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Susitna-Watana Hydroelectric Project
(FERC No. 14241)

Regional Economic Evaluation Study
Study Plan Section 15.5

Initial Study Report
Part A: Sections 1-6, 8-10

Prepared for

Alaska Energy Authority

SUSITNA-WATANA HYDRO

Clean, reliable energy for the next 100 years.

Prepared by

Northern Economics, Inc. and Veritas Economic Consulting

June 2014

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LIST OF ACRONYMS, ABBREVIATIONS, AND DEFINITIONS

Abbreviation	Definition
AE	Aurora Energy, LLC
AEA	Alaska Energy Authority
CEA	Chugach Electric Association
CIRI	Cook Inlet Region, Inc.
FERC	Federal Energy Regulatory Commission
GVEA	Golden Valley Electric Association
GWh	gigawatt hour
HAGO	heavy atmospheric gas oil
HEA	Homer Electric Association
ILP	Integrated Licensing Process
kWh	kilowatt hour
ISR	Initial Study Report
MEA	Matanuska Electric Association
ML&P	Anchorage Municipal Power and Light
MW	Megawatt(s)
Project	Susitna-Watana Hydroelectric Project No. 14241
REMI	Regional Economic Models, Inc.
RSP	Revised Study Plan
SPD	study plan determination

1. INTRODUCTION

On December 14, 2012, Alaska Energy Authority (AEA) filed with the Federal Energy Regulatory Commission (FERC or Commission) its Revised Study Plan (RSP) for the Susitna-Watana Hydroelectric Project No. 14241 (Project), which included 58 individual study plans (AEA 2012). Section 15.5 of the RSP described the Regional Economic Evaluation Study. This study focuses on assessing regional economics resulting from the operation of the proposed Project and the power generated by the Project. RSP Section 15.5 provided goals, objectives, and proposed methods for data collection regarding regional economics.

On February 1, 2013, FERC staff issued its study determination (February 1 Study Plan Determination, SPD) for 44 of the 58 studies, approving 31 studies as filed and 13 with modifications. RSP Section 15.5 was one of the 31 studies approved with no modifications.

Following the first study season, FERC's regulations for the Integrated Licensing Process (ILP) require AEA to "prepare and file with the Commission an initial study report describing its overall progress in implementing the study plan and schedule and the data collected, including an explanation of any variance from the study plan and schedule" (18 CFR 5.15(c)(1)). This Initial Study Report on Regional Economic Evaluation Study has been prepared in accordance with FERC's ILP regulations and details AEA's status in implementing the study, as set forth in the FERC-approved RSP (referred to herein as the "Study Plan").

2. STUDY OBJECTIVES

The goal of this study is to assess potential changes in regional economic conditions in the study area resulting from the operation of the proposed Project and the power generated by the Project. The study objectives are established in RSP Section 15.5.1 and include the following:

- Describe the effects of the Project on the regional economy resulting from improvements in the reliability of the electrical power grid.
- Describe the effects of the Project on the stability of electric prices over time.
- Determine the economic effects of the Project's power over time.

3. STUDY AREA

As established by RSP Section 15.5.3, the study area encompasses the region where the economic impacts of the new energy source provided by Project operations will be concentrated. This region is referred to as the Railbelt, which includes the Fairbanks North Star Borough, Denali Borough, Matanuska-Susitna Borough, Municipality of Anchorage, and Kenai Peninsula Borough.

4. METHODS AND VARIANCES IN 2013

4.1. Data Collection and Analysis

AEA implemented the methods as described in the Study Plan (RSP Section 15.5.4) with no variances. Information on current power generation, transmission, and demand in Alaska's Railbelt was obtained from the utilities or secondary sources and analyzed.

Information was compiled on existing generation facilities and historical trends in power generation and sales for the major utilities in the Railbelt region. This region is defined as the service areas of six interconnected utilities: Chugach Electric Association, Anchorage Municipal Light & Power, Golden Valley Electric Association, Matanuska Electric Association, Homer Electric Association, and Aurora Energy, LLC. The data collected to date provide a general description of each utility in terms of the service area, primary fuels, installed capacity, and amount and cost of power sold. Primary online data sources were the U.S. Energy Information Administration's websites for Form EIA-923 and Form EIA-826 information. The survey Form EIA-923 collects detailed annual electric power data on electricity generation at the power plant and prime mover level, while the survey Form EIA-826 collects annual retail sales of electricity and associated revenue from a statistically chosen sample of electric utilities in the United States. These data are current through 2012.

The forecast of socioeconomic conditions with and without the Project will be based in part on estimates derived from a data and software program created by REMI (Regional Economic Models, Inc.). The REMI model assumptions are being obtained from an information collection process aimed at developing a consensus about long-term modeling assumptions with and without the Project. Progress was made in developing the model assumptions by conducting interviews with industry and government representatives who have experience and expertise in the state's leading industries and economic policy areas. All key informants were selected for their first-hand knowledge about Alaska's current socioeconomic environment, and for their understanding of the socioeconomic opportunities and obstacles that the state may encounter in the future. An attempt was made to obtain a diverse set of representatives with different backgrounds and from different groups or sectors. This diversity provides a broad range of perspectives. In addition, interviews were conducted with business representatives in the Railbelt region to ascertain the potential for changes in business opportunities as a result of the new energy source provided by the Project. The categories of organizations interviewed and examples of interview questions are presented in Attachment 15-1 of the RSP.

4.2. Variances

No variances occurred when implementing the Study Plan in 2013.

5. RESULTS

As described in Section 4 above, efforts in 2013 focused primarily on collecting data on current power generation, transmission, and demand in Alaska's Railbelt. These data will provide context for changes in regional economic conditions resulting from the power-related effects of the Project. The preliminary results of this effort appear in Section 5.1. In addition, the study team made progress in developing the REMI model. The preliminary results of this effort appear in Section 5.2.

5.1. Description of Current Power Generation, Transmission, and Demand

This section outlines information on existing generation facilities and historical trends in power generation and sales for the major utilities in the Railbelt region. This region is defined as the service areas of six interconnected utilities, including: Chugach Electric Association (CEA), Anchorage Municipal Light & Power (ML&P), Golden Valley Electric Association (GVEA), Matanuska Electric Association (MEA), Homer Electric Association (HEA), and Aurora Energy, LLC (AE). Four of these utilities are cooperatives (CEA, GVEA, MEA, and HEA), one is a municipal utility (ML&P), and one is a private company (AE). Together, these utilities accounted for approximately 77 percent of the electricity produced statewide in 2011 (Fay et al. 2012).

The City of Seward Electric System currently has three diesel generators in operation, each with capacities of 2.5 megawatts (MW), and one diesel generator with a capacity of 2.9 MW. In this analysis, these small existing diesel generators are not included because the City of Seward is a full requirements customer of Chugach and the existing diesels are mainly used for back-up. In addition, Copper Valley Electric Association serves two small communities in the Railbelt region, Lake Louise and Nelchina.

Table 5.1-1 provides a general description of these utilities in terms of power generation facilities, primary fuels, and electricity net generation. As summarized in Figure 5.1-1, natural gas is used to generate most of the electricity for the Railbelt, but the region also has significant coal and hydroelectric capacity.

Railbelt utilities consume all of the coal, most of the natural gas, and around half of the fuel oil used for power generation in Alaska (Table 5.1-2). With exception of GVEA, the utility that provides service in the Fairbanks area, the fuel oil is used for stand-by generation. GVEA depends significantly on both fuel oil and coal for power generation; about 99 percent of all the fuel oil used in the Railbelt is consumed by GVEA, of which 71 percent is naphtha, 24 percent heavy atmospheric gas oil (HAGO), and 5 percent distillate and residual fuel oil (Fay et al. 2012).

Among Railbelt utilities, the prime mover type with the largest share of installed capacity is combustion gas turbines and combined cycle gas turbines, which together account for about 80 percent of net generation. Hydroelectric turbines and steam turbines had shares of 10 percent and 7 percent, respectively. Finally, wind turbines and internal combustion generators were the least common prime movers, with shares of 2 percent or less.

As expected, most of the electricity sales in Alaska are by Railbelt utilities (Table 5.1-3). However, the annual average use per residential customer is higher in the Southeast and North Slope regions of the state. The North Slope region consumption is high because some communities benefit from natural gas and the borough has a low flat rate structure per kilowatt hour (kWh) for all their communities. The Southeast region benefits from lower rates due to high hydropower production financed in part with public funds (Fay et al. 2012). Railbelt utilities accounted for about 77 percent of the electricity sold to commercial customers in Alaska. In 2011, the North Slope and Railbelt regions had the highest annual average use per commercial customer of about 71,085 kWh and 70,987 kWh, respectively (Fay et al. 2012).

Figure 5.1-2 compares average annual residential electricity rates across Railbelt utilities from 2005 through 2012. CEA's rate showed the least volatility during that time period, while ML&P's customers enjoyed the lowest rate due primarily to lower fuel costs. ML&P's cost for gas, which comes from its one-third ownership in the Beluga River Gas Field, is around half of what other utilities pay privately owned producers of Cook Inlet natural gas (Bradner 2011). The comparatively high rate paid by GVEA customers reflects the utility's heavy reliance on oil-fired generation. Rates have increased with rising crude oil prices and the subsequent increase in the price of refined petroleum products.

Figure 5.1-3 expands the comparison of Railbelt utilities by identifying the fuel/purchased power and base rate (non-fuel) components of a residential electrical bill effective fourth quarter 2009 to 2012. In 2012, fuel/purchased power made up about half of a typical GVEA residential bill, but only 17 percent of a ML&P bill. Due to the rise in the price of fuel, especially diesel fuel, fuel costs have come to represent a much larger portion of consumers' electricity bills, as compared to utilities' base rates, which have remained relatively steady. However, some utilities have periodically raised base rates to help fund major capital investment programs.

