



# Alaska Native Tribal Health Consortium: Sanitation Energy Efficiency Retrofits for the Communities of Alakanuk, Kotlik and Noorvik, Alaska

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**ALASKA NATIVE  
TRIBAL HEALTH  
CONSORTIUM**

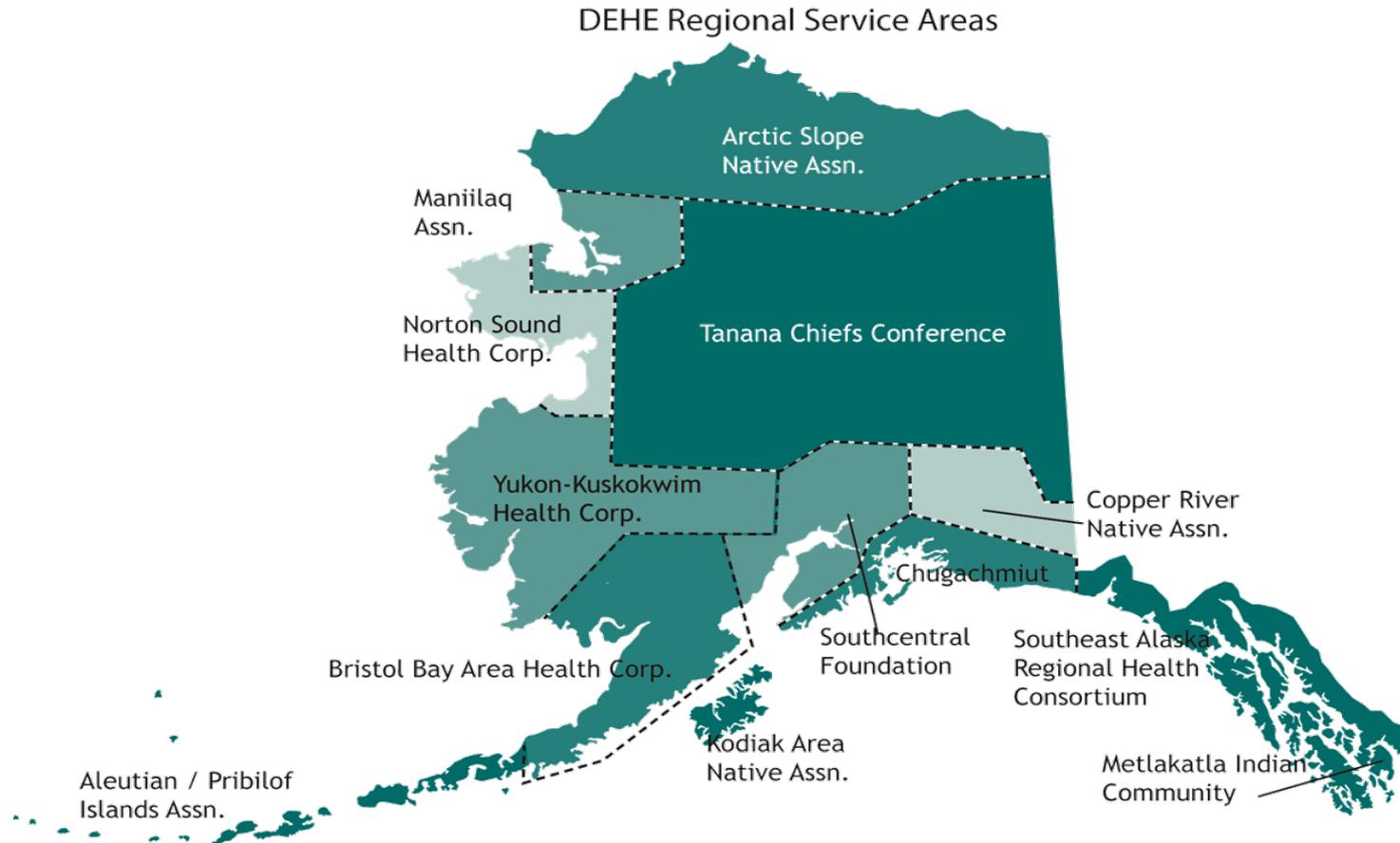
## The Alaska Native Tribal Health Consortium

