



NUVISTA

YUKON-KUSKOKWIM DELTA COMMUNITY SUSTAINABILITY MODEL

July 2016



YUKON-KUSKOKWIM DELTA COMMUNITY SUSTAINABILITY MODEL

JULY 2016

Prepared for:

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ACRONYMS AND ABBREVIATIONS

AHFC	Alaska Housing Finance Corporation
ANTHC	Alaska Native Tribal Health Consortium
ARUC	Alaska Rural Utility Collaborative
ANILCA	Alaska National Interest Lands Conservation Act
ATV	All-Terrain Vehicle
AVCP	Association of Village Council Presidents
AVEC	Alaska Village Electric Cooperative
CCHRC	Cold Climate Housing Research Center
CDQ	Community Development Quota (Program)
CVRF	Coastal Villages Regional Fund
DEC	Department of Environmental Conservation
DOE	U.S. Department of Energy
DOL	Alaska Department of Labor (and Workforce Development)
DOT&PF	Alaska Department of Transportation and Public Facilities
EPA	U.S. Environmental Protection Agency
HUD	U.S. Department of Housing and Urban Development
ICDBG	Indian Community Development Block Grant
ISER	Institute for Social and Economic Research
NAHASDA	Native American Housing and Self Determination Act
REAA	Regional Educational Attendance Area
RHA	Regional Housing Authority
UAF	University of Alaska Fairbanks
USACE	United States Army Corps of Engineers
WtE	Waste to Energy
WTP	Water Treatment Plant
YK	Yukon-Kuskokwim
YKHC	Yukon Kuskokwim Health Corporation

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YK Delta Community Sustainability Model Stakeholders

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Alaska Housing Finance Corporation

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- Deanna Latham, Capitol Projects Director

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- Kurt Kuhne, Executive Director

Village Safe Water Program (State of Alaska)

- George Wilson, P.E.
- Susan Randlett, VSW Engineer

EXECUTIVE SUMMARY



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EXECUTIVE SUMMARY

The YK Delta Community Sustainability Model plan is intended to identify the potential for shared services on Nelson Island to reduce operations and maintenance costs of these services. The communities of Toksook Bay, Tununak and Nightmute, as well as the fishing camp site of Umkumiut are analyzed in this report. The goal was to recognize and analyze the current infrastructure in these sectors: Health, Education, Transportation, Sanitation (Water, Sewer and Landfill), Housing and Energy (including Bulk Fuel).

Data was collected from various local, regional, state and federal agencies. As data gaps were identified, the outcome and methodology was modified as needed. The potential for shared services could not be established where these services is not fully available within a community.

This report also explores the potential options for improvement of services where basic service and infrastructure was not available. Profiles were created for each populated community to show the current sectors in place and their potential for shared service.

An Implementation Chart and Funding Opportunity list were created to help with future efforts to reduce costs by implementing shared services. Site visits were not made to these communities, but interviews were conducted with local leaders, regional organizations and state and federal agencies to compile the data.



Tununak, Alaska

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CHAPTER I

INTRODUCTION



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INTRODUCTION

A grant received from the State of Alaska in 2012 enabled Nuvista Light and Electric Cooperative Inc. (Nuvista) to begin research and development of the Community Sustainability Model project for the Yukon-Kuskokwim (YK) Delta region.¹ The overall goal of the project was to identify partnerships between of communities to potentially share services in the YK Delta and its subregions. Shared services for *energy, water and sanitation, transportation, education and health* could potentially save money by creating a sole shared source for each sector. This report encompasses the communities of Nightmute, Tununak, Toksook Bay and Umkumiut, all located on Nelson Island.

In April 2016, a team formed of professionals from WHPacific, Inc. and the Cold Climate Housing Research Center (CCHRC) used data collected from the Quyumta project, completed in 2014, as a baseline for this report. Quyumta means “together” in Yup’ik, the region’s traditional language. The Yup’ik cultural values, traditions, behaviors and subsistence lifestyle led the team to take a holistic approach to this project, while respectively considering indigenous wisdom and modern technology in shared services where logistically feasible.

1.1 METHODOLOGY

The planning and research team utilized the Cold Climate Housing Research Center Holistic Approach model currently being piloted in Oscarville, outside of Bethel, as a vital resource in drafting the Community Sustainability Model. This guiding tool allowed the team to collect data from previous reports, state and federal agencies and local entities in a very broad, holistic manner. The sectors include: water and sanitation, landfill, education, health, transportation, energy and bulk fuel.

This approach concept allowed the team to utilize an existing, strong network of contacts to streamline the data collection process, synthesizing data that has been previously collected and identifying data gaps. Once identified, the data gaps allowed the team to create a clear path forward.

1.2 VISION

Nuvista’s vision to seek solutions based on shared services recognizes the challenges faced by all YK Delta region communities, including the Nelson Island communities, when planning for a more sustainable, resilient future. To meet this challenge, the vision needs to see beyond the obstacles and allow for more effective collaboration and planning in all sectors: water and sanitation, landfill, education, health, housing, transportation, energy and bulk fuel. This document is intended to serve as a guide for future project development within those shared service sectors and to inspire other communities within close proximity to do the same.

1.3 ORGANIZATION

This plan contains the following chapters:

- Introduction – an overview of the regional energy issues and challenges, the goals of the plan, methodology, and stakeholders involved.
- Regional Background – summarizes physical, demographic, and energy use characteristics of the region.
- Regional Analysis – a detailed look at the potential for shared services on Nelson Island. Profiles listing each sector and its current services provide an overview of each community.
- Comparison Analysis – an overview of pros and cons of current and potential shared services.
- Implementation Plan – a summary of actions and strategy for potential shared services, or improved services in place.

¹ Note: Nuvista is a 501(c)12 non-profit utility cooperative and is guided and governed by a seven-member Board of Directors made up of YK Delta business professionals and community leaders.

Nuvista’s Mission

To improve the energy economics in Rural Alaska by creating energy generation and transmission infrastructure to serve, connect and enable the region to attain affordable, long term energy sustainability and self-sufficiency.

CHAPTER II

REGIONAL BACKGROUND



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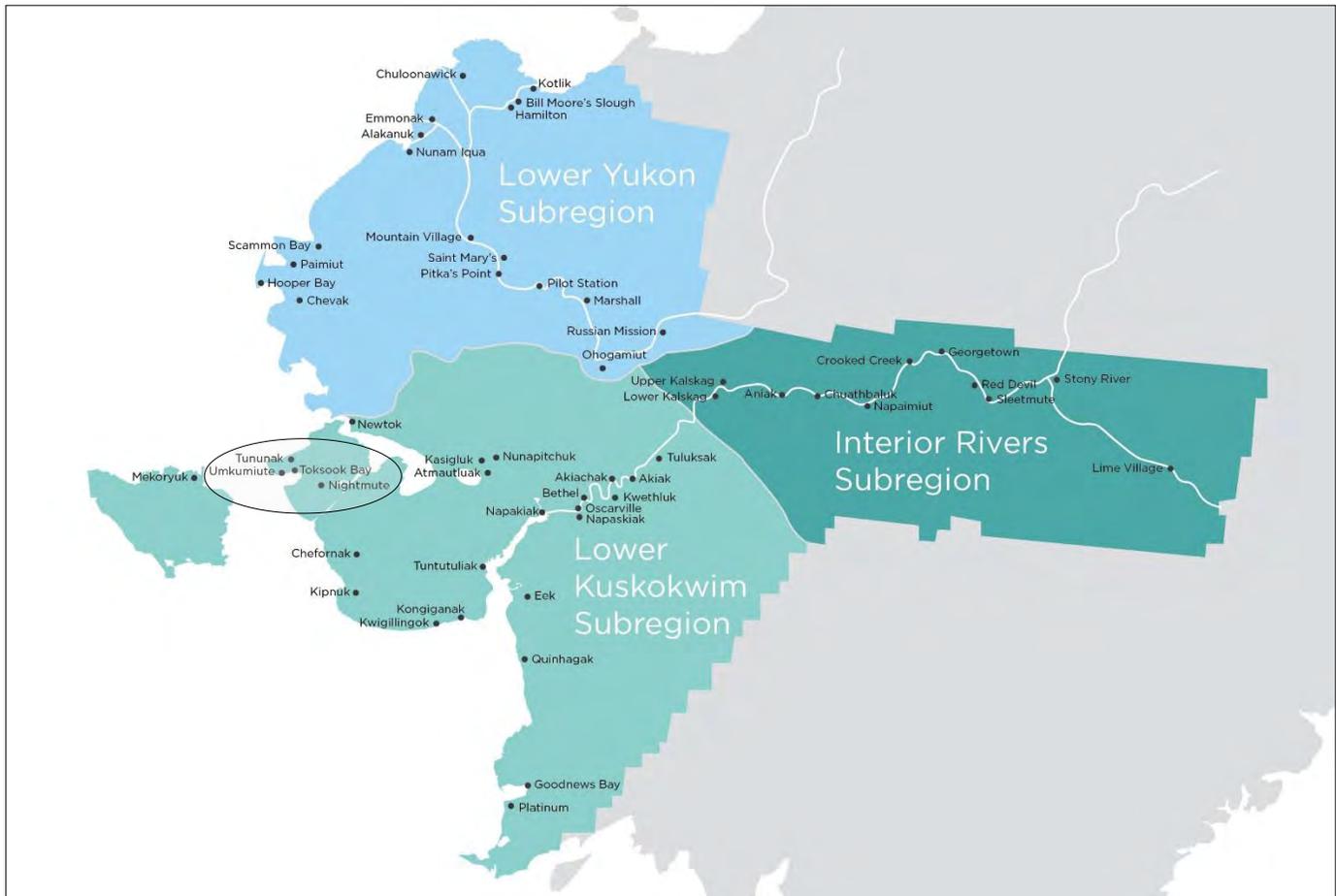
REGIONAL BACKGROUND

2.1 PHYSICAL CONDITIONS

LOCATION

Nelson Island is located in Southwestern Alaskan in the Yukon Kuskokwim Delta. It is part of the Calista Regional Corporation land boundaries, as shown in figure 1.

Figure 1: YK Delta Regional Map (Nuvista)



Nelson Island (Qaluyaaq in Central Yup'ik) is an island located in southwestern Alaska in the Bethel Census Area. It encompasses 843 square miles and is the 15th largest island in the United States. It is approximately 35 miles wide and 42 miles long. The island is separated from the mainland of Alaska by the Ningaluk River to the north, the Kolavinarak River to the east and the Etolin Strait to the southwest. Nunivak Island is located on the other side of Etolin Strait. The communities of Tununak, Toksook Bay and Nightmute are located on the Nelson Island. The summer fish camp of Umkumiut is located on the southeastern coast, within the city limits of Toksook Bay. The remaining 77% of the island is unpopulated. The community of Newtok is being relocated to the island due to erosion on the mainland. The new location will in on the northern coast near the Ningaluk River. More than 90% of the population is Central Yup'ik (Yup'it) who still live a traditional subsistence lifestyle, utilizing fishing, hunting and gathering greens and berries for their diet. The island is named after Edward William Nelson, a Smithsonian Institution naturalist who studied the people of the island in 1878.



Photo Credit 1: USFWS

In 1909, U.S. President Theodore Roosevelt set aside lands in southwestern Alaska for a wildlife refuge. More lands were added on December 2, 1980, when U.S. President Jimmy Carter signed the Alaska National Interest Lands Conservation Act (ANILCA) into law. This created the Yukon Delta National Wildlife Refuge, which includes Nelson and Nunivak islands.

Yukon Delta National Wildlife Refuge was established to conserve fish and wildlife populations and habitats in their natural diversity, including, but not limited to shorebirds, seabirds, tundra swans, emperor, white-fronted and Cackling Geese, black brant and other migratory birds, salmon, muskox, and marine mammals; to fulfill treaty obligations; to provide the opportunity for continued subsistence uses; and to ensure water quality and necessary water quantity. (U.S. Fish & Wildlife Service, n.d.)

CLIMATE

The Subregional climates in the YK Delta Region vary, with a maritime climate in the coastal communities in the Lower Kuskokwim and Lower Yukon Subregions, a continental climate in the Interior Rivers Subregion and a transitional climate in communities that exhibit characteristics of both a maritime and continental climate. The maritime climate is typically wet and can include moisture year round with typical summer temperatures around 60° F and average winter temperatures ranging from 0° to 20° F. The continental climate is generally drier and colder in the winter and warmer in the summers than a maritime climate. Temperatures range from highs in the summer near 80° F and lows in the winter well below zero. Precipitation and snowfall in the Interior Rivers Subregion is generally light.

