Susitna-Watana Hydroelectric Project Document
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SUSITNA-WATANA HYDRO

REPORT TO THE LEGISLATURE

2015

SUSITNA-WATANA HYDRO

Clean, reliable energy for the next 100 years.

The Susitna River is a stable river system. Aerial photos of the same location on the Susitna River, taken in 1951, 1983, and 2012 are below. Field work and monitoring from the current licensing effort confirms many trends found during the 1980s Susitna study process.

Letter from the Executive Director

As we have advanced through the Federal Energy Regulatory Commission licensing process for Susitna-Watana Hydro, our goal has consistently remained to be wise stewards of the state's investments and to maintain the public value of the data collected. This is even more critical as the State of Alaska faces budget challenges and Susitna-Watana Hydro an uncertain future.

Gov. Walker issued Administrative Order 271, halting discretionary spending on six large projects, including Susitna-Watana Hydro in December 2014. The project team worked hard to provide additional information to the Administration and received clarification on the administrative order this summer.

Since then, the focus has been on finishing studies nearing completion, leaving focus areas in the field in the same condition, or better, than we found them and frankly, doing more with less. We have reduced staff and renegotiated contracts with vendors and adjusted the budget to reflect priority items. The project has been operating on existing funds; the last capital appropriation was $20 million in FY 15.

The studies and work done thus far are showing a project that is financeable, and environmentally and technically feasible that could provide low-cost power to the Railbelt for generations of Alaskans. We continue to confirm many trends that were found during the 1980s licensing effort.

Climate change impacts in the Arctic and carbon emissions continue to be topics of international conversation. An important yet not often discussed benefit of Susitna-Watana Hydro is that it would reduce greenhouse emissions in Alaska by 1.3 million metric tons of CO2 per year. That is equivalent to removing more than half of Alaska's registered vehicles from the roadways.

The Susitna-Watana Hydro study effort has provided volumes of information and data about the Susitna basin, the indigenous cultures, fisheries, wildlife, and landscape; all of which is publicly available information.

We remain proud of our accomplishments and working to meet the high-bar required for this licensing effort.

Sara Fisher-Goad

Sara Fisher Goad,
Alaska Energy Authority Executive Director

Quantifying Economic Impact

The Alaska Energy Authority contracted with Northern Economics to understand the potential economic impacts from Susitna-Watana Hydro and future workforce needs. If constructed, the project would generate billions of dollars in energy savings for the Railbelt and would be a significant, long-term benefit to the economy.

AEA worked with Northern Economics on the Benefit-Cost and Economic Impact Analysis. The report was published in March 2015 and estimates energy savings of $11.2 billion during the first 50 years of the project. When additional benefits of the dam were factored, including the retirement of older generation facilities, reduction in green house gas emissions and a reduction in the frequency of power outages, the energy cost savings surpassed $14 billion.

The proposed project (Susitna-Watana Hydro) would provide jobs for many decades and Alaska businesses benefit from the goods and services, and workers spend money in the local economy.
- Northern Economics

While energy savings is the primary benefit of the project, the study also estimates Susitna-Watana Hydro would provide thousands of direct and indirect jobs for many decades. The project would support up to 5,000 jobs during preconstruction, with a total construction workforce of about 12,000 people peaking with an annual construction workforce of 1,155. In addition, Susitna-Watana Hydro would generate millions of dollars in local spending- a projected $2.6 billion during construction and an estimated $26.5 million annually during operations.

Engineering and Safety

In January 2015 Susitna -Watana Hydro completed the Engineering Feasibility Report, concluding the large majority of engineering work necessary to file for a FERC hydropower license. This effort is the result of several years of collaboration among engineering contractors, dam-safety experts, utilities, FERC and the Alaska Energy Authority to design a safe and cost-effective project.

The report is a critical milestone and concludes that the project is technically feasible. Results of studies conducted between February 2011 and December 2014 included drilling and geotechnical investigations to test the quality of rock and measure bedrock for a solid foundation; studies and modeling for maximum probable flood and seismic events; and modeling to simulate the projected electrical generation to meet Railbelt demand.

