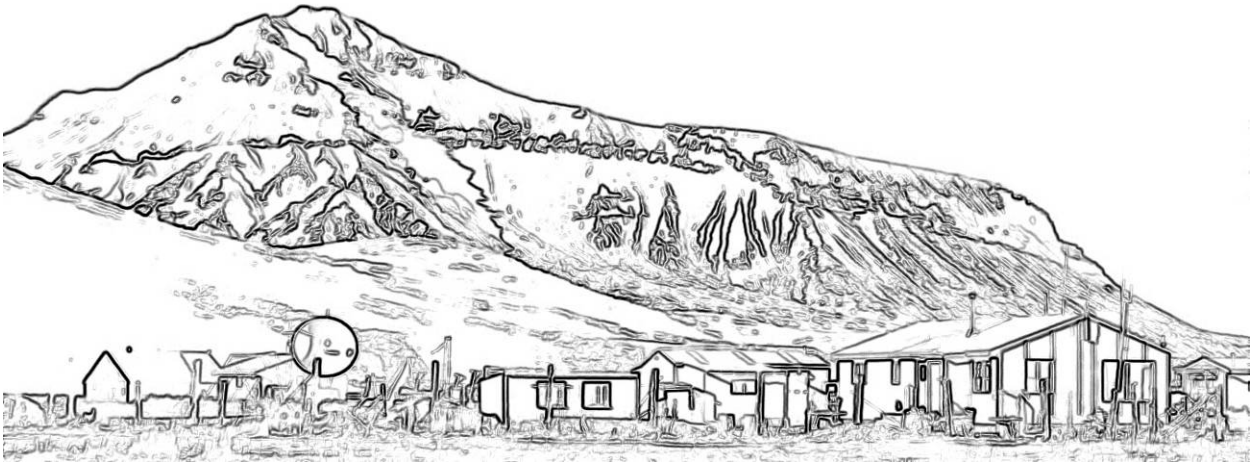


False Pass
Wind Energy Feasibility Report

July 2015

Marsh Creek, LLC

2000 E. 88th Ave.

Anchorage, Alaska 99507

False Pass Wind Energy

Contents

False Pass Wind Energy

Executive Summary

The City of False Pass began collecting data to assess their wind resource in May 2005. Data was collected through September 2007, less a three month period after a bear damaged wiring to the datalogger and repairs could be made. A cursory look at the wind data by Alaska Energy Authority in 2007 showed high turbulence, so a wind development project was put on hold. Subsequent rising fuel prices spurred the City of False Pass to request a more thorough look at the potential to integrate wind with their diesel plant and a more comprehensive analysis of the met tower wind data and additional wind modeling was accomplished in 2012.

Analysis by Marsh Creek LLC confirms AEA's assessment regarding turbulence and that despite the measured Class 4 wind resource, there are very few wind turbines potentially suitable for False Pass' particular wind conditions. Very high turbulence from the complex terrain of False Pass precludes typical wind turbines often used in rural Alaskan wind projects.

Initially considered for False Pass was a project using an alternative wind turbine design the Vertical Axis Wind Turbine (VAWT). VAWTs are designed to operate in highly chaotic wind regimes. They reportedly withstand turbulence reasonably well and produce power in a wider range of wind speeds than horizontal axis wind turbines. Additionally, while there have been no direct studies demonstrating a lesser impact on avian species than Horizontal Axis Wind Turbines (HAWT), USFWS favors the design as "bird friendly". In 2012 Marsh Creek completed an installation of VAWTs to produce electricity primarily for heat "wind-to-heat" at the USFWS stations in Cold Bay and King Salmon. Unfortunately, three years of experience with two different models of 5 kW VAWTs leaves little doubt that VAWTS's are yet ready for deployment to remote communities with extreme wind conditions.

Non-wind renewable energy options are possible in False Pass, but prior to initiating a renewable energy project, Marsh Creek strongly recommends that the City of False Pass prioritize upgrading and repairing their power plant, including moving the distribution bus bar from the old power plant to the new power plant and completely decommissioning the old plant. Repairs and upgrades will improve plant efficiency and lay the groundwork for the introduction of a renewable energy power source. Marsh Creek also recommends the City of False Pass commission a study to consider repair and upgrade of the old, presently non-functional, heat recovery system to supply heat to the False Pass School.

When ready for renewable energy, Marsh Creek recommends that the City of False Pass de-emphasize wind energy development until a robust VAWT proves reliable and is available commercially. As an alternative, the City of False Pass may want to consider developing a small run-of-the-river type hydroelectric project on the unnamed creek near the former met tower site. Marsh Creek understands that this creek has a potential power generation capacity of 150+ kW. With a long term perspective, Marsh Creek recommends that City of False Pass continues to pursue a tidal hydrokinetic energy project with Ocean Renewable Power Corporation (ORPC). Wind power with VAWTs remain a possibility, but Marsh Creek will not recommend them until the technology matures and reliability is clearly demonstrated in real world operational settings.

False Pass Wind Energy

Wind Power Study Background

Through a partnership between the Alaska Energy Authority (AEA), the Aleutian Pribilof Islands Association and the City of False Pass, a met tower was installed in False Pass in May 2005. A preliminary look at the data by AEA, prior to loss of funding for the wind study program, showed a robust wind resource with significant turbulence. As a result, the project was put on hold. In 2010 the Alaska Energy Authority (AEA) funded a grant to the Aleutians East Borough (AEB) to perform an assessment of renewable energy resources (wind, waste heat recovery, hydro, tidal, solar). The assessment was conducted by Your Clean Energy, LLC of Anchorage, and incorporated research of the community and preexisting studies, in-person site visits to assess viability and potential locations for renewable energy, and an economical evaluation of each renewable energy project.