**In 1998, ANTHC signed a contract to assume responsibility for many of the Indian Health Service's Alaska Area office programs.**



**Later that year, ANTHC also became a Title III Self-Governance entity by signing the Alaska Tribal Health Compact through the Alaska Tribal Health System (ATHS).**

# Relationship with Alaska's Regional Health Organizations



*We believe basic sanitation should be efficient, sustainable and affordable*



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# ANTHC's Division of Environmental Health & Engineering



Sanitation Projects



Health Facilities and Clinics



Operations and Maintenance (O&M) and Training



Alaska Rural Utility Collaborative (ARUC)



Environmental Health

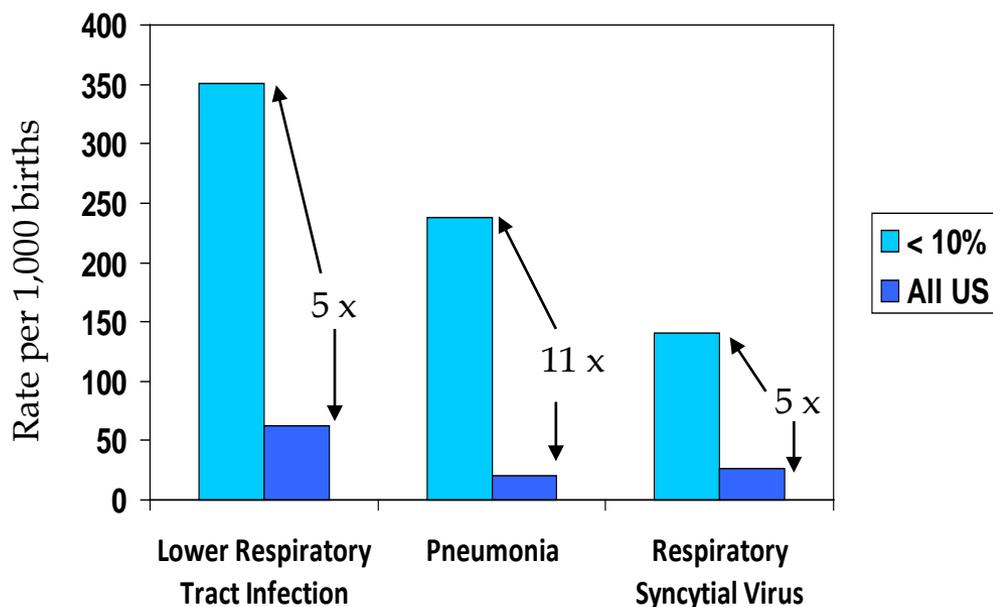