FOCUS ON SAFETY

The engineering feasibility work and environmental studies go hand-in-hand and are closely coordinated. Not only will the environmental studies influence potential operation scenarios, but flooding and seismic studies are included in the FERC-approved environmental study plan.

The project would be constructed to withstand a 50-year flood without having to open spillway gates. To further enhance project safety, the 10,000-year flood can be passed with one spillway gate inoperable.

As part of the Site Specific Seismic Hazard Analysis included in the FERC-approved study plan, seven seismographic stations were installed to form a seismic network operated by the Alaska Earthquake Center. The results have not only documented the frequency of seismic activity, but the types of seismic movement.

The seismic analysis indicates that the governing seismic event will be a subduction intraslab zone event, not a crustal event. Understanding not only the potential magnitude of a seismic event, but also the types of possible ground motions are essential to designing the safest project possible.

Active faults have not been found within the dam site. Drilling conducted during the summer of 2014 confirmed that there is no "Watana lineament" along the Susitna River channel, supporting results from investigations conducted during the 1980s licensing effort.

Annual Energy Production 2,800 GWh

In addition, the Alaska Division of Geological and Geophysical Surveys (DGGS) conducted extensive geologic mapping in the Talkeetna mountains and found no active faults directly in the project area.

DESIGN

The dam structure itself is designed as a curved gravity dam, constructed using Roller Compacted Concrete (RCC) methodology with a straight gravity (thrust) section on each abutment. The height of the dam has been optimized to 705 feet above bedrock, lowered from approximately 730 feet.

The nominal crest elevation is 2,065 feet and the crest length is approximately 2,810 feet. The reservoir would be approximately 42-miles long with an average width of 1.25 miles

The bulk of the rock excavated to provide aggregate for concrete and roads would be locally sourced, from a quarry that would eventually be submerged by the Susitna-Watana Hydro reservoir during operations.

ENERGY DEMAND

AEA has been working with the Railbelt utilities to ensure that the generators are appropriately sized for Railbelt demand, modeling potential operations and integrating into the Railbelt system to ensure maximum long-term benefits to the Railbelt.

As part of this effort, the size of the generators has changed, the overall nominal capacity rating of the three proposed turbines has been reduced to 459 Megawatts while maintaining the same energy output of 2,800 Gigawatt hours of annual power, or 50 percent of the Railbelt's current demand.

ACCESS ROUTES

In addition to reaching the significant milestone of filing the Engineering Feasibility Report, the potential access routes were narrowed down to two: a north-south route that extends off of the Denali Highway and the Gold Creek Route that runs east-west and would connect with the Alaska Railroad (unconnected to the state highway system).

The Chulitna Route, a second east-west corridor, had been under consideration but AEA has recommended to FERC to eliminate the Chulitna corridor from further consideration.

NEXT STEPS

Next steps would include continued negotiations with the Railbelt utilities toward a power sales agreement and developing an operations plan that balances the need for power and environmental concerns.

PROJECT COST AND SCHEDULE

After a FERC hydropower license is issued and final design phase site investigations are initiated, it is estimated to be 12-years until full project operation.

The anticipated project cost is estimated to be $5.65 billion (2014$), including licensing, design and construction, but excluding escalation and interest during construction. This is classified as a Class 4 estimate, according to recommended practice of the Association for the Advancement of Cost Engineering.

Optimized Dam Height at 705 Feet

Susitna-Watana Hydro could potentially provide power at less than eight cents per kilowatt hour.

Licensing Effort

The focus of the Susitna-Watana Hydro environmental and licensing program has shifted from a field-intensive effort with a peak of more than 200 individuals in the field, to wrapping up studies that are near completion, maintaining the value of the investment made by the State of Alaska and ensuring that data is saved in a meaningful and publicly accessible format.

In 2015 the Susitna-Watana Hydro staff and contractors worked to file the Initial Study Report with the Federal Energy Regulatory Commission. This voluminous report contains more than 8,000 pages of information and essentially acts as a progress report on how the Alaska Energy Authority is implementing the FERC-approved study plan (58 individual studies), accounts for any variances from the approved plan, and provides AEA and stakeholders with an opportunity to request further modifications to the studies.