More recently, however, rising fuel costs and commercialization of new technology have inspired local leadership to revisit the idea of using wind energy to save fuel. Marsh Creek LLC completed a full wind resource assessment of data from the met tower in December of 2012 (refer to the V3 Energy, LLC wind resource assessment report in Appendix A). As was anticipated by AEA's cursory data review in 2007, the wind resource assessment report documents significant turbulence at the site.

Project Goals

Alaska pays some of the highest prices for gas and electricity in the nation, despite being America's second largest producer of oil. This cost is magnified in remote villages and communities such as False Pass, where relative geographic isolation and lack of connected roads and other infrastructure make electrical generation and transmission using imported fuel an expensive proposition.

The reliance on diesel fuel and heating oil and its unpredictable cost was the primary motivating factor in City of False Pass' interest in developing alternative and sustainable energy sources for their community. For instance, in 2008 the City purchased 40,000 gallons of diesel fuel at $4.10 per gallon. One year later the same amount of diesel fuel was purchased for $2.29 per gallon. In 2014, nearly 61,000 gallons of diesel was purchased at $3.51 per gallon.

The high cost of energy negatively impacts community members, local government, and entities providing services to the area. Many of the Borough's disadvantaged residents are forced to choose between heating their homes and buying groceries.

An alternative generation infrastructure in False Pass would help stabilize energy costs, providing long-term socio-economic benefits to the city. The Aleutians East Borough is confronted by a reality that plagues much of rural Alaska: extremely limited economic opportunity combined with an almost astronomical cost of living. In small communities such as False Pass, each household is important to the well-being of the entire community. With affordable energy, more households could afford to stay in

their communities, promoting community stability and wellness and help stem the tide of rural out-migration.

PROJECT CONTACTS

Entity	Contact	Position	Email	Phone
Aleutians East Borough	Ernie Weiss	Borough Contact	eweiss@aeboro.org	907-274-7557
City of False Pass	Chris Emrich	City Clerk	cityofflasepass@ak.net	907-548-2319
Marsh Creek, LLC	Maggie McKay	Project Coordinator	maggie.mckay@marshcreekllc.com	907-343-0407
V3 Energy, LLC	Douglas Vaught, P.E.	Wind Power Engineer	dvaught@v3energy.com	907-350-5047
Marsh Creek, LLC	Connie Fredenberg	Community Liaison	Connie.fredenberg@marshcreekllc.com	907-444-6220
Alaska Energy Authority	Josh Craft	Wind Program	jcraft@aidea.org	907-771-3000

City of False Pass

The City of False Pass, part of the Aleutians East Borough, is located approximately 646 miles southwest of Anchorage along the Isanotski Strait just west of Cold Bay. False Pass was originally homesteaded by William Gardner in the early 1900's, growing in population in 1917 when P.E. Harris established the first seafood cannery there. Several of the original buildings in False Pass came from an abandoned cannery 30 miles away in Morzhovoi Bay. A post office was built in 1921 with the name "False Pass", giving the community a more official status.

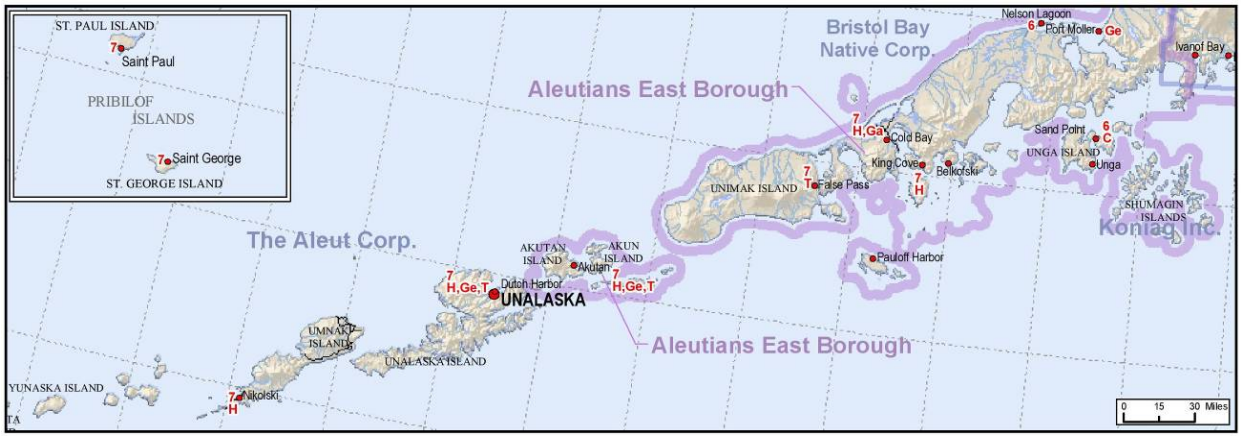
The cannery was eventually purchased by Peter Pan Seafoods and operated almost continuously until most of the plant was destroyed in a fire in 1981. Despite no longer processing fish, Peter Pan Seafoods continued to play an important role in the community with the sale of propane, lube oil and bunkhouse space until 2013. Peter Pan Seafoods has now closed all business in False Pass and the Aleutian Pribilof Islands Community Development Association (APICDA) took over the fuel sales. APICDA operates Bering Pacific Seafoods, the only fish processing plant left in the community. In 2014 APICDA completed the installation of a new tank farm on City property with the capacity to store 180,000 gallons of diesel fuel and 20,000 gallons of gasoline.

One federally recognized tribe, the Native Village of False Pass, an Unangan community, resides within the community. Fishing, fish processing and other subsistence activities are indicative of the lifestyle.