In comparison to the business and operating environment of the utility industry in the U.S., the Railbelt region is unique. The overall size of the Railbelt region is small when compared to other utilities or areas. The total combined peak load of all six utilities is approximately 1,600 MW. When compared to the peak loads of other utilities throughout the U.S., a combined "Railbelt utility" would still be relatively small. As an example, many electric utilities have single coal or nuclear plants that exceed 900 MW of capacity (based on Energy Information Administration plant data, there are 100 generating units in the U.S. with nameplate capacity greater than 900 MW) (Black & Veatch 2008).The Railbelt electric transmission grid is also unique. It has been described as a long straw, as opposed to the integrated, interconnected, and redundant grid that is in place throughout the lower-48 states. This characterization reflects the fact that the Railbelt electric transmission grid is an isolated grid with no external interconnections to other areas and that it is essentially a single transmission line running from Fairbanks to the Kenai Peninsula, with limited total transfer capabilities and redundancies. As a consequence, each Railbelt utility is required to maintain much higher generation reserve margins than elsewhere in order to ensure reliability in the case of a transmission grid outage (Black & Veatch 2008). The leading cause of outages among Railbelt utilities is associated with the transmission and distribution system. However, while customers of Railbelt utilities lose power for an estimated 2 to 3 hours per year (Thibert 2013), that still compares favorably with the nationwide annual average of 214 minutes of outages per customer (Apt et al. 2006).

The following sections provide additional information on each major Railbelt utility, including the service area, installed capacity, and amount and cost of power sold.

Chugach Electric Association

In 2011, the net generation of the CEA reached over 2.3 million MWhs, nearly half of the total net generation among major utilities. In 2012, the utility generated approximately 88 percent of its power from Cook Inlet natural gas, 10 percent from hydro and 1 percent from wind (wind comprises about 4 percent of retail energy) (Chugach Electric Association 2013). More than 90 percent of the electricity generated or purchased by CEA prior to 2013 came from the Beluga River Power Plant, which is powered by combined cycle and natural gas and has a power rating of 374.4 MW. Gas for the facility is delivered from the nearby Beluga River Gas Field, which is jointly owned by ConocoPhillips, ML&P, and Hilcorp Energy, and via a Hilcorp Energy pipeline from Granite Point. Two other CEA facilities that generate electricity using natural gas are the International Airport Road Power Plant (46.3 MW) and Southcentral Power Plant (203.9 MW). Since commissioning of the new Southcentral Power Plant, which is more efficient than the older generators at Beluga, that plant has been used to generate a major portion of power requirements for CEA and MLP.

One of CEA's facilities, the Cooper Lake Power Plant (19.4 MW), is hydro-powered. CEA also purchases the largest share of the power generated by the 126-MW Bradley Lake Hydroelectric Plant near Homer. This facility provides 5 to 10 percent of the annual Railbelt electric power need and is most important to the Railbelt electric system during the cold winter months when demand for both electric power and natural gas for heat is at its highest. CEA and other utilities limited by available natural gas are able to use Bradley Lake Hydroelectric Plant power to meet the high electric demand (AEA 2013). CEA's share of power generated by the Eklutna Lake Hydroelectric Plant is 30 percent, up to an 11.7 MW maximum

In 2011, CEA signed an agreement with Cook Inlet Region Inc. (CIRI), an Alaska Native regional corporation, to purchase power from CIRI's 17.6-MW wind turbine project on Fire Island, 3 miles off the coast of Anchorage. The facility began operating in late 2012, and it offsets approximately 0.5 billion cubic feet of CEA's natural gas consumption for power generation (Fire Island Wind LLC 2013). However, that gas would have cost CEA about $2.4 million, while the wind power cost the utility $4.6 million. CEA retail customers pay a surcharge for the wind energy, amounting to about $1.22 on a typical monthly residential bill (Bradner and Bradner 2013). CIRI has started a $45 million expansion of the wind project, which is expected to add 11 more turbines by 2015.

Figure 5.1.1-1 shows CEA's volume and value of electricity sales by customer. Prior to 2009, CEA purchased natural gas from four separate suppliers, and as gas supplies in Cook Inlet declined, the price went up. From 2009 to the present, the price CEA paid was based on either a basket of Lower 48 Production Area price points, as published in Platts Gas Daily, or on gas futures on the New York Mercantile Exchange. U.S. gas prices have decreased since 2009 due primarily to a large expansion of domestic production following improvements in drilling technology that opened immense shale gas fields. As a result, CEA's electricity rates have also decreased. Residential and commercial sales declined in the late-2000s, possibly reflecting increased energy efficiency. For example, during the past several years the Alaska Housing Finance Corporation has offered programs to promote the energy efficiency of existing and newly constructed homes.

Municipal Light and Power

ML&P serves approximately 30,000 residential and commercial customers in a 20-square-mile area in the northern portion of the Municipality of Anchorage, including the downtown central business district, Mountain View, East Anchorage, Midtown, and nearby military bases on an interruptible basis (Posey and Griffith 2003). The utility owns and operates two generation facilities that utilize seven natural gas-fired turbines and one heat-recovery turbine. The Hank Nikkels Plant 1 has a capacity of 102.9 MW, while the George M. Sullivan Plant 2 has a capacity of 266.3 MW. Five of the seven turbines in these facilities are capable of using No. 2 fuel oil as alternate fuel, and ML&P stores nearly 1 million gallons of diesel fuel as reserve fuel in the event of a natural gas shortage (Municipal Light and Power 2013). In terms of gas supply, ML&P has an advantage over other Railbelt utilities through its one-third Beluga River Gas Field ownership (Harbour 2008). It has a secure gas supply for its two power plants through 2017 (Posey and Griffith 2003). ML&P also owns 53.33 percent of the 44.4-MW Eklutna Lake Hydroelectric Plant and has rights to 25.9 percent of the power supplied by the Bradley Lake Hydroelectric Plant. ML&P is currently expanding the generation facilities at its George M. Sullivan Plant 2. Three gas turbines, which will provide 120 MW of power, are scheduled to be installed in 2015.

Figure 5.1.2-1 shows ML&P's volume and value of electricity sales by customer. Power rates have been relatively stable due to ML&P's partial ownership of the Beluga River Gas Field. The rate increase in 2010 is likely due to the costs of maintaining the gas field, including the installation of a new compressor to increase compression capacity. The growth in commercial sales in the mid-2000s occurred as a result of Elmendorf Air Force Base agreeing to purchase all of its bulk electric power requirements from ML&P.

Golden Valley Electric Association

GVEA serves nearly 100,000 Interior residents from Cantwell north along the Parks Highway and from Fairbanks south to Fort Greely along the Richardson Highway. In addition to residential customers, the utility provides electrical power to the Ground-based Missile Defense System at Fort Greeley, Alyeska's Pump Station 9, the Pogo gold mine, and the Fort Knox gold mine near Fairbanks.

The North Pole Power Plant generates nearly three-quarters of GVEA's electricity using combined cycle and gas turbines. Since the 1970s, GVEA has relied primarily on refined crude oil products from Fairbanks refineries using crude oil originating from the Trans-Alaska Pipeline System. Currently, GVEA's 181-MW power plant in North Pole burns HAGO produced at the oil refineries located in North Pole. The North Pole Expansion Plant, which adds 60 MW of generation at the North Pole Power Plant site, burns naphtha produced at the nearby Flint Hills refinery (Golden Valley Electric Association 2009a). Steam is GVEA's second largest prime mover source. Electricity generation from steam takes place at the Healy Power Plant, which is located adjacent to the Usibelli Coal Mine and is coal-fired. GVEA owns two diesel-fired power plants, the Zehnder Power Plant (42.2 MW) and Delta Power Plant (23.1 MW). In 2012, GVEA established the Eva Creek Wind Project consisting of 12 turbines with nearly 25 MWs of capacity; it is the largest wind project in Alaska.

To further satisfy customer demands, GVEA also purchases power from the Alaska Energy Authority (16.9 percent of the power generated Bradley Lake Hydroelectric Project, or approximately 20 MW), Aurora Energy (which operates a 27.5-MW coal-fired power plant in Fairbanks), CEA, and ML&P (Regulatory Commission of Alaska Undated). Under contracted terms, the Alaska Energy Authority and Aurora Energy are priority sellers; Bradley Lake energy is take-or-pay, and Aurora Energy is contracted to be base-load "firm" energy. CEA has priority for meeting GVEA's non-firm needs. It has rights to supply two-thirds of GVEA's first 450 gigawatt hours (GWh), and four-fifths of subsequent, non-firm needs (if any). CEA and ML&P compete on the "economy energy spot market" for the remainder of GVEA's non-firm needs. Competitive supply entry is possible for any utility wishing to provide firm or non-firm power, subject to conditions imposed under GVEA's non-firm energy contract with CEA (Regulatory Commission of Alaska Undated).

Figure 5.1.3-1 shows GVEA's volume and value of electricity sales by customer. In general, higher prices of crude oil were transferred to electricity rates, causing economic impacts to GVEA's customers. However, to some extent, the utility's diverse fuel mix helps stabilize costs; for example, the low-cost power from Bradley Lake helps smooth out the peaks and valleys associated with price fluctuations of fossil fuels (Golden Valley Electric Association 2009b). Moreover, in recent years lower fuel costs, together with contracts to buy wholesale gas-fired power from CEA, have further helped stabilize rates. The Alaska Intertie, a 170-mile long intertie owned by Alaska Energy Authority that connects Anchorage area utilities (CEA and ML&P) with GVEA, allows GVEA to take advantage of low cost natural gas (plus hydro and coal) generation. However, the capacity of the line is currently limited to increases in GVEA's industrial sales due to the expansion of mining activities in the Fairbanks area, including the opening of the Fort Knox gold mine in the late-1990s and the Pogo gold mine in the mid-2000s. After peaking in 2008, residential sales tapered off. As noted above, residential customers have been able to take advantage of programs offered by the Alaska Housing Finance Corporation to promote energy efficiency. While these energy-saving programs were available statewide, relatively high electricity rates, combined with the harsh winters of Interior Alaska, made the programs especially attractive to customers in the GVEA service area.

Homer Electric Association

HEA serves about 22,000 member-owners in a 3,166 square-mile service area. Prior to 2014, HEA had a wholesale purchase power agreement with CEA to purchase power from that utility. While there were other power generation sources, including HEA's Nikiski Power Plant (37.9 MW), the Bernice Lake Power Plant (76.7 MW) that HEA purchased from CEA in 2011, and the state-owned Bradley Lake Hydroelectric Plant (HEA's share is 14.8 MW), these HEA resources were operated by CEA as part of its overall generation portfolio (Homer Electric Association 2009).