As part of the Initial Study Report process, a series of meetings are to be held to discuss the findings and requested modifications in order to lead to a Study Plan Determination by FERC.

Administrative Order 271 stopped all nondiscretionary spending for Susitna-Watana Hydro and in order to comply with the order, AEA essentially pressed pause in the midst of the Initial Study Report process in early 2015. AEA was granted an abeyance from the licensing process from FERC.

AEA received clarification on discretionary spending from the Office of Management and Budget director in July 2015 and was notified that the project was to use existing funds to advance to the next licensing milestone, the FERC Study Plan Determination. AEA then filed a request to lift the licensing abeyance with FERC in August 2015 and proposed a new schedule.

During the subsequent public comment period, members of the Cook Inlet Working Group (CIRI and the Cook Inlet Region Village Corporations), Railbelt utilities, the Alaska Department of Fish and Game and Alaska Department of Natural Resources, and the Alaska Ratepayers provided letters to FERC supporting the request to lift the licensing abeyance and to approve the proposed schedule. The action was also supported by the Bureau of Land Management, Environmental Protection Agency and the U.S. Army Corps of Engineers. Opponents included the Susitna-River Coalition, Trout Unlimited, U.S. Fish and Wildlife Service and the National Marine Fisheries Service. The license abeyance was lifted in October and FERC provided a revised schedule in December 2015.

AEA will use existing funds to hold Initial Study Report Meetings in March and work toward a FERC Study Plan Determination in October 2016.

ENVIRONMENTAL PROGRAM

The extensive field work and studies done on the development projects.

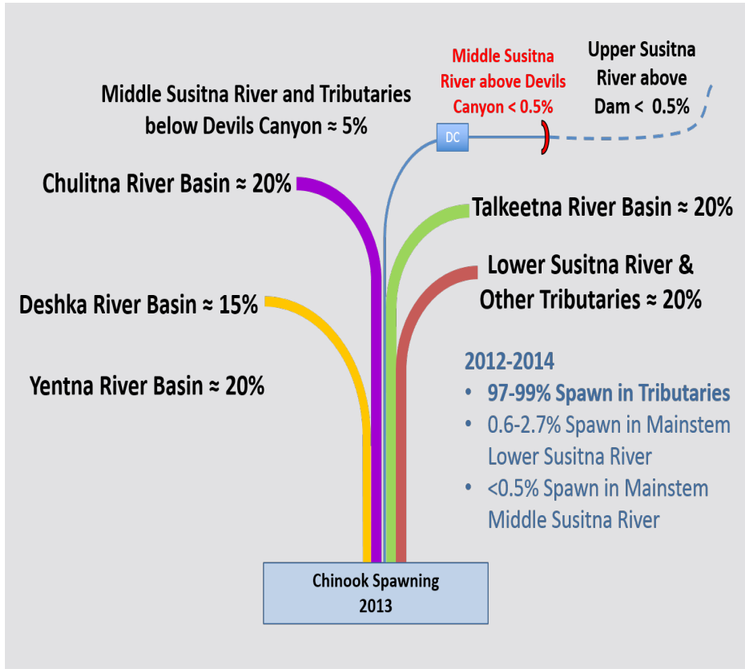
The extensive Susitna-Watana Hydro field work has expanded the knowledge base of the Susitna Basin

Susitna Basin's landscape, indigenous cultures, and wildlife and fisheries have expanded the knowledge base and provides information for better decision making, resource management and other resource development projects.

A benefit to the Susitna-Watana Hydro project is the significant study effort conducted during the 1980s. Work conducted during the 2012-15 study seasons is largely confirming the trends observed during the 1980s.

<0.5% of Chinook spawn in the Mainstem Middle Susitna River

Ninety seven to 99 percent of Chinook salmon spawn in tributaries of the Susitna River. Ninety three to 97 percent of Coho salmon spawn in the tributaries.