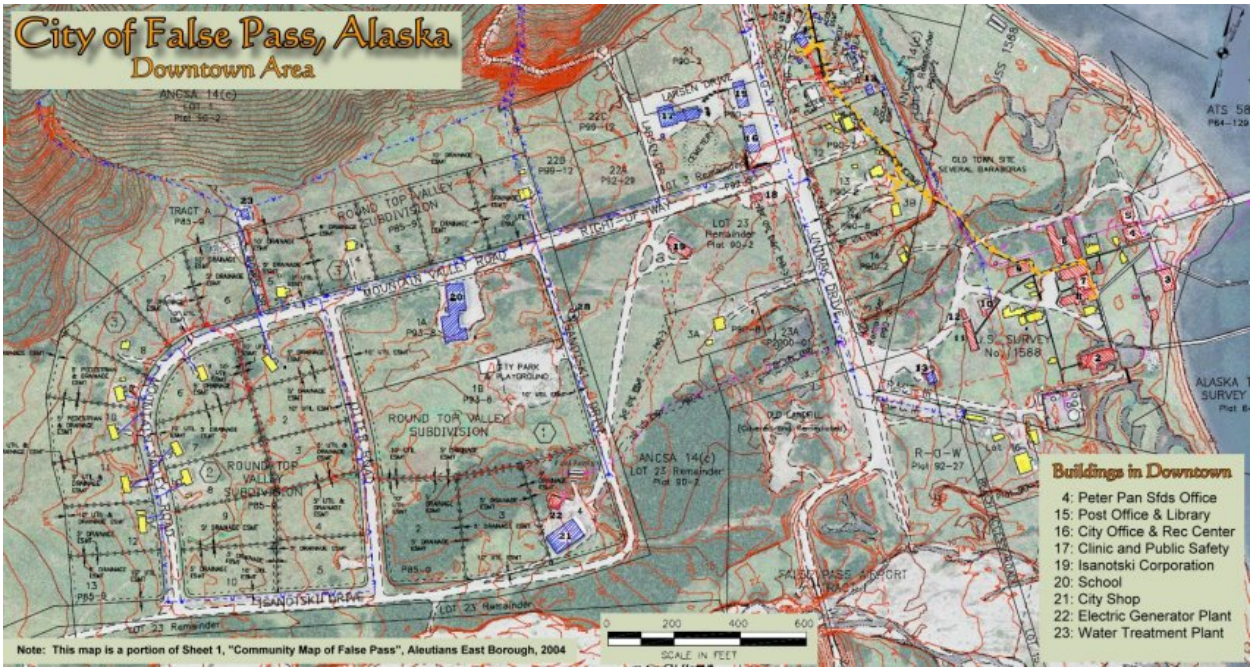
False Pass Wind Energy

The 2014 False Pass census recorded a population of 70 people, an increase from the 2000 census. The school reopened in 2014 with 11 students. There are 13 students in the community for the 2015 school year. The following map indicates the location of False Pass on the Aleutian Island Chain.

False Pass location



City of False Pass downtown area map



Access

False Pass is accessible only by water or air travel. From False pass, scheduled passenger air travel to Cold Bay is provided by Grant Aviation and from Cold Bay to Anchorage by PenAir. ACE Air Cargo

provides freight service to Cold Bay from Anchorage. Charter service can also be arranged. A state-owned 2,150 ft. long by 60 ft. wide gravel airstrip serves False Pass.

Ferry travel is available on the Alaska Marine Highway Ferry, though it is intended for passengers and vehicles only, not cargo. Barge travel for large cargo is available through Alaskan Coastal Transportation.

Economy

The local economy is driven by commercial salmon fishing and fishing services. False Pass is an important refueling stop for Bristol Bay and Bering Sea fishing fleets. Bering Pacific Seafoods processes the commercial catch. In 2010, six False Pass residents held commercial fishing permits. Cash income is supplemented by subsistence hunting and fishing of salmon, halibut, geese, caribou and seals. (*Alaska Community Database*)

Climate

False Pass lies in the maritime climate zone. Temperatures range from 11 to 55 °F. Annual snowfall averages 56 inches, with total annual water-equivalent precipitation of 33 inches. Prevailing southeast winds are constant and often strong during winter. Fog is common during summer months. (*Alaska Community Database*)

Local Infrastructure

Water is derived from a nearby spring and reservoir, and is treated and stored in a 60,000-gallon tank. Most homes are connected to the piped water system. Almost 80% of homes are fully plumbed. Many residents have individual septic tanks while wastewater from seafood processing flows directly into an outfall line. The City collects refuse twice a week. There are no recycling programs available. (*Alaska Community Database*)

Existing Power Plant Infrastructure

False Pass depends on diesel-powered generators to provide their homes and businesses with electricity, and fuel oil to generate heat. Fuel is purchased once a year and is brought into False Pass by barge in the spring. Diesel is stored in a city-owned and operated tank farm with a capacity of 60,000 gallons. Once a week, fuel is transferred from the tank farm to another city-owned 5,000 gallon tank located at the city power plant via an 850 gallon fuel truck.

City of False Pass Electric (CFPE) owns and operates the community's power utility, generating electricity with three diesel generating sets (gen-sets) located in the new False Pass power plant building (steel container).

New Power Plant with 5,000 gal. fuel tank.

Distribution Feeder for Village in Old Plant

Power Plant Location

Diesel Generator Sets

The power plant is operated and maintained by a new operator, Steve Madej, a 15 year veteran diesel plant operator formerly from Yakutat. The power plant is very clean and well maintained. Unfortunately, the distribution bus bar for the new power plant is located in the old power plant due to

financial shortfalls encountered during construction of the new plant. This should be rectified if the power plant is upgraded to integrate another energy source.