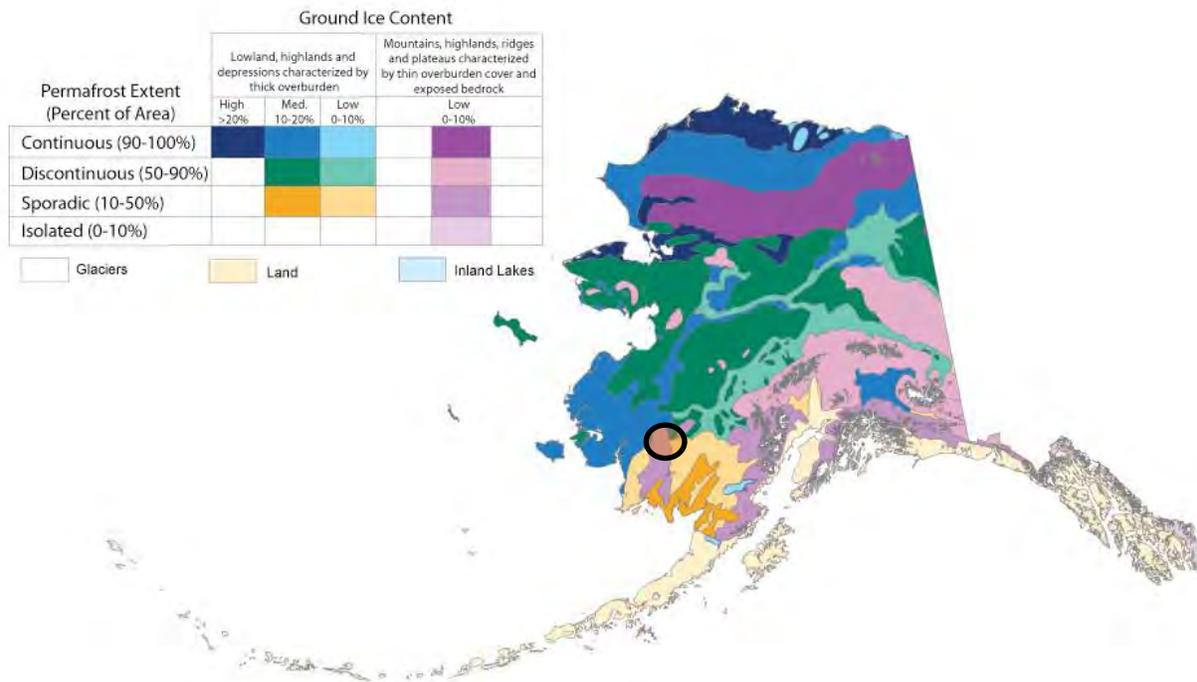


Photo Credit 2: USFWS

PERMAFROST

The unique geology of the YK Delta Region contains discontinuous permafrost that is ice rich, thaw unstable and “warmer” than northern region permafrost. (Permafrost, 2015) This creates a unique, sensitive situation where any disturbance to the ground could cause major changes in a short time, making it generally more difficult and expensive to build in this region. This, in turn, requires more funding for investment for infrastructure to be appropriately designed for this climate.

Figure 2: Permafrost Map



2.2 DEMOGRAPHICS

CURRENT POPULATION

The population on Nelson Island is 1,302 according to the State of Alaska Department of Labor. The median age is 25, significantly younger than the average residents in the state of Alaska as a whole. Current population trends show very little out-migration of population in recent years. In Tununak, the population has risen consistently since 2010. Trend forecasts show that each community has the potential for growth. Current population is shown below.

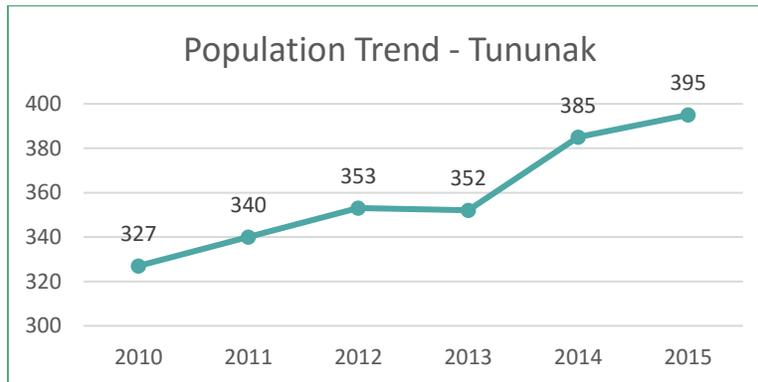
Table 1: Population – Nelson Island

Community Name	Population 2015
Tununak	395
Toksook Bay	622
Nightmute	285
Umkumiut	0 (seasonal summer fish camp)

POPULATION TRENDS

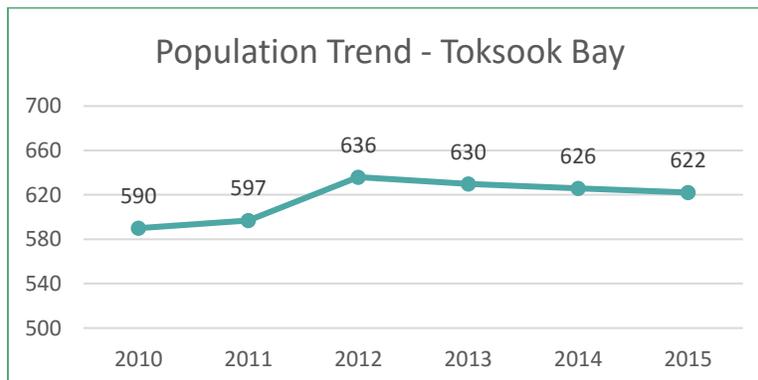
TUNUNAK

Table 2: Tununak



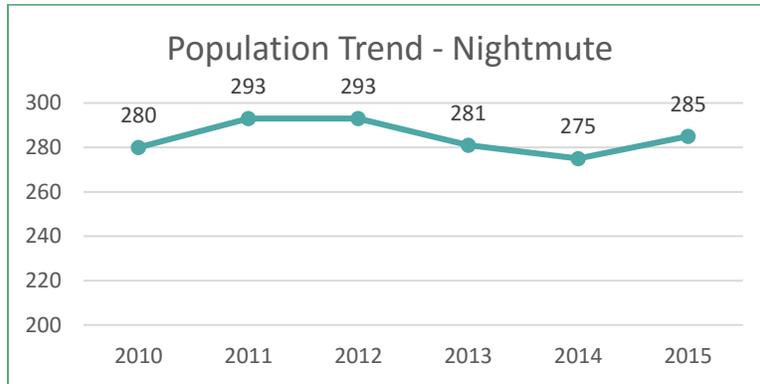
TOKSOOK BAY

Table 3: Toksook Bay



NIGHTMUTE

Table 4: Nightmute



(State of Alaska DOL, n.d.)

2.3 ECONOMY

The majority of the residents on Nelson Island supplement their cash economy with subsistence activities which is defined by state and federal laws as the “customary and traditional uses of wild resources for food, clothing, fuel, transportation, construction, art, crafts sharing and customary trade” (Alaska Department of Fish and Game, 2012). In the YK Delta Region as a whole, approximately 400 pounds of annual wild food is produced on average per person a year, compared with 17 pounds annual wild food produced in the Anchorage area annually. Alaska Fish and Game estimates that this food, if replaced with non-wild foods, would be valued about \$80,000,000. On Nelson Island, all three populated communities rely on subsistence activities to supplement their household food, thus creating an economy that is not scaled in monetary value.

Subsistence activities take place over a vast area as a result of the large-scale migration patterns of some subsistence resources. Residents also use offshore areas for subsistence hunting and fishing of a wide variety of marine mammals, birds and fish. They use onshore areas for hunting and fishing and gathering of eggs and plants. Subsistence use changes from year-to-year and throughout time, depending on the availability of a specific species.

In some ways, subsistence foods represent income. When opportunities for employment tighten, residents can adjust to smaller incomes by increasing their use of subsistence foods. For many residents, rather than replacing subsistence, the cash economy enables individuals to participate in subsistence by providing money for snow machines, boats, outboard motors, and other subsistence supplies (such as bullets, fuel, etc.). The combination of subsistence and employment contributes to the overall village economy. Other economic drivers in the region include health care, commercial fishing, government, retail and commercial services.

All three communities on Nelson Island participate in the Coastal Villages Region Fund (CVRF), one of the six Commercial Development Quota (CDQ) groups that participate in the Bering Sea fishing industry. CVRF receives royalty payments from catcher/processors and CVRF extended its involvement and purchased ownership shares, thereby receiving royalties and part of the business profits, which they use to benefit residents in the region. The funds were used to develop Community Service Centers in many communities that provide a space for community members to repair and maintain snow machines, four-wheelers, sleds, trailers and other equipment critical to maintaining the subsistence economy.



Photo Credit 3: CVRF

The Coastal Villages “People Propel™” program is another benefit created by the CVRF Board of Directors to meet the demand for safer, more fuel efficient and environmentally clean outboards and boats. By bulk-purchasing boats, motors and nets, CVRF is achieving economies of scale and bringing down prices for the region’s residents. The vision and mission of CVRF is to “continuously focus on balancing growth in commercial fishing and sustainable development of CVRF communities, by providing the means for development of our communities by creating sensible, tangible, and long-term opportunities that generate hope for all people who want to fish and work.” (Coastal Villages Region Fund, n.d.)

2.4 HOUSING

CURRENT HOUSING TRENDS

Housing in the YK Delta region has not been thoroughly assessed. In 2014 the Alaska Housing Finance Corporation (AHFC), in collaboration with CCHRC, released the Alaska Housing Assessment, which revealed that compared to other parts of the state the YK Delta region had the highest rate for inefficiency. The report showed that homes in this region used more energy to heat the average home, more than 22% higher, per square foot than any other region in the state. The cost to supply energy to heat the homes was more than 2 times the cost compared to Anchorage, and almost 3 times higher than the national average.

Using the home energy rating system, which is the industry standard by which a home's energy efficiency is measured, where a higher number of 'stars' means a more energy efficient building, homes built in the 1940s generally received a one energy star rating, while homes built after 2000 received on average an energy star rating of nearly 3.5 as shown in Figure 3.

Figure 3: Comparison of Percent of Occupied Housing Completing Energy Programs – YK Delta region

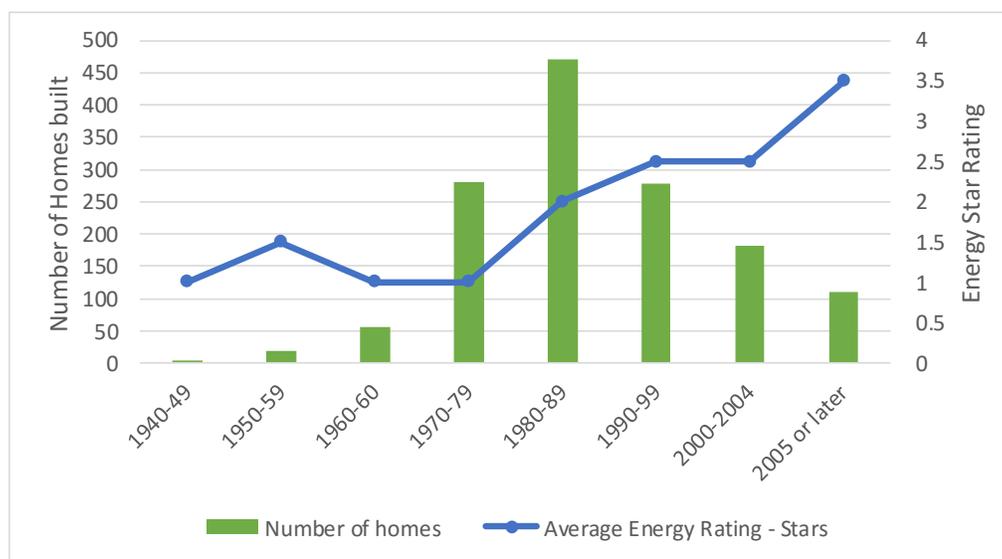


Photo Credit 4: 2014 AHFC Housing Assessment

Other issues included poor ventilation, overcrowding, lack of air-tightness, cost and overall quality of construction. According to American Community Survey (ACS) data, approximately 19% of households in the YK Delta Region spend 30% or more of total income on housing costs, including rent, water and sewer utilities, and energy. Using AKWarm estimates, the average annual energy costs constitute approximately 13% of census median area income for occupied housing.

