Final Technical Report Cover Page

Recipient Organization:	Togiak Natives Limited
Project Title:	Togiak Heat Recovery Project
Date of Report:	12/21/2023
Award Number:	Award No. DE-IE0000126
Total Project Costs:	$1,206,351
DOE Share:	$604,675
Recipient Cost Share:	$604,675
Project Manager:	Jim Fowler, jffowler@anthc.org
Project Partner(s):	City of Togiak, Howard “Tom” Lowe (mayor), togiakmayor@gmail.com Alaska Native Tribal Health Consortium (ANTHC), Jim Fowler (project manager), jffowler@anthc.org

ACKNOWLEDGMENT

This material is based upon work supported by the Department of Energy, Office of Indian Energy Policy and Programs, under Award Number DE-IE0000126.

DISCLAIMER

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1.0 Executive Summary

The original scope of this project was the construction of a heat recovery (HR) system which would pipe what was previously wasted heat generated at the power plant to the five buildings listed below. The power plant houses diesel fired generators which provide electricity to the community. A portion of the heat produced by the generators can be recovered and piped to the user buildings. This project designed and constructed the system that recovers this heat and utilizes it to heat the user buildings.

- the water treatment plant
- the city office
- the old school[1] community activity building housing the library and city shop
- the police station
- the community center & clinic (they share the building)

As the project progressed, it became clear that there was insufficient funding to build a system that would serve all five buildings, so the police station and community center/clinic were removed from the project scope. In 2022 the City of Togiak was awarded funding through a Congressionally Designated Project, to expand the system to the police station and community center/clinic. Activities are underway to finalize the funding and start the expansion into these two buildings.

The HR system integrates with each building's internal heating system. The objective was to significantly reduce the heating costs in these four community facilities. By reducing the energy use and cost in these community facilities, the local economy is strengthened by keeping the funds inside the community that were formerly used to purchase imported fuel, thereby multiplying the impact of the energy cost reduction. Energy independence is enhanced and energy resilience is increased by reducing dependence on long fuel supply chains which are easily interrupted by unpredictable natural and man-made disasters such as earthquakes, climate change, road rail and sea accidents, etc.

2.0 Background

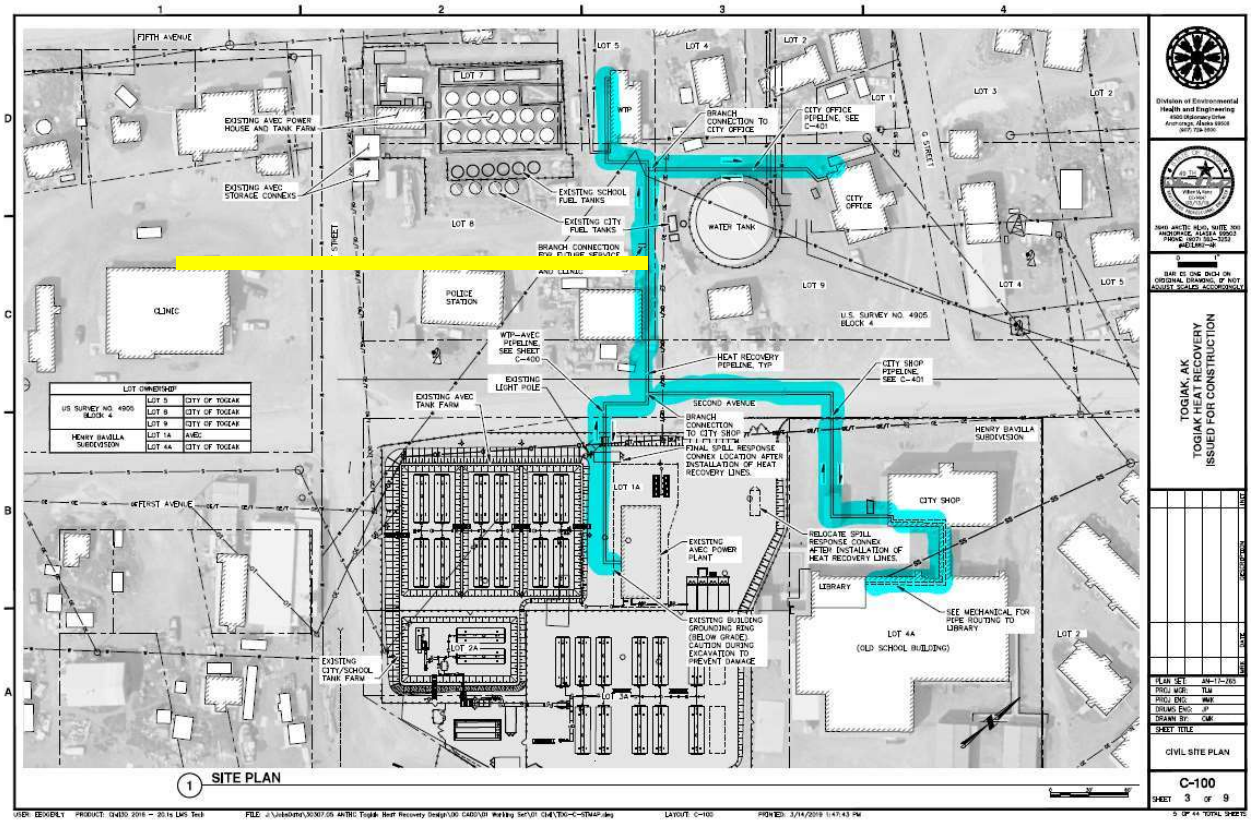
Togiak is an Alaskan Native village of 794 residents, located on the west coast of Alaska, approximately 390 air miles from Anchorage; it is accessible only by air or sea. Togiak is a traditional Yup'ik Eskimo village with a fishing and subsistence lifestyle; its population is 92.7% Alaskan Native or part Native. The Togiak Traditional Council is a federally recognized tribe located in the community. Togiak Natives Limited (TNL) is an Alaska Native Village Corporation established under the Alaska Native Claims Settlement Act (ANCSA) with original landholdings that encompass the total site area of this project. These landholdings have been deeded to the City of Togiak, one of the project partners on this grant application. TNL manages land and resources in and around Togiak, Alaska for the benefit of its shareholders, which consist of 955 residents and non-residents. TNL's long-term vision is to reduce the operating costs of community buildings, ultimately helping to keep access to clean water and community infrastructure affordable for all residents.