The power plant has three diesel generators: a John Deere 6068TF generator set rated at 75 kW, a John Deere 6081TF generator set rated at 125kW, and a John Deere 6081AF generator set rated at 175 kW. The 75 kW generator set has few hours on it. It was rebuilt but subsequently deemed too small to carry the village load. It was replaced in July 2014 by a 180 kW John Deere 6090 generator set purchased with a U.S. HUD community development block grant. Due to issues with the new Tier 4 diesel generator requirement by the U.S. EPA, the process took far more time than expected, but the generator came online in September 2014. It was installed by Salcha Electric, a small company from Fairbanks. This new generator is not often used because load demand rarely surpasses 150 kW.

Power Plant layout

Day Tank

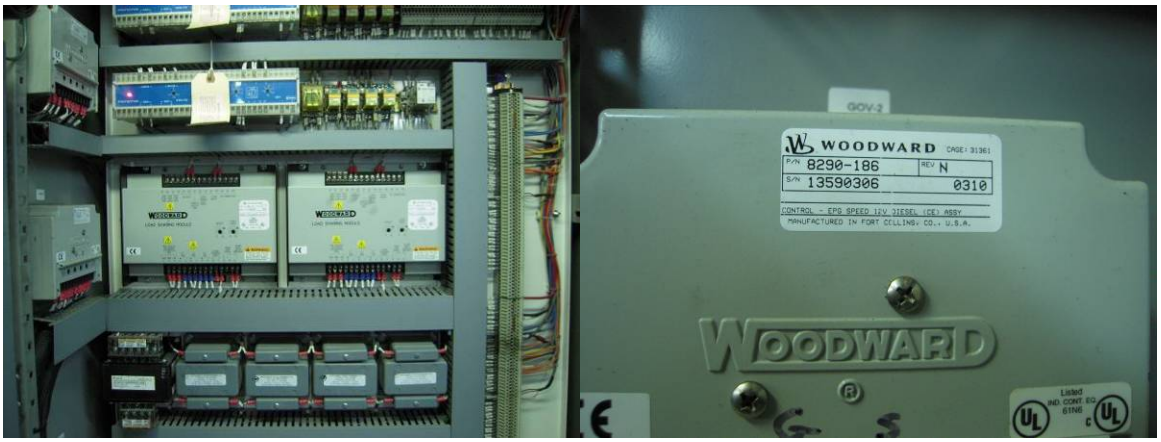
The day tank controls have proved to be difficult in the past and will need to be repaired. The motor-operated valve for the bulk tank had not worked properly and caused intermittent fill issues. The fuel fill safeties are believed to be bypassed. The tank is a standard 100 gallon day tank.

Power Plant Day Tank and Controls

Controls and Switch Gear

Automated controls were provided by Thompson Tech and consist of Woodward load-sharing and synchronizing modules with Thompson Tech MEC20 controllers on the doors.

Gen-Set Controls with Load Share



Power Plant Gen-Set Switch Gear – Close up

Power Plant Switch Gear - Overview

Heat Recovery

A tube and shell heat exchanger located in the generator building transfers heat from the generators via a buried glycol piping loop to two Modine unit heaters in the nearby City Shop. Heat that cannot be used by the City Shop is rejected to the atmosphere via two radiators located in the powerhouse. The radiator fans are not variable frequency drive (VFD) and consequently when actuating place a high instantaneous load on the system. Replacing these fans with VFD motors would be a possible energy savings for City of False Pass.

Remote Radiators

Radiator controls

An old heat recovery system exists that runs from the Old Generator Building to False Pass School via a 3-inch HPDE piping loop nested in a 2 ft. deep trench. The pipe runs through the school's crawlspace, but is no longer connected to the heating system. Residents claim that the system never sent an adequate amount of heat to the school, likely due to the length of the piping run and the lack of proper piping insulation.

Your Clean Energy's renewable resource assessment determined that there is sufficient waste heat from the power plant to heat a large percentage, or even all, of False Pass School. Proper insulation and jacketing of the heat distribution pipe would be necessary for this endeavor to succeed. An economic evaluation was completed at the time of the assessment, with the assumption that the waste heat system would displace all heating oil consumed by the school. That assessment is reflected in Your Clean Energy's financial analysis below.

False Pass Heat Recovery	
Building receiving heat	False Pass School
Distance from Power Plant	600 ft.
Estimated project cost	$300,190
Annual heating oil savings (gal)	5,162
Annual heating oil savings @ $3.45/gal	$17,809
Annual O&M costs	$1,500
30 yr net present worth	$775,223
Payback (yrs)	14

Tank Farm

The City of False Pass owns and operates a three tank, 60,000 gallon capacity tank farm for powerplant and city use.

Additionally, the Aleutian Pribilof Islands Development Association (APICDA) replaced the old Peter Pan Seafoods tank farm in the summer of 2014 and installed 180,000 gallons of diesel and 20,000 gallons of gasoline storage capacity. The APICDA tank farm is located on city property and serves visiting fishing boats and False Pass community needs as well.

Distribution System

Electrical Distribution System

The utility's power distribution system is underground 3-phase wire operating at 12,470 volts grounded Y. Currently the distribution system phases are balanced as such: A – 130 A, B – 120 A, C – 150 A. Note that APICDA installed new electrical distribution lines from the dock to the new tank farm.

Loads

The biggest electricity users are GCI and the school. In 2008 Bering Pacific Seafoods installed 1,250 kW of diesel power generation for their processing plant and related facilities and provides their own power needs independently of the False Pass electric grid.

