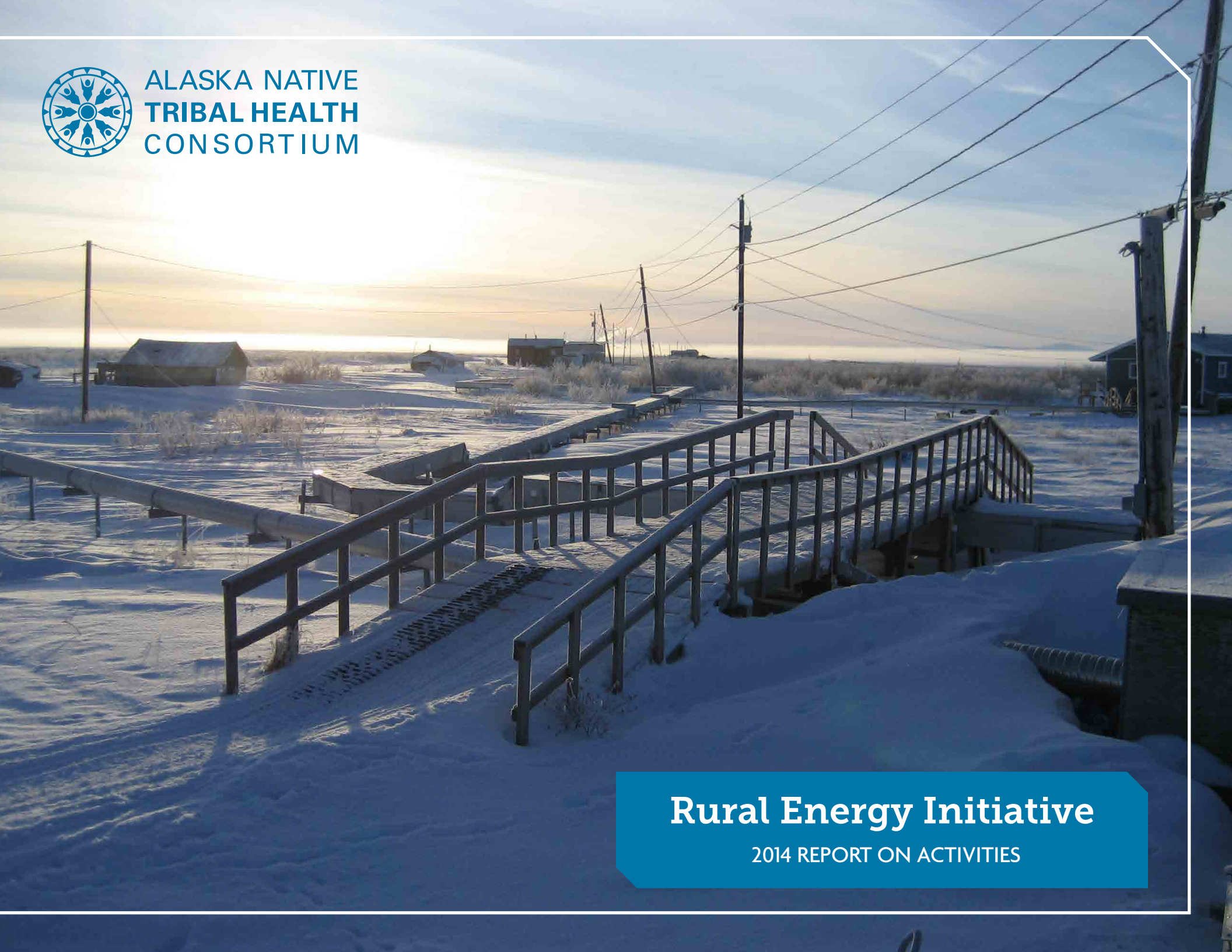


ALASKA NATIVE
TRIBAL HEALTH
CONSORTIUM

Rural Energy Initiative

2014 REPORT ON ACTIVITIES

We believe our basic sanitation should be efficient, sustainable, and affordable.

Contents

Pictured: Hooper Bay, Alaska

Message from the Program Administrator

In 2014, the Alaska Native Tribal Health Consortium's (ANTHC) Rural Energy Initiative completed several renewable energy projects. Projects include recovered heat projects in Ambler and Savoonga, a biomass system in Kobuk and our first wind to heat project in Mekoryuk in October. Along with renewable energy projects, the Rural Energy Initiative received funding from the USDA Rural Development, Denali Commission, and the State of Alaska Department of Environmental Conservation to perform additional energy audits, implement energy efficiency upgrades in 39 communities and provide operator training. To accomplish these projects, the Rural Energy Initiative collaborated with regional housing authorities and state and federal agencies, along with other stakeholders in order to confront Alaska's rural energy challenges.

A significant challenge is the continued high cost of fuel oil energy in rural Alaska, despite the drop in crude oil prices that lowers utility costs for residents of the Lower 48. Rural Alaska buys fuel in bulk during the summer to last through the year. At the time that many communities purchased fuel, the price was still high. Because of reduced oil revenue, the State of Alaska has proposed to cut revenue sharing, a funding source that many rural communities rely on to operate and maintain their sanitation systems. This potential loss, mixed with high energy costs, will challenge rural Alaska's financial sustainability. Now more than ever, it is important to reduce the high cost of operating sanitation systems in rural Alaska.

With limited funding availability at both the State and Federal levels, our program has created alternative ways to continue serving our customer owners. This next year will see more collaborative efforts with ANTHC's Alaska Rural Utility Collaborative, the Alaska Energy Authority, Tribal organizations, rural power companies and several others to reduce energy costs and improve overall sustainability throughout Alaska. The Rural Energy Initiative will continue to help communities identify renewable energy projects that reduce costs, while increasing energy efficiency and operator training and maintenance. Reductions in energy costs for sanitation systems will expand access to clean water and improve public health, reduce household expenses, improve community economies, and result in savings to the State of Alaska's operating budget.