[1] Since the projects commencement, most of the old school has been vacated; the library was still in use and heated and the city shop was moved into another portion of the old school building. The heat recovery system serves only the city shop and library in this building.

The community of Togiak began looking into heat recovery as an option to achieve this goal more than a decade ago. In 2010, a feasibility study examined this specifically and quantified the benefit. In 2016, an updated feasibility study, based on more recent data and figures, was completed. The heat recovery system design was completed in March 2019, funded by a grant from the Alaska Energy Authority (AEA); the remaining funds from the AEA grant acted as a cost share for this Department of Energy grant. In addition to the AEA grant, the City obtained a State Revolving Fund Loan (SRF loan) from Alaska's Department of Environmental Conservation to finance the balance of the project.

3.0 Project Objectives

This project recovers heat produced by diesel generators at the nearby power plant owned and operated by the Alaska Village Electric Cooperative (AVEC). This heat is produced through the cooling of the generator manifolds and was previously exhausted to the atmosphere by radiators. With the diesel generators and the HR system operating, the heat is piped to the four facilities in the three community buildings by a buried insulated pipeline and is integrated into each building's existing heating system through valves and controls. The site map is shown below and the pipe routing is highlighted in blue; the future extension to the community center/clinic and police station is highlighted in yellow.



A primary objective of the project was to replace the use of diesel heating fuel in the four facilities. This reduces their cost of operation and increases Togiak's energy independence and resilience. The vulnerable supply chain

for imported heating fuel is eliminated and the heating oil dollars formerly sent out of the community are retained in the community, which multiplies their economic impact.

The City of Togiak can redirect the savings from the library, city shop and city office to other infrastructure serving its residents. The energy cost savings at the water treatment plant can be either be used to retain chronically underpaid, trained operators or reduce the cost of water for Togiak's residents.

The major tasks included funding and managing the project, performing the engineering and construction, commissioning the heat recovery system, training City staff in its operation and maintenance and installing the remote monitoring capability.

4.0 Description of Activities Performed

The City of Togiak received a grant from the Alaska Energy Authority in 2013 to start the engineering and construction of the HR system which, at that time, would serve all five of the facilities listed in the Executive Summary. ANTHC was engaged in 2017 to manage the AEA grant and the project.

Significant delays, including the construction of a new power plant by AVEC, delayed completion of the engineering. Based on a qualification-based solicitation to pre-qualified term contractors, CRW Engineering Group, LLC was awarded a contract to perform the engineering; they issued plans for construction in 2019 for the water treatment plant, city office, city shop and library. Based on a competitive low-bid solicitation for construction, AHTNA Engineering Services was awarded a contract for construction in early 2020. Construction was delayed further due to the Covid pandemic. The system started delivering heat to the four facilities in the three buildings and a certificate of substantial completion was issued in January 2022. BTU meters measuring the heat provided to each facility were installed in April 2022, although the BTU meter in the city office was not reporting due to piping issues. The city office piping was modified in February 2023 to allow the BTU meter to operate properly.

A stub-out in the buried HR piping was installed in the appropriate location to allow future expansion of the HR system to the police station and community center/clinic buildings and the system was sized to provide additional heat to these two facilities in the future.

One year of post-construction heat delivered to the library, city shop and city office has been recorded on ANTHC's BMON platform. The raw data is found in Appendix A. Since the BTU meter in the city office was not operable, the heating fuel delivered has been recorded for that building. The HR system was fully operable in February 2022 and the BTU meters were installed at the end of March 2022. The energy consumption, measured in BTU's, the calculated equivalent gallons of heating oil and the costs from April 2022 through March 2023 are shown in Table 1 below. The baseline year is 2021.

5.0 Conclusions and Recommendations

The HR system is now providing nearly all the heat in the city office, city shop, library and water treatment plant and the Congressionally Designated Project funding will be used to expand the system to the police station and community center/clinic, thereby fulfilling the original scope of the project.

When the project's feasibility was evaluated, the Old School building was still in use as a community facility. By 2021, most of the old school was vacant; it still housed the library and the city shop had been moved into a portion of the building but it was otherwise vacant and un-heated. In 2021, the city office, city shop and library were consuming[2] a total of 2,826 gallons of heating oil annually. During the first year after the HR system was commissioned, the city office was the only building consuming any heating oil and this was largely due to an incompatibility between the HR controls and the building controls. City staff estimated that 300 gallons of oil were delivered to this building during the first year of HR operation. The HVAC controls incompatibility was rectified in late 2022 and since then no additional heating oil has been delivered to the city office. In its first year of operation, the annual savings, based on the current use and occupancy of these four facilities is 2,525 gallons, or $12,852 based on the current $5.09/gallon cost of heating fuel. Now that the city office controls are operating properly, this is expected to increase to 2,825 gallons and $16,329 in annual savings.

With the basic HR system infrastructure now in place, the expansion to the police station and community center/clinic buildings is feasible and funded. The predicted savings in those buildings is estimated to be an additional 3,208 gallons per year and $12,639 in costs.

In addition to the energy cost savings benefit from the HR system, it also provides additional resiliency benefits to the community. Heat recovery systems serve as a secondary heating system for these essential community facilities. In many communities throughout Alaska this has prevented water infrastructure and other buildings from freezing up when their existing oil-fired boiler heating systems failed in the winter. In this way, Togiak's HR system provides redundancy, ensuring that residents have uninterrupted access to clean water and other city services and potentially saving extremely expensive repairs in the case of boiler failures.

Since 2000, the community of Togiak has been exploring viable alternative energy projects[3]. The Bristol Bay Regional Energy Plan of 2015 has as one objective to "complete (heat recovery) projects in New Stuyahok and Togiak". The operating HR system fulfills an important part of both the region's and the community's energy vision of implementing renewable and alternative energy sources to reduce their energy costs and increase their energy independence and resilience. With its fast paybacks, low-risk implementation and proven track record, heat recovery from the local power plant is the "low hanging fruit" in rural Alaskan communities. Togiak now joins the 101 other Alaskan Native communities recovering heat from their power plants to heat nearby buildings and water systems.