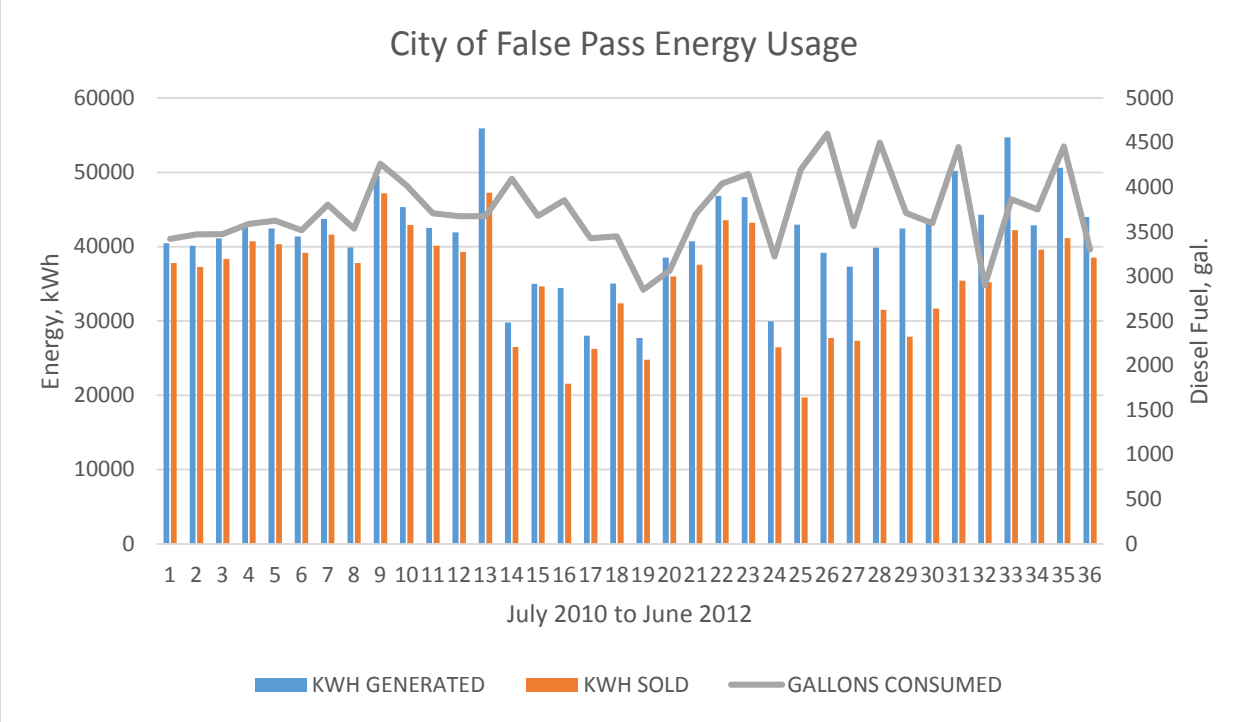
Community Energy Use

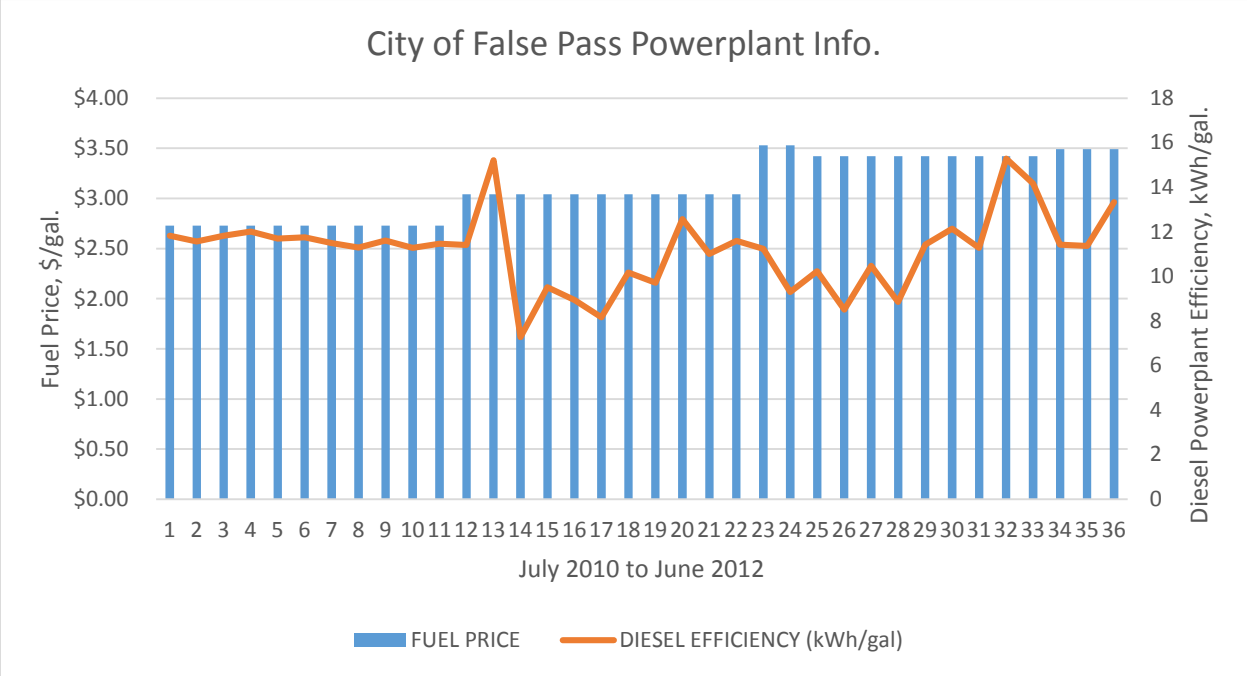
The following table, with data gathered from Regulatory Commission of Alaska's Power Cost Equalization (PCE) reports shows energy generated, sold, #2 diesel fuel usage, price, and diesel efficiency in False Pass over a three year period, from July 2009 to June 2012.

