHORITY	1982	FEASIBILITY

SUSITNA HYDROELECTRIC ALTERNATIVE

SUSITNA PROJECT

WATANA PHASE

- 1020 MW

DEVIL CANYON PHASE

- 600 MW

ASSUMES BRADLEY LAKE ON LINE 1987

NON-SUSITNA HYDROELECTRIC ALTERNATIVES

- CONSIDERED 91 POTENTIAL SITES IN RAILBELT
- REJECTED 26 SITES - NOT ECONOMICALLY VIABLE
- REJECTED 20 SITES WITH SIGNIFICANT ENVIRONMENTAL IMPACT
- 46 SITES EVALUATED WITH TRANSMISSION LINKS FOR ECONOMY AND ENVIRONMENTAL IMPACTS - 18 SITES REJECTED
- 28 SITES CATEGORIZED BY SIZE AND RANKED BY ENVIRONMENTAL AND ECONOMIC CONSIDERATIONS
- 10 SITES SELECTED FOR DETAILED COST ESTIMATES

TEN SELECTED SITES

SITE	RIVER	CAPACITY (MW)	COST (MILLIONS)
SNOW	SNOW	50	255
BRUSKASNA	NENANA	30	238
KEETNA	TALKEETNA	100	477
CACHE	TALKEETNA	50	564
BROWNE	NENANA	100	625
TALKEETNA 2	TALKEETNA	50	500
HICKS	MATANUSKA	60	529
CHAKACHAMNA	CHAKACHAMNA	330	1,480
ALLISON	ALLISON CREEK	8	54
STRANDLINE LAKE	BELUGA	20	126

A black and white map of Alaska showing major rivers, highways, and locations. Rivers include Tanana, Chulitna, Susitna, Yentna, Chakachamna, and Copper. Highways include Denali, Parks, and Glenn. Locations marked include Fairbanks, Healy, Browne, Bruskasna, Glenn, Hicks, Palmer, Anchorage, Valdez, Allison Cr., Kenai, Homer, and Strandline L. Two stars mark locations near Cache and Keetna.

SELECTED DEVELOPMENT

◦ CONSTRUCTION OF:

SITE	CAPACITY (MW)	ON LINE DATE
CHAKACHAMNA	330	1993
KEETNA	100	1997
SNOW	50	2002

◦ SUPPLEMENT CAPACITY SHORTFALL WITH
THERMAL GENERATION

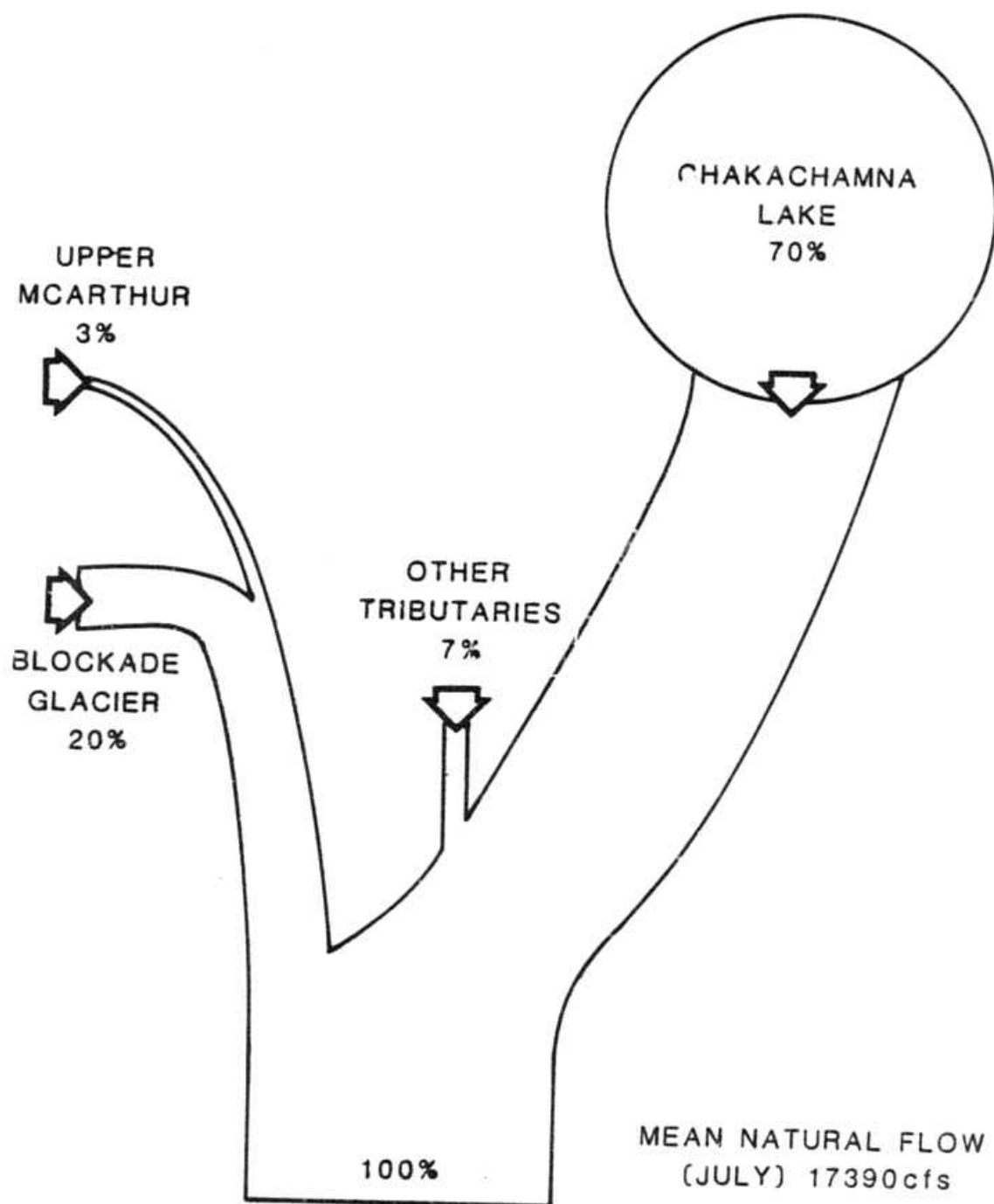
◦ ASSUMES BRADLEY LAKE CONSTRUCTED AND ON LINE 1987

CHAKACHAMNA DETAIL REPORT

(BECHTEL MARCH 1983)

- **330 MW CAPACITY**
- **10 MILE POWER TUNNEL**
- **50 FT. DAM WITH FISH PASSAGE**
- **POWER HOUSE ON MCARTHUR RIVER**
- **\$1.44 BILLION CONSTRUCTION COST (1983 \$)**
- **SIGNIFICANT IMPACT TO 70,000+ SALMON**
- **ADDITIONAL FISHERIES STUDIES REQUIRED**

CONTRIBUTION TO CHAKACHAMNA SYSTEM FLOW (JULY, PRE-PROJECT)



CONTRIBUTION TO CHAKACHAMA SYSTEM FLOW (JULY, PROJECT FLOWS)