Rural Energy Initiative



# The Value of Rural Sanitation Investments

## Infant Hospitalization Rates in Villages with <10% of Homes with Water Service\* Compared with U.S. Infants\*\*

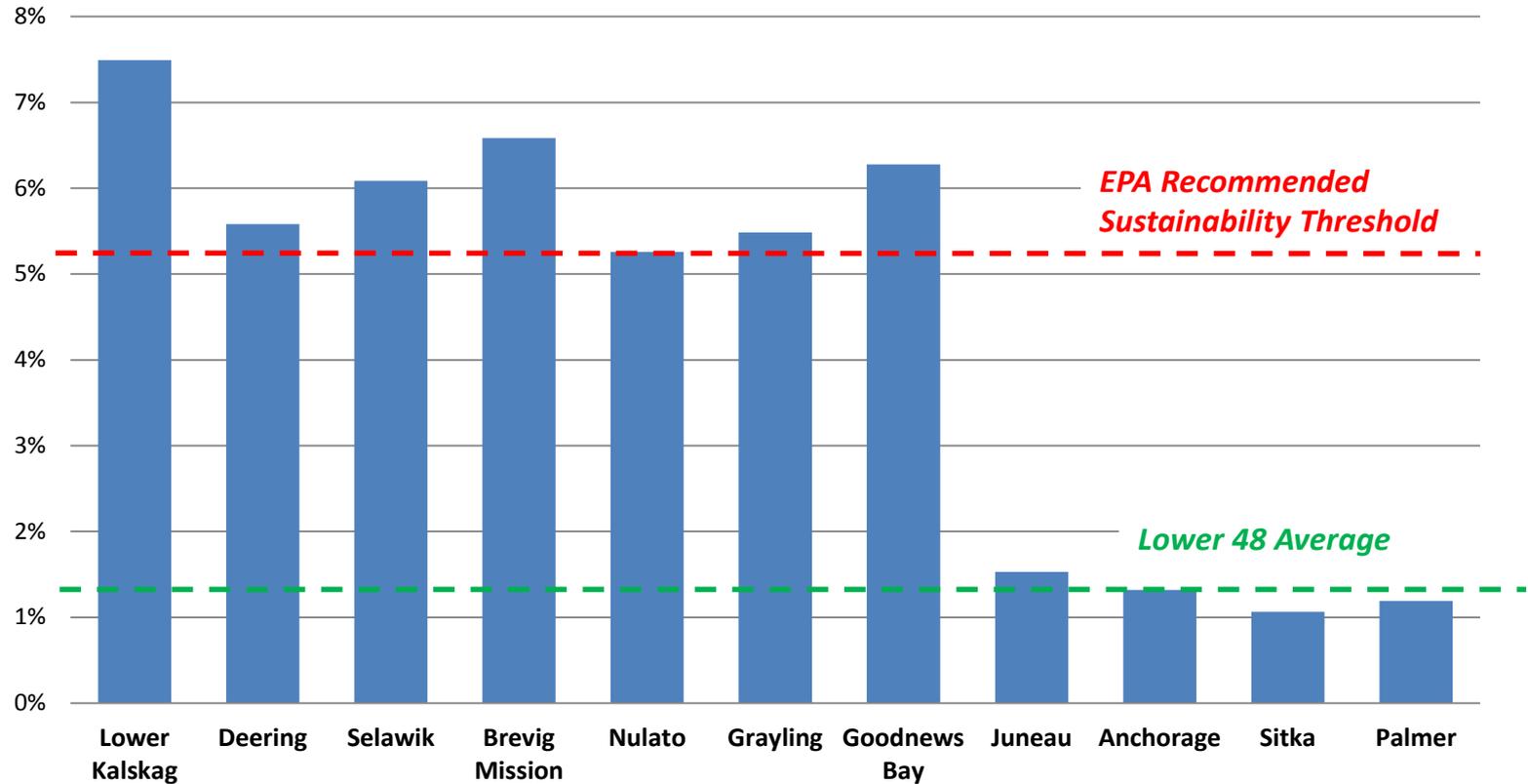


\*YK Region, Alaska, 1999-2004

\*\*All U.S., 1999-2001



## Water and Sewer User Fees as a Percentage of Median Household Income



Water and sewer bills in rural Alaska range from \$80 to \$250 per month, and average 3-8% of median household income; this confluence of factors is a direct threat to the sustainability of public sanitation across rural Alaska.



# ANTHC Rural Energy Initiative

## Our Purpose

The Alaska Native Tribal Health Consortium's (ANTHC) 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.