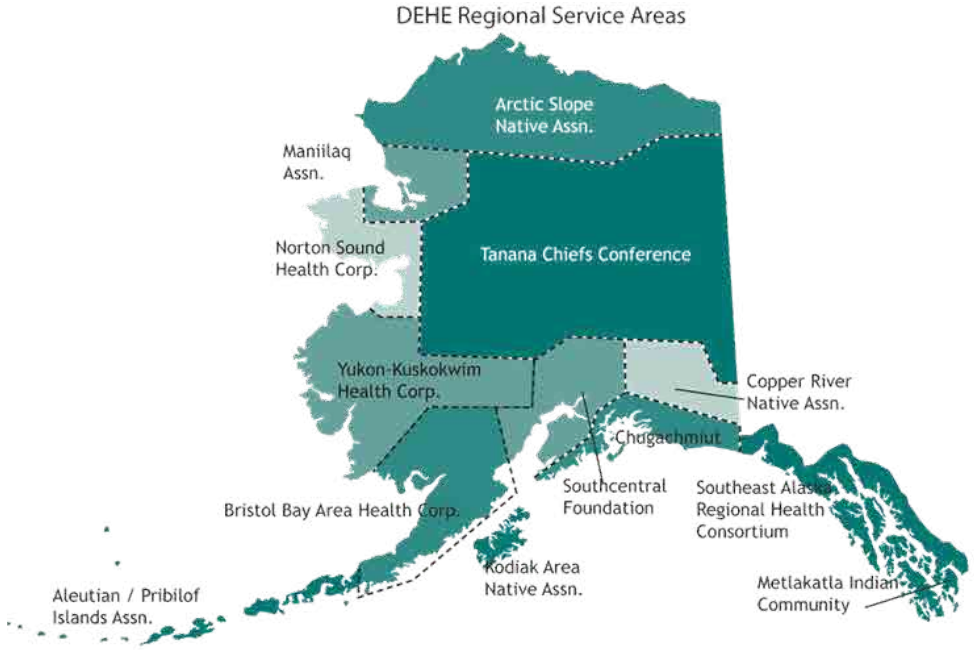
Though the next year may be more competitive for project funding, our newly formed partnerships will help us effectively carry on our work to improve the overall vitality of the rural Alaskan communities we serve. We look forward to working with you in the challenges ahead.

Gunalchéesh,

Suzanne Wolf
Rural Energy Initiative Program Administrator

What is the Rural Energy Initiative?

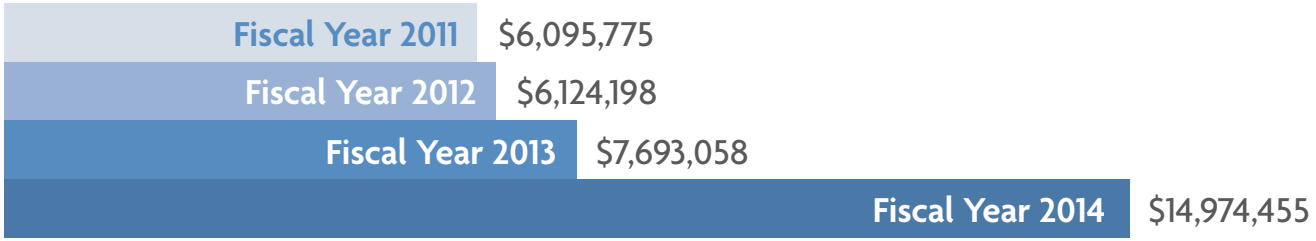
Pictured: Gavin Dixon, Suzanne Wolf, Eric Hanssen, Kevin Ulrich, and Daniel Reitz



The Alaska Native Tribal Health Consortium (ANTHC) Division of Environmental Health & Engineering provides planning, design, construction, and operations support for sanitation projects throughout Alaska. These services contribute to ANTHC's vision that Alaska Native people are the healthiest people in the world by providing preventative health through access to clean water and sewer. Recognizing the high cost to operate sanitation infrastructure in rural Alaska, in 2010 ANTHC created the Rural Energy Initiative. The Rural Energy Initiative works with communities to implement innovative energy efficiency and renewable energy solutions to make public sanitation affordable for the people we serve across Alaska.

