

## Susitna-Watana Hydroelectric Project Document ARLIS Uniform Cover Page

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A large, stylized water splash in shades of teal and blue, centered on the page. The splash is horizontal and elongated, with many smaller droplets and ripples trailing off to the left and right. A dark green horizontal band is superimposed over the middle of the splash.

REPORT TO THE LEGISLATURE 2014



# SUSITNA-WATANA HYDRO

*Clean, reliable energy for the next 100 years.*



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## Letter from Executive Director



Sara Fisher-Goad,  
Executive Director  
Alaska Energy Authority

In 2011, the Alaska Energy Authority formally entered the Federal Energy Regulatory Commission licensing effort for Susitna-Watana Hydro. Since then, the Susitna-Watana Hydro team has executed three field seasons, which included an estimated cumulative 500 field personnel, with a stellar safety record.

We had drilling crews in the field during fall of 2014 confirming the quality of the rock at the proposed project site and verifying that there are no active faults at the dam site. The board of consultants – international experts in dam design and safety – confirmed that the proposed method of construction is safe and viable.

Crews have confirmed many of the trends learned during the 1980s. As you will see in this report, the Susitna River system is an extremely stable river system. Although the population counts have changed, fish distribution trends remain consistent. Devils Canyon, located 22-32 river miles downriver from the proposed project site, remains a natural impediment to fish passage. Chinook salmon remain the only fish documented within 30 miles of the proposed project site and the number spawning upriver from Devils Canyon represents less than half of a percent of the total run.

Our financial advisory firm, experienced in financing large projects across the U.S., has provided scenarios that allow the state to use a blend of options to finance the development of the project – rather than fully fund it through the capital budget – and recoup its investment through the sale of power. It has been confirmed that Susitna-Watana Hydro can provide power at wholesale, 50-year average rates at approximately 7 cents per kilowatt hour.

We have worked with Cook Inlet Region Inc. and the Cook Inlet village corporations on a multi-year, field-season access permit and continue to foster those relationships.

Susitna-Watana Hydro remains a potentially valuable project, but we recognize the fiscal realities facing our state and there are tough decisions to be made. The project is at a critical decision-making point and during the coming months we will look to Governor Walker and the Alaska Legislature for policy direction.

Sara Fisher-Goad, Executive Director  
Alaska Energy Authority



# Susitna-Watana Hydro at a Glance

**Location:**

River mile 184,  
above Devils Canyon

**Cost:**

\$5.65 billion

**Size:**

735-foot-high dam

**Annual Energy:**

2,800,000 MWh

**Licensing:**

Federal Energy Regulatory Commission

**Reservoir:**

About 42 miles long,  
average width of 1 mile

**Project Life:**

100+ years, providing  
long-term, stable rates

**Estimated Supply:**

About 50 percent of Railbelt  
electrical demand





## Key Accomplishments and Milestones

The Susitna-Watana Hydro team has worked to prioritize field efforts based on the level of funding received through the annual capital budgets. 2014 marked a year of intensive and specific research and data collection on high-priority studies like Chinook salmon. Additional progress was made with land-access agreements, meeting licensing milestones and advancing the engineering and design.

### Land-Access Agreement

Alaska Energy Authority (AEA) reached a critical land-access agreement in 2014 with Cook Inlet Region Inc. (CIRI) and six Cook Inlet village corporations to allow AEA access to land in order to further Susitna-Watana Hydro environmental studies.

"Completing this monumental task has been a historic achievement requiring much commitment, time, effort and willingness to compromise for the greatest good for the greatest number of people," said Greg Encelewski, president of the Ninilchik Natives Association.

The cooperative land-use agreement paved the way for ongoing scientific research needed to meet crucial Federal Energy Regulatory Commission (FERC) licensing requirements and continue valuable stakeholder outreach efforts.

### Stakeholder Engagement

In the spring and early summer, AEA held a series of six public meetings in the communities of Wasilla, Fairbanks, Glennallen, Kenai, Anchorage and Talkeetna. The meetings were well-attended and members of the community had the opportunity to provide comments and ask questions about the project directly to project team members.

In recognition of the level of activity in Talkeetna associated with field seasons, the project team opened an office in Talkeetna to provide information and access to both local residents and visitors.