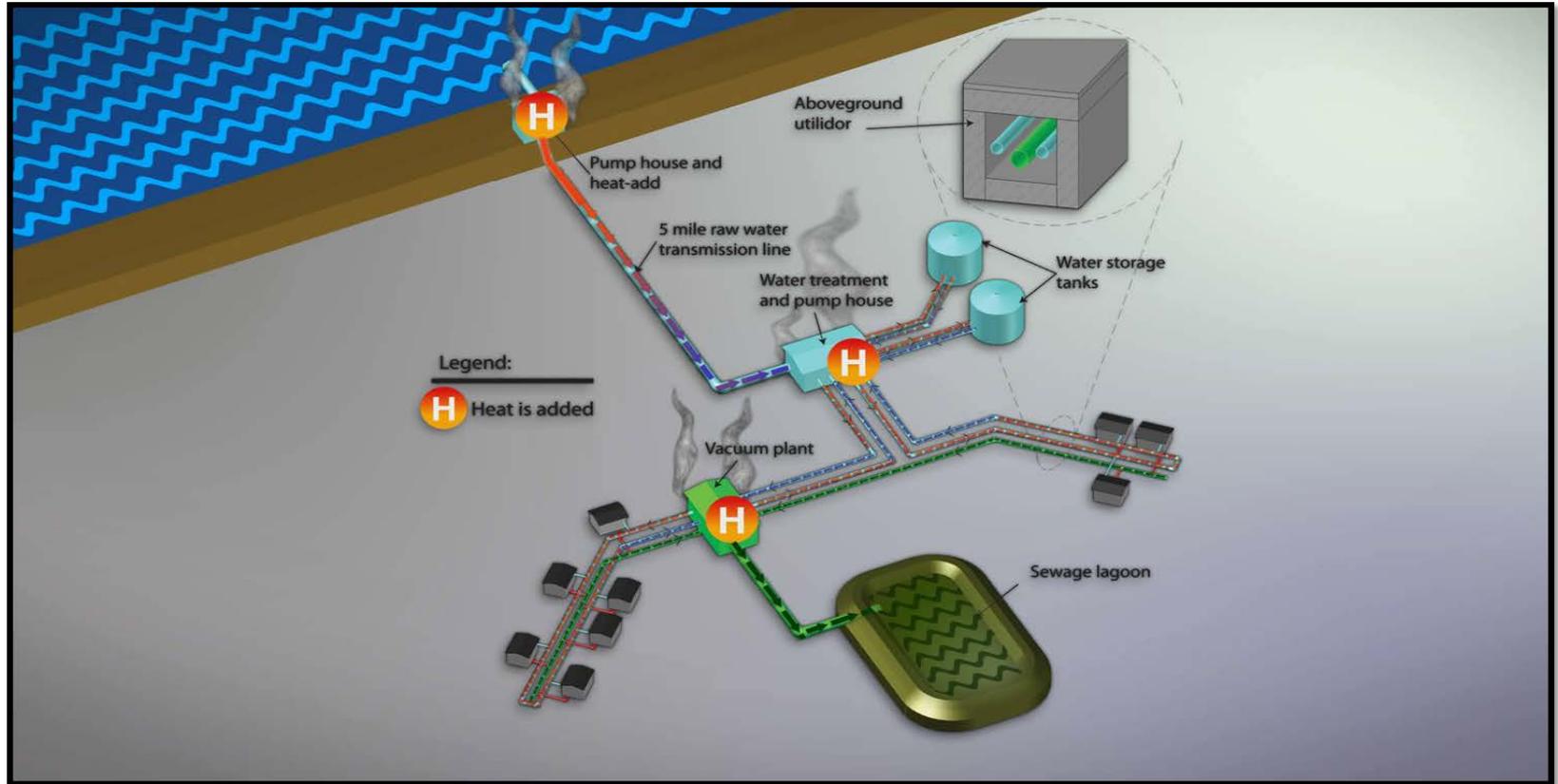


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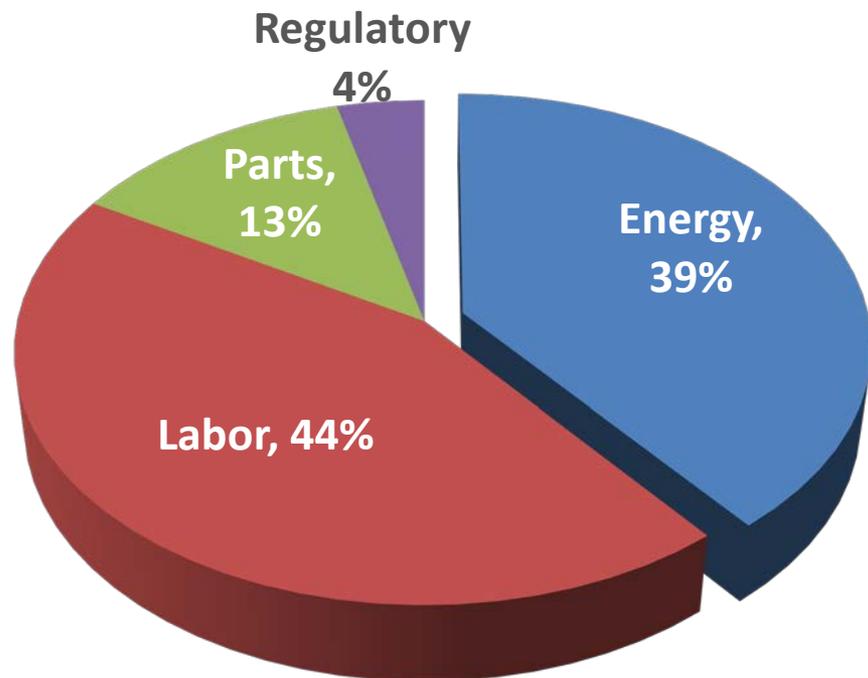