Our Finances

Total grant funds applied for on behalf of communities by fiscal year



Total project funds awarded by fiscal year

Our Impact

$1,496,430

Estimated annual savings of projects implemented in fiscal year 2014

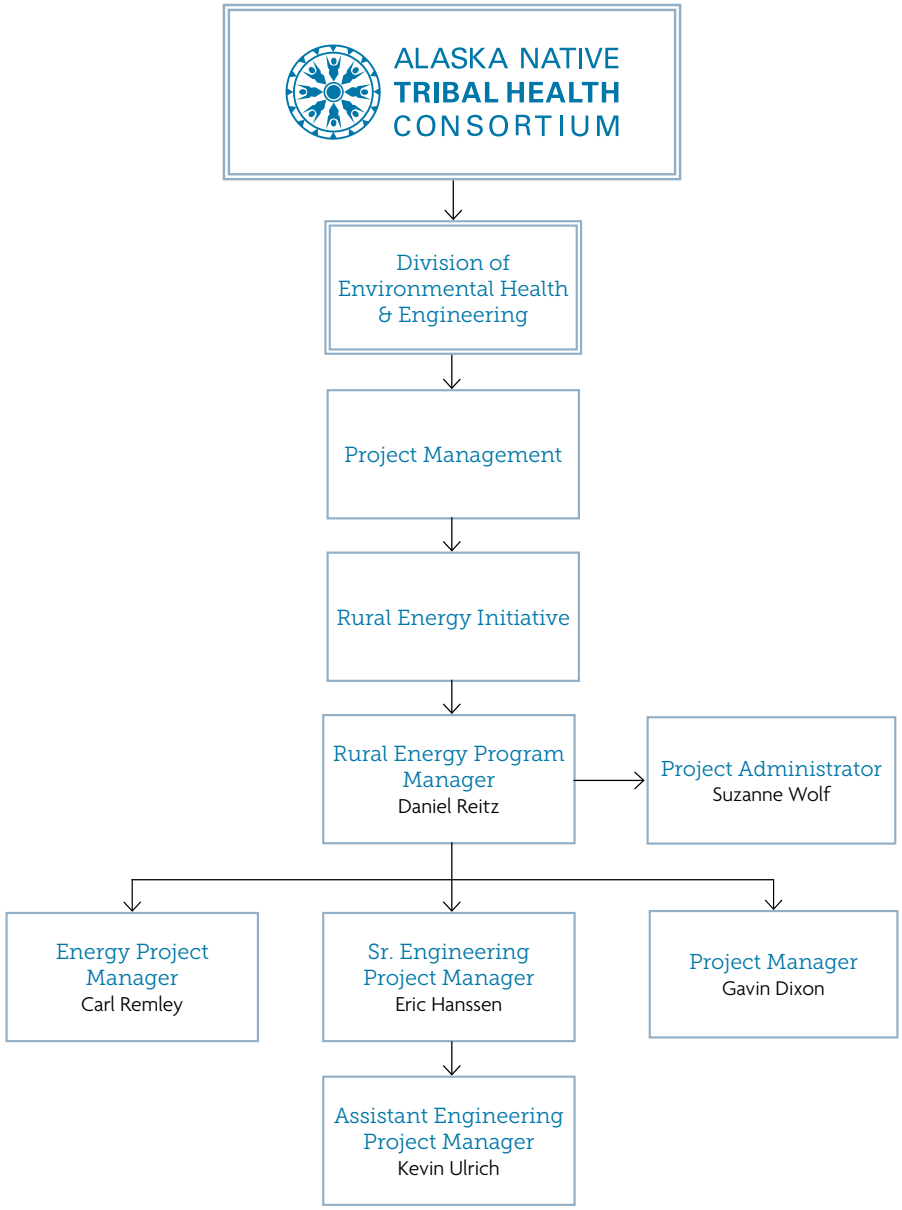
$3,783,566

Estimated cumulative annual savings of projects completed from start of program through fiscal year 2014

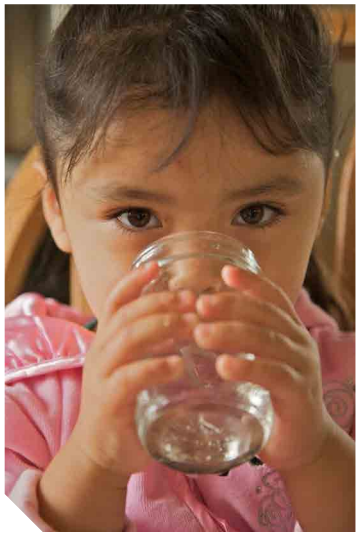
$6,698,977

Estimated projected savings of projects from start of program through fiscal year 2015

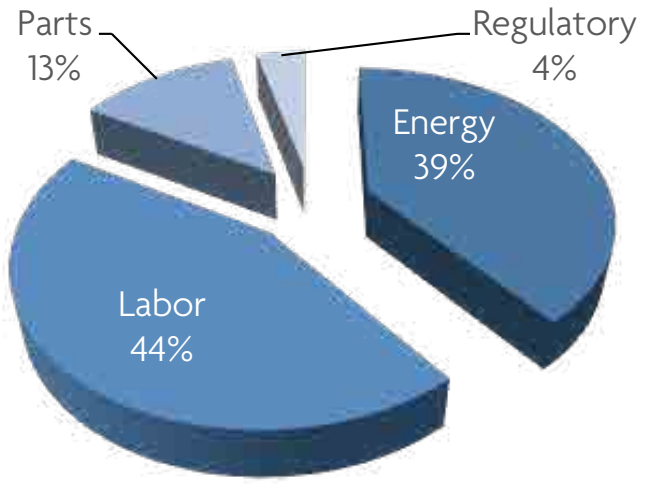
Fiscal Year 2014 Organization Chart



What Does Energy Have to Do With Water and Sewer?



Providing clean water and sanitary sewer systems for remote communities with no road access in extremely cold climates presents unique challenges, including extremely high energy usage and high energy costs. On average, energy costs are 39 percent of the total cost of providing public sanitation in rural Alaska, with electricity costs as high as $1.00/kilowatt hour, and heating fuel costs over $10.00 per gallon in some locations. Water and sewer bills in rural Alaska range from $80 to $250 per month, and average 3-8 percent of median household income. This confluence of factors is a direct threat to the sustainability of public sanitation across rural Alaska.



Breakdown of the operating cost for an average water/ sewer system in rural Alaska

What We Do

Energy Audits

Energy audits identify measures that can greatly reduce energy costs. ANTHC adapts industry accepted energy audit practices to fit the unique needs of Arctic water systems.

Energy Efficiency Retrofits

Reducing energy use is much cheaper than increasing energy supply, so ANTHC identifies ways to make existing home and utility systems operate more efficiently. ANTHC has conducted energy audits for 46 community sanitation systems across Rural Alaska since 2011. These audits have been funded by DOE, USDA Rural Development, the State of Alaska, and the Denali Commission.

Renewable Energy Projects

Renewable energy projects such as biomass, wind to heat, heat recovery, hydroelectric, and solar can offer high impact energy solutions for rural Alaska. ANTHC assists communities in identifying renewable energy projects that work for each community, seeks funding to implement the project and provides project management and construction of the system. ANTHC has completed 12 renewable energy projects for rural Alaska sanitation systems since 2011. This initial effort has resulted in a total annual cost savings of $1,030,000 in 2014. Funding for these projects has been provided by DOE and the State of Alaska's Renewable Energy Fund.

Energy Efficiency

Audit

Onsite Assessment
Collect Data
Evaluate Operating Practices
Access Facility Energy Use

Analysis

Develop Energy Model
Identify Potential
Improvements
Identify Cost to Implement

Implement Recommendations

Develop Training Plan
Purchase Materials
Implement Changes
Provide Operator Training

Savings

Monitor Energy Usage
Evaluate
Effectiveness

ANTHC's Rural Energy Initiative received a grant from the Denali Commission to implement energy efficiency measures in up to 45 rural Alaska sanitation systems. The grant also funds energy audits for sanitation systems in up to 39 additional rural Alaska communities.

The grant provides funding for maintenance and operations training, installation of more efficient retrofitted equipment, and increases the useful life of the aging sanitation infrastructure in rural Alaska. Implementing appropriate new technologies, such as LED lighting, high efficiency pumps, and new controls infrastructure, helps realize significant energy savings. ANTHC is further able to provide personalized operator training, so that operators can run their sanitation facilities more efficiently and maintain energy savings for communities for years to come.

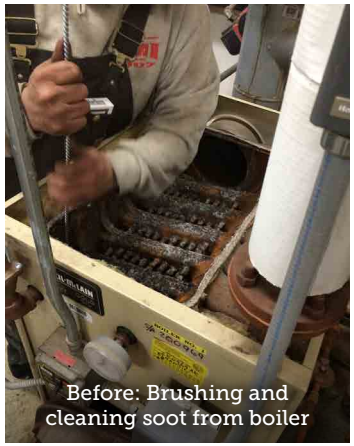
The goal of reducing energy costs in rural sanitation systems is to improve the long-term sustainability of facilities and reduce the cost of water and sewer service for homeowners.

This grant, in conjunction with energy efficiency focused funding from USDA Rural Development, State of Alaska Department of Environmental Conservation and the Alaska Legislature, is expected to produce **$643,200 in annual energy savings in rural sanitation systems** once all work is complete.

