

App # 800 West Creek Hydroelectric Project

Resource: Hydro

Proposed Project Phase: Design
Feasibility

Proposer: Borough & Municipality of Skagway

AEA Program Manager: Ott

Applicant Type: Local Government

Project Description

The Municipality of Skagway (Municipality) proposes to construct the West Creek Hydroelectric Project (Project) located on West Creek, approximately seven miles west of Skagway and adjacent to the small community of Dyea. The primary purpose of the Project would be off-setting diesel generation by cruise ships that dock in Skagway from May through September each year. Up to five cruise ships per day dock in Skagway for 12-15 hours and continuously operate their diesel plants to provide for on-board electricity consumption. The continuous stack emissions spread a blue haze at about the 1,500 foot elevation where vegetation has been noticeably affected. The Project will improve air quality and save vegetation in the area (there may be other unknown environmental benefits). To emphasize how serious the air quality of the area is being taken, the National Park Service, Municipality of Skagway, and Alaska Power & Telephone Company (AP&T) have a cooperative agreement to place and maintain equipment at AP&T's Dewey Lakes Hydro project site to monitor this pollution. Preliminary results of this monitoring are attached as an appendix. A secondary purpose of the Project is to provide winter energy to the local utility when they have a shortfall of hydro energy from their hydroelectric projects (2011 - Dewey Lakes Hydro, Lutak Hydro, Goat Lake Hydro, Kasidaya Creek Hydro) as well as to sell winter energy to the Yukon Territory, Canada through their generation company Yukon Energy. The Alaska Power Authority had a feasibility study conducted for the Project by R. W Beck and Associates in 1981-82. That study focused on a development that would meet the electricity needs of Skagway and Haines rather than the nascent cruise ship industry. It recommended an installed capacity of 6.0 MW and a 20,000 acre-foot reservoir formed by a 120-foot high concrete-faced rockfill dam. The proposed Project will be significantly different than proposed by Beck in that the installed capacity will be greater and the reservoir storage will also be greater. Nevertheless, the Beck study provides an excellent starting point for the proposed reevaluation of the site, and therefore the Municipality believes that a Phase I reconnaissance study is not necessary. West Creek drains from an ice field into the Taiya River. The Municipality has already requested the Project site land from the State as Municipal Entitlement Land. Since the stream is glacial, flows are very high in the summer, which is also when the cruise ships are active. Preliminary analysis indicates that a Project with a capacity to serve one large cruise ship could be operated on a run-of-river basis. Increasing the capacity so the Project could serve two or three cruise ships is possible and a storage reservoir would be required to make the generation dependable. The costs and benefits of these capacity/storage alternatives will be a primary focus of the proposed Phase II studies.

AEA Review Comments and Recommendation **Full Funding**

The Borough and Municipality of Skagway proposes feasibility and conceptual design of a 6-26 MW hydro project at West Creek to be connected to the Upper Lynn Canal (Haines-Skagway) grid. The estimated cost of this project \$140 million. The primary purpose of the project is to offset diesel generation by cruise ships that dock in Skagway from May to September. The secondary purpose is to supply power to the local grid during periods of shortfall and to the Yukon Territory grid in the winter. The BMS applied for a similar project in round 2 (#262). AEA recommended the project for partial funding and stated that an integrated resource energy plan would be needed to assess the project in the context of other potential projects. Due to limited funding, however, the project did not receive funding.

The economic analysis performed for this project is based solely on cruise ship load over a period of 50 years. It estimates a B/C ratio of 1.5 to 2.1 assuming an average electrical consumption of 18,900 to 27,000 MWh/yr.

The BMS states that a major benefit of the project is the reduced air emissions from diesel generation by the cruise ships.

AEA has the following concerns about this project:

1. AEA has already committed funding for Connelly Lk, Schubeck Lk, and Burro Cr reconnaissance and feasibility assessment. These projects would compete to meet the same loads as the proposed project.
2. Given that the chief aim of the project is to supply the shore-based cruise ship load, AEA questions the amount of public benefit to be received versus the high capital cost and high technical, business, and regulatory risks of the proposed project.
3. Since the project would affect the waters of the Klondike Gold Rush National Park, there is significant permitting risk.

Based on the additional information that BMS provided regarding potential benefits of the project, AEA has reconsidered its original recommendation against funding. The additional information more thoroughly explained the benefits the projects would accrue from reduced cruise ship emissions and a potential intertie to BC.

Recommend full funding.