The Association of Village Council Presidents (AVCP) Regional Housing Authority (RHA) is a state-chartered, regional housing authority formed to address housing needs in Southwest Alaska, including the Nelson Island communities. They work with 50 Tribal councils in the Region that have named AVCP-RHA as the Tribal Designated Housing Entity and are funded with Native American Housing Assistance and Self Determination Act of 1996 (NAHASDA) funds. AVCP-RHA was organized on October 17, 1974 and is located in Bethel.

The housing authority provides affordable housing services to program-eligible individuals and families. The largest program it offers is the "Mutual Help Homeownership Program". The agency also provides low rent housing as well as rental housing for elderly or handicapped persons. AVCP-RHA has constructed over 1,500 homes in 48 villages.



The AVCP-RHA Tribal Operations Department works with tribal councils, future and current homebuyers and rental tenants, as well as individuals and families who are seeking affordable housing opportunities (AVCP-RHA).

When looking at solutions, increased collaboration within the island’s perimeters would allow for an all-island approach when completing energy-efficiency upgrades.

2.5 SANITATION

SEWER & WATER

Compared to the rest of the state, the YK Delta Region (outside of Bethel) has the most “unserved” communities in terms of water and sewer services. Unserved is defined as 55% or less of homes in the region are served by piped water/sewer or haul systems, with the remaining residents relying on “honey buckets” (use of plastic buckets for toilets). With honey bucket systems, human waste can spill, exposing residents to raw sewage. Those exposed are more likely to contract diseases including hepatitis A, bronchitis, and impetigo. Observations indicate that water and sewer systems in this region are in worse shape than any other region in the state.

There are many reasons for the lack of conventional sewer and water systems in this region, including the lack of suitable soils and gravel, discontinuous permafrost, drainage, climate and environmental factors, technical constraints, operation and maintenance challenges, and low per capita income.

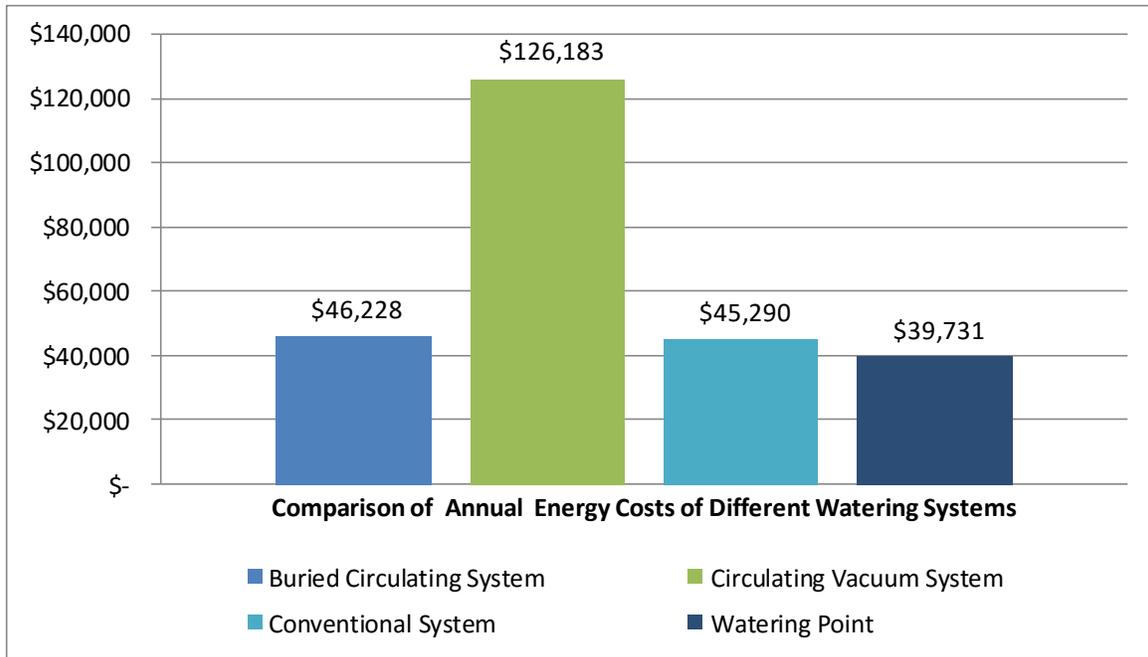
One of the issues preventing the installation of the more desirable piped water and sewer systems in the YK Delta Region is finances, both in terms of construction and maintenance costs. Due to the isolation of the communities and lack of access, construction costs are extremely high, often making a project out of reach. The YK Delta Region also has one of the highest unemployment and poverty rates in the state. This limits the ability of the area’s residents to pay the monthly fee required to maintain a piped water and sewer systems. Energy costs make up, on average, 40% of the operating cost of a water and sewer utility in Arctic and Sub-arctic Alaska according to the Alaska Rural Utility Collaborative (ARUC) at the Alaska Native Tribal Health Consortium (ANTHC). Keeping energy costs down can increase the likelihood that residents can afford piped sanitation facilities.

There are several types of water and sewer systems including buried or unburied circulating systems, circulating vacuum system, conventional system and a watering point. Energy costs for each system vary, with the circulating vacuum system being the most expensive. ANTHC recently conducted energy audits on the water and sewer systems in 28 of the 56 communities in the YK Delta Region. Table 5 illustrates the annual costs for the water systems in the communities in the YK Delta Region that were audited by ANTHC.

The Yukon Kuskokwim Health Corporation (YKHC) is raising funds to develop a “Dump the Bucket” campaign. They plan to test a couple off-the-shelf systems for recycling gray water. They hope that by using water twice people will spend less money to deliver water to their homes (Eurich, 2015).

Water systems vary in each community on Nelson Island. Nightmute has a watering point for community members and an independent piped system only at the school. Residents use honey buckets for sanitation and haul water from the school for drinking and cleaning. Toksook Bay has some piped sanitation and water, operated by the ANTHC and honey buckets. Tununak has piped systems at the washeteria and clinic and an independent system at the school. The watering point for the community is at the washeteria. None of the communities have improvements or system upgrades scheduled at this time.

Table 5: Average Water System Energy Costs (audits of 28 communities in YK Delta region) ANTHC



LANDFILLS

Alaska Department of Environmental Conservation (DEC) manages the solid waste permit process required by state law. Landfills in Nightmute and Toksook Bay are non-permitted. Tununak’s landfill was inspected in 2015 and is permitted. All landfills are Class III landfills and are in need of improvements, waste management and proper burn management. The landfill in Tununak needs to be relocated due to its proximity to water, it is within 100 feet of surface water bodies and only 400 feet from the Bering Sea. The landfill is also roughly 1,000 feet from the Tununak Airport. The landfill is about 3,500 feet from the nearest community buildings and 6,600 feet from the school’s groundwater well and 7,400 feet from the community surface water drinking source. (DEC)

2.6 TRANSPORTATION

METHODS

Nelson Island residents rely on a system of airports, rivers, ports, barge landings, and trails for transportation to, from and within the region. Communities are not connected to the state’s highway system. This lack of connection contributes to the high cost of fuel, services and goods. While air travel is the only year-round mode of transportation, a patchwork of surface transportation modes – varying depending on the time of year – supports the movement of passengers and cargo (including fuel delivery) within this region. Alaska Airlines provides passenger service and freight delivery between Anchorage and the hub community of Bethel. Grant Aviation provides air service to 15 villages; Ravn Alaska and Yute Air serve 26 villages; and Pen Air provides air service to 2 villages.

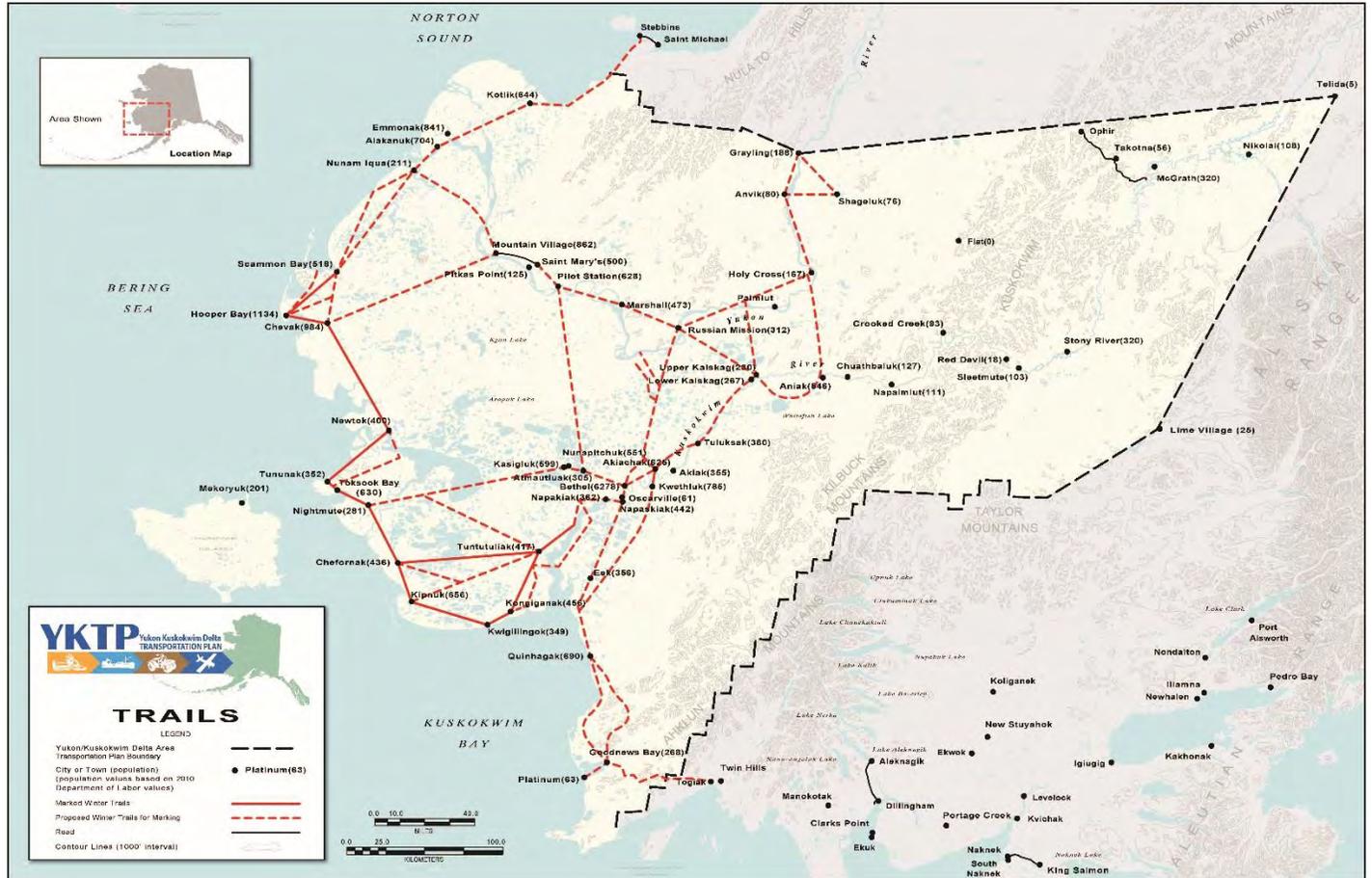


There are numerous marked winter trails throughout the region. The trail markings consist mostly of wooden tripods.

All three populated communities on Nelson Island use primarily All-Terrain Vehicles (ATVs), boat or foot travel in the summer and snowmobiles in the winter months to travel throughout the island. Each community has local board-road systems, which allow

residents to easily access housing and local businesses. Most communities are linked in the winter by these marked trails, as seen in the YK Transportation Plan map in Figure 4.

Figure 4: Trail Map, YKTP (Dowl)



2.7 STAKEHOLDERS & CONTACTS

Table 6 and Table 7 provide contact information for the entities serving the Nelson Island communities.