Case Study: Pilot Station

Before: High-pressure sodium entrance light

After: LED entrance light



Before: Brushing and cleaning soot from boiler

After: Clean flue passage

In 2014, ANTHC completed energy efficiency work on the local water and sewer system in Pilot Station. Since these retrofits were implemented, **the community has seen a 66 percent reduction in fuel use and a 33 percent drop in kWh consumption** compared to the initial energy audit in 2012.

This project is expected to save the community more than 1,000 gallons of fuel oil and 25,000 kWh annually for a **combined annual savings of $11,090** including an $8,750 annual savings to the Power Cost Equalization (PCE) program.

Upgrades included cleaning of the boilers, upgrading hydronic controls, replacing lights with LEDs, rerouting plumbing, and minor building weatherization. Training was provided to the local operator, which included boiler run times, setting and maintaining proper operational parameters and preventative maintenance schedules.

Remote Monitoring

Monitoring energy investments to ensure that ongoing energy savings are realized and maintained is an important part of the Rural Energy Initiative.

ANTHC installs simple monitoring equipment to remotely monitor sanitation systems performance and maintain information on energy use. To date, this program provides monitoring service to 17 communities, with 28 communities expected to be served by the end of 2016. In addition to tracking energy performance, remote monitoring enables utility operators to access maintenance expertise outside the community to identify potential catastrophic failures such as freeze-ups and avoid expensive and damaging emergencies.

What it is and how it can help

Small wireless devices are installed in key locations in the water plant (and other facilities) which supplies information to an internet-based data bank on a regular recurring schedule. Information such as water temperature, plant temperature, water flow rates and tank levels are typically reported. The data assists state, federal and Tribal Health Organization responders to identify threats to the systems that may not be detected locally. The data will also create a record of long-term operational performance that can help operators, engineers and others identify trends and make recommendations to save energy, supplies, labor and money.

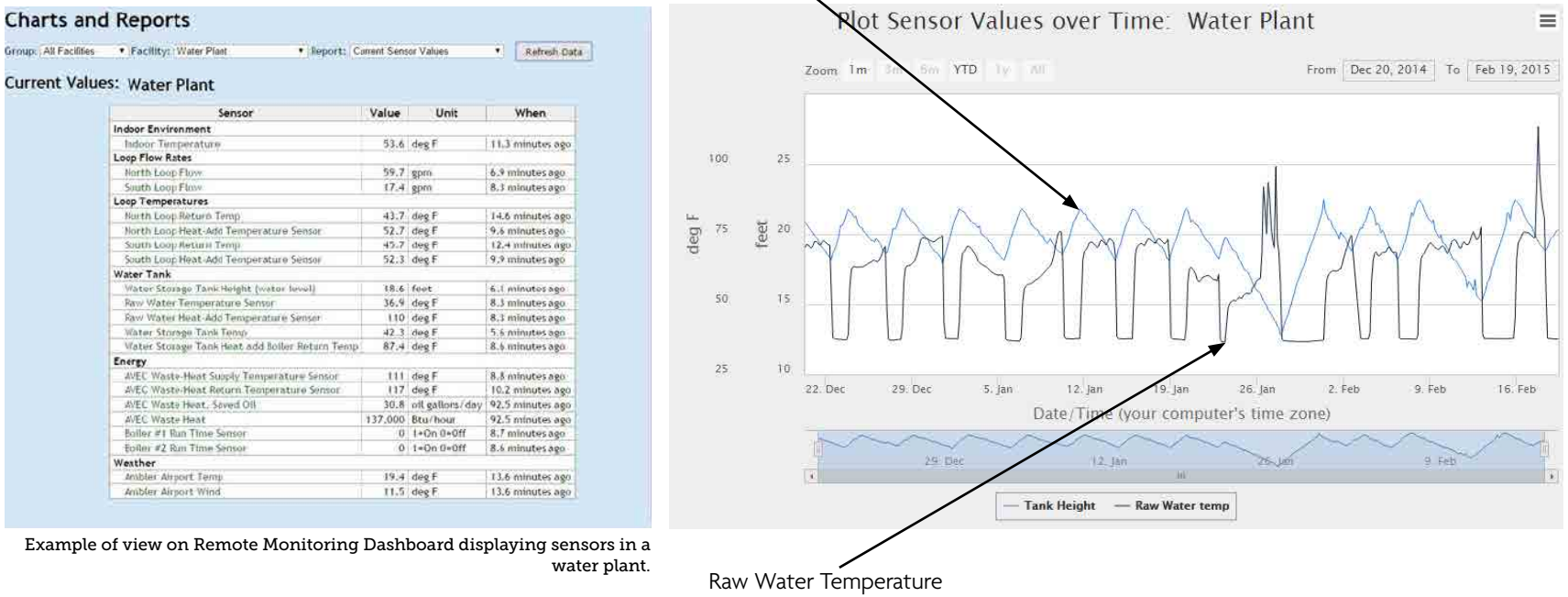
All remote monitoring equipment is labeled and does not change the existing operation of the water plant. This system simply allows for improved outside technical support when necessary. If desired, the water operators, financial administrators or other community members are welcome to also monitor the information captured by visiting the Remote Monitoring Dashboard available online.

Remote Monitoring serves two critical functions:

1. Direct monitoring of a facility to prevent catastrophic failure
2. Data collection for future energy audits/retrofits.

The Remote Monitoring Dashboard can be accessed by visiting: www.rm.anthc.webfactional.com.

Remote Monitoring (continued)



Example of view on Remote Monitoring Dashboard displaying sensors in a water plant.