Table 1 shows the actual post-construction BTU's provided by the HR system to each of the three facilities and the actual gallons of oil delivered to the city office. For the pre-construction baseline year (2021), Table 1 shows the gallons of heating oil delivered each facility, as well as the cost and savings, using today's cost per gallon of $5.09. It should be noted that none of these facilities has a cumulative heating oil meter which would show the actual oil consumed by the boilers. Delivered oil figures can be misleading, as the tank could be full at the beginning of the period and empty at the end of the period, or vice versa.

[2] It is important to note that there were no meters measuring the fuel oil consumption in any of these buildings, the gallons stated here are estimates of the oil delivered to the buildings, not necessarily consumed.
[3] Bristol Bay Native Association CEDS Energy Plan; https://bbna.com/ceds-energy/

Table 1 – One year post-construction savings

Month	POST-CONSTRUCTION									2021 BASELINE				SAVINGS		
	Measured BTUs consumed				Equivalent gallons consumed - 3 facilities (using 132,000 BTU/gal and 80% boiler efficiency)	Actual gallons delivered - 3 facilities	Actual gallons delivered - City office	Heating oil cost	HR charges from AVEC	Gallons delivered						
	Water treatment plant	Library	City Shop	City Office						Water treatment plant	Library & City Shop	City Office	Cost	Gallons	AVEC charges	Cost
Apr-22	9,012,800	10,224,900	748,860	0	189.27				$218							
May-22	2,085,470	21,665,970	1,095,840	0	131.38				$151							
Jun-22	32,420	28,693,430	1,095,840	0	66.85				$77							
Jul-22	183,140	36,483,960	1,095,840	0	75.51				$87							
Aug-22	605,170	46,619,000	1,105,090	0	101.79				$117							
Sep-22	544,000	57,374,000	1,105,090	0	107.00	0	300	$1,527	$123	1580	1085	160	$14,379	2,525		$11,166
Oct-22	0	57,374,000	1,105,090	0	0.00				$0							
Nov-22	329,000	57,746,000	1,781,420	0	13.04				$15							
Dec-22	6,493,000	72,210,000	2,072,700	0	201.21				$231							
Jan-23	5,043,000	86,373,000	3,937,600	0	199.54				$229							
Feb-23	8,651,000	100,214,000	6,044,500	0	232.94				$268							
Mar-23	0	113,708,000	8,157,600	0	147.79				$170							
TOTALS	**32,979,000**	**688,686,260**	**29,345,470**	**0**	**1466.33**	**300**		**$3,213**		**2,825**			**$14,379**	**2525**	**$1,686**	**$9,480**

6.0 Lessons Learned

Funding: A lack of full funding at the program outset in 2012 turned what was anticipated to be a 3-year project into a 10 year project. Each time it became clear that funding was running out, new grants had to be applied for and the remaining activities had to be re-estimated. In the meantime, both City, Tribal and ANTHC staff had turned over. Then the Covid pandemic hit; this further delayed the program and added more cost. In general, construction costs have nearly doubled since 2019. Finally, the City was unable to secure the Alaska State Revolving Fund (SRF) loan for more than two years due to the State's bureaucratic requirements. This further delayed the project. Each delay resulted in added project costs due to inflation, re-mobilization costs and manpower turnover.

Engineering Issues: The engineering was contracted to a qualified ANTHC term-contractor. Several challenges arising from using an outside contractor became clear during the construction phase:

- The glycol make up tank in the water treatment plant was also used to provide make up glycol to the HR system. This cost saving measure made sense until the tank stopped operating and City staff were unaware. A small leak caused the HR system to shut down and it took 2 months to rectify the problem; if the make-up tank was operating, the small leak would not have resulted in a system shut down. A make-up tank dedicated to the HR system has now been designed and purchased and will be installed in 2023. The lesson learned is that each hydronic system should have its own dedicated glycol make-up tank.
- The boiler controls in the city office building do not have the capability to manage a second heat source (i.e. the HR system), they were therefore, precluding the use of the recovered heat piped to the building. Outside engineering firms (i.e. outside of ANTHC) are reticent to become involved and avoid making any changes inside "user buildings" due to liability concerns. In hindsight, the lesson learned is that the engineering scope of work should explicitly include evaluating and if necessary, modifying or replacing the HVAC controls in any user building to assure optimal use of the recovered heat and proper integration into that building's HVAC system.

Appendix A – Utility source data

The table below shows the source data recorded on ANTHC's BMON remote monitoring platform, located at this URL:
https://anthc.bmon.org/reports/?select_org=0&select_group=0&select_bldg=110&select_chart=1&select_sensor=2445

The conversion from MMBTUs to equivalent gallons of heating oil uses these factors:

- 132,000 BTU/gallon
- 80% boiler efficiency

The HR system was shut down for a leak repair in October and November, the shaded cells show this time frame. The city shop and library were unheated during this period and the water treatment plant used, but did not record heating oil from its reserve tank.

	WTP			Library			City shop		
	MMBTU	MMbtu's used	equiv gal	MMBTU	MMbtu's used	equiv gal	MMBTU	MMbtu's used	equiv gal
April	9.0128	9.0128	85.35	10.2249	10.2249	96.83	0.74886	0.74886	7.09
May	11.09827	2.08547	19.75	21.666	11.44107	108.34	1.09584	0.34698	3.29
June	11.13069	0.03242	0.31	28.6934	7.02746	66.55	1.09584	0	0.00
July	11.31383	0.18314	1.73	36.484	7.79053	73.77	1.09584	0	0.00
Aug	11.919	0.60517	5.73	46.619	10.13504	95.98	1.10509	0.00925	0.09
Sep	12.463	0.544	5.15	57.374	10.755	101.85	1.10509	0	0.00
Oct	12.463	0	0.00	57.374	0	0.00	1.10509	0	0.00
Nov	12.792	0.329	3.12	57.746	0.372	3.52	1.78142	0.67633	6.40
Dec	19.285	6.493	61.49	72.21	14.464	136.97	2.0727	0.29128	2.76
Jan	24.328	5.043	47.76	86.373	14.163	134.12	3.9376	1.8649	17.66
Feb	32.979	8.651	81.92	100.214	13.841	131.07	6.0445	2.1069	19.95
Mar	32.979	0	0.00	113.708	13.494	127.78	8.1576	2.1131	20.01
Annual total			**312.30**			**1076.78**			**77.25**