Table 6: Regional Contacts

Community Development Quota Organization (CDQ)	Coastal Villages Region Fund 711 H Street, Suite 200 Anchorage, AK 99501 Phone: (907) 278-5151 Website http://www.coastalvillages.org/
Health Corporation	Yukon Kuskokwim Health Corporation 900 Chief Eddie Hoffman Highway Bethel, AK 99559 Phone: (907) 543-6000 Website: http://www.ykhc.org
Electric Cooperative	Nuvista Light and Electric Cooperative, Inc. 1205 E. International Airport Road, Suite 202 Anchorage, AK 99518 Phone: (907) 562-3103 Website: http://www.Nuvistacoop.org
	Alaska Village Electric Cooperative 4831 Eagle St. Anchorage AK 99503 Phone: (907) 561-1818 Website: http://www.avec.org
Native Corporation	Calista 301 Calista Court # A Anchorage, AK 99518-3000 Phone: (907) 279-5516 Website http://www.Calistacorp.com
Native Association	Association of Village Council Presidents P.O. Box 219 Bethel, AK 99559 Phone: (907) 543-3596 Website: http://www.avcp.org
Regional Housing Authority	AVCP Regional Housing Authority P.O. Box 767 Bethel, AK 99559 Phone: (907) 543-3121 Website: http://www.avcphousing.org
School Districts	Lower Kuskokwim School District 1004 Ron Edwards Way, Bethel, AK 99559 P.O. Box 305 Bethel, AK 99559-0305 Phone: (907) 543-4800 Website: http://www.lksd.org/lksd/
Workforce Development	Yuut Elitnaurviat P.O. Box 869 Bethel, AK 99559 Phone: (907) 543-0999 Website: http://www.yuut.org

Table 7: Local Contacts

Toksook Bay	Nunakauyak Tribe: ntcadmin@nunakauyak.com Or Winnie Julius: w.julius@nunakauyaktc.com
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	<p>(907) 427-7114 President: Simeon John Administrator: Sam Turner IGAP Coordinator: Roderick Atti</p> <p>City of Toksook Bay: admin@cityofook.com (907) 427-7511 Administrator: Paul Chimiugak Mayor: Henry Simons City Clerk/Administrator: Susie Moses clerk@cityofook.com</p> <p>Nunakuiak Yupik Corp: nycbookkeeper@outlook.com (907) 427-7929 Vice Chair: Simeon Chakuchin Manager: Joseph Lincoln Jr.</p> <p>YKHC Sub-Regional Clinic: (907) 427-3500</p> <p>Toksook Bay Public Safety: (907) 427-7313</p> <p>Toksook Bay School: (907) 427-7815</p>
<p>Tununak</p>	<p>Village of Tununak: tribe2work@yahoo.com (907) 652-6527 President: George B. Hooper Jr. Tribal Administrator: James James IGAP Coordinator: Alma Kanrilak</p> <p>Tununrmiut Rinit Corporation: ctununrmiutrinit@yahoo.com (907) 652-6311 President/CEO: Alex Albert Manager: Gloria Tanrilak</p> <p>Tununak Public Safety: (907) 652-6812</p> <p>YKHC Tununak Clinic: (907) 652-6800</p> <p>CVRF Fisheries Support Center: (907) 652-6520</p>
<p>Nightmute</p>	<p>Native Village of Nightmute: (907) 647-6215 Acting TA: Genevieve Anthony negtemiut_tribe@live.com President: Simeon Tulik Administrator: Paul Tulik IGAP Coordinator: Mary Matthias</p> <p>Umkumiut Native Village: umkumiut@yahoo.com (907) 647-6145 President: Jay Dul Sr. Tribal Administrator: Kevin Wiseman</p> <p>City of Nightmute: nmcityclerk@yahoo.com (907) 647-6426 Mayor: Clement George City Clerk/Administrator: Eliza Scholl</p>

	<p>Chinuruk Inc.: (907) 647-6813 President: Maggie Michaels</p> <p>Nightmute Clinic: (907) 647-6312</p> <p>Nightmute School: (907) 647-6313</p>
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2.8 COMMUNITY PROFILES

The following profiles show the individual community sector data available at the time of this report. Each profile gives a brief description of the culture and people, current infrastructure, economic factors and each sector as it contributes to this project. This snapshot in time allowed the team to do a cross-comparison and analysis for the potential for shared services.

Working with local, regional and state agencies, these profiles are the baseline for the regional analysis chapter that follows.

COMMUNITY SUSTIANABILITY PROFILE: NIGHTMUTE

Location: Nightmute is located on Nelson Island, in western Alaska. It is 18 miles upriver from Toksook Bay and 100 miles west of Bethel.

Language: Central Yup'ik

Historical Setting: Nelson Island has been inhabited by the Qaluyaarmiut ("dip net people") for 2,000 years. The area was relatively isolated from outside contact and has kept its traditions and culture. Umkumiut is the traditional fish camp. In 1964, several residents moved to Toksook Bay to obtain more cost-effective goods. The city was incorporated in 1974.

Climate: Nightmute falls within the western transitional climate zone, characterized by tundra interspersed with boreal forests, and weather patterns of long, cold winters and shorter, warm summers.

Access: Air service is available year-round. Fishing boats, skiffs, snow machines, and ATVs are used by residents for local travel. Winter trails with markers exist to Toksook Bay () and Tununak (). There are no docking facilities, but boat haul-out services are available. Barges deliver goods during the summer months via lightering up the Tuqsuk River.

Cultural Resources: Yup'ik residents continue to hunt and fish subsistence in the traditional lifestyle.

Local Contacts

Village Corporation: Chinuruk, Inc. **Email:** mcecityclerk@yahoo.com **Phone:** 907-647-6813

City: City of Nightmute **Email:** mcecityclerk@yahoo.com **Phone:** 907-647-6426

Tribal: Native Village of Nightmute **Email:** mcecityclerk@yahoo.com **Phone:** 907-647-6215

Demographics / Housing

Poverty Rate	22.4%	Rate of Unemployment	28%	
Total Population	208	285	Median Household Income	\$26,875
Median Age of Total Population	22	23	Denali Commission Distressed Community	Yes
Average Household Size	5	5	Percentage of Native Alaskans	94.64%
Housing Units	61 total, 59 occupied, 2 vacant, AVCP Regional Housing Authority			

Energy

Owner	Description	Notes	Economic Factors
AVEC	Electrical Power Plant owned and operated by AVEC, PCE subsidized	4 Northwind 100 wind turbines installed in Toksook Bay. No improvements scheduled.	# Emp/ \$\$ budget

Bulk Fuel

Owner/Operator	Fuel Provider	Storage Capacity	Economic Factors
City		54,000 Heating Oil, 30,000 Gasoline	# Emp/ \$\$ budget
AVEC		40,000 Diesel	
School District (LKSD)		31,000 Diesel	

Water & Sanitation

Owner/Operator	System Type	Number of served	Notes	Economic Factors
LKSD	Piped, well	School	Watering point	#Emp/ \$\$ budget
Residents	Honey bucket	61	No Haul System	

Health

Owner/Operator	Description	Notes	Economic Factors
Tribe/YKHC	Health Clinic	No improvements scheduled.	# Emp/\$\$ budget

Education

Owner/Operator	Description	Number of Students	Economic Factors
LKSD	K-12 School	100	#Emp/ \$\$ budget

Transportation

		Notes	Economic Factors
Air Access	Gravel airport, good condition	General aviation airport	#Emp/ \$\$ budget
Boat / Barge Access	Beach landing	Fuel, Goods, Materials	
Roads/Trails	Boardwalks, winter trails	Toksook Bay 20 miles	

Landfill

Owner/Operator	Description	Notes	Economic Factors
City of Nightmute	Not permitted, Class III, inspected 2013	Improper burn, lack of management, human waste	#Emp/ \$\$ budget

COMMUNITY SUSTIANABILITY PROFILE: TOKSOOK BAY (Nunakauyak)

Location: Toksook Bay is one of three villages located on Nelson Island, which lies 115 miles northwest of Bethel. It is on Kangirivar Bay across the water from Nunivak Island. Tununak is about 8 miles to the northwest.

Language: Central Yup'ik

Historical Setting: The area has been inhabited and utilized by Yup'ik Eskimos for thousands of years. Toksook Bay was established in 1964 along the Tuqsuk River by residents of Nightmute. Cyril Chanar, Tom Sunny and Nasgauq Tangkaq were the earliest inhabitants. Toksook Bay was settled to be more accessible to the annual freighter ship, The North Star. The City was incorporated in 1972. Toksook Bay is served by a tribal government, city government and a village corporation.

Climate: Toksook Bay falls within the western transitional climate zone, characterized by tundra interspersed with boreal forests, and weather patterns of long, cold winters and shorter, warm summers.

Access: Air service is available year-round. Fishing boats, skiffs, snow machines, and ATVs are used by residents for local travel. Winter trails with markers exist to Nightmute (20 mi), Tununak (8 mi), Newtok (40 mi), and Chefornak (50 mi). There are no docking facilities, but boat haul-out services are available. Barges deliver goods during the summer months.

Cultural Resources: Yup'ik residents continue to hunt and fish subsistence in the traditional lifestyle.

Local Contacts

Village Corporation: Nunakauiak Yupik Corporation **Email:** nycbookkeeper@outlook.com **Phone:** 907-427-7929

City: City of Toksook Bay **Email:** admin@cityofook.com **Phone:** 907-427-7511

Tribal: Nunakauyarmiut Tribe **Email:** ntcadmin@nunalauyak.com **Phone:** 907-427-7114

Demographics / Housing

Poverty Rate	9.8%		Rate of Unemployment	27.2%
Total Population	532 (2000)	590 (2010)	Median Household Income	\$54,464
Median Age of Total Population	23	27	Denali Commission Distressed Community	Yes
Average Household Size	5	5	Percentage of Alaskan Natives	92.03%
Housing Units	135 total, 125 occupied, 10 vacant, AVCP Regional Housing Authority			

Energy

Owner	Description	Notes	Economic Factors
AVEC	M & O AVEC, PCE applied	4 Northwind 100 wind turbines installed, tie line to Tununak and Nightmute. No improvements scheduled.	# Emp/\$\$ budget

Bulk Fuel

Owner/Operator	Fuel Provider	Storage Capacity	Condition	Economic Factors
City of Toksook		27,000 Heating Oil	Good	# Emp/\$\$ budget
Native Corporation		96,000 Heating Oil, 86,000 Gasoline	Good	
Tribe		96,000 Heating Oil, 86,000 Gasoline	Good	
AVEC		324,000 Diesel	Good	
School District (LKSD)			Good	

Water & Sanitation

Owner/Operator	System Type	Number of served	Notes	Economic Factors
City/ARUC	Piped, Well	113	ANTHC	# Emp/\$\$ budget
	Honey buckets	22		

Health

Owner/Operator	Description	Notes	Economic Factors
YKHC	Sub Regional Health Clinic	Serves: Toksook Bay, Tununak, Nightmute	# Emp/\$\$ budget

Education

Owner/Operator	Description	Number of Students	Economic Factors
LKSD	K-12 School	203	# Emp/\$\$ budget

Transportation

		Notes	Economic Factors
Air Access	Gravel airport, good condition	General aviation airport, 3,218' x 60'	# Emp/\$\$ budget
Boat / Barge Access	Beach landing	Fuel, Goods, Materials	
Roads/Trails	Geoblock surfaced trail	7 miles to Tununak	

Landfill

Owner/Operator	Description	Notes	Economic Factors
City of Toksook Bay	Non permitted Class III, inspected 2014	Good location, improper burn, room for improvement	no fees, collection program

COMMUNITY SUSTIANABILITY PROFILE: TUNUNAK

Location: Tununak is located in a small bay on the northeast coast of Nelson Island, 115 miles northwest of Bethel and 519 miles northwest of Anchorage.

Language: Primarily Central Yup'ik.

Historical Setting: Nelson Island was named after Edward Nelson in 1878, a Smithsonian naturalist who noted 6 people, including 1 non-Native trader, living in Tununak. In 1925 a government school was built, and a Northern Commercial Co. store was opened in 1929. The City was incorporated in 1975, but it was dissolved on Feb. 28, 1997 in favor of traditional council governance.

Climate: Tununak falls within the western transitional climate zone, characterized by tundra interspersed with boreal forests, and weather patterns of long, cold winters and shorter, warm summers.