Funding & Cost	Project Cost:	\$140,000,000
Cost of Power: \$0.22 /kWh	Requested Grant Funds:	\$236,000
Energy Region:	Matched Funds Provided:	\$59,000
Southeast	Total Potential Grant Amount:	\$295,000
	AEA Funding Recommendation:	\$236,000

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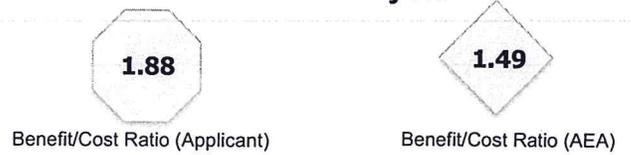
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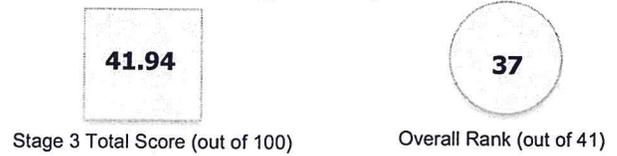
Stage 3 Scoring Summary

<u>Criterion (Weight)</u>	<u>Score</u>
1) Cost of Energy (Max 35)	9.63
2) Matching Resources (Max 15)	9.75
3) Project Feasibility from Stage 2 (Max 20)	9.90
4) Project Readiness (Max 5)	1.00
5) Benefits (Max 15)	8.50
6) Local Support (Max 5)	2.00
7) Sustainability (Max 5)	1.17

Economic Analysis



Scoring & Project Rank



DNR/DMLW Feasibility Comments

Municiple conveyance survey underway, but Skagway has management authority at this time.

DNR/DOF Feasibility Comments

DNR/DGGS Feasibility Comments

DNR/DGGS General Comments (permanent construction sites and potential geohazards)

All projects proposing the development of permanent structures should conduct a geotechnical site survey to determine the potential detrimental effects from natural hazards such as flooding, earthquakes, active faults, tsunamis, landslides, volcanoes, liquefaction, subsidence, storm surges, ice movement, snow avalanches, and erosion, and incorporate appropriate measures to mitigate the risks. Projects may be required to perform a geohazards site survey as a condition of receiving construction permits, depending on location of proposed site.

DNR/DGGS Geohazards Comments

Project is ~20 km away from Chilkat river segment of the Denali fault. See general DGGS comment.

800 West Creek Hydro

Proposer: Borough and Municipality of Skagway

Benefit/Cost Ratio: Applicant self-reported: 2.06 App calculated B/C: 1.88 AEA B/C: 1.49

Recommend using AEA B/C 1.49

Project Description:

The West Creek Hydro project is located about seven miles from the community of Skagway. The primary purpose of the project is to reduce diesel generation on cruise ships docked in Skagway from May through September of each year. Right now up to four or five cruise ships per day generate their own power using on-vessel diesel generators for 12 to 15 hours at a time. The applicant notes visible pollution in the area in the form of a blue haze rising up to 1,500 ft. elevation and negatively impacting vegetation.

The application is for a feasibility study and conceptual design. Total project costs are estimated at \$140 million and generation is estimated at 27GWH/year, enough to serve three cruise ships 12 to 15 hours per day, 5 days per week during the summer tourist season. The Municipality of Skagway is requesting for \$236,000 with matching funds of \$59,000 to make the total phase cost \$295,000.

Contribution to Lower the Cost of Energy:

N/A the project is not designed to serve the community of Skagway, only cruise ships. The main benefit to the community will be in reduced negative environmental impact.

Assumptions Modified:

AEA fuel price assumptions used in both analyses

Applicant calculated B/C 1.89

- Displaced electricity 27,000,000 kwh/yr
- O&M calculated based on applicant provided annual \$1,512,000 and 27gwh generation - \$0.056/kwh

AEA B/C 1.49

- Displaced electricity reduced by 30 percent to reflect variation in cruise ship landings and provide some sensitivity analysis. B/C does not fall below 1 until generation is reduced by more than half.
- AEA standard O&M used - \$0.005/kwh

Concerns:

Some potential concern about the project proximity to Klondike Gold Rush National Historic Park giving FERC jurisdiction and creating a more costly and time consuming process.

Funding of both Connelly Lake hydro and this project might provide excess and expensive to maintain hydro capacity whose main purpose is to provide energy to cruise ships during the summer tourist season.

Some concern about the appropriateness of State grants funding a project that is designed to serve a private industry not a community.

Possible Enhancements:

Better information regarding cruise ship landings and potential sales agreement with cruise companies.

Long Term Sustainability:

If cruise ship industry reduces landings in Skagway the long term sustainability of the project would be compromised.