The Susitna-Watana Hydro stakeholder team participated in regular meetings with CIRI and the Cook Inlet village corporations in 2014, discussing everything from the land-access permit, hosting site tours, drilling permits, project updates and economic development opportunities. AEA, CIRI and Tyonek Native Corporation held a site inspection of the summer geotechnical drilling program.

The project team also presented to numerous groups, associations and NGOs throughout 2014 to present information gathered as part of the environmental field effort and licensing status.

Further, AEA assisted the Copper River-Ahtna Intertribal Resource Conservation District with a successful proposal for a U.S. Department of Agriculture Conservation Innovation grant. AEA provided an in-kind match by providing public data from Susitna-Watana Hydro environmental studies. This grant will afford the opportunity to develop local technical expertise in wildlife habitat and forestry management benefiting forage vegetation for moose.



## Licensing Milestones

AEA continued to meet the FERC licensing milestones, most notably filing the Initial Study Report in June 2014. More than 8,600 pages of information provided a detailed status report of AEA's progress, including the implementation of the 58 FERC-approved individual studies.

An overview of the Initial Study Report is available [here](#).

## Engineering

In January 2015, AEA is anticipated to release the draft engineering feasibility report. The AEA team has been working with dam safety experts, the utilities and FERC to design a safe and effective project.

The board of consultants, a group of international dam design and safety experts required by FERC, has endorsed the roller-compacted concrete construction method and the dam design and configuration.

The 2014 drilling program showed no active seismic faults at the dam site and verified the quality of the rock. Research was conducted so that the project would be designed to withstand the maximum probable flood and seismic events.

AEA worked with the utilities throughout the year to optimize the project and energy production. The overall capacity rating of the three proposed turbines has been reduced to 459 megawatts while maintaining the same energy production of 2,800,000 megawatt hours of annual energy, or roughly half of the Railbelt's current demand.

## Health and Safety

The Health, Safety and Environment (HSE) team worked with contractors to ensure a solid safety culture starting with a project kickoff and following up with compliance reviews and daily briefings to ensure a safe and successful field season. With more than 200 people in the field working a combined 116,732 hours in remote areas accessible only by helicopter, the season had just one OSHA-recordable incident.

During routine field visits, the HSE coordinator conducted health and safety and permit compliance checks of camp facilities, aircraft and watercraft, as well as observations of crews as they worked. The main goal of these checks was to assure that personnel were following guidelines set forth in their health and safety plans and land-access permits, working safely and watching out for their fellow employees.

### Economic Impacts of Licensing Activity

- Susitna-Watana Hydro maintained a 65 percent Alaska hire rate, capitalizing on hydroelectric experience in the Pacific Northwest while providing jobs to Alaskans.
- In 2014, nearly \$7 million was earned in Alaska wages. This includes subcontractors, camp support services, helicopter pilots, boat operators, biologists, drill operators and more.





## 2014 Field Studies



The 2014 study season involved more than 200 field scientists, geologists, biologists, drillers and archaeologists to further data collection as part of the FERC-approved study plan. Fieldwork efforts focused heavily on fish, water quality and wildlife studies, along with geotechnical programs that included core-drilling studies and ongoing geotechnical investigations.

Data collection has been completed for 13 of the FERC-approved studies.

AEA strives to use innovative and creative methods to reduce costs and time to complete the FERC-required studies. One successful example is that AEA used a new data collection approach to characterize bed material of the Susitna River by photographing the river during the clear-water winter conditions.

Modeling efforts for project operation, water quality, ice, sediment transport and instream flow are underway. The models have been used to simulate 50 years of existing conditions and one potential operational scenario. All of this helps feed into the development and operational scenarios of the project.

Through collaboration with the Alaska Department of Fish and Game (ADF&G), more is understood about moose and caribou habitat, movements, populations and productivity in the Susitna Basin than ever before. This provides valuable game-management data. As part of the Susitna-Watana Hydro study effort, mixing between the Nelchina and Delta caribou herds was documented.

### In 2014, AEA completed data collection for 13 FERC-approved studies

- Water Quality
- Bioaccumulation of Mercury
- Ice Processes
- Glacial and Runoff Changes
- Salmon Escapement
- Aquatic Habitat Characterization
- Fish Passage Barriers
- Large Carnivores
- Terrestrial Furbearers
- Little Brown Bat
- Wood Frog
- Subsistence
- Probable Maximum Flood





## Advancing Understanding Through Science

The goal of the scientific research and resulting data is to better characterize the environment in and around the proposed project area.