Access: Air service is available year-round. Fishing boats, skiffs, snow machines, and ATVs are used by residents for local travel. Winter trails with markers exist to Nightmute (20 mi), Toksook Bay (8 mi), Newtok (40 mi), and Cheforak (50 mi). There are no docking facilities, but boat haul-out services are available during summer.

Cultural Resources: Yup'ik residents continue to hunt and fish subsistence in the traditional lifestyle.

Local Contacts

Village Corporation: Tununrmiut Rinit Corporation **Email:** ctununrmiutrinit@yahoo.com **Phone:** 907-652-6311

Tribal: Village of Tununak **Email:** tribe2work@yahoo.com **Phone:** 907-652-6527

Demographics / Housing

Poverty Rate	47%		Rate of Unemployment	21%
Total Population	325 (2000)	327 (2010)	Median Household Income	\$26,875
Median Age of Total Population	23	25	Denali Commission Distressed Community	Yes
Average Household Size	4	4	Percentage of Native Alaskans	94.5%
Housing Units	90 total, 84 occupied, 6 vacant, AVCP Regional Housing Authority.			

Energy

Owner	Description	Notes	Economic Factors
AVEC	M & O AVEC, PCE applied	4 Northwind 100 wind turbines installed in Toksook Bay, tie line to Toksook Bay. No improvements scheduled.	# Emp/\$\$ budget

Bulk Fuel

Owner/Operator	Fuel Provider	Storage Capacity	Condition	Economic Factors
Native Corporation		81,000 Heating Oil	Good	# Emp/\$\$ budget
AVEC		Diesel		
School District (LKSD)		Diesel		

Water & Sanitation

Owner/Operator	System Type	Number of served	Notes	Economic Factors
Tribe/VSW	Piped, Well	Washeteria and Clinic	No improvements scheduled. Watering point for community	# Emp/\$\$ budget
LKSD	Piped, Well	School		
Residential	Honey bucket Haul System	90		

Health

Owner/Operator	Description	Notes	Economic Factors
Tribe/YKHC	Health Clinic	No improvements scheduled	# Emp/\$\$ budget

Education

Owner/Operator	Description	Number of Students	Notes	Economic Factors
LKSD	K-12 School	118	Independent W&S	# Emp/\$\$ budget

Transportation

			Notes	Economic Factors
Air Access	Gravel airport	# Emp/\$\$ budget		# Emp/\$\$ budget
Boat / Barge Access	Beach access, no dock	Fuel, Goods, Materials		
Roads/Trails	Geoblock surfaced trail	7 miles to Toksook Bay		

Landfill

Owner/Operator	Description	Notes	Economic Factors
Native Village of Tununak	Permitted, Class III, Inspected 2015	Needs improvement, needs to be relocated, lack of management, improper burn mgmt.	# Emp/\$\$ budget

CHAPTER III

OPTIONS FOR SHARED SERVICES



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3.1 HEALTH

OPTION: ESTABLISH A SUB-REGIONAL HEALTH BOARD

Currently there are local clinics in Tununak and Nightmute that each employ one health aid and provide basic first aid and general examinations. There is a sub-regional hub clinic in Toksook Bay which provides urgent care, lab testing, and hosts specialty clinics periodically. A sub-regional health board would be made up of representatives from each village and could identify health issues and solutions for the three communities.

Location: Regional
Term: Medium (5-10 years)
Permitting: None
Reference Links: N/A

ADVANTAGES

- **Central knowledge base to communicate best practices:** The health board could facilitate communication between villages and also YKHC. If one village has a successful practice, it can be communicated to other parties; YKHC can use the health board as a starting point to health education in the communities.
- **Opportunity to pursue grants as a group:** A health board could write regional language and compile regional data to use in grant applications for funding to benefit health at the sub-regional level, rather than each village having to search for and apply for funding on its own.

DISADVANTAGES

- **Cost of meetings:** The members of the health board would need to travel to a central location to meet. The villages would have to find funding for the cost of the travel and the meetings.
- **Requires authority to act and enforce:** The three villages would need to recognize the health board and agree to consider their recommendations. Further, the health board would need to communicate its function to other organizations in the region working on health, such as YKHC and ANTHC.

EVALUATION

The increased communication and support avenues for the health professionals, as well as the potential opportunities to pursue grants should make up for the potential financial costs. The extension of the board to members beyond the health care professionals will provide avenues to increase the awareness of existing health issues as they arise, and disseminate treatment information to a wider authoritative audience more quickly.

Recommendation: This option appears to provide some additional benefits to the communities. A deeper examination of this option is warranted.

OPTION: CENTRALIZED CLINIC

Currently there are local clinics in Tununak and Nightmute that each employ one health aid and provide basic first aid and general examinations. There is a sub-regional hub clinic in Toksook Bay which provides urgent care, lab testing, and hosts specialty clinics periodically. A centralized clinic could potentially allow broad-range services for health issues for the three communities. One central clinic could consolidate services and lower the cost of maintenance and operation for this sub-region.

Location: Regional
Term:
Permitting: None
Reference Links: N/A

ADVANTAGES

- **Centralize services to provide a broad-range medical facility:** A centralized clinic would consolidate services and help lower the cost of maintenance and operations. One centralized clinic would allow for a larger range of health services.

DISADVANTAGES

- **Lower access to immediate medical services:** The current clinics offer basic medical needs in place. A centralized clinic would eliminate these services and create a greater human life risk.
- **Directly impact economic impact to communities:** The two communities that have clinics closed to a centralized clinic would lose the economic impact to jobs, housing and funding for medical services.
- **Increased travel expenses to residents:** The cost of transporting patients to and from the centralized clinics would create a negative economic impact to an already distressed area.
- **No housing available for staff:** The lack of current housing stock would be negatively impacted. There are no available housing options to support more residents.

EVALUATION

The negative impacts from loss of services in two communities, increased time penalties on residents of two communities, and the potential loss of jobs for the island as a whole with merging classes (larger class sizes) do not appear to have any strong positive impact on the communities. This option would also require acceptance from the regional health organization, YKHC.

Recommendation: This option does not provide benefits to the communities, and will remove needed services and funds from village economies and create a life risk to all residents in the other two communities. This option is not recommended.

3.2 EDUCATION

OPTION: CENTRALIZED SCHOOL

Currently, there are schools in Toksook Bay, Nightmute, and Tununak. The school in Toksook Bay is the largest of the three schools. If this option were implemented, the schools would be combined into one large school located in Toksook Bay.

Location: Toksook Bay
Term: Long (10+ years)
Permitting: None
Reference Links: N/A

ADVANTAGES

- **Stronger inter-community ties:** All children will be educated together in a community school, bringing children from each village together. A larger, centralized school will also provide a location for the greater community to gather for events, dances, and meetings.
- **Lower utility costs:** Only having one school will mean fewer buildings to maintain, heat, operate, and insure. **New roads connecting villages:** A community school, if implemented prior to a road that connects the three villages, would provide incentive to funders and communities to act on road building.
- **New housing for teachers and staff:** The larger community school may create need for additional housing in Toksook Bay as some teachers and staff may choose to move to Toksook Bay rather than remain in Nightmute or Tununak and commute.

DISADVANTAGES

- **Increased travel costs for teachers, staff, and students:** Teachers, staff, and students living in Nightmute and Tununak would be required to travel to Toksook Bay to attend school. The communities are currently connected via a surface trail. This trip will result in an increase in fuel costs and time for the parties that are traveling. The increase in travel could also cause deterioration of the surface trail if it is not designed to accommodate that amount of travel. Currently, there are approximately 100 students and 10 teachers at each of two other schools (in Nightmute and Tununak).
- **Loss of village employment:** While more jobs will be created in Toksook Bay, there is no guarantee that these jobs would go to members of other villages; or that teachers and staff from other villages would remain in a village with no local school.
- **Loss of funds for school maintenance:** With no school in Nightmute and Tununak, those communities would lose state funds that currently go to maintain the school buildings. If the community wanted to maintain the building for another purpose, such as for community gatherings, it would be at their own cost.
- **Potential loss of a potable water point at Tununak:** In Tununak, the residents not connected to the flush/haul system rely on the potable water source at the school. Shutting down the school could result in this water source not being maintained.
- **Need for improved transportation infrastructure between villages:** Currently, there is only a surface trail connecting the villages. This trail may not be able to support the increased traffic that a community school would bring, and would need to be improved.
- **No available housing for new teachers and staff in Toksook Bay:** There may not be sufficient housing in Toksook Bay to accommodate teachers and staff that wish to relocate to work at a community school.
- **New energy demands in Toksook Bay:** A larger community school would require increased energy in the form of fuel oil and electricity that would need to be provided by the AVEC power plant and AVEC fuel storage facility in Toksook Bay.

EVALUATION

The negative impacts from loss of services in two communities, increased time penalties on residents of two communities, and the potential loss of jobs for the island as a whole with merging classes (larger class sizes) do not appear to have any strong positive impact on the communities except for greater inter-community ties from attending school together. This option would also require acceptance from the regional education attendance area administrations.

Recommendation: This option does not provide benefits to the communities, and will remove needed services and funds from village economies. This option is not recommended.

3.3 TRANSPORTATION

OPTION: SURFACED TRAIL CONNECTING ALL THREE COMMUNITIES

Currently, there are surface trails that are used by ATVs and snow machines that originate in Toksook Bay and connect to Tununak and Nightmute. There are also seven miles of Geoblock trail between Toksook Bay and Tununak, installed in 2012-2014. The snow machine trails are marked, and also exists connecting Toksook Bay to Newtok and to Chefornek in the winter. This option would expand the Geoblock surface trail to encompass the entire distance between Toksook Bay and Tununak, and to upgrade the trail between Toksook Bay and Nightmute.

Location: In-place
Term: Short (1 - 5 years)
Permitting: Required
Reference Links:

- <http://dnr.alaska.gov/mlw/trails/rs2477/>

ADVANTAGES

- **Stronger community ties as travel is easier:** A permitted trail would require maintenance, which would ensure smooth travel between villages. The maintained trails would allow for regular travel between the villages.
- **Necessary for some shared services such as a centralized landfill:** The trail is required to share other services between the villages. Some examples include a centralized landfill, and the potential port in Umkumiut. It would also facilitate easier use of current shared services, such as the health clinic in Toksook Bay.

DISADVANTAGES

- **Maintenance costs:** The region would have to hire an individual or corporation to maintain the trail. This would add a yearly expense to the region.
- **Initial funding:** Feasibility studies in other areas indicate that the initial permitting and construction costs can be several million dollars.
- **Changing demographics:** With easier travel comes the potential for families and individuals to move between the villages, possibly changing the demographics in the region.

EVALUATION

A number of the shared services options could either benefit from, or require this option. Since many of those options also have long lead times (due to permitting, feasibility studies, and/or surveying work), there is time for an examination of information on the currently existing surfaced trail to determine its wear, projected life, and cost. A traffic analysis of the trail systems on the island for frequency of use and amount of freight could also provide further information to inform a go/no go decision on this option.

Recommendation: This option appears to provide some additional benefits to the communities. A deeper examination of this option is warranted.

OPTION: SURFACED ROAD CONNECTING ALL THREE COMMUNITIES

Currently, there are trails that are used by ATVs and snow machines that originate in Toksook Bay and connect to Tununak and Nightmute. There are also seven miles of Geoblock trail between Toksook Bay and Tununak installed in 2012-2014. The snow machine trails are marked. Trails also connect Toksook Bay to Newtok and to Chefornak in the winter. This option would upgrade the trails going from Toksook Bay to Tununak and to Nightmute to a surfaced road.

Location: In-place
Term: Medium (5 - 10 years)
Permitting: Required
Reference Links: N/A

ADVANTAGES

- **Stronger community ties as travel is easier:** A surfaced road would require maintenance, which would ensure smooth travel between villages. The maintained road would allow for regular travel between the villages.
- **Necessary for some shared services such as the deep water port:** The road is required to share other services between the villages. Some examples that would benefit from a road include a centralized landfill, and the potential port in Umkumiut. It would also facilitate easier use of current shared services, such as the health clinic in Toksook Bay.