How it prevents catastrophic failures

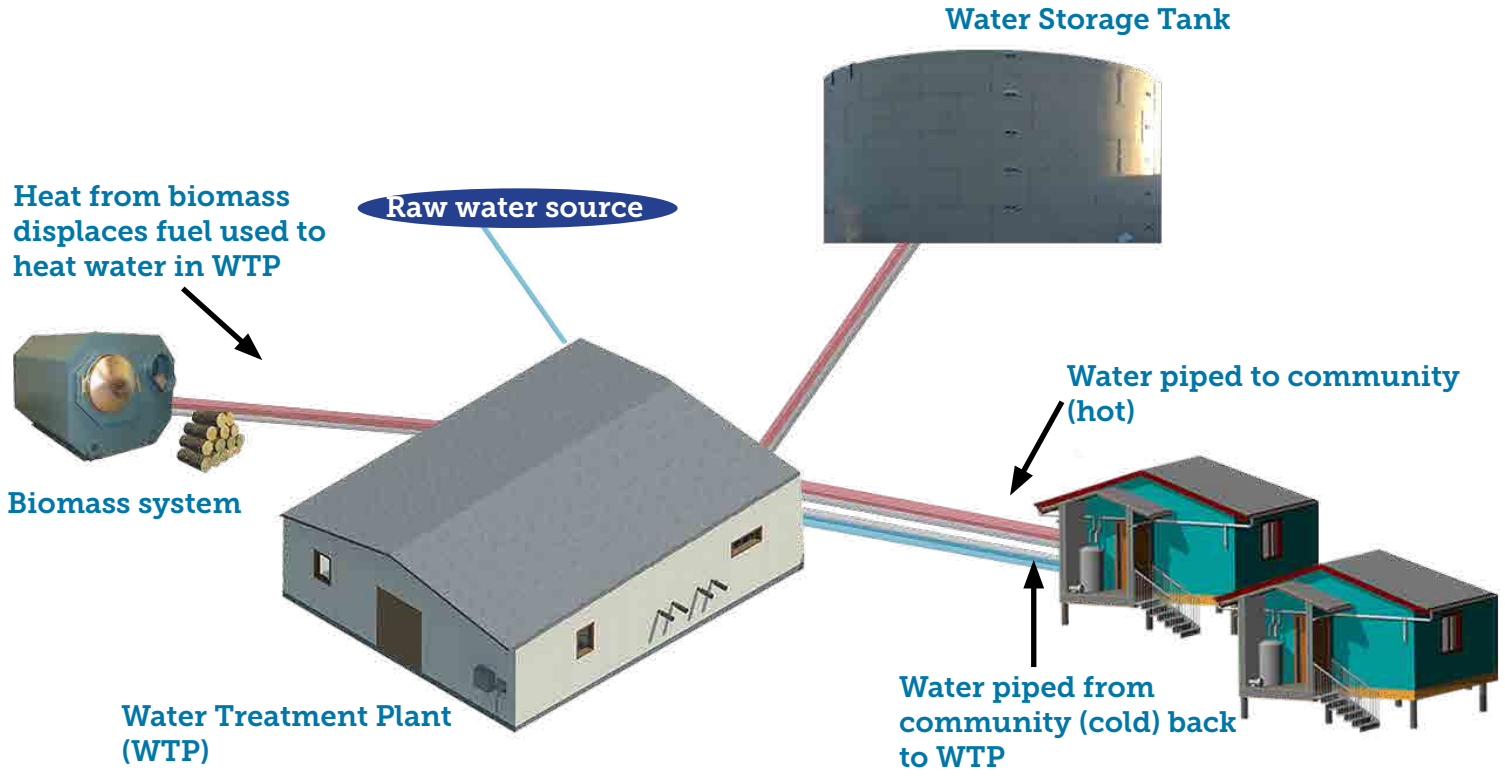
With remote monitoring, understanding trends allows us to predict what is actually happening in the water plant. When a water treatment plant operator pumps water, the raw water temperature drops dramatically. When no water is being pumped, the temperature of the static water in the line should increase as indicated in the graph above.

The ability to see flow rates and water tank levels allows us to easily monitor system performance and diagnose problems. In Kiana the school was able to isolate and repair a leaking water loop with the help of remote monitoring. By logging into the remote monitoring dashboard, the remote maintenance worker in Kotzebue was able to assist local operators over the phone in identifying the location of the leak, avoiding travel costs for outside assistance, and resulting in operational savings for the entire community.

Renewable Energy: Biomass

Biomass projects use wood fired boiler systems that displace fuel oil for heating public facilities. Using locally harvested wood in the heating system, instead of fuel oil, keeps energy dollars in the local economy and reduces the dependence on fuel oil for heating. These benefits promote energy sustainability and provide the added benefit of creating new jobs for local wood cutters in rural communities, where employment is hard to come by.

The Rural Energy Initiative is at the forefront of biomass projects for rural communities. During 2014, four new projects were designed and began construction in the communities of Kobuk, Anvik, Hughes, and Koyukuk. Combined, **these projects are expected to reduce annual heating oil consumption by 21,000 gallons and save an estimated $121,000 in annual energy costs**. The Rural Energy Initiative is also working with the communities of Huslia and Ambler to develop and seek funding for future public facility biomass heating systems.



Case Study: Kobuk Biomass

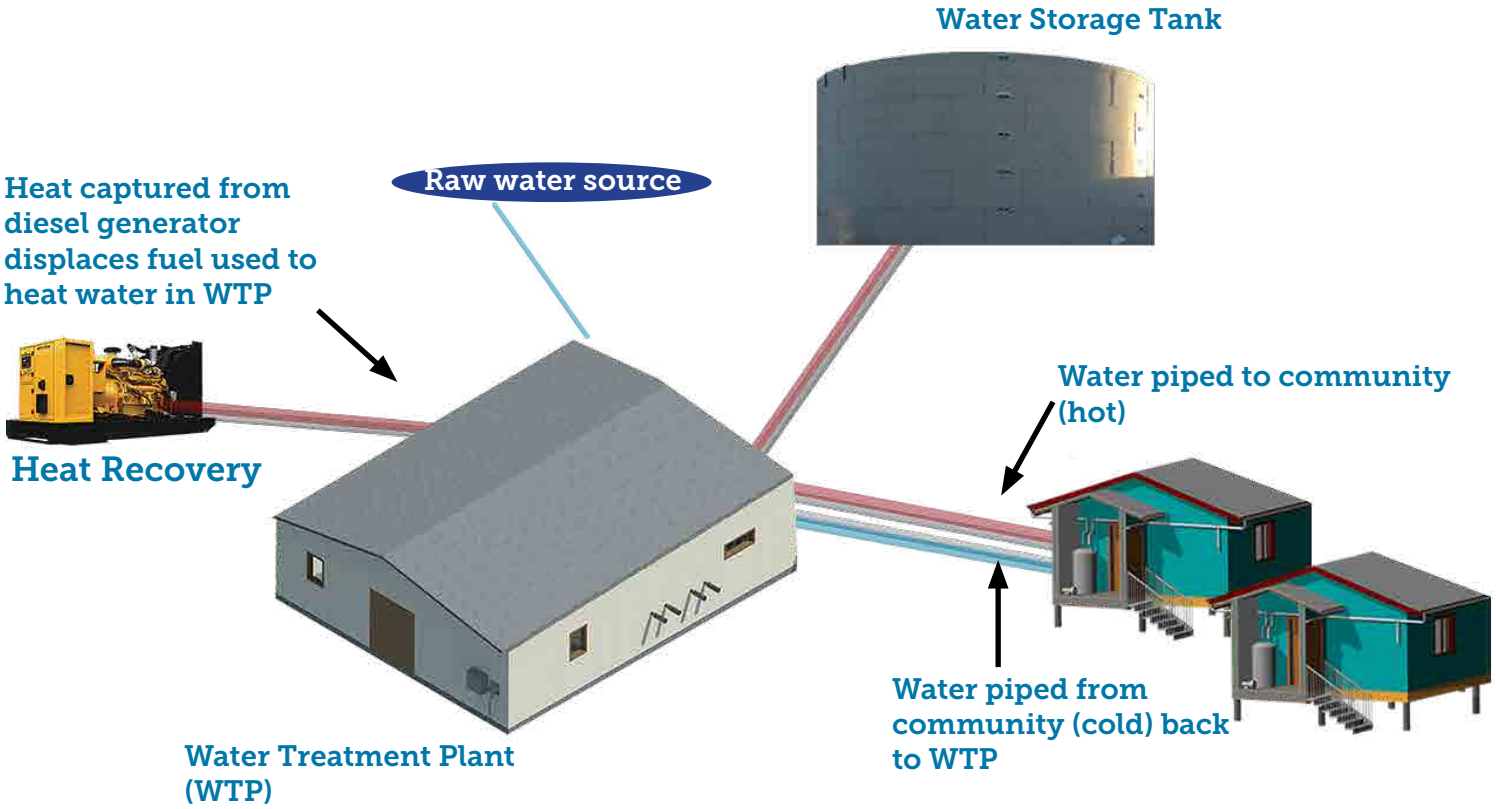
In 2013, Kobuk received funding through the State's Alaska Energy Authority to design and construct a biomass boiler to heat the community's water system. Thanks to the combined efforts of ANTHC's Rural Energy Initiative team, ANTHC's Alaska Rural Utility Collaborative, NANA Regional Corporation, the City of Kobuk and the Kobuk Traditional Council, it is anticipated that the Kobuk biomass project will help the community's water treatment plant save $24,000 annually.