MONTH AND YEAR	KWH GENERATED	KWH SOLD	GALLONS CONSUMED	CURRENT PRICE OF FUEL / GAL	DIESEL EFFICIENCY (kWh/gal)
Jul-09	40447	37796	3419	$2.73	11.83
Aug-09	40138	37295	3470	$2.73	11.57
Sep-09	41096	38364	3476	$2.73	11.82
Oct-09	43143	40735	3590	$2.73	12.02
Nov-09	42429	40351	3625	$2.73	11.70
Dec-09	41350	39165	3518	$2.73	11.75
Jan-10	43736	41628	3803	$2.73	11.50
Feb-10	39907	37799	3534	$2.73	11.29
Mar-10	49520	47181	4264	$2.73	11.61
Apr-10	45341	42939	4020	$2.73	11.28
May-10	42513	40104	3707	$2.73	11.47
Jun-10	41937	39322	3675	$3.04	11.41
2009-10 total	**511557**	**482679**	**44101**		
Jul-10	55906	47278	3675	$3.04	15.21
Aug-10	29772	26529	4097	$3.04	7.27

False Pass Wind Energy

MONTH AND YEAR	KWH GENERATED	KWH SOLD	GALLONS CONSUMED	CURRENT PRICE OF FUEL / GAL	DIESEL EFFICIENCY (kWh/gal)
Sep-10	35004	34656	3679	$3.04	9.51
Oct-10	34451	21545	3854	$3.04	8.94
Nov-10	28010	26266	3427	$3.04	8.17
Dec-10	35061	32354	3449	$3.04	10.17
Jan-11	27703	24791	2850	$3.04	9.72
Feb-11	38512	35988	3065	$3.04	12.57
Mar-11	40727	37569	3700	$3.04	11.01
Apr-11	46857	43564	4042	$3.04	11.59
May-11	46653	43238	4150	$3.53	11.24
Jun-11	29959	26464	3223	$3.53	9.30
2010-11 total	**448615**	**400242**	**43211**		
Jul-11	42962	19688	4200	$3.42	10.23
Aug-11	39157	27725	4600	$3.42	8.51
Sep-11	37342	27351	3564	$3.42	10.48
Oct-11	39869	31499	4500	$3.42	8.86
Nov-11	42440	27911	3713	$3.42	11.43
Dec-11	43633	31679	3595	$3.42	12.14
Jan-12	50181	35422	4450	$3.42	11.28
Feb-12	44301	35215	2900	$3.42	15.28
Mar-12	54733	42217	3865	$3.42	14.16
Apr-12	42871	39610	3750	$3.49	11.43
May-12	50628	41137	4458	$3.49	11.36
Jun-12	44010	38531	3301	$3.49	13.33
2011-12 total	**532127**	**397985**	**46896**		


City of False Pass Energy Usage
Energy, kWh
Diesel Fuel, gal.
July 2010 to June 2012
KWH GENERATED
KWH SOLD
GALLONS CONSUMED


City of False Pass Powerplant Info.
Fuel Price, $/gal.
Diesel Powerplant Efficiency, kWh/gal.
July 2010 to June 2012
FUEL PRICE
DIESEL EFFICIENCY (kWh/gal)

False Pass Wind Energy

Wind Resource Summary

A wind resource study in False Pass with sensors placed on a 30 meter met tower was conducted from 2005 to 2007.

Site Selection

The met tower was originally installed in May of 2005 with monitoring equipment and installation support contributed by AEA partially funded by a DOE Tribal Energy Grant. The city manager and village corporation CEO chose the site with guidance from the Federal Aviation Administration and the Endangered Species department of the USFWS). The original location by the airport was not approved by FAA. The second site option, which was approved by FAA and USFWS, was near a proposed site for a new dump, where plans called for a road to be built and power extended to serve the facility. Since installation of the met tower, the road and bridge have been built, but the power line was not.

Wind Resource

The wind resource as the False Pass met tower site is generally good with measured wind power class 4 by measurement of wind power density (Class 3 if considering only mean annual wind speed). Given the cool temperatures of False Pass test site, air density is moderately higher than standard conditions. By other measures important for wind power analysis, the site has a low 50-year return period extreme wind probability but high turbulence; the latter apparently due to the high mountains that border Isanotski Strait and that are very near the met tower to the north, west and south. Turbulence intensity calculated from the met tower data indicates much higher than desirable turbulence conditions. This would require special care with turbine selection and operations.

It is not immediately clear if an alternate wind site that has good wind exposure and less turbulence exists in the near proximity of the village of False Pass. Siting restrictions include the obvious constraints of geography – mountains and Isanotski Strait – and the location and orientation of the False Pass airstrip. Computation fluid dynamics (CFD) modeling may lend insight into wind flow patterns at False Pass and would be a useful tool to investigate other wind turbine siting options.

Met tower data synopsis

Data dates	May 7, 2005 to August 19, 2005 and November 30, 2005 to September 4, 2007 (24 months)
Wind power class	Class 3 to 4 (fair to good)
Wind power density mean, 30 m	338 W/m^2
Wind speed mean, 30 m	6.11 m/s (13.6 mph)
Max. 10-min wind speed average	26.5 m/s (59.3 mph)
Maximum 2-sec. wind gust	39.0 m/s (87.2 mph; January, 2007)
Weibull distribution parameters	k = 1.62, c = 6.76 m/s

Wind shear power law exponent	0.291 (high)
Roughness class	3.80 (suburban)
IEC 61400-1, 3rd ed. classification	Class III-S
Turbulence intensity, mean	0.173 (at 15 m/s)
Calm wind frequency (at 30 m)	35% (winds < 4 m/s)

WAsP Model of False Pass

WAsP (Wind Atlas Analysis and Application Program) and is PC-based software for predicting wind climates, wind resources and power production from wind turbines and wind farms and was used to model the False Pass terrain and wind turbine performance.