Devils Canyon acts as a natural barrier to fish passage. After field work to trap and tag fish as well as setting up radar stations along the river, the Chinook remain the only salmon documented within 30 miles of the proposed dam site. The numbers represent far less than half of one percent of the total Susitna Chinook run.

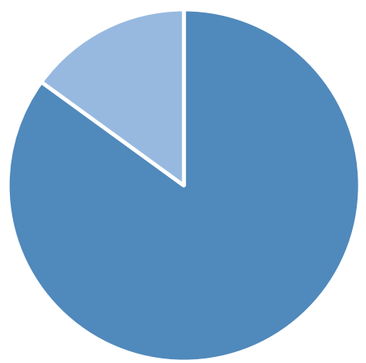
Data collection for 13 studies has been completed. In addition, the studies and modeling have helped to further define the potential areas of impact, mainly on flows and geomorphology of the river.

The tributaries are significant contributors to the Susitna River flows. As a result, impacts attenuate moving downriver. There would be insignificant water quality or geomorphic impacts below the Yetna River confluence. There would be minor impacts on the main channel geomorphology from the dam site to the Chulitna River.

Study Plan Status

- ✓ Study Plan Development
- Study Implementation Phase
- Impact Assessment
- Development of Protection, Mitigation and Enhancement Measures (PMEs)

85% of data collection complete



Financing the Project

Alaska Energy Authority staff has worked with PFM, an international financial advisory firm, on financing models for Susitna-Watana Hydro that include combinations of state investment, bonds and federal financing programs and private financing.

While developing scenarios to finance the project three goals were kept in mind: 1) provide affordable power to Alaskans, 2) protect investments made by the State of Alaska and 3) investigate ways that the State could be repaid on its initial investment.

Scenario One: Bond and Rural Utility Service Financing

This scenario uses a combination of Alaska Energy Authority Revenue Bonds (30 years, five percent interest, refinanced) and Rural Utilities Service (RUS) financing. RUS is a division of the U.S. Department of Agriculture that provides low-cost financing for infrastructure improvements. AEA received confirmation that RUS could provide financing for up to 50 percent of the project costs.

The challenge with RUS financing is that although it is low-cost, construction must be completed within five years, an impossible time frame for the construction of Susitna-Watana Hydro. The revenue bonds would be used to pay for the initial construction and program costs and the RUS financing for the remaining five years of construction costs.

The resulting cost of power is $0.074 per kilowatt hour (kWh), 50-year average real price. (2014$)

Scenario Two: All Bond Financing

In the second scenario, all construction costs are financed with AEA Revenue Bonds (30 years, five percent interest, refinanced).

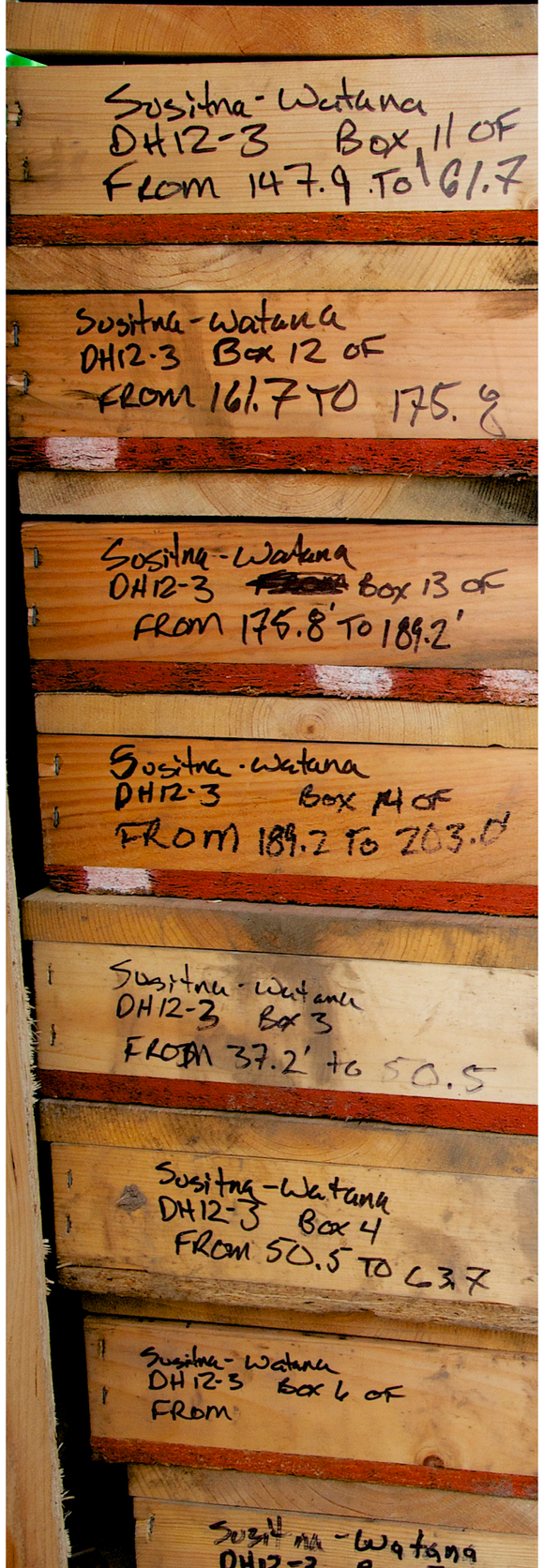
The resulting cost of power is $0.083/kWh, 50-year average real price. (2014$)