The information gathered through the Susitna-Watana Hydro field effort is a valuable resource to the state and to other privately pursued energy projects in the region. Studies to date not only continue to inform project efforts, but have also significantly advanced the volume and quality of science available for local and state agencies to better manage existing natural resources in the Susitna Basin.

In a collaborative effort with the ADF&G, GPS radio-collars for moose and caribou are providing fine-scale data on habitat use and movement that benefit state management programs in an important hunting area. Dall's sheep surveys are providing data in an area where populations have experienced a decline in the last decade and where current population-status information has been sparse. Area studies of eagles and other raptors are producing crucial insight into regional population trends of species that are subject to federal management oversight.

The fisheries studies have further documented the distribution of invasive northern pike in the lower Susitna River, expanded distribution data for species such as Chinook salmon, lake and rainbow trout and contributed more than 4,500 tissue samples to the ADF&G Gene Conservation Lab. AEA worked closely with the ADF&G to maximize the value of state dollars invested in Chinook salmon research and to not duplicate study efforts.

Through the expansive 2014 studies and subsequent Initial Study Report meetings, the Susitna-Watana Hydro project's fieldwork efforts have greatly expanded public knowledge and understanding of the Susitna Basin. Today, as a direct result of these studies, Alaskans have an unprecedented amount of publicly available data, images and information about the area and its inhabitants.





## Confirming Historical Trends and Defining Areas of Impact

During the 1980s, a three-phase, two-dam project was extensively studied by the Alaska Power Authority and a license application was filed with FERC. In 1986, the application was withdrawn, mainly due to the declining price of oil and impacts on the state budget.

As part of the current licensing effort, AEA reviewed the historical information and has used it not only as baseline data, but also to identify trends in areas like fish and aquatics. Today, despite advancements in technology and superior data collection methods, recent studies, including those conducted as part of the 2014 field season, continue to confirm findings similar to those documented more than 30 years ago.

### A Stable River System

The Susitna River is in a state termed “dynamic equilibrium.” This means that characteristics of the river are changing at the same time. As you can see from this series of photos, the river has remained remarkably consistent during the past six decades. There also is very little human development along most of the Susitna River. The data collection during the 1980s plays an even more important role and augments any recent data collection.