WAsP software calculates gross and net annual energy production (AEP) for turbines contained within wind farms, such as an array of two or more turbines in proximity to each other. For s single turbine array, WAsP calculates gross AEP. With one turbine, net AEP is identical to gross AEP as there is no wake loss to consider.

Orographic Modeling

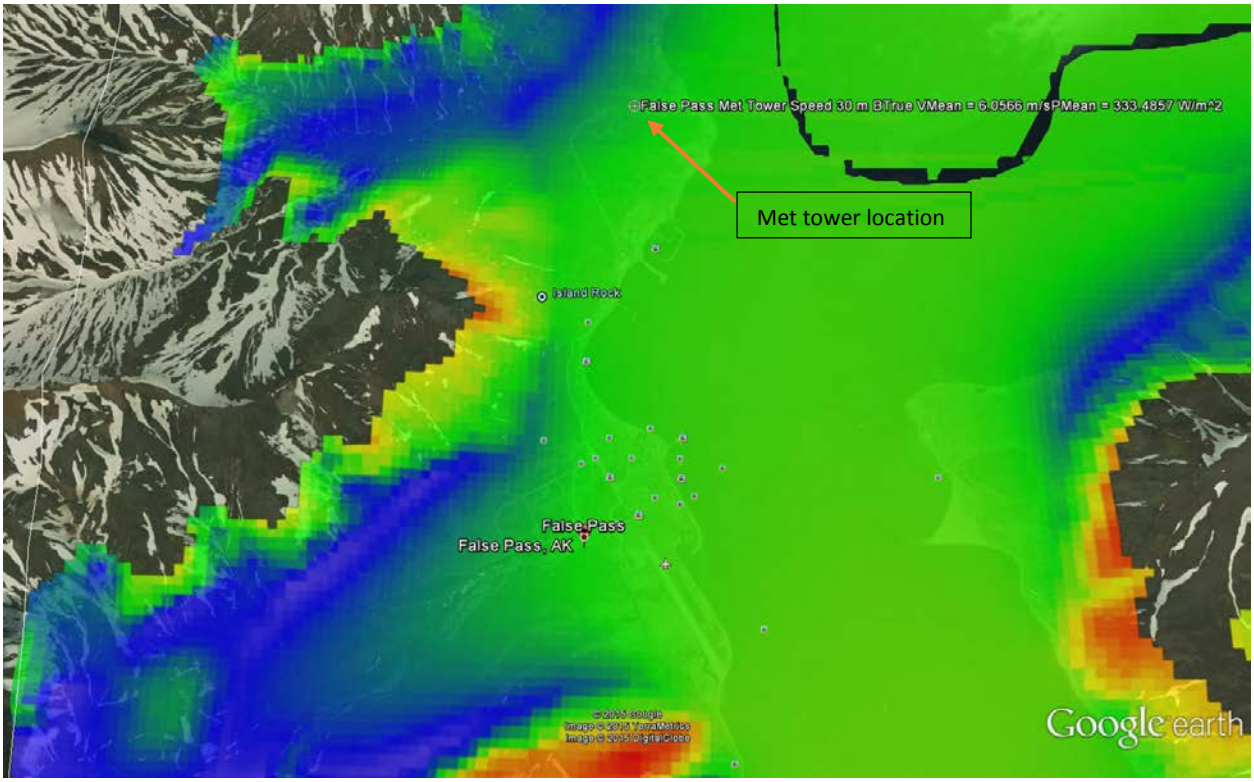
WAsP modeling begins with import of a digital elevation map (DEM) of the subject site and surrounding area and conversion of coordinates to Universal Transverse Mercator (UTM). UTM is a geographic coordinate system that uses a two-dimensional Cartesian coordinate system to identify locations on the surface of Earth. UTM coordinates reference the meridian of its particular zone (60 longitudinal zones are further subdivided by 20 latitude bands) for the easting coordinate and distance from the equator for the northing coordinate. Units are meters. Elevations of the DEMs are converted to meters (if necessary) for import into WAsP software.

A met tower reference point is added to the digital elevation map, wind turbine locations identified, and a wind turbine(s) selected to perform the calculations. WAsP considers the orographic (terrain) effects on the wind (plus surface roughness and obstacles) and calculates how wind flow increases or decreases at each node of the DEM grid. The mathematical model has a number of limitations, including the assumption of overall wind regime of the turbine site is the same as the met tower reference site, prevailing weather conditions are stable over time, and the surrounding terrain at both sites is sufficiently gentle and smooth to ensure laminar, attached wind flow. WAsP software is not capable of modeling turbulent wind flow resulting from sharp terrain features such as mountain ridges, canyons, shear bluffs, etc.

Orographic modeling of wind across the site, with the False Pass met tower as the reference site, indicates a good wind resource along Isanotski Strait, with a low-to-marginal resource near the mountains and within the valley of False Pass' location. Wind resource is modeled as very high at higher elevations of the surrounding mountains, but there is no developed access to these areas at present and

hence impractical to consider. Plus, turbulence on the mountains at higher elevations likely would be very high.

WAsP model of False Pass site area of predicted wind speed



Wind Power History

In 2008 APICDA installed a 2.4 kW Skystream wind turbine near the city office as a pilot project. The goal was reduce the cost of power for False Pass. Reportedly the turbine functioned only briefly before failing for unknown reasons.