Appendix B – DOE 2021 Program Review slides

Alaska Native Tribal Health Consortium

Energy Infrastructure Deployment on Tribal Lands Grant
US Department of Energy, Office of Indian Energy

Jim Fowler, PE, CEM

Senior Project Manager

ANTHC Rural Energy Group

ALASKA NATIVE TRIBAL HEALTH CONSORTIUM

ANTHC Rural Energy Group

Alaska Native Tribal Health Consortium

Vision:

Alaska Natives are the Healthiest People in the World

- Formed in 1998, non-profit, 3000+ employees, serving 180,000+ Alaska Natives and American Indian people
- Larges Tribal health organization in US
- Medical services, wellness programs, disease research, rural provider training, rural water & sanitation systems

We believe basic sanitation should be efficient, sustainable and affordable

ALASKA NATIVE TRIBAL HEALTH CONSORTIUM

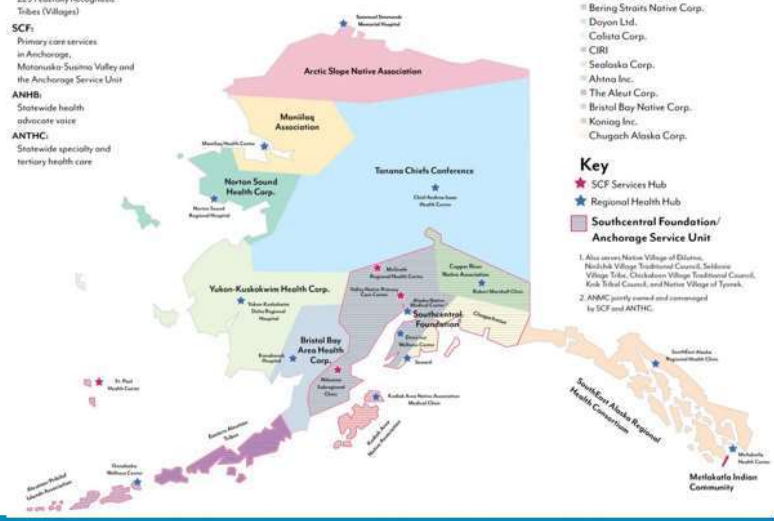
Alaska Native Health System

Facts
229 Federally Recognized Tribes (Villages)

SCF:
Primary care services in Anchorage, Matanuska-Susitna Valley and the Anchorage Service Unit

ANHB:
Statewide health advocate voice

ANTHC:
Statewide specialty and tertiary health care



Regional Native Corporations
- Arctic Slope Regional Corp.
- NANA Regional Corp.
- Bering Straits Native Corp.
- Doyon Ltd.
- Calista Corp.
- CIRI
- Sealaska Corp.
- Ahtna Inc.
- The Aleut Corp.
- Bristol Bay Native Corp.
- Koniag Inc.
- Chugach Alaska Corp.

Key
- SCF Services Hub
- Regional Health Hub
- Southcentral Foundation/ Anchorage Service Unit

1. Also serves Native Village of Eklutna, Nedelthk Village Traditional Council, Seldovia Village Tribe, Chickaloon Village Traditional Council, Knik Tribal Council, and Native Village of Tyonek.
2. ANMC jointly owned and comanaged by SCF and ANTHC.

ALASKA NATIVE TRIBAL HEALTH CONSORTIUM

ANTHC Rural Energy Group

Dept of Environmental Health & Engineering (DEHE)

- DEHE is the "Prevention arm" of ANTHC
- Study linkages between absence of clean water & increased disease
- 3 Core operating areas

Sanitation

Health Facilities Support

Utility Management
- Operations & Maintenance and Training (Tribal Utility Support)
- Alaska Rural Utility Collaborative (ARUC)

We believe basic sanitation should be efficient, sustainable and affordable

ALASKA NATIVE TRIBAL HEALTH CONSORTIUM

ANTHC Rural Energy Group

Mission: Lower the cost of energy in rural communities

- 40 projects, $20,000,000 in grants
- 7 staff: engineers & project managers
- Anchorage based
- Work with communities to write and manage grants, design and implement projects
- Energy efficiency and renewable energy projects:
  - energy audits and upgrades
  - heat recovery from power plants
  - remote monitoring
  - solar PV, wind and biomass heating
- "Topping off" (optimizing & expanding) existing renewable systems
  - Wind to heat
  - Expanding heat recovery & biomass

39% of operating cost of water/sanitation systems is the cost of energy

ALASKA NATIVE TRIBAL HEALTH CONSORTIUM

ANTHC Rural Energy Group

Grantee: Togiak Natives Limited (TNL)

- Togiak is one of 21 villages in the Bristol Bay region of western Alaska
- 67 air miles SW of Dillingham, 392 air miles SW of Anchorage
- Founded in 1973, TNL is a village corporation formed under the Alaska Native Claims Settlement Act (ANSCA)
- Serves 974 shareholders, approximately 690 living in Togiak
- Subsistence Lifestyle

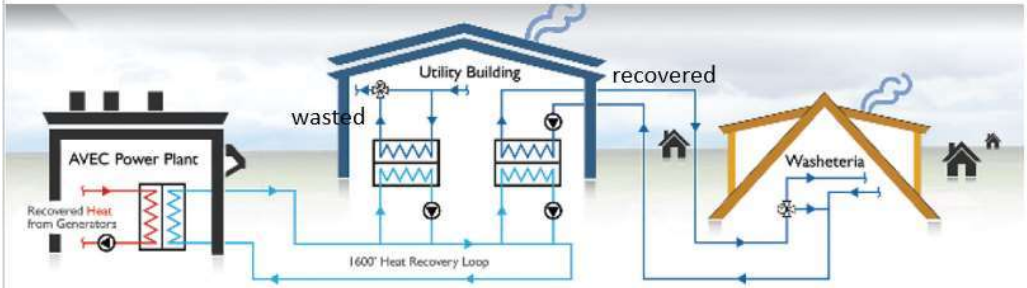
ALASKA NATIVE TRIBAL HEALTH CONSORTIUM

Grantee: Togiak Natives Limited (TNL)

Togiak Natives Limited drives innovation and economic growth in our region in order to preserve our rich Yupiaq culture and language, protect our unique land, and ensure youth, elder, and shareholder well-being. We are committed to our values of respect, honesty, collaboration, and integrity.