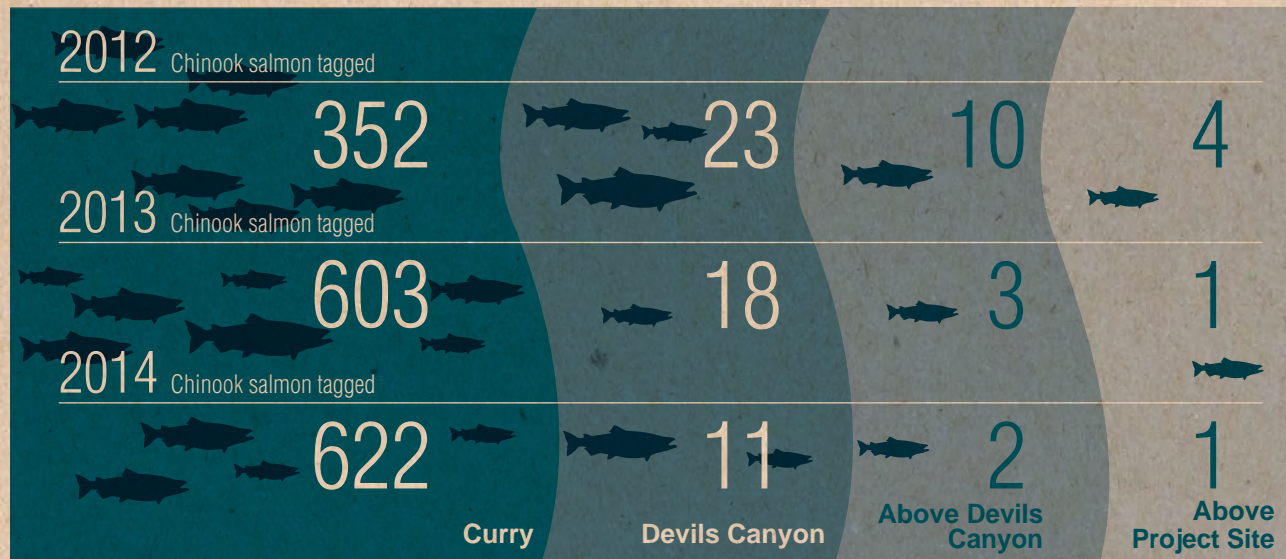


## Fish Distribution

Chinook salmon remain the only documented anadromous fish above Devils Canyon. Devils Canyon is a 10-mile stretch of rapids that begins 32 miles from the proposed dam site that acts as a natural fish barrier. The number of Chinook salmon estimated to make it up river past Devils Canyon represent less than half of a percent of the total Susitna River escapement.

## Tagged Chinook Salmon and Devils Canyon

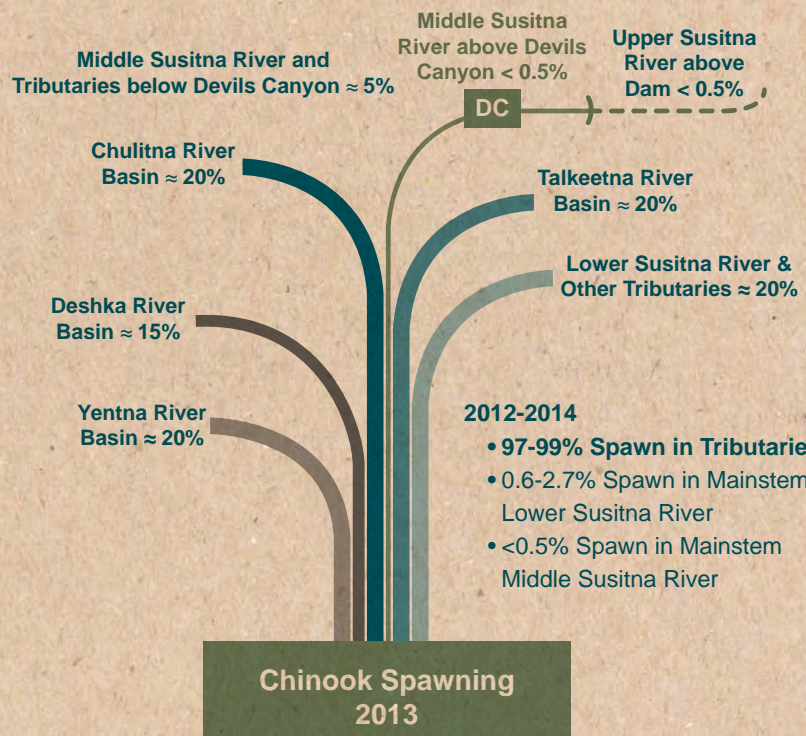
Only one salmon species has been documented within 30 miles of the project site.



## Salmon Spawning

Studies are showing that salmon for the most part use the Susitna River as a corridor to get to their preferred spawning habitat in the side channels and tributaries. In fact, 97 to 99 percent of the Chinook tagged in the lower Susitna River spawned in tributaries. Ninety-three to 97 percent of Coho tagged in the lower Susitna River spawned in tributaries.