Of the overall $24,000 annual savings, $10,500 goes to local wood cutters for supplying cordwood and $13,500 will be the direct savings to the operation of the Kobuk Water Plant.

Renewable Energy: Heat Recovery

Up to 70 percent of the energy from diesel generators is lost as heat that is a normal part of the generator's cooling processes. This means that only 30 percent of the diesel used goes towards creating electricity. To make use of this "wasted" energy, ANTHC has partnered with the Alaska Village Electric Cooperative and other local power companies to recover heat from community power plant cooling systems and redistribute it for heating water.

In a heat recovery system, excess heat energy is captured from the local electric plant and transferred to heat the water plant instead of burning heating fuel, which results in substantial cost savings for both utilities. The heat in the electric plant is created as a byproduct of diesel-powered electricity generators. Since the installation of these heat recovery systems in communities, there are tremendous results in energy savings from reducing fuel oil consumption. Examples of such savings can be seen in a case study of the system in Savoonga on the following page.



Case Study: Savoonga Heat Recovery

As fuel prices and energy costs have climbed across Alaska, ANTHC's heat recovery projects and partner support are helping rural communities and their residents save money and maximize resources. In collaboration with the Alaska Energy Authority, Alaska Village Electric Cooperative, and ANTHC's Alaska Rural Utility Collaborative program, a heat recovery project was completed in Savoonga in October 2014. This project took previously unutilized energy from the power plant and redistributed it to the water treatment plant.

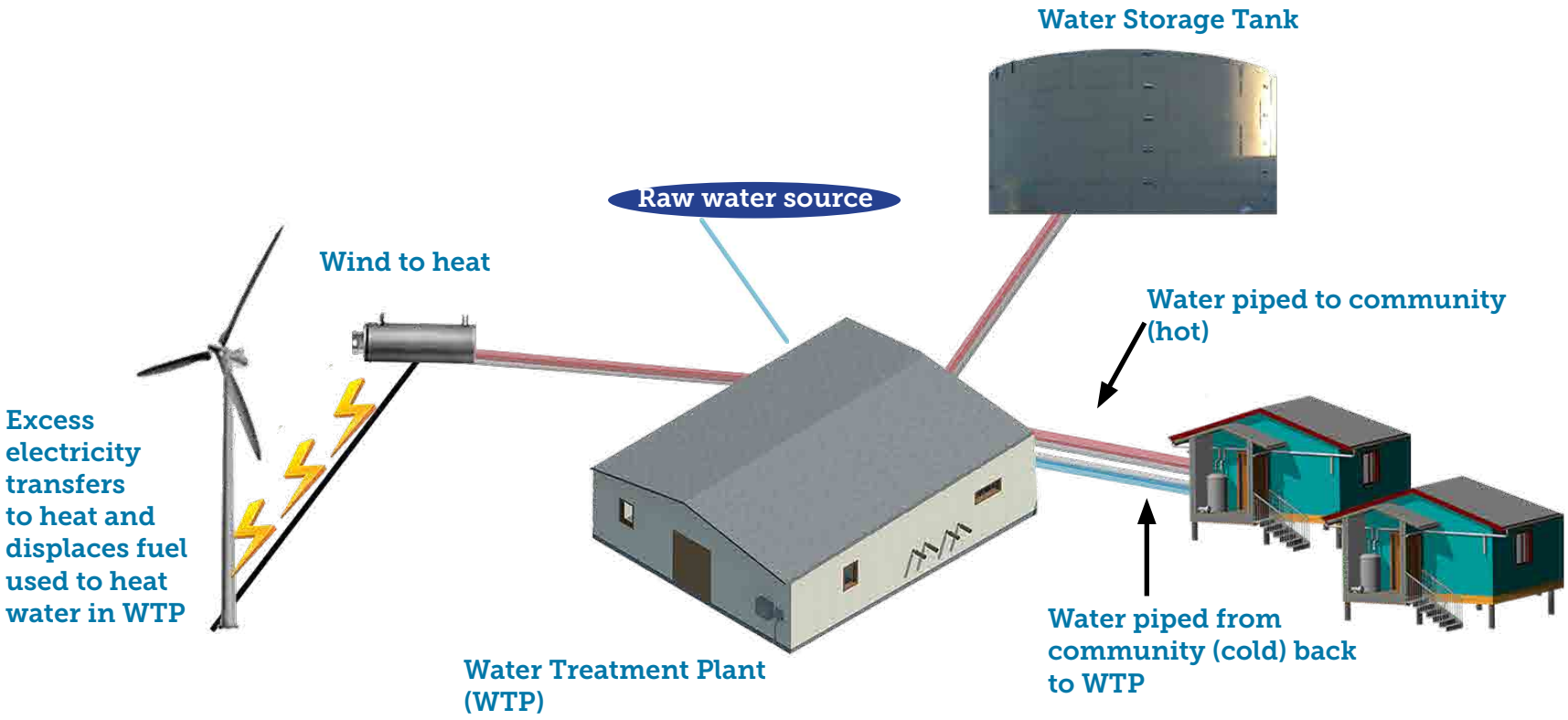
From the time the system was installed to March 2015, it **reduced fuel usage by 90 percent, displacing 1,686 gallons of heating oil or about $7,166 in energy savings**.