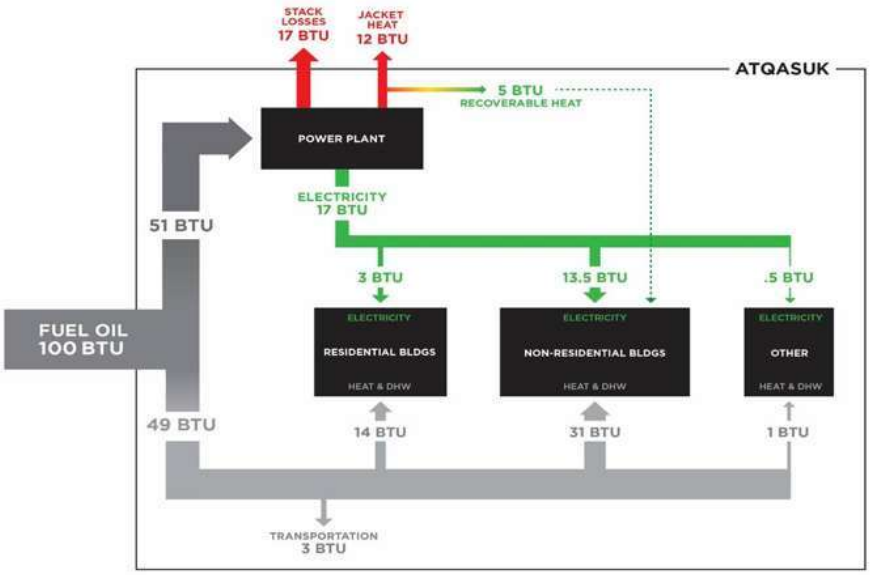
- Fish and heat
- Togiak district herring allotment is nearly 50,000 tons, out of the nearly 250,000 tons total biomass

ANTHC Rural Energy Group



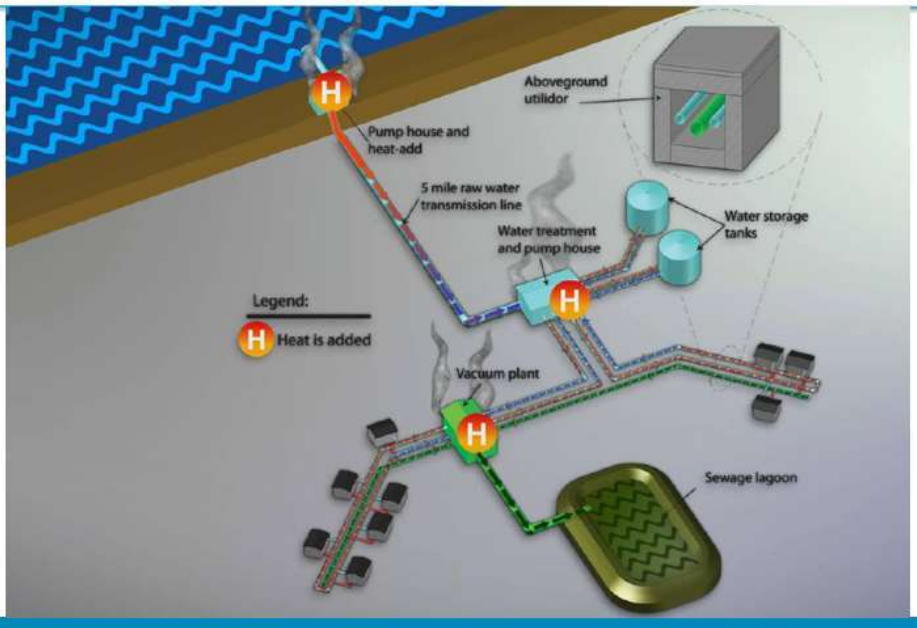
ALASKA NATIVE TRIBAL HEALTH CONSORTIUM

ANTHC Rural Energy Group



ALASKA NATIVE TRIBAL HEALTH CONSORTIUM

ANTHC Rural Energy Group

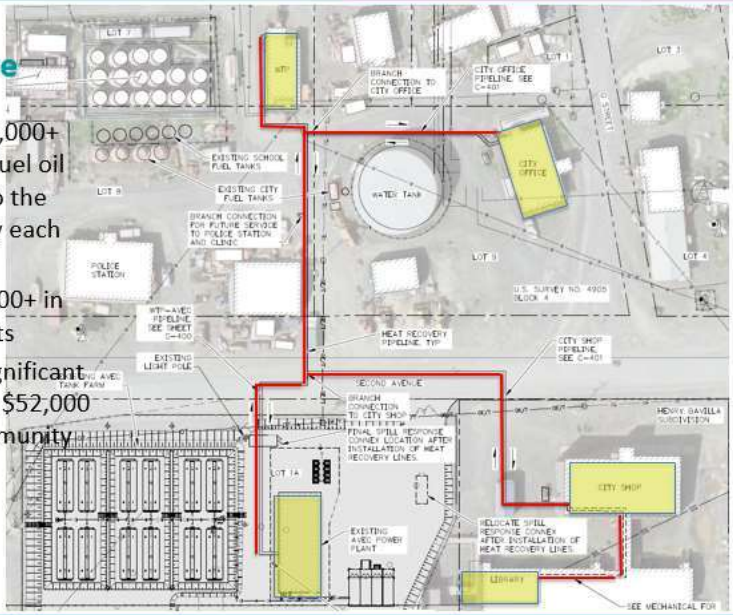


ALASKA NATIVE TRIBAL HEALTH CONSORTIUM

ANTHC Rural Energy Group

Objective

- Replace 14,000+ gallons of fuel oil barged into the community each year
- Save $52,000+ in fuel oil costs
- Retain a significant part of the $52,000 in the community