DISADVANTAGES

- **Maintenance costs:** The region would have to hire an individual or corporation to maintain the road. This would add a yearly expense to the region.
- **Initial funding:** Feasibility studies in other areas indicate that the initial permitting and construction costs can be several million dollars.
- **Changing demographics:** With easier travel comes the potential for families and individuals to move between the villages, possibly changing the demographics in the region.
- **Increased population:** A road may increase the population of villages in the region as it increases mobility and access to services. This could potentially increase social risks.

EVALUATION

Roads, unlike trail systems, often require a permitting process. Other rural Alaska road projects have had a planned 5-year permitting process followed by a 2-year build period. Roads also require a higher maintenance cost than a trail system. Currently the amount of freight and frequency of traffic between communities has not been quantified, so the strong justification for a road cannot yet be made.

Recommendation: This option does not provide benefits to the communities at this time. The deeper examination for the surfaced trail system option could change that decision.

OPTION: UMKUMIUT PORT

Currently, there is no deep-water port on the island. Toksook Bay and Tununak have shallow landing areas for fishing boats and barges, although the safe harbor for local boats in Toksook Bay (Qemqeng Creek) is eroding and needs improvement.

Location: To be determined

Term: Long (10+ years)

Permitting: Unknown

Reference Links:

- <http://www.dot.state.ak.us/stwddes/desports/arctic.shtml>

ADVANTAGES

- **Landing point for larger boats on the island:** This may allow for reduced shipping costs for goods and materials.
- **Lower fuel costs for communities:** A larger boat landing point would allow for a larger bulk fuel delivery, which could help to lower fuel costs in the region.

DISADVANTAGES

- **Road required:** This option would require a road to Umkumiut in order to transport goods to other villages. Building a road will require funding and permits.
- **Fish camp impact:** Currently the port location serves as a fish camp. Depending on the size of the area, the port facilities may intrude on the fish camp area, or affect the fish in the surrounding area during the dredging process.
- **Interruption of subsistence use:** The port and corresponding road potentially could affect subsistence activities in the surrounding area, including fishing, hunting, and berry picking

EVALUATION

The construction of a port has one of the larger potential impacts on subsistence of the options for consideration. The required road would impact land-based activities, and the port facilities would impact sea-based activities. Part of the long lead time is the requirement to look at environmental impacts and navigate the permitting process. While this option could provide some benefits to the communities in lower fuel costs and the ability to ship in larger bulk goods this does not seem to offset the disruptions at this time.

Recommendation: At this time, this option is being reviewed by the Army Corps of Engineers for feasibility potential and should be reexamined upon completion of report.

3.4 SANITATION (WATER, SEWER, LANDFILL)

OPTION: INSTALL AND PROVIDE TRAINING IN THE USE OF BURN BOXES IN EACH COMMUNITY AND TRAIN A PERSON TO FILL A SHARED POSITION TO CONDUCT PROPER BURNS IN ALL THREE COMMUNITIES

Currently, the community landfills have low inspection scores. In Toksook Bay, the landfill is not permitted and 2014 inspection score was 31%. In Tununak, the landfill is permitted and the 2015 inspection score was 40%. In Nightmute, the landfill is not permitted and the 2013 inspection score was 16%. This option would implement a burn box to dispose of waste to decrease the volume of waste in each landfill and separate human waste from garbage. Instead, communities would collect waste and trained individual would travel to each community to conduct scheduled burns to dispose of the waste.

Location: In-place
Term: Short (1 - 5 years)
Permitting: N/A

Reference Links:

- Burning Garbage and Land Disposal in Rural Alaska
<http://www.akenergyauthority.org/Content/Programs/AEEE/Biomass/Documents/PDF/BurningGarbage.pdf>

ADVANTAGES

- **Provides a way to manage waste in a controlled fashion:** A burn box would provide the communities with a way to dispose of waste, rather than store it in a landfill.
- **Better waste management increases health:** Current landfills face issues such as the lack of consolidation and cover, proximity to surface water bodies, lack of waste screening, lack of fencing, and active erosion. These problems pose health risks to the community that could be lessened with the addition of a regulated burn box.
- **Potential to add jobs:** The burn box would add training and jobs in each community for the collection and disposal of waste, and maintenance of the burn box. This would result in at least one job, if not multiple jobs, for positions shared amongst the three communities.

DISADVANTAGES

- **Financing to install, maintain, and operate:** The burn box would require funding for installation, maintenance, and operation. Further, communities would need to pay the individual responsible for the burns. Currently none of the communities collect fees related to waste disposal.
- **Locating land for a new site:** Each community would need to identify an area to put the burn box. While this site could potentially be near or at the existing landfill in Toksook Bay and Tununak, in Nightmute the landfill is actively eroding and needs to be relocated.

- **Need for improved transportation infrastructure between villages:** Currently, there is only a surface trail connecting the villages. The individual conducting the burns would need at least reliable, maintained surface trail between the villages in order to conduct the burns on schedule.

EVALUATION

Burn boxes come in many sizes, and burn boxes which closely meet the communities' needs can be acquired. Proper utilization of burn boxes can assist landfill management, and better waste management generally leads to improvements in health for surrounding people. This would create paid positions on the island, and potentially increase awareness of health risks. Money needed to pay for the position and an overseeing body would need to exist.

Recommendation: This option appears to provide some additional benefits to the communities. A deeper examination of this option is warranted. A comparative analysis with the in-place services option below could be considered.

OPTION: ESTABLISH A CENTRALIZED LANDFILL

This option would establish one large central landfill to replace the local landfills. Communities would collect waste and transport it to the central landfill for disposal.

Location: Either expansion of an existing landfill, or new location in a central area
Term: Medium (5-10 years)
Permitting: Unknown
Reference Links: N/A

ADVANTAGES

- **Provides a way to manage waste in a controlled fashion:** A centralized, permitted landfill would provide the sub-region with a way to manage waste in a controlled fashion. It would also mean that the sub-region would only have to maintain one landfill, rather than three separate landfills.
- **Better waste management increases health:** Current landfills face issues such as the lack of consolidation and cover, proximity to surface water bodies, lack of waste screening, lack of fencing, and active erosion. These problems pose health risks to the community that could be lessened with the addition of a central permitted landfill.
- **Potential to add jobs:** The centralized landfill would result in one or multiple jobs for the sub-region. An individual would need to be trained to maintain the landfill. Also, one or more people would need to fill positions to collect waste in the individual communities and transport it to the landfill.

DISADVANTAGES

- **Need for improved transportation infrastructure between villages:** Currently, there is only a surface trail connecting the villages. The transportation of waste to the centralized landfill will require a reliable, maintained surface trail between the villages in order to move waste on a reliable schedule.
- **Locating centralized landfill site:** The communities would need to identify a landfill site that would be reachable by a surface trail and have the capacity to accept waste from all three communities.
- **Financing to install, maintain, and operate:** The centralized landfill would require funding for installation, maintenance, and operation. Currently none of the communities collect fees related to waste disposal. They would need to agree on the operation of the landfill and how to fund its installation and operation.

EVALUATION

A centralized landfill would by default achieve the need for Nightmute to move their current landfill. The positive impacts of a staffed and permitted landfill on health and the environment in the immediate surroundings of the communities are also important. This would create paid positions on the island, and potentially increase awareness of health risks. Money needed to

pay for the positions and an overseeing body would need to exist. A centralized landfill would require a surfaced transportation system between the communities, and additional trash hauling infrastructure. The long lead time for the surfaced transportation combined with the lead time on the centralized landfill suggest this is a project for future consideration after a surfaced transportation system, but not immediate action.

Recommendation: To pursue this option an evaluation of needed improvements to current transportation infrastructure is recommended.

OPTION: CENTRALIZED WATER AND SEWER

Currently, Toksook Bay is the only Nelson Island community with a piped water and sewer system. Most homes in Toksook Bay have access to this system; those that do not, rely on hauled water and honey buckets. In Nightmute and Tununak, all homes rely on hauled water and honey buckets. A centralized water and sewer system would connect all communities to a central fresh water source, and a central lagoon for wastewater disposal.

Location: Regional
Term: Long (10+ years)
Permitting: Unknown
Reference Links: N/A

ADVANTAGES

- **Better hygiene and health:** Indoor plumbing for homes allows residents to more easily establish habits that reduce the spread of disease such as hand washing, bathing, clothes-washing, and cleaning.
- **Potential to add jobs:** The construction of such a system would add jobs to the region, if local hires were used. Furthermore, the system would require constant maintenance and operation, resulting in multiple jobs.

DISADVANTAGES

- **Need for improved transportation infrastructure between villages:** Currently, there is only a surface trail connecting the villages. The maintenance of a centralized water and sewer system would require reliable surface transportation of maintenance personnel between villages, as well as trails or roads along the pipes in order to check and maintain them.
- **Not economically feasible:** Such a system would require funding for the installation of the water treatment and storage, an appropriately-sized lagoon, and insulated pipes to transport water and sewage. The funding and the permitting required is not economically feasible compared to options to improve services-in-place. Furthermore, the funding required to maintain such a system across the sub-region would need to be raised by the communities.
- **Locating site for water storage and sewage:** The communities would need to identify a location for fresh water supply, treatment, and storage as well as a location for a sewage lagoon large enough to accommodate all three communities. The location would need to be in an area accessible by maintenance personnel.

EVALUATION

This option requires a go decision from the current water utilities on the island and represents a significant capital investment, as well as ongoing annual maintenance costs. While this option provides potential benefits to the residents of the island, the final decision to pursue this option is not in the hands of the communities.

Recommendation: This option is not recommended. To pursue this option an evaluation of environmental and societal impacts as well as an evaluation of the financial feasibility would be required and would need to be presented to the utilities.

OPTION: ESTABLISH A SUB-REGIONAL WATER QUALITY CONTROL BOARD

Currently, Toksook Bay is the only Nelson Island community with a piped water and sewer system. Most homes in Toksook Bay have access to this system; those that do not, rely on hauled water and honey buckets. In Nightmute and Tununak, all homes rely on hauled water and honey buckets. A sub-regional water quality control board would be made up of representatives from each village and could identify water and sewer issues and solutions for the three communities.

Location: Regional
Term: Short (1-5 years)
Permitting: None
Reference Links: N/A

ADVANTAGES

- **Central knowledge base to communicate best practices:** The board could facilitate communication between villages and also YKHC and ANTHC. If one village has a successful practice, it can be communicated to other parties; YKHC and ANTHC can use the board as a starting point to education related to water and sewer best practices in the communities.
- **Opportunity to pursue grants as a group:** A board could write regional language and compile regional data to use in grant applications for funding to benefit water and sewer infrastructure at the sub-regional level, rather than each village having to search for and apply for funding on its own.

DISADVANTAGES

- **Cost of meetings:** The members of the board would need to travel to a central location to meet. The villages would have to find funding for the cost of the travel and the meetings.
- **Requires authority to act and enforce:** The three villages would need to recognize the board and agree to consider their recommendations. Further, the board would need to communicate its function to other organizations in the region working on water and sewer, such as YKHC and ANTHC.

EVALUATION

Given the strong ties between water quality and health, a joint entity that examined both health and water quality might be a better option. Many of the arguments for water quality control are health-related and could lead to conflicts when seeking funding opportunities. As a standalone entity a water quality control board would have a harder time drawing on health reasons in their justifications.

Recommendation: This option should be merged with the sub-regional health board option. A deeper examination of this option is warranted.

3.5 HOUSING

OPTION: ENERGY CONSERVATION EDUCATION

Currently, about two thirds of the homes in the three villages have undergone energy retrofits (65% in Nightmute, 68% in Toksook Bay, and 68% in Tununak). The three communities could hire and train a single weatherization crew to perform retrofits on remaining homes, as well as to educate community members on energy conserving behavioral strategies.

Location: In-place
Term: Short (1 - 5 years)
Permitting: None
Reference Links:

- <https://www.ahfc.us/efficiency/energy-programs/weatherization/>

ADVANTAGES

- **Centralized training for a weatherization crew:** Having individuals trained to perform energy retrofits would allow for local hires for retrofit work as well as for new construction.
- **Reduce household energy costs:** Weatherization would help households realize energy savings. Furthermore, community education on energy efficient practices will allow all community members to reduce their energy costs.

DISADVANTAGES

- **Seeking lead agency to facilitate:** Communities would need to identify an agency to fund and facilitate the training, as well as identify the individuals to fill the crew.
- **Funding for retrofits, training and travel:** Communities would need to fund the weatherization and training activities, or apply for funding to facilitate them. Additionally, funding would be required for the crew to travel between communities.