Wind Power Development Issues

The road to the met tower site is gravel and adequate for transporting equipment. A mile and a half of new 3-phase distribution would be required to connect wind turbines to the existing city distribution grid. While wind power is not recommended at this time, new power distribution to this area could serve a proposed small hydro project, to be located just upstream in the unnamed creek that flows past the old met tower site.

Should wind power be considered in the future, a site near the runway might have less turbulence, but FAA likely will not approve this location for typical wind turbines, with the possible exception of the VAWTs (or HAWTs) placed on short towers. Given the high turbulence noted in the met tower data,

short term wind monitoring at a proposed project site is strongly recommended to measure turbulence conditions. Note also that the old Skystream wind turbine was located at the city office. It is possible that this turbine failed because turbulence made the site unsuitable, but this is not known. Ideally for turbulence mitigation, wind turbines would be located nearer Isanotski Strait and away from the slopes and ridges that border City of False Pass to the west.

Geotechnical Considerations

A geotechnical study was performed by Golder and Associates and is attached to this report.

Permitting Review of Wind Power

The environmental permitting steps below are based on the publication *Alaska Wind Energy Development: Best Practices Guide to Environmental Permitting and Consultations*, a study written in 2009 by URS Corporation, for the AEA.

Alaska Pollution Discharge Elimination System

State regulations (18 AAC 83 APDES) require that all discharges, including storm water runoff, to surface waters be permitted under the Alaska Pollutant Discharge Elimination System (APDES) permit program, which aims to reduce or eliminate storm-water runoff that might contain pollutants or sediments from a project site during construction. The construction of one or more wind turbines and the connecting access road and power line, in False Pass would likely not disturb one acre or more of soil, and thus will not need to be permitted under the State of Alaska's Construction General Permit (CGP) and have a Storm Water Pollution Prevention Plan (SWPPP). During the construction phase of the project a survey will confirm.

Federal Aviation Administration

Submission of Federal Aviation Administration (FAA) Form 7460-1, Notice of Proposed Construction or Alteration, is required in most situations of wind turbine construction. Given proximity of possible wind turbine sites to the runway, obstruction lighting on wind turbine(s) likely would be required.

Alaska Department of Natural Resources

The following two agencies are listed under the Alaska Department of Natural Resources.

Alaska Coastal Management Program Consistency Review

The Alaska Coastal Management Program (ACMP) sunset at 12:01 AM, Alaska Standard Time, on July 1, 2011 per AS 44.66.030. The Legislature adjourned the special legislative session May 14, 2011 without passing legislation required to extend the Alaska Coastal Management Program (ACMP). If the ACMP is revived, False Pass will apply for approval of their wind project.

State Historic Preservation Office (SHPO) consultation

The State Historical Preservation Office (SHPO) was consulted to ascertain if the area would be likely to contain sensitive historical sites. The project design consultant will complete a consultation under Section 106 of the Historic Preservation Act with the State Historic Preservation Office (SHPO), to receive a letter concurring that a wind project would affect no historic properties. If the project siting is moved, False Pass will contact SHPO regarding the new site, but no issues are expected.

US Army Corps of Engineers

The US Army Corps of Engineers (USACE) requires the placement of fill in "waters of the United States", including wetlands and streams, under Section 404 of the Clean Water Act (CWA). We do not foresee any issues with this, even if the site changes from the current met tower site.

Wetlands and Waterways

The project area has been reviewed for the presence and distribution of wetlands and aquatic resources using the US Fish and Wildlife Service (USFWS) National Wetland Inventory Wetland Mapper (2012).

Current data is not available on the Wetland Mapper for False Pass, Alaska. However, there is digital information available on web site for nearby and similar landscapes.

The NWI Wetland Mapper indicates complete coverage of the proposed project area by freshwater emergent, freshwater pond, lakes, and riverine features. All of these features and resources are regulated by the US Army Corps of Engineers (USACOE). Fill placement and other discharges of construction materials into these features requires a section 404 permit from the Army Corps and may require mitigation and/or restoration of impacted habitats. It is important to note, however, that in wind energy development projects; wetland loss is largely due to road construction and foundations for wind turbines, issues far less at issue when not building a road to the site. Neither the current met tower site nor a proposed site near the runway for VAWTs will require a road.

Vegetation

The vegetation in the Unimak area is classified as marine tundra composed of arctic-alpine species, dominated by heath, grass and composite families. In general, three plant communities can be distinguished: beach communities, lowland and upland tundra.

US Fish and Wildlife Service

False Pass is located in an area known as habitat for Steller's eiders. Eiders spend most of their time on and near the coast, sometimes flying over land to reach another coast but they are not known for flying inland for any other reason. They generally fly at an altitude of 30' or less.

Consultations with USFWS prior to installing the met tower led to placement of the met tower inland from the beach by just over one mile. With mountains on to the north, west, and south, the expectation was that Eiders would not fly near the tower. Monitoring of the met tower following installation confirmed this expectation.

USFWS prefers VAWTs as, according to the service, they do not pose a collision risk for birds as do horizontal wind turbines. USFWS has noted that VAWTs present a solid object that birds can see and avoid. Unfortunately, however, and as previously noted, village-scale VAWT technology is not yet reliable and hence cannot be recommended for False Pass. Despite USFWS concerns, only traditional HAWT technology would be appropriate for False Pass at this time, turbulence issues notwithstanding. Mitigation to minimize bird collision risk would be to locate HAWTs away from Isanotski Strait, although this exacerbates the turbulence problem.

Appendix A, Wind Resource Assessment Report

Appendix B, Geotechnical Report

Appendix C Distribution Survey