ALASKA NATIVE TRIBAL HEALTH CONSORTIUM

ANTHC Rural Energy Group

Project Partners

- Togiak Natives Limited (TNL)
- City of Togiak
- Alaska Village Electric Cooperative (AVEC)
- Alaska Native Tribal Health Consortium (ANTHC)
- US Department of Energy – Office of Indian Energy (DOE-OIE)
- Alaska Energy Authority (AEA)
- State of Alaska – Department of Environmental Control

ALASKA NATIVE TRIBAL HEALTH CONSORTIUM

TOGIAK NATIVES LIMITED

AVEC
ALASKA VILLAGE ELECTRIC COOPERATIVE

ALASKA ENERGY AUTHORITY

ALASKA NATIVE TRIBAL HEALTH CONSORTIUM

ANTHC Rural Energy Group

Project History

- Originally explored heat recovery feasibility in 2010
- Applied for AEA Renewable Energy Fund (REF) in 2011
- REF grant awarded in 2012, $443,030
- Shifting priorities delayed the project
  - Design and construction bids were much higher than estimates in feasibility study
- Design completed March 2019
- Additional funding sources secured in fall of 2019
  - DOE OIE Energy Infrastructure Grant
  - Commitment from State of Alaska revolving loan fund

ALASKA NATIVE TRIBAL HEALTH CONSORTIUM

ANTHC Rural Energy Group

Project History – Part 2

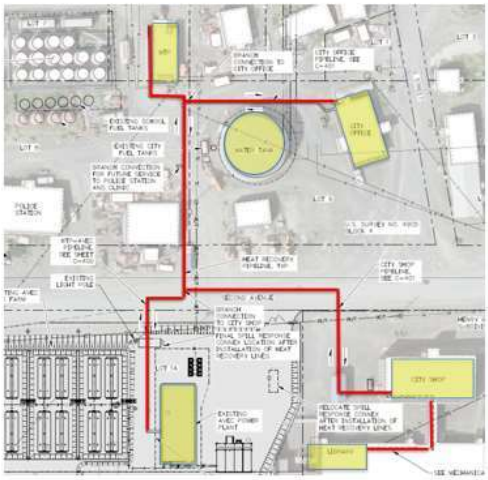
- Covid Pandemic delayed project timeline, first mobilization September 2020
- Setbacks including:
  - Travel restrictions
  - Changes in power plant requirements
- Work is 98% complete, awaiting minor changes and final commissioning

ALASKA NATIVE TRIBAL HEALTH CONSORTIUM

Project Summary

End Users

- Water treatment plant and storage tank
- City office
- City Shop
  - Search and rescue garage
- Library
- Future Expansion
  - Clinic
  - Village Public Safety Office



ALASKA NATIVE TRIBAL HEALTH CONSORTIUM

Appendix C – DOE 2022 Program Review slides

Togiak Heat Recovery Project

Togiak Natives Limited
Alaska Native Tribal Health Consortium

Leslie Crocker, CEO Togiak Natives Limited
Jim Fowler, PE, CEM; ANTHC Project Manager
Dustin Madden, CEM; ANTHC Rural Energy Program Manager

ANTHC Rural Energy Program

ALASKA NATIVE TRIBAL HEALTH CONSORTIUM

Overview

- Project partnerships
  - Togiak Natives Limited
  - Alaska Native Tribal Health Consortium
- Heat recovery systems
- Project
  - Objectives
  - History
  - Current status
  - Benefits
  - Future plans

ALASKA NATIVE TRIBAL HEALTH CONSORTIUM

Background

ALASKA NATIVE TRIBAL HEALTH CONSORTIUM

Project Partners

- Togiak Natives Limited (TNL)
- City of Togiak
- Alaska Village Electric Cooperative (AVEC)
- Alaska Native Tribal Health Consortium (ANTHC)
- US Department of Energy – Office of Indian Energy (DOE-OIE)
- Alaska Energy Authority (AEA)
- State of Alaska – Department of Environmental Control

ALASKA NATIVE TRIBAL HEALTH CONSORTIUM

TOGIAK NATIVES LIMITED

AVEC ALASKA VILLAGE ELECTRIC COOPERATIVE

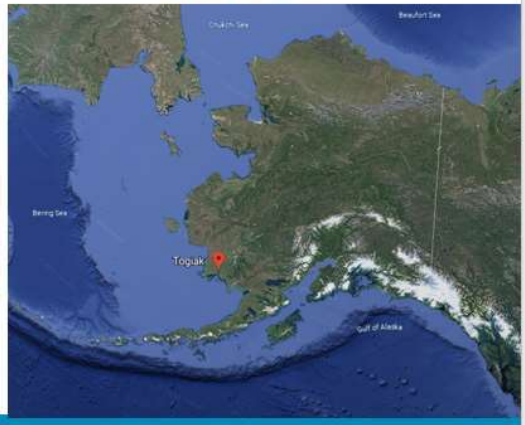
ALASKA ENERGY AUTHORITY

ALASKA NATIVE TRIBAL HEALTH CONSORTIUM

Grantee: Togiak Natives Limited (TNL)

- **Togiak:**
  - ~800 people, 94% Alaska Native
  - Subsistence Lifestyle
- **TNL: ANCSA Village corporation**
  - Serves ~1,000 shareholders
  - Mission:

  Togiak Natives Limited drives innovation and economic growth in our region in order to preserve our rich Yupiaq culture and language, protect our unique land, and ensure youth, elder, and shareholder well-being. We are committed to our values of respect, honesty, collaboration, and integrity.



ALASKA NATIVE TRIBAL HEALTH CONSORTIUM

Alaska Native Tribal Health Consortium (ANTHC)

- Non-profit tribal health organization representing 229 Federally recognized tribes in Alaska
  - Board members from each Alaska Native regional health organization
- "Compact Agreement" with the Indian Health Service to provide health services to Alaska Native people
- Customer-owners

ALASKA NATIVE TRIBAL HEALTH CONSORTIUM

OUR VISION:

Alaska Native people are the healthiest people in the world.