Scenario Three: State Loan and Rural Utilities Service Financing

The third scenario uses State loans to pay for the initial construction and program costs and assumes that this State investment would be repaid over 30 years with zero percent interest. The RUS financing would be used for the remaining construction and program costs, repaid over 35 years at four percent interest.

This option is often referred to as an adaptation of the Bradley Lake Model. The Bradley Lake Hydroelectric project was constructed by an up front investment shared by the State of Alaska and participating utilities. Beginning in 2022, the State's initial investment will be repaid by the Power Sales Agreement with the utilities. A similar structure is proposed with scenario three with the state's investment to be repaid after the RUS financing costs.

The resulting cost of power is $0.041/kWh, 50-year average real price. (2014$)



(all costs in billions of 2014 dollars)

	2010-2018	2019-2023	2023-2028	Total
Licensing and Design	$0.53	$ -	$ -	$0.53
Construction	$ -	$1.96	$2.14	$4.10
Program Costs	$ -	$0.51	$0.51	$1.03
Total	$0.53	$2.47	$2.65	$5.66
	Presumes State Upfronts	The "Donut Hole" is the main financing question.	Presumes the cheapest funding is RUS	

Stakeholder Engagement

The Alaska Energy Authority honors its commitment to keeping Alaskans informed about the status of the project by continuing meetings with stakeholder groups and state and federal resource agencies.

WORKING WITH LANDOWNERS

Although logistics and field work has slowed significantly since its peak during the Summer of 2014, continued coordination with the landowners, namely Cook Inlet Region Inc., (CIRI) and the six Cook Inlet village corporations remains a high priority. The group collectively has been working as the Cook Inlet Region Working Group (CIRWG).

AEA continues to provide project status updates, works to meet permit requirements and reporting commitments and data sharing. As the field work has slowed, the impacts on landowners in the Susitna project area has been minimized. AEA staff continues to work with the CIRWG members to adjust the Plan of Operations and access permit necessary to meet the reduced field efforts while respecting the concerns and requirements of land owners.

Summary of Project Funding

Below is a summary of project funding as of Jan. 17, 2016 (in thousands).

Authorized Funds- State of Alaska Appropriations	$192,072.8
Expenditures to Date	(175,892.3)
Encumbered and Committed Funds	(7,966.2)
Remaining Funds Required to Complete Essential Tasks	(5,897.9)
Remaining Budget Estimate- Direct and Indirect Personnel, Legal Support, Contractual Support Services, Project Office Costs Through June 30, 2017	(2,316.4)
Balance of Authorized Funds	(0.00)

This report was designed and created in-house and distributed in electronic format.

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