## 2013 Chinook Salmon Spawning Distribution by Basin





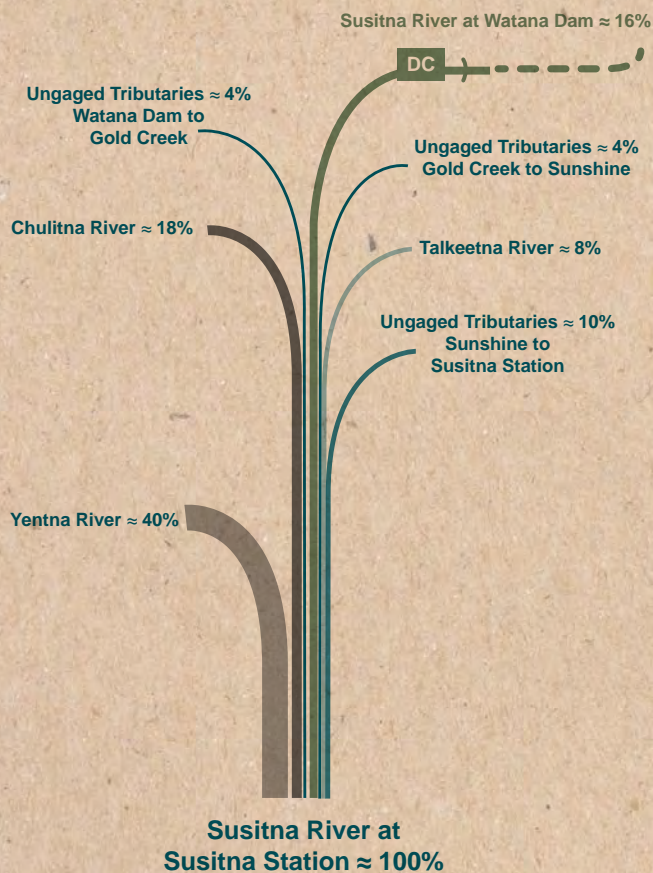
## Defining Potential Areas of Impacts

The Susitna Basin includes the Deshka, Yentna, Chulitna, Talkeetna and Susitna rivers and numerous tributaries that feed into the river system. The Susitna River at the proposed dam site represents 16 percent of the total flow contribution and 11 percent of the annual bed material load contributions (silt).

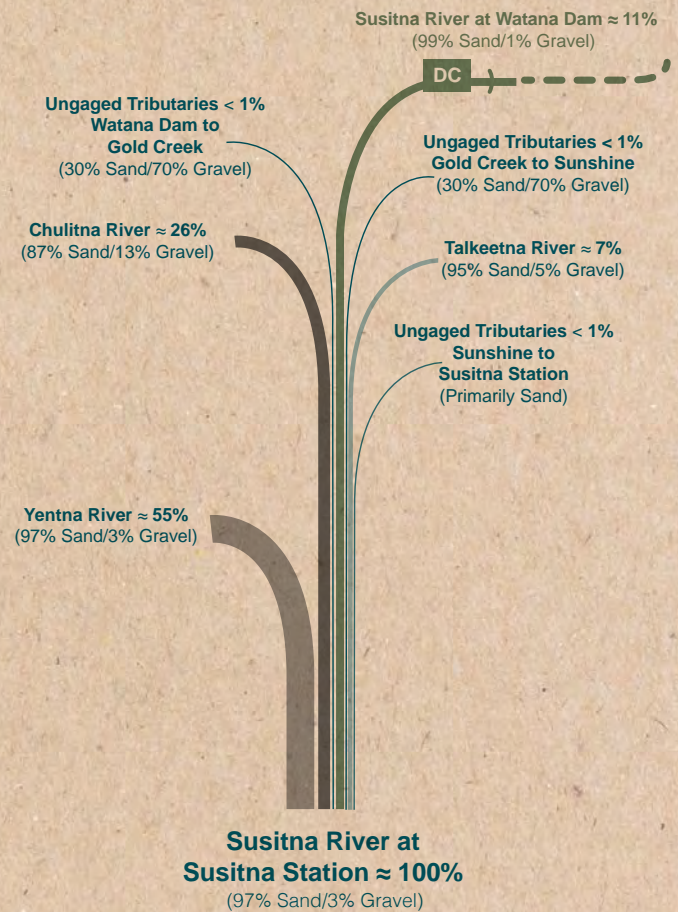
The geomorphology studies have shown that potential impacts from the project are attenuated as the flows from the other contributing rivers enter the Susitna. There would be insignificant water quality or geomorphic impacts below the Yentna River confluence and no further modeling is proposed in this reach.

If the project is pursued, the main area of study should remain the Middle River, from the Chulitna and Talkeetna River confluences, upstream to the potential dam site.

### Average Annual Flow Contributions



### Average Annual Bed Material Load Contributions





## Social Sciences

A component of the FERC-approved study plan is to better understand the historical and current human use of the Susitna region. This includes subsistence, cultural resources, archeology, ethnogeography, recreation, health and more.

In 2014, the project team completed the Ahtna Ethnogeography Study to better understand the traditional use of the region. The work included interviewing Ahtna elders to discuss traditional uses and to document Ahtna placenames. Athabascan groups and territorial boundaries were documented, as well as cultural resources, artifacts, traditional routes and trails. AEA is following proper federal and state regulations on the protection of this information and the locations of significant cultural importance.

A similar study effort is planned for the Dena'ina people.