After the agreement with CEA expired at the end of 2013, HEA began producing its own power under its Independent Light program. The cornerstone of the program is the Nikiski Combined Cycle Plant, consisting of the Nikiski Power Plant gas turbine and a newly-installed turbine powered by steam produced from exhaust heat generated by the gas turbine. The capacity of the Nikiski Combined Cycle Plant is 80 MW, and working in concert with HEA's share of the Bradley Lake Hydroelectric Plant, the facility covers all of HEA's power needs. In addition, HEA recently installed a 48-MW combustion turbine at the utility's property in Soldotna. This facility, together with the Bernice Lake Power Plant, is used to provide reserve power. To fuel its power facilities, HEA has secured contracts for natural gas supply with Hilcorp Energy through March 31, 2016 (Smith 2013).

Figure 5.1.4-1 shows HEA's volume and value of electricity sales by customer. Power rates closely tracked those of CEA because of the power purchase agreement between the utilities. The decline in industrial sales beginning in 2008 is due largely to the closure of the Agrium ammonia-urea fertilizer plant in Nikiski as a result of natural gas price and availability issues.

Matanuska Electric Association

MEA serves the Matanuska Borough and the community of Chugiak-Eagle River within the Municipality of Anchorage. Under a current contract, which expires on December 31, 2014, MEA must purchase all of its power from CEA, and CEA is required to meet all of MEA's requirements. MEA is CEA's largest customer, accounting for nearly 25 percent of all power sold. MEA's shares in the Eklutna Lake (16.67 percent) and Bradley Lake (13.8 percent) hydroelectric projects have been temporarily assigned to CEA to manage in the interest of MEA.

To meet its power needs after the electricity supply contract with CEA expires, MEA is constructing a new 170-MW power plant northeast of the Eklutna Interchange on the Glenn Highway. This dual-fuel facility will operate primarily on natural gas, but it will be able to switch to diesel. The plant is expected to be operational by 2015 and will produce about 90 percent of MEA's total power output, with the remaining portion coming from the Bradley Lake Hydroelectric Plant. MEA has negotiated a natural gas supply contract with Hilcorp Energy that would begin in 2015 and run through to March 2018.

Figure 5.1.5-1 shows MEA's volume and value of electricity sales by customer. As with HEA, the electricity rates of MEA closely followed those of CEA because of the power purchase agreement between the utilities.

Aurora Energy, LLC

Aurora Energy operates a 32-MW coal-fired power plant in Fairbanks. All of its electricity is sold to GVEA under a long-term contract.

5.2. REMI Model Development

In 2013, progress was made in developing the model assumptions by conducting interviews with industry and government representatives who have experience and expertise in the state's leading industries and economic policy areas. A description of the persons and organizations included in the interview process and the information collected is available in Appendix A.

6. DISCUSSION

Data collection was adequate in 2013 to describe current power generation, transmission, and demand in the Railbelt. These data will provide context for changes in regional economic conditions resulting from the power-related effects of the Project. The primary data source was the U.S. Energy Information Administration, which provides online data current through 2012. Efforts are currently underway to collect data for future conditions under the with and without Project scenarios, including changes in generation facilities and fuels, megawatt hours sold, and sales price by customer category.

The assumptions for the REMI model are being obtained from an information collection process aimed at developing a consensus about reasonably foreseeable future economic activities in Alaska with and without the Project. Progress was made in developing the model assumptions by conducting interviews with industry and government representatives who have experience and expertise in the state's leading industries and economic policy areas.

7. COMPLETING THE STUDY

[Section 7 appears in the Part C section of this ISR.]

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9. TABLES

Table 5.1-1. Railbelt Utilities Power Generation Facilities and Fuel Types

Plant Name	Plant Owner (percent ownership)	Net Generation (MWh)[3]					
		Gas	Coal	Oil	Hydro	Wind	Total
Beluga River	CEA	2,009,571					2,009,571
Cooper Lake	CEA				77,589		77,589
International Airport Road	CEA	56,163					56,163
Fire Island	Cook Inlet Region, Inc.[1]					50,092	50,092
Hank Nikkels 1	ML&P	54,582		51			54,633
George M. Sullivan 2	ML&P	1,005,890		1,199			1,007,089
Delta Power	GVEA			-32			-32
Zehnder	GVEA			10,667			10,667
Healy	GVEA		215,310	114			215,424
North Pole	GVEA		423,592	167,379			590,971
Eva Creek	GVEA					65,443 (Jan./13-Nov./13)	65,443
Chena 5	AE		201,405				201,405
Bernice Lake	HEA	78,818					78,818
Nikiski	HEA	239,080					239,080
Seldovia	HEA			201			201
Southcentral	CEA (70%), ML&P (30%)	607,739 (Jan./13-Aug./13)					607,739
Eklutna Lake	CEA (30%), ML&P (53.33%), MEA (16.67%)				71,126		71,126
Bradley Lake	Alaska Energy Authority[2]				397,373		397,373

[1]Cook Inlet Region Inc. sells all the energy from the Fire Island Wind Project to CEA.

[2]Alaska Energy Authority distributes energy from the Bradley Lake Hydroelectric Plant as follows: CEA (30.4%); ML&P (25.9%); GVEA (16.9 %); MEA (13.8%); HEA (12%); Seward Electric Utility (1%)

[3] Data are for 2012 unless otherwise noted.

Source: U.S. Energy Information Administration (2013a)

Table 5.1-2. Railbelt Utilities Fuel Use for Power Generation, 2011

	Fuel Oil (Barrels)	Gas (Mcf	Coal (Short Tons)
	821,105	40,181,450	397,367
Percent of Statewide Total	49.8%	98.2%	100.0%

Source: Fay et al. (2012)

Table 5.1-3. Railbelt Utilities Sales, 2011

	Residential	Commercial	Other[1]	Total (MWh)
	1,640,126	2,125,764	1,050,834	4,817,024
Percent of Statewide Total	76.6%	77.1%	76.2%	76.7%

[1] Other includes sales to community and governmental facilities and industrial customers.

Source: Fay et al. (2012)

10. FIGURES

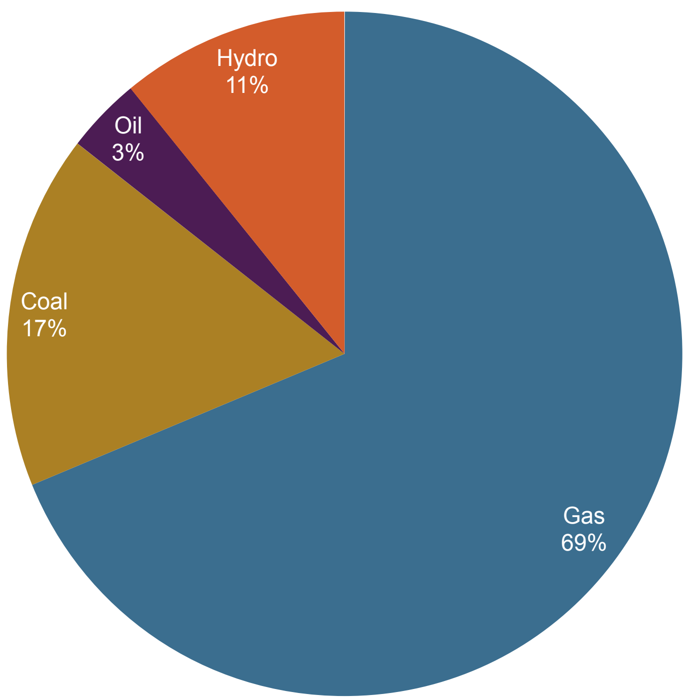

Figure 5.1-1. Railbelt Utilities Net Generation by Fuel Type

Source: U.S. Energy Information Administration (2013a)

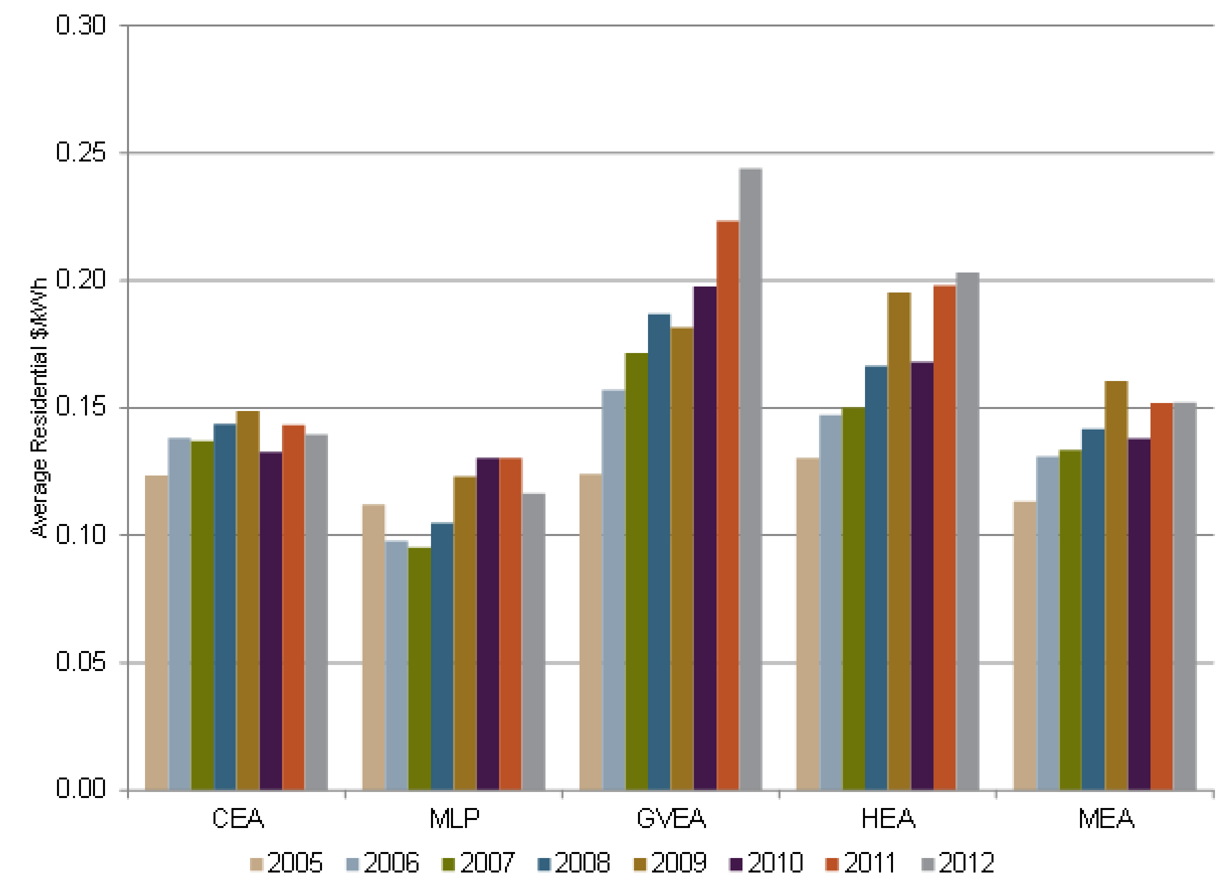

Figure 5.1-2. Average Annual Residential Electricity Rates by Utility, 2005-2012

Source: U.S. Energy Information Administration (2013b)

