

Agency: Commerce, Community and Economic Development**Grant Recipient: Community & Economic Dev****Project Title:****Project Type:** Remodel, Reconstruction and Upgrades

Alaska Energy Authority - Kwigillingok Power System Upgrade

State Funding Requested: \$2,168,000
One-Time Need**House District: 38 / S****Brief Project Description:**

Electrical power system upgrade.

Funding Plan:

Total Project Cost:	\$2,168,000
Funding Already Secured:	(\$0)
FY2013 State Funding Request:	<u>(\$2,168,000)</u>
Project Deficit:	\$0

Detailed Project Description and Justification:

The community's current wind-diesel power system dates back to the 1970's. Now, the village experiences year-round power outages due to rotten and falling poles, worn and sagging conductors, and overloaded transformers. As time passes, the outages' severity and length quickly worsen.

The community has developed a cost estimate and project plan; upgrades will include pole, transformer, and conductor installation throughout the community. Major physical work will be completed during the winter when the tundra is frozen hard enough to support heavy equipment. Project labor will come primarily from local electrical crews from Kwigillingok and surrounding communities, guided by experienced management.

The upgrades will improve safety and efficiency. See attached backup for further information.

Project Timeline:

Expenditures will begin immediately upon receipt of funds, and will be complete as soon as possible.

Entity Responsible for the Ongoing Operation and Maintenance of this Project:

Kwig Power Company

Grant Recipient Contact Information:

Name:	William Igkurak
Title:	General Manager
Address:	Kwig Power Company Kwigillingok, Alaska 99622
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Has this project been through a public review process at the local level and is it a community priority? Yes No

<i>For use by Co-chair Staff Only:</i>
3:17 PM 5/2/2012

2012 Legislative Request – Electrical Distribution Systems

**Kwig Power Company
William Igkurak, General Manager
907-588-2686
wmigurak@att.net**

Total project request - \$2,168,000

This project consists of replacement of the worn out and dangerous electric power distribution system for the village of Kwigillingok.

The project applicant is Kwig Power Company on behalf of the village of Kwigillingok. Project consists of providing all labor, materials, tools and equipment necessary for the construction and replacement of 32000 feet of main distribution powerline, 125 power poles on driven steel piling and 30 distribution transformers.

The existing distribution system is beyond repair. The poles are severely weathered and well beyond service limits to support, electrical conductors, communication cables and transformer loads. Due to local soil conditions, all existing poles are leaning and have been jacking out of the ground. Soil loadings are too weak to support powerpoles and guy wires unless supported by piling. The combination of weak, weathered, and leaning poles has resulted in wide spread safety issues, reduced generation efficiency and frequent power outages. The existing system is fully worn out, cannot be worked on safely must be replaced.

Project Overview:

Kwig Power Company provides electrical service to the 350 residents of Kwigillingok. The KPC distributes power via overhead conductors attached to wooden power poles. The utility has 140 powerpoles, of these 125 were installed in the 1970's and 1980's. Kwig is 2 miles from the Bering Sea and is battered by severe winds, rain and snow. Due to the high water content silt based soils of the Kuskokwim Delta frost jacking on all poles has occurred. All poles in Kwig fail soil/foundation holding capacities, and are tilted or jacked out of the ground. Local crews are constantly trying to stabilize poles, however the poles have deteriorated so significantly due to age and erosion that they can no longer be repaired or worked on. The pole structures all fail stress tests for loading of conductors, cables and transformers. It is necessary to both replace the poles, conductors and attachments, and install the poles on driven pile foundations to provide the necessary and permanent support.

The electrical distribution grid in Kwigillingok and Tuntutuliak were installed in the late 1970's and expanded during the mid 1980's. Currently each village experiences repeated and multiple power outages, especially during storms due to rotting, weather eroded power poles, worn and sagging conductors, and over-

loaded transformers. Frequent multi-hour outages occurring at all times of the year, and with regular frequency during in winter storms. Inability for the soils to support existing poles causes power conductors to sag close to the ground. Combined with the inability of weathered poles to support conductor and attachment loads, local crews are unable to service these poles, and the electrical distribution system now presents serious safety hazards for repair personnel and members of the community.

These problems have become irreparable, and replacement is the only option. Almost all distribution work must be done in the wintertime as the soils are too weak to support equipment and personnel. The growing number of distribution faults is increasing and has significantly diminished the reliability of the electrical system. Every windy day represents an increasingly serious safety hazard. While power poles, transformers and conductors have been replaced and repaired on an emergency basis, the communities have grown beyond the capacity of the current distribution systems, and must be completely reconfigured and replaced to ensure grid reliability and stability. Besides safety the distribution upgrades are estimated to increase power system efficiency up to 4%.

A cost estimate and project plan has been developed. The project will involve the installation of 125 powerpoles, 30 transformers, and 32,000 feet of conductor in the Kwigillingok. To prevent frost jacking the poles must be installed on 30' to 40' driven steel H piles. The power poles will then be bolted to pilings, and new conductors and transformers installed. This installation will involve the redistribution and partial replacement of a limited number of residential service drops. The work must be completed during the winter when the ground is frozen and will support heavy equipment.