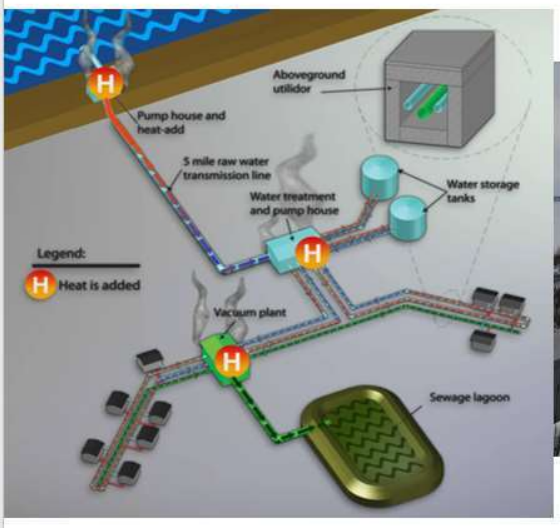
ALASKA NATIVE TRIBAL HEALTH CONSORTIUM

Water Health Impacts

- **Water *Quantity*** is limited by:
  - No piped service
  - Frozen / damaged systems
    - Boil water notices
- **Infant hospitalization:** *1 out of 3 of babies will be hospitalized* with respiratory infections in the first year of life in communities where less than 10% of homes have in-home water service
- **Skin infections:** 10x higher rates in communities with lower water quantity than similar communities with mostly piped service

ALASKA NATIVE TRIBAL HEALTH CONSORTIUM

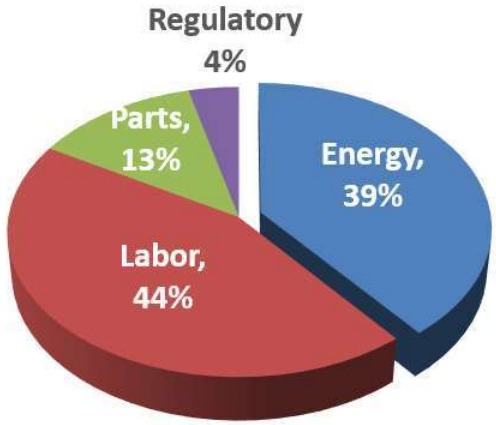
Sanitation Facilities in Rural Alaska



Water and Sewer Utilidor in Saint Michael, Alaska

ALASKA NATIVE TRIBAL HEALTH CONSORTIUM

Energy Costs in Rural Sanitation Facilities



- Rural sanitation can account for up to **1/3 of total community energy costs**
- 60 – 260 times higher per capita than national avg
- Sanitation energy costs can be a high percentage of household income:
  - Avg: 4 – 7% of income
  - Maximum: 16%
- Energy is 39% of the cost of water/sewer on average

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How the Rural Energy Program Supports Communities

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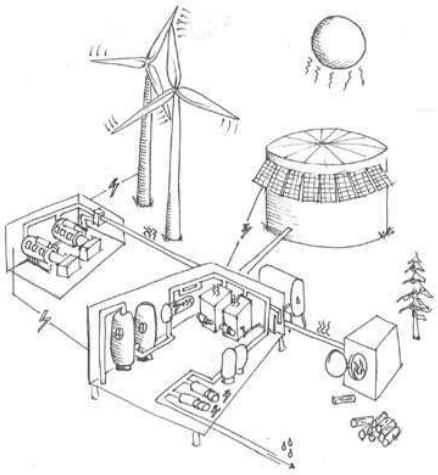
Rural Energy Program: Project types



- Energy Efficiency:
  - Most cost-effective
- Heat Recovery
  - Biggest $ savings + resiliency
- Biomass heating
  - Local jobs / resources + resiliency
- Solar PV
- Wind-to-heat
- Hydroelectric

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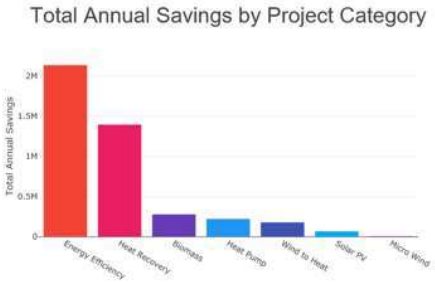
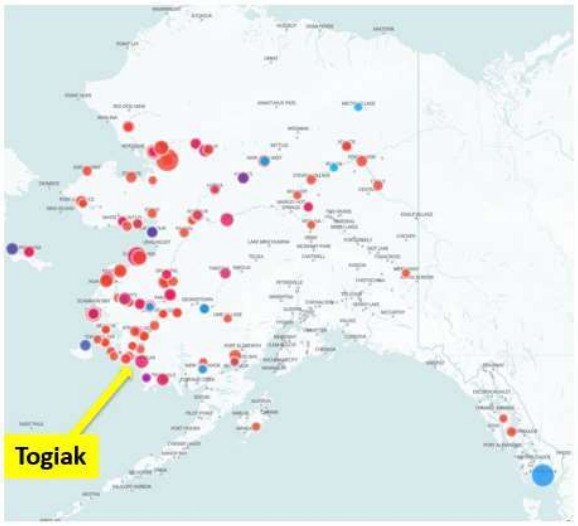
Rural Energy Program Savings

- Program began in 2011
- $4.7M ongoing annual savings
- $30.0M cumulative savings
- Total homes in 86 served villages: 7,745
- Annual energy savings per family: $609





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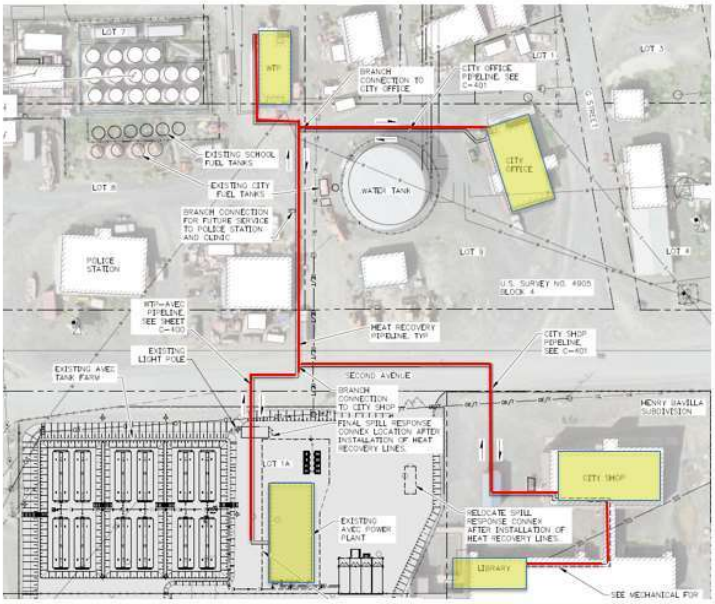
Togiak Heat Recovery Project: Objectives