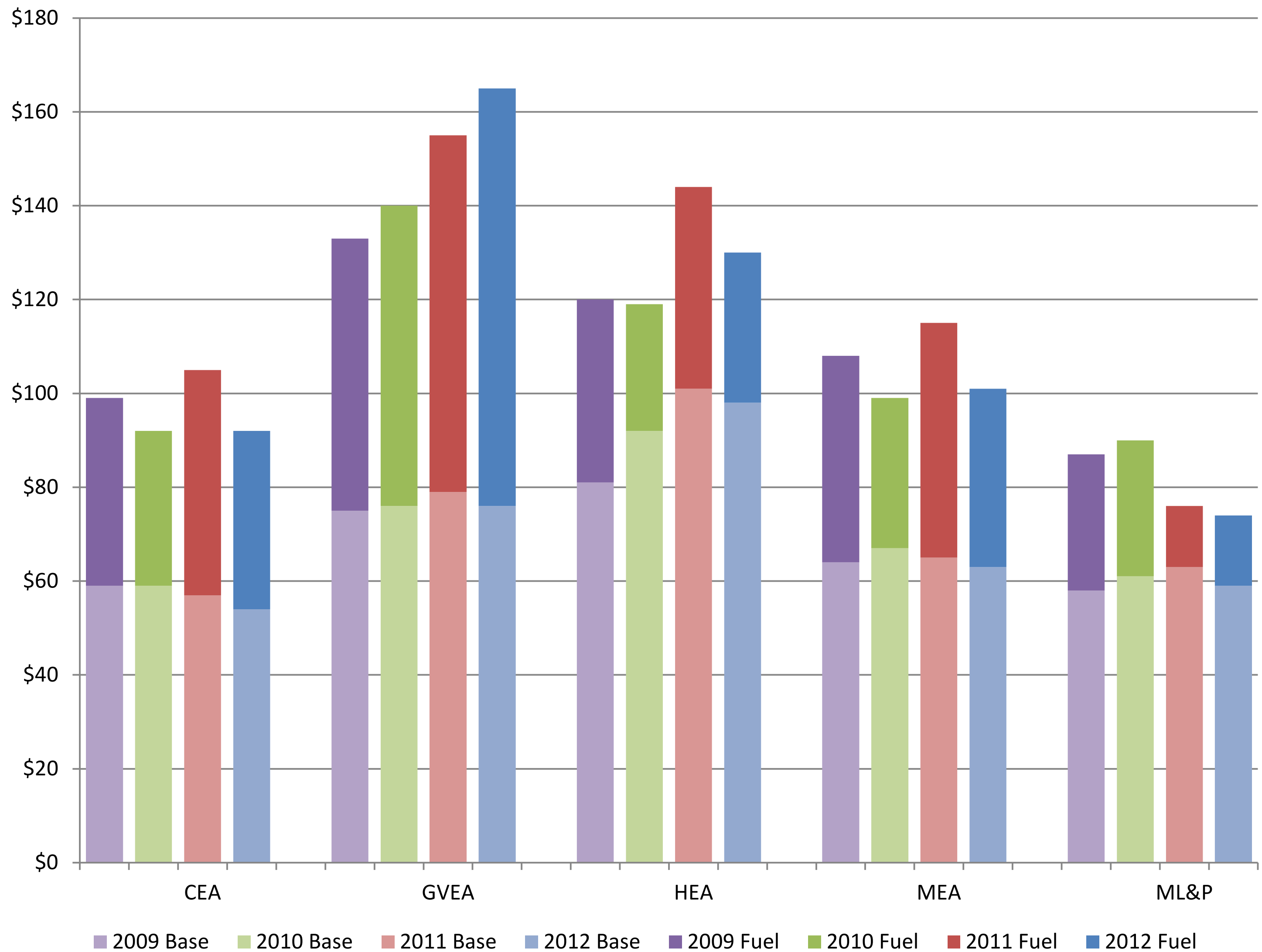

Figure 5.1-3. Base Rate and Fuel and Purchased Power Components of a Residential Electrical Bill by Railbelt Utility, Fourth Quarter 2009-2012

Source: Chugach Electric Association (2009; 2010; 2011; 2012)

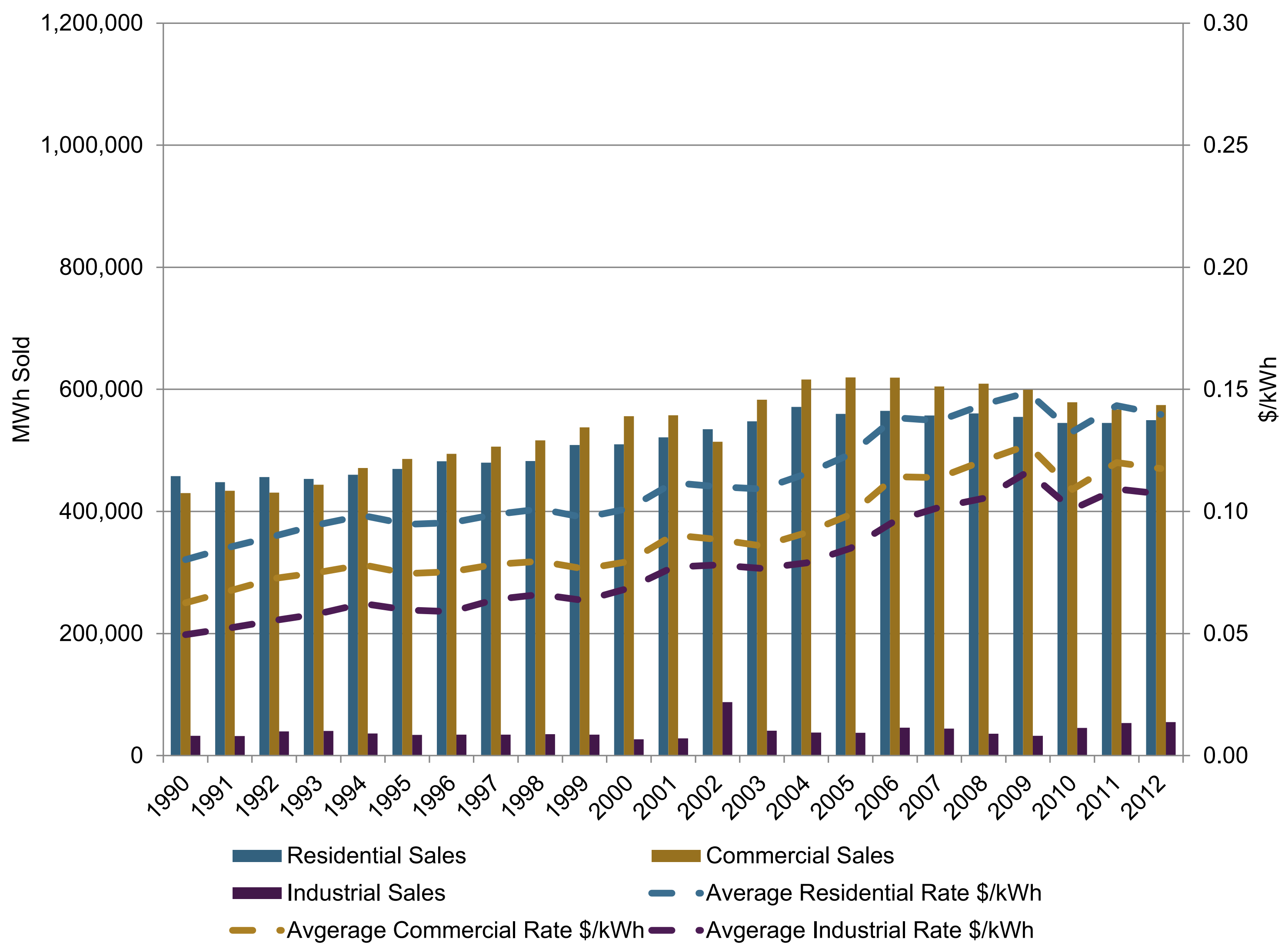

Figure 5.1.1-1. Amount and Cost of Power Sold by Chugach Electric Association, 1990-2012

Source: U.S. Energy Information Administration (2013b)