The project can be completed by the Chaninik Wind Group's multi-village electrical crews working under the guidance of an experienced project manager and electrical superintendent. The project will create between 6 to 8 well paid jobs lasting six to eight months for local residents, in villages, with 30%+ unemployed and with 26% of families are below the poverty line. These jobs will build local capacity to install and service electrical distribution systems throughout the region.

Replacement of the distribution system is necessary due to improve safety and increase the energy efficiency of the community's wind-diesel system. The distribution replacement will enable a higher displacement of diesel fuel, saving money for all local residents.

Cost items for the new distribution systems are as follows:

Total project cost - \$2,168,200.00

Estimate to replace 125 poles and 30 transformers and 32000 feet of conductors

				Kwigillingok Powerline Replacement Project						
					UNIT MATERIAL	TOTAL	UNIT WEIGHT	TOTAL	UNIT LABOR	TOTAL COST
1.)	36,000	FT	4-5 weeks	#2 ACSR SPARATE	\$0.48	\$17,280.00	.105 LBS FT	3,780.00 LBS	\$2.00	\$72,000.00
2.)	125	EA	7 weeks	35' CLASS 4 FULL LENGTH TREATED PENTA DOUGLAS FIR POLE PER ANSI-RUS	\$869.00	\$108,625.00	875 LBS EA	109,375.00 LBS	\$4,000.00	\$500,000.00
3.)	125	EA	STOCK	C1.41, 15KV-30 4W FLAT TANGENT SUPPORT NEUTRAL ON CROSSARM	\$284.00	\$35,500.00	85 LBS EA	10625.00 LBS	\$250.00	\$31,250.00
4.)	250	EA	STOCK	C2.51, 15KV-30 4W FLAT DOUBLE SUPPORT - SMALL ANGLE, NEUTRAL ON CROSSARM	\$345.00	\$86,250.00	167 LBS EA	41750.00 LBS	\$315.00	\$78,750.00
5.)	125	EA	STOCK	C3.2X, 15KV-30 SUSPENSION ANGLE	\$245.00	\$30,625.00	40 LBS EA	5000.00 LBS	\$125.00	\$15,625.00
6.)	125	EA	STOCK	C5.31X, 15KV-30 SINGLE DEADEND - 3/ARM	\$395.00	\$49,375.00	200 LBS EA	25000.00 LBS	\$300.00	\$37,500.00
7.)	250	EA	STOCK	E1.1X, SINGLE DOWN GUY ASSY.	\$165.00	\$41,250.00	35 LBS EA	8750.00 LBS	\$312.00	\$78,000.00
8.)	250	EA	STOCK	E2.2X, DOUBLE DOWN GUY ASSY.	\$310.00	\$77,500.00	80 LBS EA	20000.00 LBS	\$225.00	\$56,250.00
9.)	125	EA	STOCK	Screw pile anchor assembly, Hubble	\$125.00	\$15,625.00	35 LBS EA	4375.00 LBS	\$175.00	\$21,875.00
10.)	125	EA	STOCK	H1.1, POLE GROUND ASSY.	\$65.00	\$8,125.00	15 LBS EA	1875.00 LBS	\$50.00	\$6,250.00
11.)	500	EA	STOCK	A1.011, PIN AND GLASS ASSY.	\$15.50	\$7,750.00	6 LBS EA	3000.00 LBS	\$35.00	\$17,500.00
12.)	3	EA		3 PHASE FUSE CUTOUT	\$870.00	\$2,610.00	250	750.00 LBS	\$1,975.00	\$5,925.00
13.)	20	EA		35 KVA TRANSFORMER 480V TO 12.47KV	\$1,576.00	\$31,520.00	3000	60000.00 LBS	\$2,200.00	\$44,000.00
14.)	125	EA		10x 57 steel piling x 40 foot	\$3,280.00	\$1,500.00	2280	285000.00 LBS	\$700.00	\$87,500.00
15.)	1	EA	SHIPPING	Approximate Shipping costs to Kwigillingok	\$289,640.00	\$289,640.00				
					TOTAL	\$803,175.00	TOTAL WT	579,280.00 LBS		\$1,052,425.00
					Subtotal cost	\$1,855,600.00				
					Equipment rental					\$65,000.00
					Travel					\$12,000.00
					Room board, per diem					\$6,500.00
					Subtotal					\$1,939,100.00
					Contingency			5%		\$96,955.00
					Engineering and Inspections					\$22,000.00
					Project Management and Supervision					\$60,000.00
					Total					\$2,118,055.00
					Assumptions:					
					Barge shipments	multiple containers				
					Two experienced linemen trainers and local crews					
					Rental of excavator with mounted pile driver					
					2 weeks on site 10 hours per day plus overtime.					
					Use of local labor and materials to the maximum extent					
					Utility will manage projects, and unload, load inventory					