EVALUATION

Education of community members on energy conservation behavior and the benefits to the communities are quick and easy. This can be incorporated into the curriculum for any of the K-12 classes for additional impact. Hiring and training weatherization crews may not be as feasible as seeking grant funding in collaboration with a regional housing authority for the express purpose of retrofitting the remaining homes up to standard. A grant could specify that local labor be hired for the work crews with oversight, lead positions and equipment being supplied by the housing authorities.

Recommendation: This option appears to provide some additional benefits to the communities. A deeper examination of this option is warranted.

3.6 ENERGY AND BULK FUEL

OPTION: CONSOLIDATED BULK FUEL PURCHASING

Currently, each community has a bulk fuel storage facility and fuel is hauled to individual home storage tanks. This option would have communities order and purchase fuel oil together, allowing for the possibility of a lower price per gallon. Fuel would be stored in one tank farm, and hauled to individual home storage tanks.

Location: In-place
Term: Long (10+ years)
Permitting: None for purchase, required for transport
Reference Links: N/A

ADVANTAGES

- **Lower fuel costs:** Residents have the potential for lower energy and transportation costs if the price per gallon of fuel oil can be reduced.
- **Less maintenance for central fuel storage:** The three communities would store fuel in one bulk tank farm. This would result in less maintenance and permitting.

DISADVANTAGES

- **Funding to expand an existing tank farm:** The Island does not currently have a tank farm with a large enough capacity to store bulk fuel for all three communities. Funding would be required to expand a designated tank farm to be able to store more fuel.

- **Infrastructure to haul fuel between communities:** Transportation would need to be acquired and infrastructure may need to be built to accommodate fuel transport between communities if one large tank farm receives bulk fuel deliveries for the island.
- **Lack of port:** Currently there is no deep water port on the Island, which would facilitate the delivery of one large bulk fuel purchase.
- **Need for improved transportation infrastructure between villages:** Currently, there is only a surface trail connecting the villages. Fuel transport from a single tank farm requires a maintained trail or road between the villages.

EVALUATION

This option has two parts. First, can the communities combine their buying power to lower fuel prices for island bulk fuel purchases? The answer to this is yes, and provides the potential for cost savings for all communities. Second, can they specify that the bulk fuel be delivered to the three communities rather than one centralized tank farm? If the answer is yes, then this is a fairly simple and straightforward option that should be adopted. If the answer is no, then the potential capital and operating costs for the larger tank farm and intra-island fuel transportation infrastructure must be evaluated before this option can be fully considered.

Recommendation: Before proceeding, confirm that fuel purchased for the three communities as a single purchase can be delivered to the three communities and still realize cost savings. If yes, then this option is recommended to proceed. If no, this option will need to be reevaluated at a later date. To pursue this option, an evaluation of environmental and societal impacts as well as an evaluation of the financial feasibility would be required and the results presented to the operators of the existing tank farms.

3.7 OPTIONS TO IMPROVE SERVICES-IN-PLACE

In many of the sectors, there are currently no feasible options to implement shared services. In these cases, the communities could first focus on improving services-in-place, with the long-term goal of re-evaluating shared services after local conditions have improved. This is especially apparent in the sanitation sector, with residents in Nightmute and Tununak relying on hauled water and honey buckets, and only Tununak having a permitted landfill.

OPTION: IMPROVE LANDFILL MANAGEMENT AND PURSUE THE AK DEC PERMITTING PROCESS

Currently, the community landfills have low inspection scores. In Toksook Bay, the landfill is not permitted and 2014 inspection score was 31%. In Tununak, the landfill is permitted and the 2015 inspection score was 40%. In Nightmute, the landfill is not permitted and the 2013 inspection score was 16%. This option would improve the landfills in Toksook Bay and Nightmute so that they could pass the permitting process.

Location: Nightmute, Toksook Bay
Term: Short (1 - 5 years)
Permitting: Unknown
Reference Links: N/A

ADVANTAGES

- **Provides a way to manage waste in a controlled fashion:** Permitted, maintained landfills would provide each community with a way to manage waste in a controlled fashion.
- **Better waste management increases health:** Current landfills face issues such as the lack of consolidation and cover, proximity to surface water bodies, lack of waste screening, lack of fencing, and active erosion. These problems pose health risks to the community that could be lessened with the permitted, maintained landfills.

- **Potential to add jobs:** Maintained landfills would result in one or multiple jobs for the each community. An individual would need to be trained to maintain the landfill. Also, one or more people would need to fill positions to collect waste in the individual communities and transport it to the landfill.

DISADVANTAGES

- **Need for new location:** Nightmute’s landfill will need to be moved in order to be permitted because it is currently located in an area of active erosion. The community needs to identify a new area for a landfill
- **Financing to install, maintain, and operate:** Permitted landfill would require funding for upgrades to obtain the permit, maintenance, and operation. Currently none of the communities collect fees related to waste disposal. They would need to agree on the operation of the landfill and how to fund its improvement and operation.

EVALUATION

The process of getting landfills through the permitting process has previously improved landfill quality and helped the health of nearby residents and the surrounding environment. Permitted landfills will require funding to maintain and operate.

Recommendation: This option appears to provide some additional benefits to the communities. A deeper examination of this option is warranted.

OPTION: INSTALL AND PROVIDE TRAINING IN THE USE OF BURN BOXES IN EACH COMMUNITY; TRAIN A PERSON IN EACH COMMUNITY TO CONDUCT PROPER BURNS

Currently, the community landfills have low inspection scores. In Toksook Bay, the landfill is not permitted and 2014 inspection score was 31%. In Tununak, the landfill is permitted and the 2015 inspection score was 40%. In Nightmute, the landfill is not permitted and the 2013 inspection score was 16%. This option would implement a burn box to dispose of waste in each community.

Location: In-place
Term: Short (1 - 5 years)
Permitting: Unknown

Reference Links:

- Burning Garbage and Land Disposal in Rural Alaska
<http://www.akenergyauthority.org/Content/Programs/AEEE/Biomass/Documents/PDF/BurningGarbage.pdf>

ADVANTAGES

- **Provides a way to manage waste in a controlled fashion:** A burn box would provide the communities with a way to dispose of waste, rather than store it in a landfill.
- **Better waste management increases health:** Current landfills face issues such as the lack of consolidation and cover, proximity to surface water bodies, lack of waste screening, lack of fencing, and active erosion. These problems pose health risks to the community that could be lessened with the addition of a regulated burn box.
- **Potential to add jobs:** The burn box would add training and jobs in each community for the collection and disposal of waste, and maintenance of the burn box. This would result in at least one job, if not multiple jobs, for positions in each community.

DISADVANTAGES

- **Financing to install, maintain, and operate:** The burn box would require funding for installation, maintenance, and operation. Further, communities would need to pay the individuals responsible for the burns. Currently none of the communities collect fees related to waste disposal.

- **Locating land for a new site:** Each community would need to identify an area to put the burn box. While this site could potentially be near or at the existing landfill in Toksook Bay and Tununak, in Nightmute the landfill is actively eroding and needs to be relocated.

EVALUATION

This option varies from the shared services option in that there is not a traveling shared staff position, but three in-place staff positions, one for each community. Burn boxes come in many sizes, and burn boxes which closely meet the communities' needs can be acquired. Proper utilization of burn boxes can assist landfill management, and better waste management generally leads to improvements in health for surrounding people. This would create paid positions on the island, and potentially increase awareness of health risks.

Recommendation: This option appears to provide some additional benefits to the communities. A deeper examination of this option is warranted. A comparative analysis with the shared services option could be considered.

OPTION: INTRODUCE A HOME POTABLE WATER SYSTEM

Currently, residents in Tununak and Nightmute haul fresh water from a source, and rely on honey buckets for waste. Home potable water systems are small systems that treat water using filters, allowing homeowners to use rainwater and snowmelt for fresh water, as well as water from other sources. They also feature Separett toilets, which direct urine into a closed container for transport and solid waste into a holding area where a fan directs air over them to dry out. Dried solid waste can then either be burned or easily transported.

Location: Tununak, Nightmute

Term: Short (1 - 5 years)

Permitting: None

Reference Links:

- <http://anthc.org/clean-water-and-sanitation/>

ADVANTAGES

- **Option to conduct centralized training on how to build and use the system:** There is a potential to share training on installing and using the system between villages. However, the systems are designed to be easy to set up, so in some cases training may not be necessary.
- **Better hygiene and health:** Indoor plumbing for homes allows residents to more easily establish habits that reduce the spread of disease such as hand washing, bathing, clothes-washing, and cleaning.

DISADVANTAGES

- **Financing for implementation, maintenance and operation:** Communities would need to find funding to install the system, maintain the systems (changing filters and maintaining pumps), and train people to use them.

EVALUATION

This option is a definite step up from the honey bucket, and allows for non-potable water to be cleaned. These systems can run even in power outages and have a high potential for decreasing health risks by providing clean water. Filters are fairly inexpensive and the systems are a much less costly outlay than an upgraded village water and sewer system.

Recommendation: This option appears to provide some additional benefits to the communities. A deeper examination of this option is warranted.

OPTION: UPGRADE COMMUNITY WATER AND SEWER TO INCLUDE WHOLE VILLAGE

Currently, residents in Tununak and Nightmute haul fresh water from a source, and rely on honey buckets for waste. This option would feature those communities installing and maintaining central water and sewer systems.

Location: Tununak, Nightmute
Term: Long (10+ years)
Permitting: Unknown
Reference Links: N/A

ADVANTAGES

- **Shared training/equipment:** There is the potential to share training costs for workers to implement systems, and potential for cost savings by ordering equipment in bulk for both locations. Also, the communities could design the systems with input and lessons learned from Toksook Bay, which currently has a water and sewer system.
 - **Better hygiene and health:** Indoor plumbing for homes allows residents to more easily establish habits that reduce the spread of disease such as hand washing, bathing, clothes-washing, and cleaning.
 - **Potential to add jobs:** The construction of such a system would add jobs to the region, if local hires were used. Furthermore, the system would require constant maintenance and operation, resulting in multiple jobs.
-

DISADVANTAGES

- **Financing for implementation, maintenance and operation:** Communities would need to find funding to install the system, maintain the systems, and operate them.
 - **Locating site for water storage and sewage:** The communities would need to identify a location for fresh water supply, treatment, and storage as well as a location for a sewage lagoon large enough to accommodate all buildings on the system. The location would need to be in an area accessible by maintenance personnel.
-

EVALUATION

This option requires a go decision from the current water utilities on the island and represents a significant capital investment, as well as ongoing annual maintenance costs. While this option provides potential benefits to the residents of the two communities, the final decision to pursue this option is not in the hands of the communities.

Recommendation: To pursue this option an evaluation of environmental and societal impacts as well as an evaluation of the financial feasibility would be required and would need to be presented to the utilities. Potential for “out-of-the-box” options should be explored.