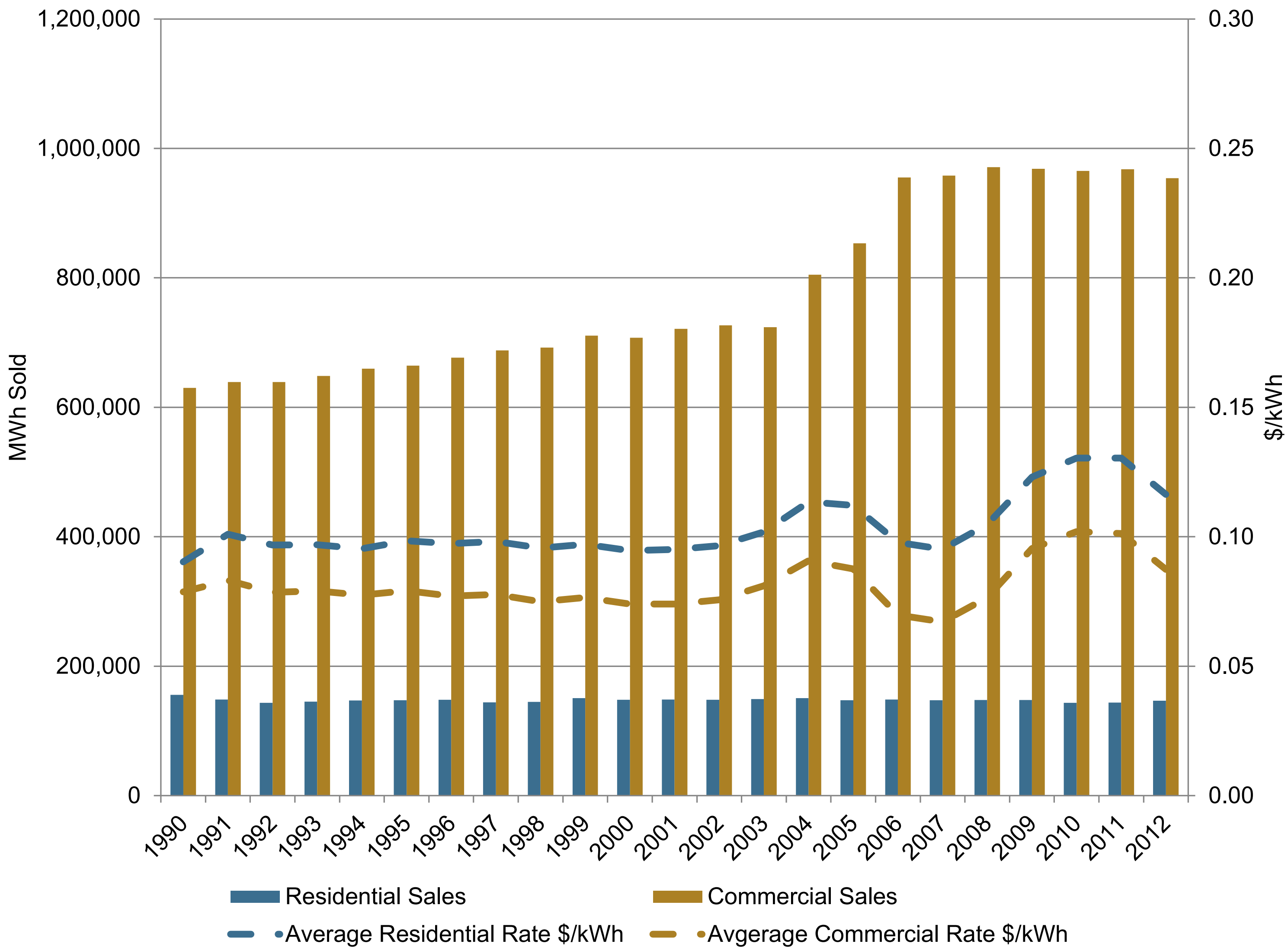

Figure 5.1.2-1. Amount and Cost of Power Sold by Municipal Light and Power

Source: U.S. Energy Information Administration (2013b)

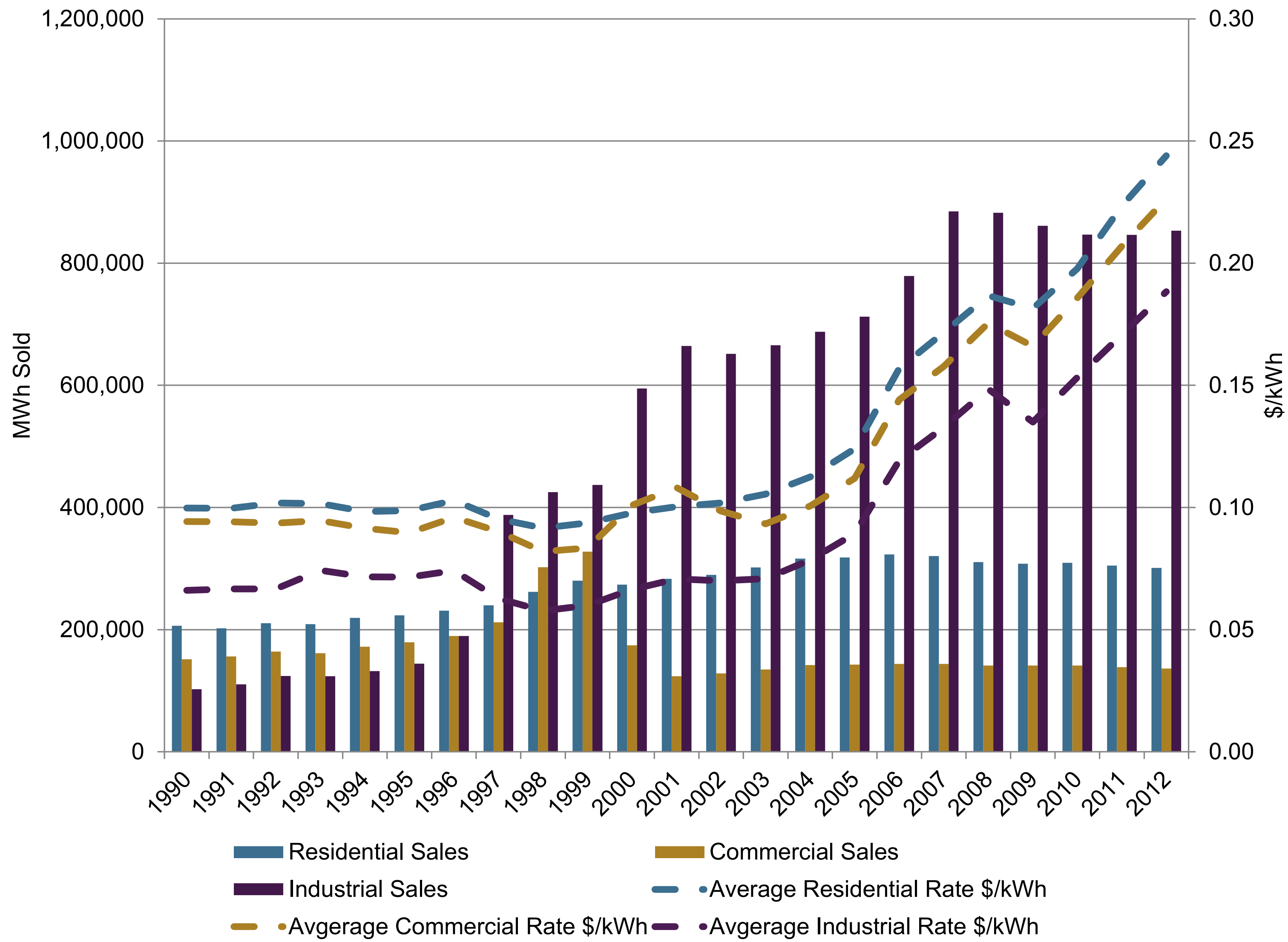

Figure 5.1.3-1. Amount and Cost of Power Sold by Golden Valley Electric Association

Source: U.S. Energy Information Administration (2013b)

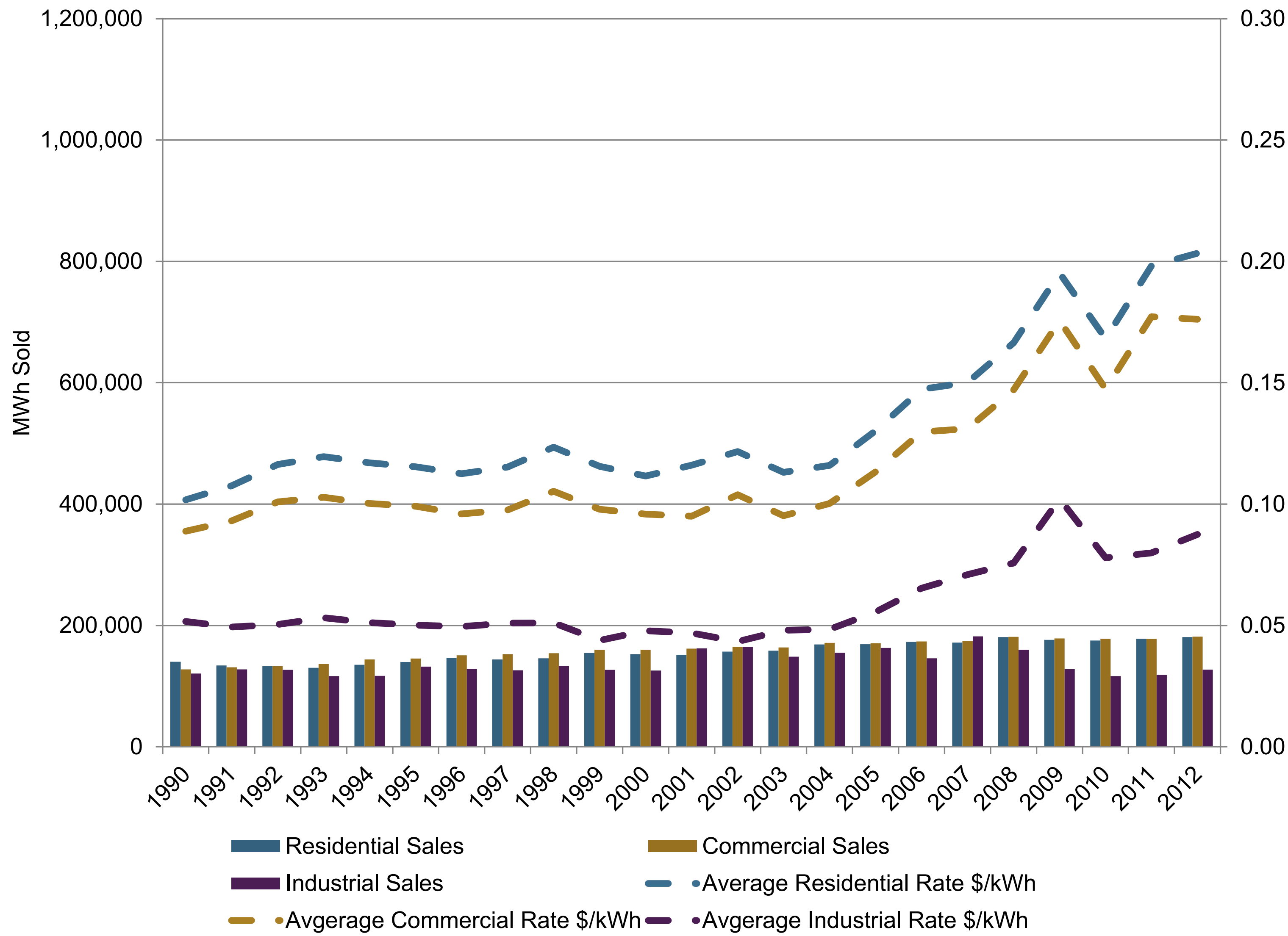

Figure 5.1.4-1. Amount and Cost of Power Sold by Homer Electric Association

Source: U.S. Energy Information Administration (2013b)