- Replace 14,000+ gallons of fuel oil barged into the community each year
- Save $52,000+ in fuel oil costs annually
- Retain a significant part of the $52,000 in the community
- **Update:** Heating fuel price increased to $5.59 per gallon → $78k annual savings



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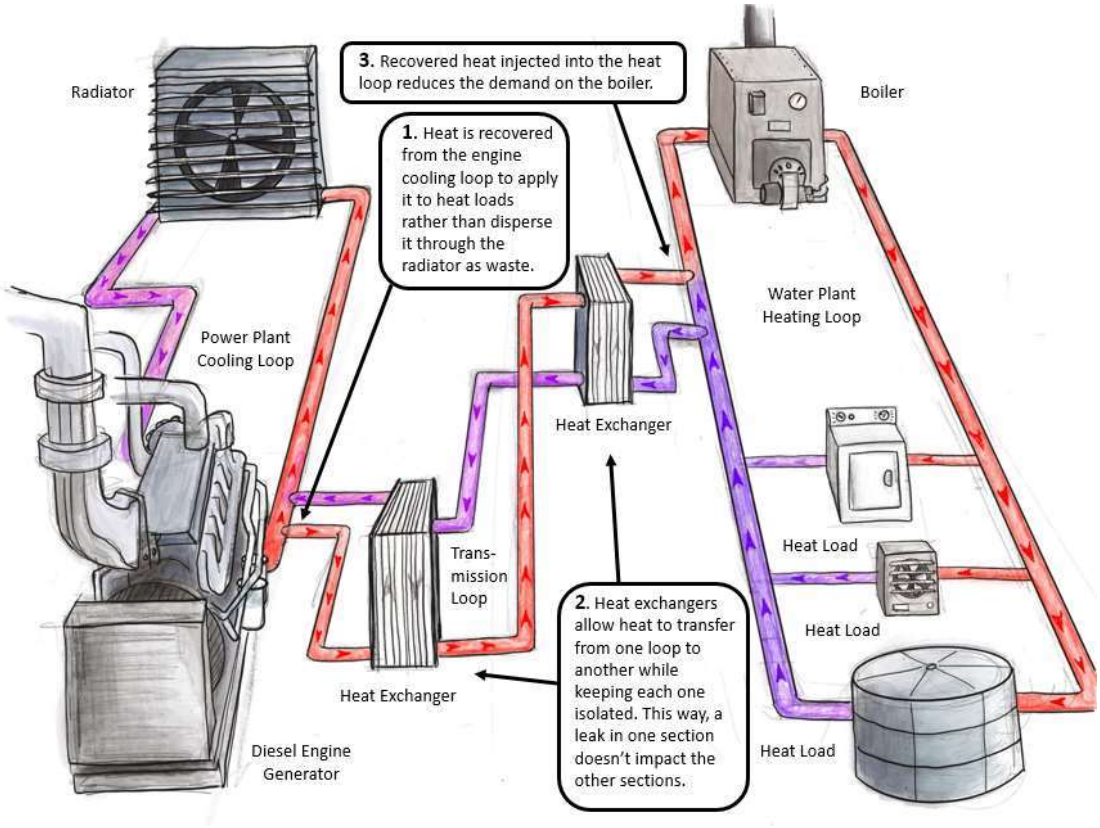
Togiak Heat Recovery Project: End-Users



Project History

- Originally explored heat recovery feasibility in 2010
- Applied for AEA Renewable Energy Fund (REF) in 2011
- REF grant awarded in 2012, $443,030
- Project delays
  - Design and construction bids were much higher than estimates in feasibility study
  - AVEC built new power plant in new loc.
- Design completed March 2019
- Additional funding sources secured in fall of 2019
  - ***DOE-OIE Energy Infrastructure Deployment on Tribal Lands Grant***
  - Commitment from State of Alaska DEC revolving loan fund

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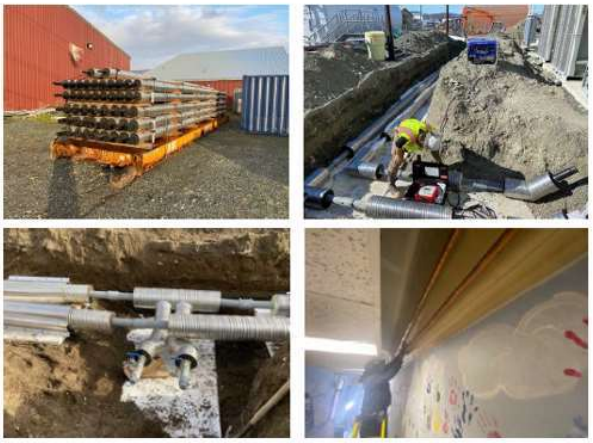
Project History and Current Status

History (continued):

- COVID-19 Pandemic delayed project timeline; first mobilization September 2020
- Setbacks including:
  - Travel restrictions
  - Changes in power plant requirements

Current status:

- System commissioned in January 2022; currently operating
- Controls and integration issues are preventing full utilization in some end-users:
  - Troubleshooting and optimization in process
- Currently in M&V phase



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System benefits

- **Energy cost savings:**
  - ~14,000 gallons annually (est)
  - $78k at current retail fuel prices
- **Community Resiliency:**
  - Heat recovery system serves as secondary heating system for piped water system and community facilities
  - Keeps money in local economy
  - Insulates community from global oil price fluctuations

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Future Plans

- **Proposed Expansion:**
  - Health Clinic
  - Village Public Safety Office
- **Funding:**
  - City of Togiak requested Congressionally Delegated Spending from Sen. Murkowski
  - ANTHC working to help secure match funding

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Questions? Comments?
Thank You!
Dustin Madden
Program Manager
Rural Energy Program
dmmadden1@anthc.org
Jim Fowler
Project Manager
Rural Energy Program
jffowler@anthc.org
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