With the system now fully operational, it is expected that the community will reduce their heating fuel usage by 8,800 gallons of fuel, for a savings of almost $40,000 per year.

Renewable Energy: Wind to Heat

"Wind to Heat" systems use the extra electricity generated from wind turbines during peak wind events to heat water for use in Arctic sanitation systems.

Development of the "wind to heat" system was conceived by ANTHC's Rural Energy Initiative in 2011. This innovation, the first in Alaska and perhaps in the country for public water systems, was developed by ANTHC in partnership with the Alaska Village Electric Cooperative, an electric company that owns and operates rural electrical utilities utilizing a mix of diesel and wind power. AVEC has agreed to sell extra power generated by wind turbines under interruptible power agreements at substantial discounts to the community sanitation utilities. Wind energy is transferred through use of electric boilers in the water treatment plant and displaces fuel used to heat the water.



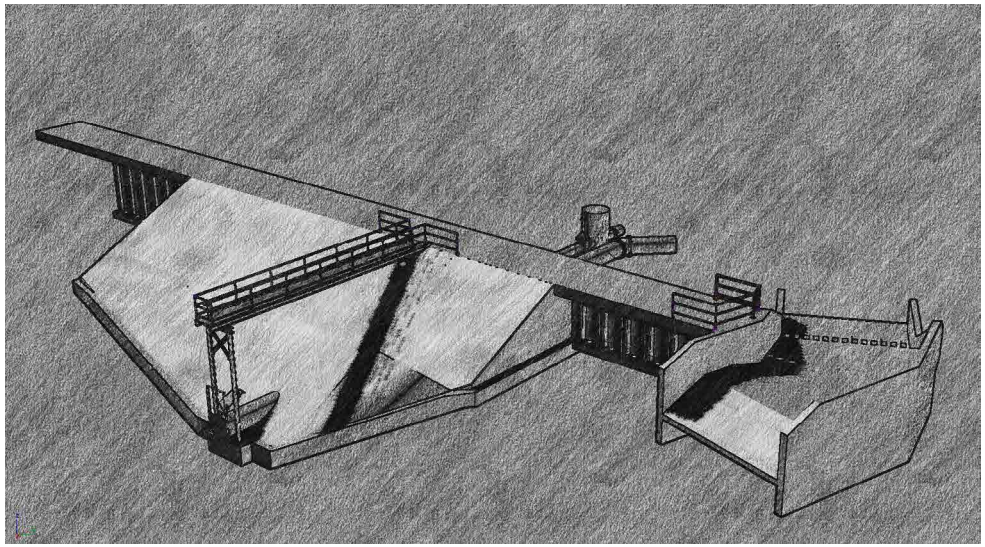
Case Study: Mekoryuk Wind to Heat

Potential fuel savings of $40,000 annually

Cost of $0.05 per kWh is equivalent to fuel oil at $1.46 per gallon.

Since October 23, 2014, the wind to heat system in Mekoryuk has transferred 9,252 kilowatt-hours. By estimation, these savings are only the beginning of decades of continual savings to public sanitation systems in these underserved, remote communities.

Renewable Energy: Hydroelectric



Water systems often share infrastructure with hydroelectric facilities. Often, a dam and penstock are shared between the hydroelectric producer and the water system owner. The dam backs up water needed for a year round drinking water as well as providing water for steady hydroelectric operations. The penstock, or pipeline, is needed to transport water to both the generator and water plants.

Combining public water and power facilities reduces capital costs associated for both sanitation and power infrastructure, with compounded benefits for the community.

Where hydroelectric facilities are possible, ANTHC has helped communities identify that potential and assemble technical analysis to assist with grant funding. ANTHC submitted a grant application for design funding from the State of Alaska Energy Authority's Renewable Energy Fund for the communities of Scammon Bay and Ouzinkie, which has been recommended to the state legislature for funding.

In Scammon Bay, ANTHC has identified the potential electrical generation of 755,790 kWh through hydroelectric, a diesel offset of 39,252 gallons of fuel or $157,007 a year.

Case Study: Ouzinkie Dam

The Ouzinkie Dam project was completed in 2014. The $2.3 million project replaced a deteriorating wooden dam constructed in 1986 with a new, state of the art concrete faced rock-fill facility built to withstand magnitude 8.8 earthquakes and major floods, while efficiently providing clean water and affordable hydroelectric power to residents.

Construction on this project allowed the community to continue producing 30 percent of its electricity from hydroelectric power, or 300,000 kWh/year, with a diesel offset of 24,584 gallons of diesel or $148,240 per year.

ANTHC completed and submitted a feasibility study to Alaska Energy Authority's Renewable Energy Fund Round 8 to upgrade the city owned hydro turbine that would further enhance this project.

The application identified an additional potential electrical generation of 100,000 kWh through an improved turbine and penstocks for an additional annual savings of $46,382.