CHAPTER IV

IMPLEMENTATION PLAN



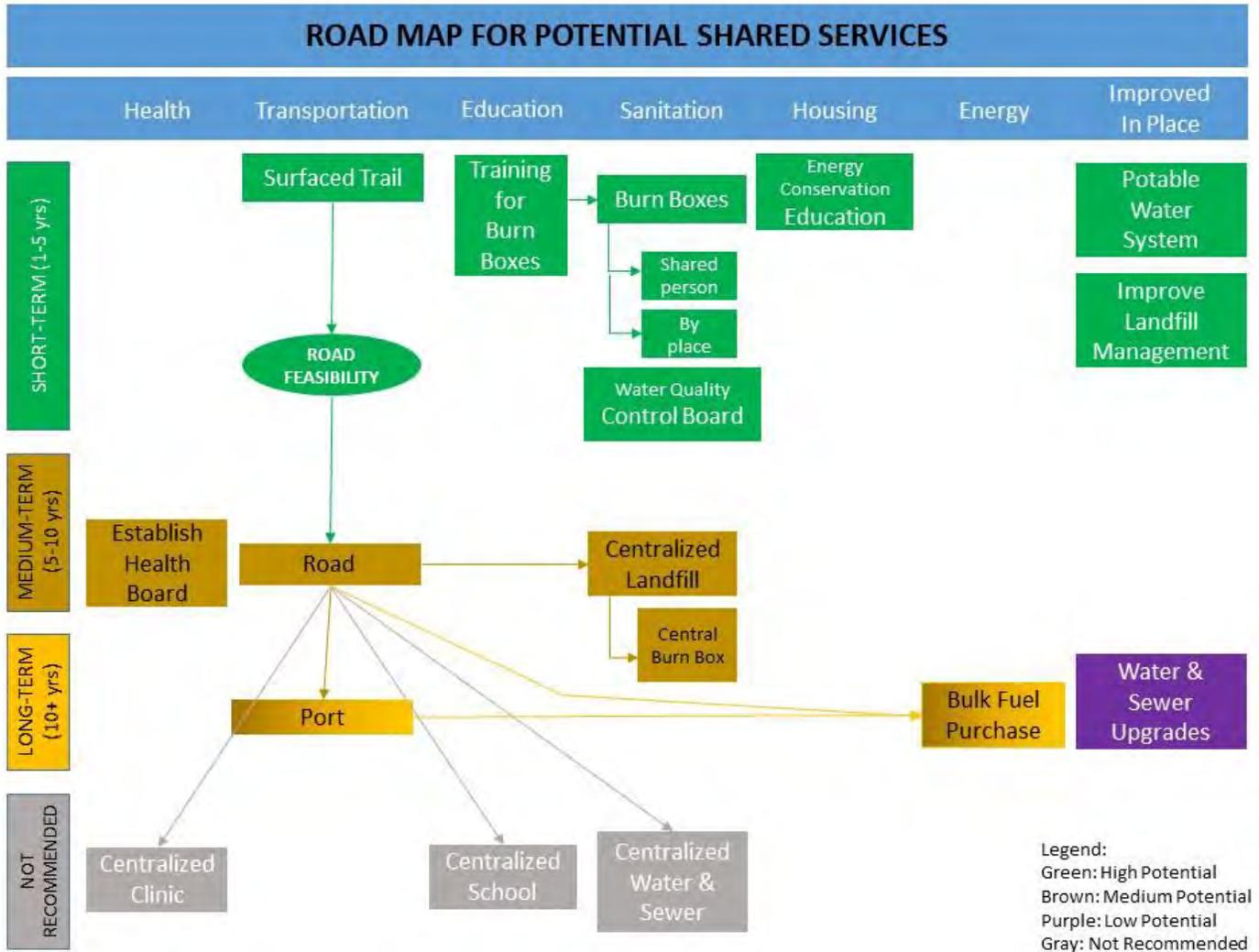
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IMPLEMENTATION PLAN

4.1 SUMMARY OF RECOMMENDATIONS

Figure 5 provides an overview of potential development projects by sector and timeframe. It also shows how some projects are dependent on the development of others, i.e. a centralized landfill is dependent on inter-village transportation infrastructure.

Figure 5: Roadmap for Potential Shared Services



4.2 FUNDING OPPORTUNITIES

The majority of energy funding resources accessed for Alaska projects come from either the State of Alaska or from federal agencies.

Private foundations and corporations also provide funds for smaller projects, some of which can be energy improvements, but most of which are capital funds for construction or reconstruction projects.

In the table that follows, funding sources are listed by type of project and then funding agency. The description of the type of project eligible is included as well as if the funding eligibility is dependent on economic status of the applicant.

Program	Funding Agency	Description of Funding Opportunity	Comments
Power Cost Equalization	Alaska Energy Authority http://www.akenergyauthority.org/	To provide economic assistance to customers in rural areas of Alaska where the kilowatt-hour charge for electricity can be three to five times higher than the charge in more urban areas of the state. PCE only pays a portion of approximately 30% of all kWh's sold by the participating utilities.	AEA determines eligibility of community facilities and residential customers and authorizes payment to the electric utility. Commercial customers are not eligible to receive PCE credit. Participating utilities are required to reduce each eligible customer's bill by the amount that the State pays for PCE.
Low Income Home Energy Assistance Program -- LIHEAP	Department of Health and Social Services http://liheap.org/?page_id=361	Fuel assistance for low-income families.	
Trend Alaska	Alaska Small Business Development Center http://trendalaska.org/fund/	The U.S. government provides funding to small businesses that are producing technology with the potential for commercialization. Through a competitive process, companies can get grants to develop new technology.	Potential for new small businesses if a centralized landfill were established.
USDA EE and Conservation Loan Fund	U.S. Department of Agriculture http://www.rd.usda.gov/programs-services/energy-efficiency-and-conservation-loan-program	This is an ongoing program that provides loans to electric utilities for energy improvement projects.	

Program	Funding Agency	Description of Funding Opportunity	Comments
AAHA Training and Technical Assistance Program	Association of Alaska Housing Authorities http://www.aahaak.org	The Association offers a comprehensive and innovative training and technical assistance program for Indian Housing Block recipients. The services are delivered in close collaboration with the Alaska HUD Office of Native American Programs (HUD ONAP), Alaska Regional Housing Authorities, and housing experts. AAHA utilizes an efficient and flexible demand-driven model to deliver the services. The Program builds capacity and improves effectiveness of Alaska’s affordable housing programs and has a special emphasis on individualized on-site assistance.	
Section 108 Loans HUD – CDBG grants	U.S. Housing and Urban Development http://www.hud.gov	Section 108 is the loan guarantee provision of the Community Development Block Grant (CDBG) program. Under this section, HUD offers communities a source of financing for certain community development activities, such as housing rehabilitation, economic development, and large-scale physical development projects. The Community Development Block Grant (CDBG) program is a flexible program that provides communities with resources to address a wide range of unique community development needs. Beginning in 1974, the CDBG program is one of the longest continuously run programs at HUD. The CDBG program provides annual grants on a formula basis to 1209 general units of local government and States.	
Alaska Energy Efficiency Revolving Loan Fund Program	Alaska Housing Finance Corporation http://www.ahfc.us	Provides financing for permanent energy-efficient improvements to buildings owned by regional educational attendance areas, the University of Alaska, the State or municipalities in the state. Borrowers obtain an investment grade audit as the basis for making cost-effective energy improvements, selecting from the list of energy efficiency measures identified. All of the improvements must be completed within 365 days of loan closing.	

Program	Funding Agency	Description of Funding Opportunity	Comments
Commercial Energy Audit Program	Alaska Energy Authority http://www.akenergyauthority.org/	Funding for energy efficiency audits for privately owned commercial buildings across Alaska. The program provides reimbursements of qualified commercial energy audits for privately owned commercial buildings up to 160,000 square feet. The maximum reimbursement is set by the building size and complexity and ranges from \$1,800 for buildings under 2,500 square feet up to \$7,000 for buildings from 60,000 and above.	This funding was available in 2013/2014. Check website for notice of future funding availability. Application period is typically November to December.
Energy Efficiency Interest Rate Reduction Program	Alaska Housing Finance Corporation http://www.ahfc.us	AHFC offers interest rate reductions when financing new or existing energy-efficient homes or when borrowers purchase and make energy improvements to an existing home. Any property that can be energy rated and is otherwise eligible for AHFC financing may qualify for this program. Interest rate reductions apply to the first \$200,000 of the loan amount. A loan amount exceeding \$200,000 receives a blended interest rate rounded up to the next 0.125 percent. The percentage rate reduction depends on whether or not the property has access to natural gas.	
Alaska Home Energy Rebate Program	Alaska Housing Finance Corporation http://www.ahfc.us	Homeowners may receive up to \$10,000 for making energy-efficient improvements. Based on before and after energy audits. Rebate is based on final energy rating audit outcome.	Upfront cost for energy audit.
Second Mortgage Program for Energy Conservation	Alaska Housing Finance Corporation http://www.ahfc.us	Borrowers may obtain a second mortgage to finance home improvements or purchase a home in conjunction with an assumption of an existing AHFC loan and make repairs if need be.	The maximum loan amount is \$30,000. The maximum loan term is 15 years. The interest rate is the Taxable Program or Rural Owner-Occupied, 15-year interest rate plus 0.375.

Program	Funding Agency	Description of Funding Opportunity	Comments
Village Energy Efficiency Program	Alaska Energy Authority http://www.akenergyauthority.org/	Upgrades are performed in rural Alaskan community buildings. There are currently three phases of funding with Phase II communities recently completed. Community selection was based on the status of the respective village's Rural Power System Upgrade (RPSU). The community either recently received or is slated to receive a new power system.	
Weatherization Program	Alaska Housing Finance Corporation http://www.ahfc.us	Weatherization programs have been created to award grants to nonprofit organizations for the purpose of improving the energy efficiency of low-income homes statewide. These programs also provide for training and technical assistance in the area of housing energy efficiency. Funds for these programs come from the US Dept. of Energy and AHFC.	
RurAL CAP Weatherization	RurAL CAP http://www.ruralcap.com	Rural Alaska Community Action Program, Inc. (RurAL CAP) manages a state program administered by Alaska Housing Finance Corporation that offers free weatherization services for low and middle-income residents in western and northern Alaska, the Municipality of Anchorage, and the City and Borough of Juneau. An Anchorage family of four with income up to \$87,800 qualifies.	
RurAL CAP Energy Wise	RurAL CAP http://www.ruralcap.com	The Energy Wise Program engages rural Alaskan communities in behavior change practices resulting in energy efficiency and energy conservation. This tested model uses community-based social marketing to save energy – a multi-step educational approach involving residents in changing home energy consumption behaviors. Locally hired crews are trained to educate community residents and conduct basic energy efficiency upgrades during full-day home visits. Through Energy Wise, rural Alaskans reduce their energy consumption, lower their home heating and electric bills, and save money.	Communities receive the following: ten locally hired and trained crew members; on site "launch week" by a RurAL CAP staff for hiring and training of local crews; one community energy fair to engage community residents and organizations. Households receive: Full day home visit from a trained, locally hired crew; household energy consumption and cost assessment conducted with the resident; education on energy cost-saving strategies; an estimated \$300 worth of basic, home energy efficiency supplies installed.

Program	Funding Agency	Description of Funding Opportunity	Comments
Alternative Energy & Energy Efficiency Development Program	Alaska Energy Authority http://www.akenergyauthority.org/	AEA's Alternative Energy and Energy Efficiency programs promote: 1.) Use of renewable energy resources and local sources of coal and natural gas alternatives to diesel-based power, heat, and fuel production; 2.) Measures to improve efficiency of energy production and end use.	
Bulk Fuel Construction Program	Alaska Energy Authority/Denali Commission http://www.akenergyauthority.org/	With substantial contributions from the Denali Commission, the bulk fuel upgrades program provides funding for the design/engineering, business planning and construction management services to build code-compliant bulk fuel tank farms in rural communities. The bulk fuel upgrade retrofit and revision program, with financial support from the Denali Commission, provides funding for repairs to enable affected communities to continue to receive fuel.	
Emerging Energy Technology Fund	Alaska Energy Authority http://www.akenergyauthority.org/	The Authority may make grants to eligible applicants for demonstration projects of technologies that have a reasonable expectation to be commercially viable within five years and that are designed to: test emerging energy technologies or methods of conserving energy; improve an existing energy technology; or deploy an existing technology that has not previously been demonstrated in Alaska.	Eligible applicants: An electric utility holding a certificate of public convenience and necessity under AS 42.05; an independent power producer; a local government, quasi-governmental entity, or other governmental entity, including tribal council or housing authority; a business holding an Alaska business license; or a nonprofit organization.
Renewable Energy Fund	Alaska Energy Authority http://www.akenergyauthority.org/	Solar water heat, photovoltaics, landfill gas, wind, biomass, hydroelectric, geothermal electric, fuel cells, geothermal heat pumps, CHP/cogeneration, hydrothermal, waste heat, transmission or distribution infrastructure, anaerobic digestion, tidal energy, wave energy, fuel cells using renewable fuels, geothermal direct-use	

Program	Funding Agency	Description of Funding Opportunity	Comments
Smart Growth Implementation Assistance Program	Environmental Protection Agency https://www.epa.gov/smartgrowth/smart-growth-implementation-assistance	Many communities want to foster economic growth, protect environmental resources, enhance public health, and plan for development, but might lack the tools, resources, and information to achieve their goals. In response to this demand, EPA developed the Smart Growth Implementation Assistance (SGIA) Program.	
Tier 1 Grant Program	Rasmuson Foundation http://www.rasmuson.org	Grants for capital projects, technology updates, capacity building, program expansion and creative works, including building construction/renovation/restoration, technology upgrades in community facilities, and capacity building grant support.	

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