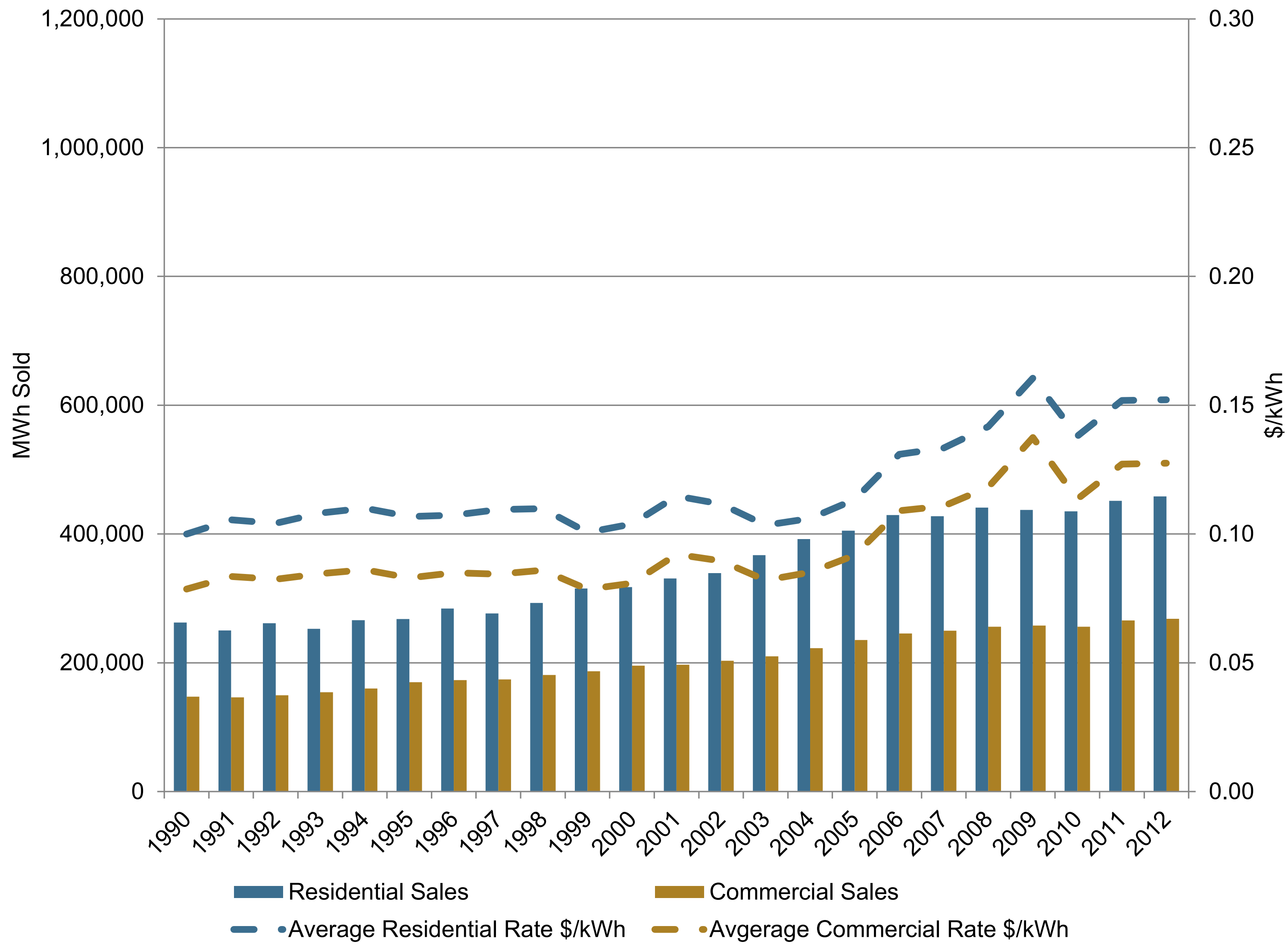

Figure 5.1.5-1. Amount and Cost of Power Sold by Matanuska Electric Association

Source: U.S. Energy Information Administration (2013b)

PART A - APPENDIX A: TECHNICAL MEMORANDUM ON LONG-TERM MODELING ASSUMPTIONS

Memorandum

Date: December 13, 2013

To: The Project File

From: Marcus Hartley, Patrick Burden, and Leah Cuyno

Re: **Draft: Technical Memorandum on Long-term Modeling Assumptions (LTMAs)**

This technical memorandum summarizes our long-term modeling assumptions (LTMAs) which will form the basis for the analyses of socioeconomic impacts under the **"With Watana Dam"** and the **"Without Watana Dam"** scenarios. In general, the LTMAs create a qualitative framework within which the quantitative economic impact models and analyses will be developed. The description of future events or activities provided in this memorandum is general in nature, without any specific amounts or terms provided except for a few of the key assumptions directly related to the proposed Watana project. These long-term sets of assumptions represent two logical futures of the Alaska economy. Choosing any one of the assumptions may preclude use of another assumption. While some of the assumptions may be mutually exclusive in this regard, they are not necessarily independent from each other as assumptions about events that occur later in time are path-dependent and the selection of an earlier assumption may preclude certain activities in later years.

Sources of LTMAs

The LTMAs are the result of an information collection process aimed at deriving a consensus of the most probable economic future for Alaska. The LTMAs reflect the combined information from published reports, project proponents, statements from industry and government representatives, and opinions from other stakeholders. In addition to a review of published reports and news articles, the study team interviewed more than 30 Alaskan stakeholders with experience and expertise in the state's leading industries and policy areas. These interviews took place from August–November 2013 and their collective responses played a significant role in shaping many of the LTMAs. The list of persons interviewed, and the businesses and organizations that they represent, are listed in the table at the end of the document. Ultimately, Northern Economics was responsible for assessing the likelihood of the future outcomes identified by these sources and compiling the information into the consistent set of assumptions presented in the memorandum.

Organization of the LTMAs

There are 25 LTMAs organized into different categories. The categories start at the national level (LTMAs 1–3), then move on to describe Alaska oil and gas production and prices (LTMAs 4–9). From there a description of the future power generation infrastructure in the Railbelt is provided (LTMA 10), followed by assumptions on other major industries in the state (LTMAs 11–16). The

State of Alaska's fiscal assumptions are described in LTMAs 17–20, followed by assumptions on large transportation (road and port) projects (LTMA 20–21). Finally, the memo describes assumptions on statewide population, labor availability, and rural issues (LTMAs 22–25).

1 U.S. Economy

No Action / Without Watana Dam
The REMI model generates a baseline forecast that incorporates a time series of historical data about the U.S. economy over the last three decades. The REMI model's baseline forecast covering the entire project timeline (2013–2060) will be used in the Without Watana Dam or No Action analysis.
With Watana Dam
This set of assumptions will include additional economic activity from construction and operation of Watana Dam.

2 U.S. Oil Prices

No Action / Without Watana Dam
EIA forecasts for oil prices out to 2040 will be taken from the 2013 Annual Energy Outlook. The EIA assumes increased prices as the world economy recovers from the recent recession. By 2040, oil is expected to cost $163 per barrel (Brent[1] crude oil price in 2011 dollars). Oil prices from 2041 to 2060 will be extrapolated based on the trend of EIA prices from 2031–2040.
With Watana Dam
The study will use the same assumptions as in the Without Watana Dam Scenario.

3 Federal Spending and Permitting Activities in Alaska

No Action / Without Watana Dam
Federal per capita spending will remain at current levels in real terms through the remainder of the study period. Permitting policies are also assumed to remain generally constant with those in place today.
With Watana Dam
The study will use the same assumptions as in the Without Watana Dam Scenario.

[1] In the 2013 Annual Energy Outlook, the Brent crude oil price is tracked as the main benchmark for world oil prices. The WTI crude oil price has recently been discounted relative to other world benchmark crude prices. The divergence between WTI and other world crude oil prices over the last few years has made WTI a less reliable indicator of U.S. average refiner crude oil costs and petroleum product prices (EIA). Note that Alaska North Slope oil is delivered aboard tankers almost exclusively to West Coast refineries. It competes against foreign oils priced off Brent for space in the refineries. Lately, however, West Coast refineries have also been bringing in crude oil by rail from the Midwest and Canada.

4 Alaska On-shore Oil Production

No Action / Without Watana Dam
Oil production from currently producing on-shore fields continues to decline and will follow the forecasts of the Alaska Department of Revenue annual production through 2022 (the endpoint of ADOR's forecasts). Beyond 2022, production from these existing fields will continue to decline at a rate equal to the projected rate of decline from 2013–2022 (an average annual decline of 8 percent). The "2013 More Alaska Production Act" (2013 MAP Act) reforming Alaska's oil and gas tax regime is expected to create incentives that will result in an increase in oil production. The ADOR projects that new oil would increase total ANS oil production by 10 percent in 2014, and about 27 percent by 2022. The study will also assume that the construction of the Alaska-LNG project will further induce onshore oil production. The following future activities/development are assumed to take place in the North Slope: • Liberty is developed and comes on line in 2021 with peak production in 2023. • Point Thomson condensates production will commence in 2016. With the start-up of Alaska-LNG project in 2025 condensate production increases significantly. • Permitting delays push first production in NPRA to 2017. Production peak occurs in 2027. • The development of the Trans-NPR-A pipeline (TNP) to move oil from the Chukchi to TAPS will spur additional development of previously marginal fields in the NPR-A. These marginal fields will contribute an average of 70,000 bod from 2030–2060. • Some of the North Slope shale oil fields will be sanctioned in 2015 and subsequently developed with first oil production in 2022. However, regulatory and capital constraints as well as technical and cost issues result in limited field development until 2030. After that date, shale oil begins to add significant oil production to total North Slope production and TAPS throughput for the remainder of the study period. • The combination of the 2013 MAP Act and later on the construction of the Alaska-LNG project will lead to oil production from previously marginal or sub-economic oil fields beginning in 2016. • Development in ANWR will not be permitted during the study period.

With Watana Dam
The study will use the same assumptions as in the Without Watana Dam Scenario.

5 Alaska OCS Oil Production

No Action / Without Watana Dam
OCS oil production from the Chukchi Sea and the Beaufort Sea will begin in 2030 and 2034, respectively. Oil produced in the Beaufort Sea will be transported through TAPS. Oil produced in the Chukchi Sea will be transported through an onshore pipeline across the NPR-A to TAPS with construction beginning in 2027. There are no changes from the current rules for federal OCS royalties; the State of Alaska will not receive any portion of the royalties from OCS activity that are paid to the federal government. OCS production will create a significant number of jobs both in the oil and gas sector and the support sectors.
With Watana Dam
The study will use the same assumptions as in the Without Watana Dam Scenario.