Energy Efficiency Projects to Date by Community

Community	Energy Audits	Sanitation Energy Efficiency	Health Clinic Energy Efficiency	Remote Monitoring
Akiachak	Funded			
Akiak	Completed	Funded		
Alakanuk	Completed	Active		
Alatna	Funded	Funded		
Allakaket	Active	Funded		
Ambler	Completed	Active		Completed
Brevig Mission	Completed			
Buckland	Funded			Funded
Chefornak	Completed	Funded		
Chevak	Completed	Completed		Active
Chuathbaluk	Completed	Funded	Completed	
Deering	Active			Active
Eek	Completed	Funded		
Ekwok	Funded			
Elim	Completed	Active		Completed
Emmonak	Completed	Active		
Fort Yukon	Funded			
Galena	Funded			
Gambell	Completed	Active		Funded
Golovin	Funded			

Energy Efficiency Projects to Date by Community (continued)

Community	Energy Audits	Sanitation Energy Efficiency	Health Clinic Energy Efficiency	Remote Monitoring
Goodnews Bay	Completed			
Grayling	Completed	Active		
Gulkana	Funded			
Holy Cross	Completed	Active		
Hooper Bay	Funded			
Huslia	Completed	Completed		
Igiugig	Funded			
Kaltag	Active	Funded		
Kasigluk	Funded			
Kiana	Funded			
Kipnuk	Completed		Completed	
Kivalina				Active
Kobuk	Completed	Active		Completed
Koliganek	Funded			
Kongiginak	Completed	Active		
Kotlik	Funded			
Koyuk	Completed	Active		Funded
Koyukuk	Completed	Active		
Lower Kalskag	Completed	Funded	Completed	
Manokotak	Funded			

Energy Efficiency Projects to Date by Community

Community	Energy Audits	Sanitation Energy Efficiency	Health Clinic Energy Efficiency	Remote Monitoring
Marshall	Completed	Funded	Completed	
McGrath	Funded			
Minto	Funded	Funded		
Mountain Village	Funded			
Napaskiak	Completed	Funded	Completed	
Nenana	Completed		Completed	
New Stuyahok	Funded			
Newtok	Completed	Funded	Completed	
Nightmute	Completed	Funded		
Nikolai	Funded			
Noatak	Funded			Completed
Nondalton	Completed	Active		
Noorvik	Funded			
Nulato	Completed	Completed	Completed	
Nunam Iqua	Completed	Active		
Nunapitchuk	Completed	Funded		
Oscarville	Completed			
Pilot Station	Completed	Active	Completed	
Pitkas Point	Completed	Funded		
Platinum	Funded			
Quinhagak	Funded			
Rampart	Funded			
Russian Mission	Completed	Funded	Completed	

Energy Efficiency Projects to Date by Community (continued)

Community	Energy Audits	Sanitation Energy Efficiency	Health Clinic Energy Efficiency	Remote Monitoring
Saint Mary's	Completed			
Savoonga	Completed	Funded	Completed	Funded
Scammon Bay	Funded			
Selawik	Completed	Completed		Completed
Shaktoolik	Completed	Active	Completed	Funded
Shishmaref	Active	Funded		
Shungnak	Funded			Completed
Sleetmute	Completed		Completed	
St. Michael	Completed	Active		
Stebbins	Funded			Funded
Tanacross	Funded			
Tanana	Funded			
Teller	Completed	Funded	Completed	
Togiak	Funded			
Toksook Bay	Completed	Funded		
Tuluksak	Completed			
Tuntutuliak	Completed	Funded	Completed	
Tununak	Completed	Funded		
Twin Hills	Completed			
Unalakleet	Funded			
White Mountain	Funded			

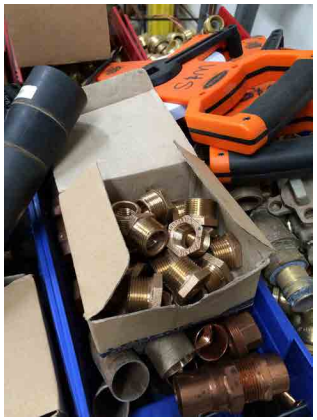
Renewable Energy Projects to Date by Community

Community	Heat Recovery	Biomass	Wind to Heat	Feasibility Study
Allakaket	Completed			
Ambler	Completed			Completed
Anvik		Active		Completed
Atmautluak	Active			
Brevig Mission	Active			Completed
Chevak	Funded			Completed
Chuathbaluk				Completed
Eek				Completed
Elim		Completed		
Emmonak	Funded			Completed
Gambell			Active	
Goodnews Bay	Completed			Completed
Grayling			Active	Completed
Holy Cross				Completed
Hughes		Active		
Huslia				Completed
Kobuk		Completed		
Koyuk				Completed
Koyukuk		Active		Completed
Kwigillingok	Completed			
Lower Kalskag				Completed
Marshall	Active			Completed
Metlakatla				Completed

Renewable Energy Projects to Date by Community (continued)

Community	Heat Recovery	Biomass	Wind to Heat	Feasibility Study
McGrath	Completed			
Mekoryuk			Completed	
Minto	Completed			Completed
Noatak	Completed			Completed
Noorvik	Active			
Nulato				Completed
Ouzinkie				Completed
Quinhagak	Active			Completed
Russian Mission	Active			Completed
Saint Mary's	Funded			Completed
Saint Michael				Active
Savoonga	Completed			Completed
Selawik	Completed			Completed
Shaktoolik	Active		Active	Completed
Shishmaref				Completed
Shungnak	Completed			Completed
Sleetmute	Completed			Completed
Stebbins	Active			Completed
Togiak	Active			Completed
Tuntutuliak	Active			Completed
Venetie				Completed
White Mountain	Completed			

How are we moving forward?



Expand ANTHC's Energy Efficiency Program: Seeking funding to expand audits, energy retrofits and training.

Audits and retrofits in more than 40 additional communities to be completed over the next two years.

Work with villages and regional partners to apply for grants and loans to implement long term recommendations – including renewable energy.

Monitor results to capture data and develop "Best Practices."

Coordinate with the Alaska Remote Maintenance Worker (RMW) Program and local government specialists as upgrades are made to enhance long-term regional-level support.

Provide hands-on training and formal instruction in partnership with AVTEC.

Explore different technologies such as ground source heat pumps and solar water heating.

Strengthen Statewide Partnerships to collaboratively develop innovative solutions to address the high cost of sanitation in rural Alaska.

We would like to thank the following partners for their assistance and support:

Alaska Department of Commerce
Alaska Department of Environmental Conservation
Alaska Housing Finance Corporation
Alaska Rural Utility Collaborative
Alaska Energy Authority
Alaska Village Electric Cooperative
Aleutian Pribilof Islands Association
Annette Island Service Unit
Association of Village Council Presidents
Bristol Bay Area Health Corporation
Cold Climate Housing Research Center
Denali Commission
Indian Health Service
Interior Regional Housing Authority
Kodiak Area Native Association
Maniilaq Association
Metlakatla Indian Community
NANA Regional Corporation, Inc.
Norton Sound Economic Development Corporation
Norton Sound Health Corporation
Northwest Arctic Borough
Tanana Chiefs Conference
U.S. Department of Energy
U.S. Environmental Protection Agency
USDA Rural Development
Yukon Kuskokwim Health Corporation

Our Vision:
Alaska Native people are the healthiest people in the world.

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