## Scientific Innovation

Alaska presents a unique environment and opportunities for innovative study methods.

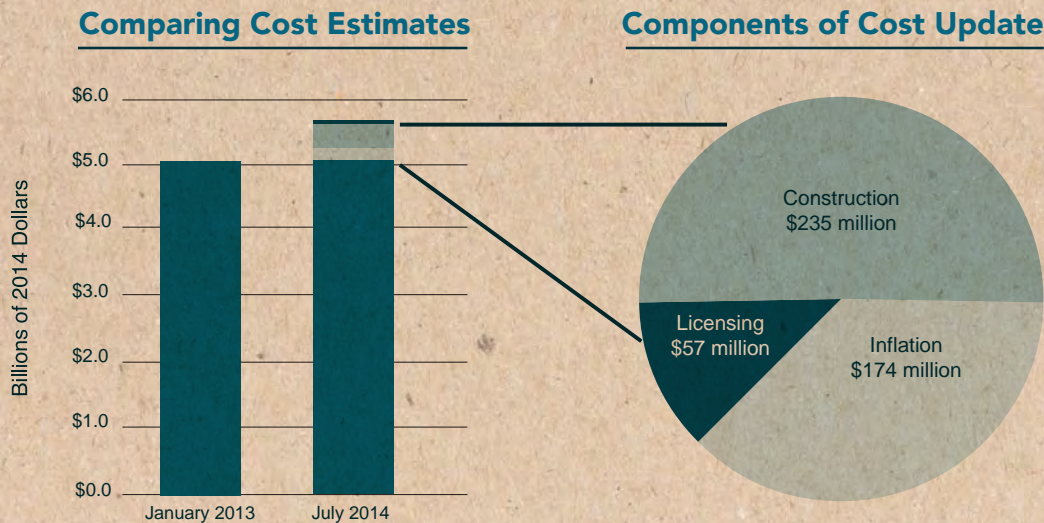
When posed with the question of how to study a river system that freezes in the winter, AEA and its contractors pioneered winter sampling approaches, including nighttime behavior of fish.





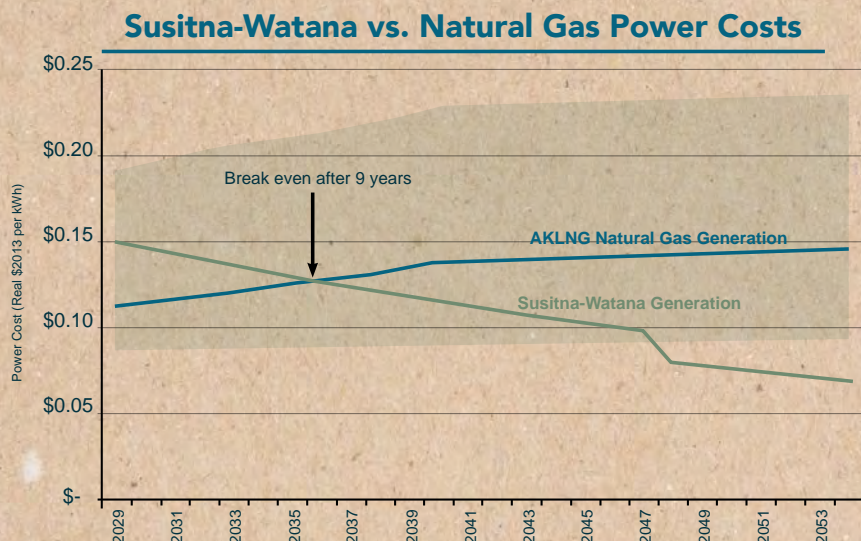
# Project Economics

AEA has remained committed to providing accurate and thorough Susitna-Watana Hydro licensing and cost estimates. In January 2013, the most probable cost of the project was \$5.2 billion (Jan. 2013 \$). As part of the engineering feasibility report, the most probable cost estimate was updated to \$5.65 billion (July 2014 \$), with a range of potential costs from \$4.46 to \$6.8 billion. The significant components of the cost increase included inflation and updated costs of construction based on the current design.



AEA hired a financial management firm with international large project development experience to develop financing options. Susitna-Watana Hydro is anticipated to be financed through a combination of bonds and lending sources and not fully funded by the capital budget, post FERC hydropower license. In addition, it is anticipated that the state would be repaid on its initial investment through the sale of power. The state has experience with this type of model, with the financing of the Bradley Lake Hydroelectric project.