6 TAPS

No Action / Without Watana Dam
With increased production from the 2013 MAP Act, induced production related to Alaska LNG, and most importantly development of large OCS oil fields in the Beaufort and Chukchi Sea, the owners of TAPS make the necessary investments to keep the pipeline open and flowing. With throughput from the OCS expected to continue through the study period, and with the development of the shale oil plays, TAPS is reauthorized to operate for another 30 years in 2033.
With Watana Dam
The study will use the same primary assumptions as in the Without Watana Dam Scenario.

7 North Slope/Arctic OCS Natural Gas Production

No Action / Without Watana Dam
Prior to the Alaska LNG project, natural gas will be produced in sufficient quantities to meet localized demand in the NSB and for field consumption. Long-term purchase agreements with one or more of the Fairbanks natural gas utilities results in the construction of a small-scale (16 to 25 mmcfd) modular LNG plant on the North Slope that begins production in 2016. When the Alaska LNG project begins operations, the small LNG plant supplies LNG to industrial users on the North Slope. The Alaska LNG project is sanctioned and export of gas (LNG) starts in 2027. An average of 3.0 bcfd of ANS natural gas will be supplied to the Alaska LNG pipeline starting in 2027 through the end of the study period. Several off-take points are built along the route to supply natural gas to communities with large populations or large industrial users that can justify the capital cost of the facilities (e.g., Livengood gold mine). The study assumes that most of the NGLs (liquid petroleum gases) associated with ANS gas will also be exported; with some propane distribution to communities on the road system. The route of the Alaska LNG pipeline will transit from Livengood south along the Tanana River to Nenana and will not parallel the existing road system. As a result, a spur pipeline will be required to bring gas from an off-take point to Fairbanks. This spur pipeline is not part of the Alaska LNG project but will be another construction project to incorporate into the assumptions. Prudhoe Bay and Point Thomson will be primary gas sources for the Alaska LNG project during the early years of operation. Later, gas production from other fields will begin to meet Alaska LNG needs, primarily from NPR-A, and the Foothills of the Brooks Range. Gas production from Beaufort Sea OCS will begin in 2043 and will be transported to markets via the Alaska LNG project. Some Chukchi OCS gas is used for field use with the balance re-injected and not fully developed until after the study period.
With Watana Dam
The study will use the same assumptions as in the Without Watana Dam Scenario except that the Livengood gold mine is assumed to use electric power from Watana after transmission lines are built.

8 Cook Inlet Natural Gas Production

No Action / Without Watana Dam
Natural gas production in Cook Inlet recovers as a result of state incentive programs and long-term contracts with Southcentral gas and electric utilities. Gas production from Cook Inlet continues at levels sufficient to meet regional utility needs throughout the study period, although the natural gas storage facilities must be expanded in 2015 to ease winter peak demand issues. Some Southcentral utilities purchase gas from the Alaska LNG project when it begins operation to seek diversity in their fuel supplies. The ConocoPhillips LNG facility in Nikiski re-opens in 2014 and operates through 2030; the facility continues to operate on a seasonal basis beyond 2030. The Agrium fertilizer facility in Nikiski also reopens (in 2015) and operates using a single train through 2030. Other discussions related to in-state use of natural gas are described under **Prices for Users of Natural Gas in Alaska** and **Mining**.
With Watana Dam
Watana reduces the demand for gas from Southcentral electrical utilities, which leaves enough supply of Cook Inlet gas for both the ConocoPhillips LNG plant and Agrium to remain in operation using Cook Inlet Gas. The Agrium plant closes in 2030, but the Conoco LNG Plant operates through 2040 and then seasonally after that year. With Watana, the natural gas storage facilities are expanded again in 2022 to ease winter peak demand issues.

9 Prices for Users of Natural Gas in Alaska

No Action / Without Watana Dam
Natural gas prices for consumers in Alaska will be higher than Lower 48 prices in order to generate adequate returns to local gas producers that operate in a high-cost Alaskan environment. In general, prices paid by consumers for natural gas will not be subsidized by the state and will equal the sum of the wellhead value of the gas plus transportation costs. Prior to the beginning of operations of the Alaska LNG project, the wellhead value of the gas will be linked to the sales price of ANS oil sold on the West Coast and the ratio of $5.71 per mmBtu (the current prevailing value for Cook Inlet gas) of gas to $100 per barrel oil, with a floor of $5.00 per mmBtu. According to AIDEA project documents for the Interior Energy Plan (2013), natural gas prices in Fairbanks prior to the operations of the Alaska LNG project are expected to range between $14.50 and $17 for the end user. After the Alaska LNG project is operating, ANS gas will be purchased by utilities on long term contracts (20+ years). The cost of natural gas to Southcentral Alaska customers will be a blend of ANS and Cook Inlet pricing, and it is anticipated that ANS gas prices will be higher than prices for natural gas from Cook Inlet production. It is assumed that the wellhead value of ANS gas will be the netback price from LNG sold in Asia.
With Watana Dam
When Watana comes online, demand for Cook Inlet (CI) gas by utilities will decline, and result in Cook Inlet gas becoming a smaller percentage of the total gas supply. Cook Inlet gas prices may not drop because production will be negatively affected by the decline in demand. Since ANS gas is priced higher than CI gas, the blended gas price in Southcentral increases. Other assumptions in the Without Watana Dam scenario hold.

10 Electrical Generation Infrastructure

No Action / Without Watana
HEA's Soldotna LM6000 turbine comes online in 2014, and MEA's Eklutna Generation Station (EGS) comes online in 2015. ML&P's George M. Sullivan Plant 2 Generation Replacement Project comes online in 2016 with a 120-MW capacity. The Healy Clean Coal plant comes online in 2015. In Fairbanks, GVEA converts one of their North Pole generator units to natural gas in 2016 with the availability of LNG from the North Slope. Proposed upgrades to the existing Railbelt electrical transmission system are completed in 2020. Beginning in 2027, the availability of propane and LNG from the Alaska LNG project leads to the replacement of diesel powered generation plants use by Copper Valley Electric Association (CVEA) and other Railbelt communities on the road system that are not served by the Railbelt transmission system. No additional thermal generation plants are developed in the Railbelt, although aging plants are replaced with similar-sized but more efficient gas-fired generators as maintenance costs increase. Some relatively small renewable energy projects are brought online, but the goal to generate 50 percent of electricity from renewable sources by 2025 is not achieved. The Mount Spur geothermal project is built as a private/public partnership and comes online in 2026. LNG and propane from Alaska LNG are shipped to rural Alaska to replace high-cost diesel generators in communities that have year-round road or marine access.
With Watana
Power from Watana dam becomes available in 2024. The goal of generating 50 percent of electrical power from renewable sources is met. Because energy from Watana is available, the state elects not to partner with the developer of the Mt. Spur geothermal project and plans are shelved. Additional transmission lines connect CVEA to the Railbelt transmission system in 2028 and to Tok in 2030. Unless otherwise discussed here the Without Watana Dam scenario holds.

11 Alaska In-state Oil Refining and Imports of Petroleum Fuels

No Action / Without Watana Dam
In-state refineries are assumed to continue to operate at current levels through 2026. With the opening of Alaska LNG in 2027, and the availability of low cost natural gas, refineries in North Pole (Flint Hills and Petro Star) convert to natural gas as their primary source of energy. This situation results in cost savings for the refineries and operations at current levels through the end of the study period. However, the cost of petroleum imports is higher than production from in-state refiners which means there is no noticeable reduction of in-state gasoline or distillate prices.
With Watana Dam
The study will use the same assumptions as in the Without Watana Dam Scenario.

12 Mining

No Action / Without Watana Dam
Mining activity expands with development of several large prospects and expanded resource utilization at existing operations. In general, mine developers determine that they cannot afford to wait for the state to develop energy infrastructure and therefore provide their own infrastructure in a way that allows future flexibility if new energy sources become available. The major new mining projects are described separately below, but other smaller mining operations also come on line during the study period. 1) The Donlin Creek Mine begins production in 2019. The project would require 150 megawatts of electricity to power the mill and facilities. The power would be produced using on-site natural gas fired generation. The gas is transported to Donlin Creek via a gas pipeline from Cook Inlet. Revitalized production of Cook Inlet natural gas (see LTMA #8) generates sufficient gas supply until the opening of Alaska LNG in 2027. The mine operates for 27+ years (from 2019–2046 and produces a total of 30 million ounces of gold. 2) Pebble begins production in 2040, after permitting delays. The mine has a smaller footprint than currently envisioned, but is still able to access known mineral resources. The mine utilizes natural gas as its primary energy source. The gas is transported to the mine via a sub-sea pipeline from Anchor Point to Insikin Bay and then a 90-mile pipeline that runs from Iniskin Bay to the mine. The mine operates throughout the remainder of the study period. The copper and gold are exported via the port facility in Iniskin Bay. 3) Livengood mine comes on line in 2028, two years after the opening of Alaska LNG. A gas off-take point at Livengood enables the mine to generate its own electricity and to use co-generated steam in the milling process. The mine would produce 16 million ounces of gold during the study period. 4) Red Dog Mine expands operations to adjacent resource deposits and operates through 2045. 5) Coal exports increase from the Usibelli Mine through the Port of Seward. 6) Smaller unspecified mines with road/port access and access to energy will generate additional mining jobs each year from 2013–2060. These have the effect of replacing jobs from older mines that are reaching the end of their production cycles.
With Watana Dam
The study will use the same assumptions as in the Without Watana Dam Scenario with the following difference: Livengood mine comes on line in 2024, two years after the opening of Watana Dam. Livengood builds a transmission line from GVEA's distribution system to access electricity. The mine would produce 16 million ounces of gold during the study period.

13 Fisheries

No Action / Without Watana Dam
Harvest volumes of most species are expected to stay within the ranges of the last 10 years. Revenues from seafood are expected to increase as demand in Asia continues to grow and wild-caught seafood attains a premium over farm-raised seafood in the marketplace. Trends associated with global climate change continue with some northward movement of fish stocks and densities. The industry is able to adapt to the gradual changes, as stocks that were formerly found in more southerly waters are now more abundant in Alaska waters. Commercial fish harvests in the Chukchi and Beaufort Seas continue to be prohibited.
With Watana Dam
The study will use the same assumptions as in the Without Watana Dam Scenario. Assumptions on Watana's impact on salmon stocks in Cook Inlet or on recreation fishing in the main stem of the Susitna River will await more information from fisheries related studies.