With all scenarios, it is fully anticipated that Susitna-Watana Hydro could provide wholesale, 50-year-average power at approximately 7 cents per kilowatt hour. Based on natural gas price forecasts, the Susitna-Watana Hydro power costs would be less than power generated using natural gas within nine years.





# Expenditures

## Susitna-Watana Hydroelectric Project Status Report as of Dec. 31, 2014 Project Costs (in thousands)

Activity	FY2009- FY2011	FY2012	FY2013	FY2014	FY2015	Total	Encumbrance	Budgeted & Committed	Total
	Actual	Actual	Actual	Actual	To Date			Funds	
Site Determination & Pre-Feasibility (Prior to Pre-Application Document)	2,487.0	4,011.3	-	-	-	6,498.3	-	-	6,498.3
Personnel	-	625.7	1,432.4	2,427.1	412.6	4,897.8	-	2,144.4	7,042.2
Licensing Costs	-	-	-	-	-	-	-	-	-
Engineering Feasibility Study	-	1,244.3	7,304.0	5,051.6	2,103.5	15,703.3	1,378.1	643.9	17,725.3
Board of Consultants	-	-	418.6	322.6	15.3	756.6	131.8	263.3	1,151.6
Detailed Engineering Design	-	-	-	-	-	-	-	-	-
Utility Corridor, Dept. of Transportation Analysis	-	450.8	94.8	91.9	-	637.5	143.1	-	780.6
FERC Licensing Support	-	510.0	1,032.6	674.6	76.5	2,293.7	187.7	417.6	2,899.0
Office of Project Management & Permitting	-	165.7	1,519.0	1,054.7	614.7	3,354.1	1,638.3	82.5	5,074.9
Resource & Feasibility Studies	-	4,915.7	25,008.0	47,828.1	9,947.5	87,699.2	13,737.2	9,079.3	110,515.7
Project Management Consult.	-	533.3	136.3	7.0	-	676.6	-	-	676.6
Technical Assistance	-	104.0	24.2	-	-	128.1	-	-	128.1
Permitting	-	2.0	458.9	2,206.2	619.8	3,286.9	141.5	219.0	3,647.4
Logistical Support	-	134.3	6,434.3	13,364.6	6,304.2	26,237.4	901.1	359.4	27,497.9
GIS	-	199.2	415.6	276.3	80.7	971.9	136.7	67.6	1,176.2
Website and Public Info Library	-	40.8	69.0	75.2	5.7	190.7	34.3	50.0	275.0
Communications	-	9.6	223.6	162.3	45.7	441.2	148.1	463.8	1,053.1
Legal	-	1,084.5	1,309.1	1,600.6	54.2	4,048.3	640.0	234.1	4,922.5
Travel	-	29.1	64.7	48.1	26.2	168.2	-	25.6	193.8
Project Office	-	106.4	172.8	143.5	63.6	486.3	33.0	231.7	750.9
Unallocated	-	-	-	-	-	-	-	63.7	63.7
<b>Total Project Costs</b>	<b>2,487.0</b>	<b>14,166.6</b>	<b>46,117.9</b>	<b>75,334.4</b>	<b>20,370.2</b>	<b>158,476.0</b>	<b>19,250.8</b>	<b>14,345.9</b>	<b>192,072.8</b>

Funding Sources	FY2009- FY2011	FY2012	FY2013	FY2014	FY2015	Total
Railbelt Energy Fund	1,528.1	65,700.0	-	-	-	67,228.1
General Fund	9,644.7	-	-	95,200.0	20,000.0	124,844.7
<b>Total Funding Sources</b>	<b>11,172.8</b>	<b>65,700.0</b>	<b>-</b>	<b>95,200.0</b>	<b>20,000.0</b>	<b>192,072.8</b>
Expenditures	11,075.7	64,088.2	-	76,477.6	6,834.4	158,476.0
Encumbrances	37.8	1,036.9	-	14,733.3	3,442.8	19,250.8
<b>Balance by Appropriation (Budgeted &amp; Committed)</b>	<b>59.2</b>	<b>574.9</b>	<b>-</b>	<b>3,989.0</b>	<b>9,722.7</b>	<b>14,345.9</b>



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no printing costs were incurred.

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