14 Tourism

No Action / Without Watana Dam
Growth in Alaska's tourism industry continues, but at a lower rate than in the past decade due to competition from other global tourist destinations, and a limited number of communities that can meet the needs of the cruise ship industry. The growth rate in the tourism sectors is constrained to two-thirds of the prior decade's growth rates.
With Watana Dam
Watana Dam is assumed to have no net impact on the number of out-of-state visitors to Alaska. There may be in-state distributional impacts resulting from enhancement of certain sites as a result of the dam. The studies on recreational impacts will inform these assumptions when they become available.

15 Air Transportation

No Action / Without Watana Dam
Air cargo support in Alaska will continue to grow, but at lower rates than in prior decades. Tourism accounts for a substantial portion of air transportation activity and future growth rates are constrained to two-thirds of the prior decade's growth rates.
With Watana Dam
The study will use the same assumptions as in the Without Watana Dam Scenario.

16 Economic Diversification

No Action / Without Watana Dam
A liquid petroleum gas (LPG) handling facility and marine terminal is developed at Nikiski to export the LPGs to the Pacific Rim countries. The facility uses gas liquids from the Alaska LNG project as inputs. Some of the propane is shipped to rural Alaska ports with ice-free access.
With Watana Dam
The study will use the same assumptions as in the Without Watana Dam Scenario.

17 State Revenues

No Action / Without Watana Dam
The State of Alaska will continue to depend on revenues from the oil industry. Long-term projections on state revenues will therefore depend on assumptions regarding future oil production and prices (as stated in the LTMAs above). The "2013 More Alaska Production Act" is expected to incentivize additional investments in exploration and development of oil and gas resources that would result in additional oil and gas production, and State revenues. When significant volumes of OCS oil begin to flow through TAPS, the value of TAPS will increase substantially. Prior to the value increase, the legislature is assumed to rewrite the existing oil and gas property tax statutes to limit the local government take of the shared tax and increase the amount available to the state. The oil and gas property tax mill rate is also assumed to increase at the same time. However, despite near and medium-term assumptions regarding new fields coming on line that would slow down the decline rate of producing oil fields, in the long run, it is anticipated that the State of Alaska will need to create additional revenue sources from new taxes in order to fund government services. The fiscal model will determine the level of taxes that would have to be generated in order to balance the operating budget. The operating budget will be consistent with assumptions stated in the LTMA regarding state spending. Any taxes that are implemented would be considered temporary and would be eliminated or reduced if operating budget surpluses are generated. The timing of imposition of these taxes, if they are required, would be determined by initial model runs specific to the Without Watana Dam Scenario.
With Watana Dam
The study will use the same assumptions as in the Without Watana Dam Scenario, except the timing of imposition of taxes, if required, would be determined by initial model runs specific to the With Watana Dam Scenario.

18 Permanent Fund and Permanent Fund Dividends

No Action / Without Watana Dam
As mandated by the Alaska Constitution, 25 percent of state oil and gas royalties continue to be paid into the Permanent Fund (PF) and the principal balance of the PF continues to grow. Earnings from the PF continue to be paid as dividends (PFDs) unless it is determined by initial model runs that state budget deficits have fully depleted the Constitutional Budget Reserve (CBR). At that time, all PFD payments are eliminated and investment earnings from the PF are used to balance the state budget. PFDs would resume only if the PF earnings are not required to balance the budget.
With Watana Dam
The study will use the same assumptions as in the Without Watana Dam Scenario.

19 Spending by the State of Alaska

No Action / Without Watana Dam
Unless constrained by budget deficits, the state operating budget plus the capital budget and receipts from the federal government is set to equal state revenues less dedicated contributions to the Permanent Fund, the CBR, Education Fund, and other accounts. In years when the CBR is needed to balance the budget, the operating budget is reduced by two percent per year, and in years after the CBR is depleted and a budget deficit is facing the state, the operating budget, plus a modest capital budget of $200 million (in 2013 $ and adjusted for inflation in future years), is set to equal total revenues. In years when there is a budget surplus, the state capital budget is assumed to be approximately 75 percent of the available surplus (total revenues less operating budget), with 25 percent going into the CBR. Future capital projects include: • Railbelt transmission upgrades • North Slope LNG facility for Fairbanks • Port MacKenzie rail • Port of Anchorage upgrade • State investment in Alaska LNG pipeline (including at least some of off-take points and a pipeline to supply gas to Fairbanks.) • Road projects (see State Funded Road projects)
With Watana Dam
The study will use the same assumptions as in the Without Watana Dam Scenario. In addition, the State of Alaska will subsidize the cost of the Watana Dam construction. The project will be funded in a manner similar to the Bradley Lake hydroelectric project. Project financing assumptions will be further fine-tuned in collaboration with the Alaska Energy Authority.

20 State Funded Road Projects

No Action / Without Watana Dam
Because of the recognition that the state government needs to spend within its means, only those new road projects that appear to generate positive economic development will be built. In general, the state will require these road projects to be funded through private/public partnerships and local improvement programs. The only road projects that are foreseeable under these conditions is an upgrade of the road from Iniskin Bay to Pebble, the Umiat Road on the North Slope, and the road to Ambler. Following construction of the Alaska LNG project, the Parks Highway, and the Dalton Highway and the Glenn Highway between Anchorage and Palmer are refurbished to repair construction related damage.
With Watana Dam
The road projects assumed under the "Without Watana" Scenario will be undertaken. In addition, a new road providing access to Watana Dam and the Watana Reservoir will be developed in 2018. This road may or may not be accessible to the public; public access will be determined in the decision-making process.

21 Port Projects

No Action / Without Watana Dam
Port of Seward improvements will be completed in 2020 to support coal exports. An expanded LNG port will be developed at Nikiski by 2022. The port in Iniskin Bay will be built to support development of the Pebble Mine in 2035. A port on the Chukchi Sea coastline will be developed in 2026 to support OCS and TNP development. The Port of Anchorage expansion will be completed in 2018 (this is included in the list of State-funded projects).
With Watana Dam
All port projects assumed under the Without Watana Dam Scenario will be built.

22 Statewide Population growth

No Action / Without Watana Dam
Statewide population is an output of the REMI model; no specific assumptions regarding population will be made.
With Watana Dam
The study will use the same assumptions as in the Without Watana Dam Scenario. Population will be determined independently for the With Watana Dam Scenario.

23 Rural and Urban Changes

No Action / Without Watana Dam
Population for modeled boroughs and census areas will be an output of the REMI model. Borough and census area totals from the model will be allocated down to the community level

using existing trends, but modified by any of the model assumptions that are specific to individual communities.

Other assumptions that affect community populations include:

- State funding of schools in communities as long as 10 students remain.
- Revenue sharing formulas that are currently in place will remain unchanged.
- Bypass mail subsidies continue.

With Watana Dam
The study will use the same assumptions as in the Without Watana Dam Scenario.

24 Resident v. Non-Resident Labor

No Action / Without Watana Dam
The trends of resident versus non-resident labor over the past 10 years will continue through the study period and any differences by major industry groups will be utilized.
With Watana Dam
Specific assumptions regarding resident and non-resident workforce for construction and operation of the Watana Dam, in-migration, and similar topics will be developed in concert with ADOLWD. Otherwise, the study will use the same assumptions as in the Without Watana Dam Scenario.

25 Subsistence

No Action / Without Watana Dam
Subsistence activities are not addressed in the REMI or the fiscal model.
With Watana Dam
Subsistence activities are not addressed in the REMI or the fiscal model.

Persons Interviewed

Person Interviewed	Company or Organization	Title
Mr. Phil Steyer	Chugach Electric Association	Government Affairs Manager
Mr. Lee Thibert	Chugach Electric Association	Vice President, Regulatory Affairs
Mr. Arthur Miller	Chugach Electric Association	Director, Regulatory Affairs
Mr. Mark Fouts	Chugach Electric Association	Marketing Director
Mr. Cory Borgeson	Golden Valley Electric	President & CEO
Mr. Brad Janorschke	Homer Electric Association	General Manager
Mr. Joe Griffith	Matanuska Electric Association	General Manager
Mr. James Posey	Anchorage Municipal Light and Power	General Manager
Mr. Ed Fogels	Alaska Department of Natural Resources	Deputy Commissioner
Mr. Kevin Banks	Alaska Department of Natural Resources	Petroleum Market Analyst
Ms. Karen Matthias	Council of Alaska Producers	Executive Director
Mr. Jeff Cook	Flint Hills Refinery	Refinery Manager
Mr. Dan Dickinson	Dan Dickinson, CPA	CPA
Ms. Cindi Bettin	Alaska Mental Health Trust Authority	Senior Lands Manager
Mr. Glen Haight	Alaska Department of Commerce, Community, & Economic Development	Executive Director
Mr. Andrew Halcro	Anchorage Chamber of Commerce	
Ms. Deantha Crockett	Alaska Miners Association	Executive Director
Mr. JR Wilcox	Cook Inlet Energy	President
Mr. Neal Fried	Alaska Department of Labor & Workforce Development	Economist
Mr. Scott Goldsmith	University of Alaska, Institute of Social & Economic Research	Economist
Mr. Larry Persily	Federal Pipeline Coordinator	
Ms. Colleen Starring	ENSTAR Natural Gas Company	President
Mr. Curtis McQueen	Eklutna, Inc.	CEO
Mr. James Hemsath	Alaska Industrial Development & Export Authority	Deputy Director
Ms. Sarah Leonard	Alaska Travel Industry Association	President
Mr. Bill Popp	Anchorage Economic Development Corporation	President & CEO
Mr. Robert Wilkinson	Copper Valley Electric Association	CEO
Mr. Jim Dodson	Fairbanks Economic Development Corporation	President & CEO
Mr. Kurt Gibson	Hillcorp	Vice President, AK Midstream
Mr. Jim Jansen	Lynden Transportation	
Mr. John Parrott	Ted Stevens Anchorage International Airport	Manager
Ms. Lorali Simon	Usibelli Coal	Vice President, External Affairs
Mr. Scott Jepsen	ConocoPhillips Alaska, Inc.	Vice President, External Affairs
Mr. Tim Buller	Agrium US Inc.	Senior Specialist, Engineer