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## The Energy Intensive Arctic Sanitation System



## Understanding the Arctic Water-Energy Nexus



Breakdown of average operating costs for a water/sewer system in rural Alaska



## Our Path: A Comprehensive and Collaborative Approach



### Onsite Assessment

- Collect Data
- Evaluate Operating Practices
- Assess Facility Energy Use

### Develop Energy Model

- Identify Potential Improvements
- Identify Cost to Implement

### Develop Training Plan

- Purchase Materials
- Implement Efficiency Retrofits
- Provide Operator Training
- Construct Renewable Energy Systems

### Monitor Energy Usage

- Evaluate Retrofit Effectiveness



## Our Path: A Comprehensive and Collaborative Approach

### Opportunities to Reduce Rural Sanitation Energy Costs

#### Behavior Changes

#### Hardware Changes

Proper  
O&M

Training  
&  
Education

Ongoing  
Monitoring

ANTHC Rural  
Utility Support

Efficiency  
Retrofits

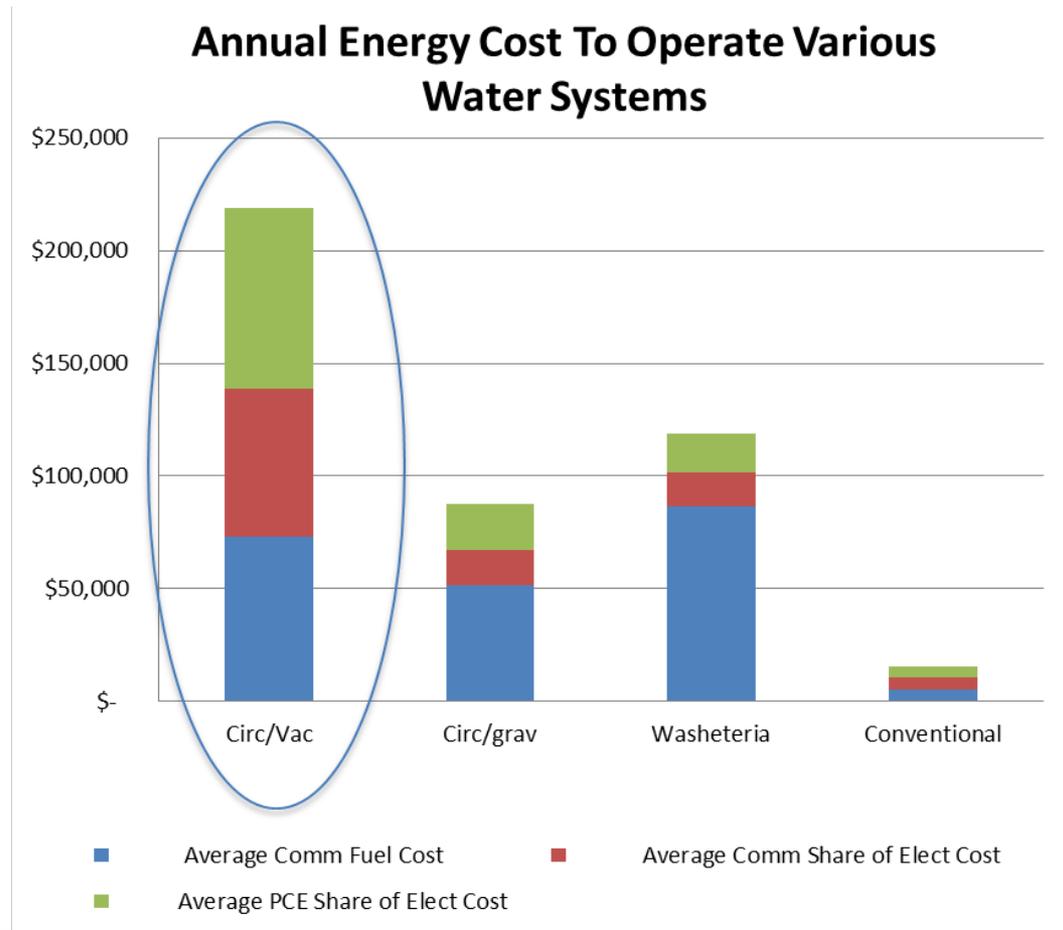
New and  
Ongoing  
Projects

Renewable  
Energy  
Systems



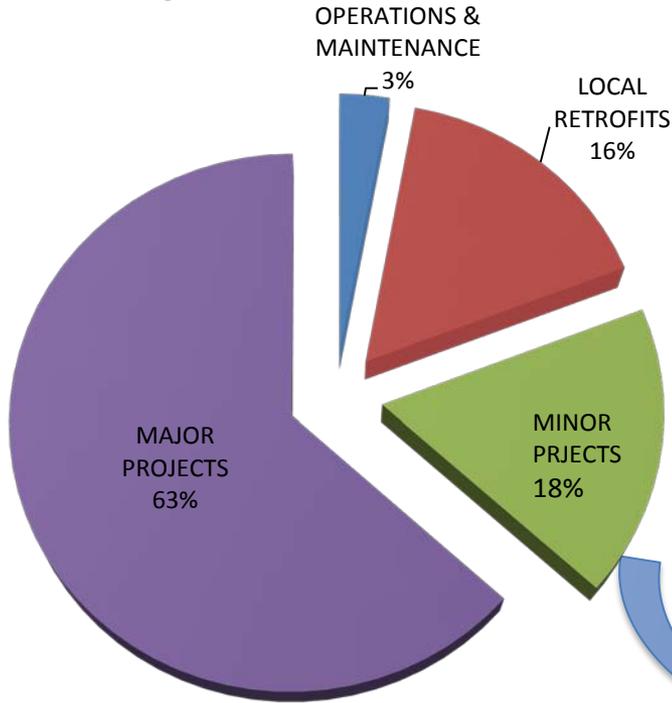
## Energy Costs Vary by Type of Sanitation System

- Northern & Interior Alaska communities have circulating water, and many have vacuum sewer, unlike Anchorage and Southeast Alaska conventional systems.
- The result is very high fuel and electricity costs.

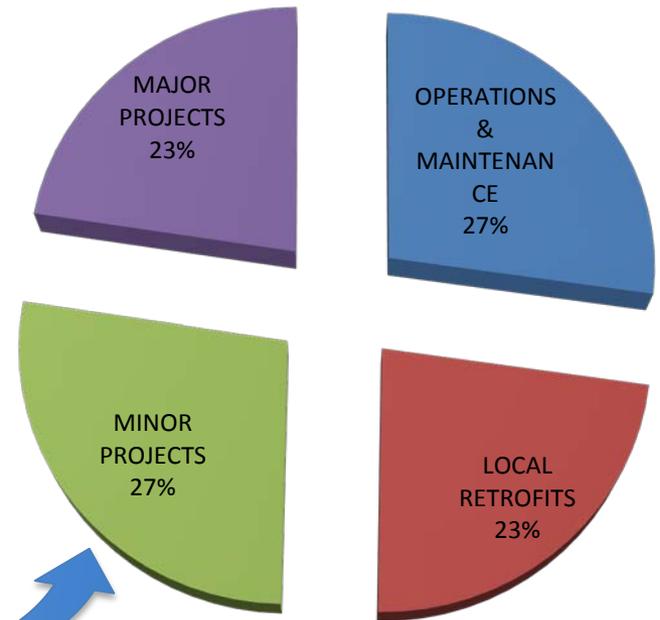


# Small Efficiency Investments Yield Big Savings

**Implementation Cost**



**Annual Energy Savings (\$)**



Small Efforts = **Big Results**



# Efficiency: Typical Operational Issues and Minor Fixes Identified

- Boilers need to be cleaned and tuned
- Boilers settings are too high and not properly staged
- Boilers are operated all summer when they are not needed
- Circulation pumps can be shut-off in summer
- Building temperature is not set back during unoccupied hours
- Water storage tank and circulating loop temperature set higher than needed
- Lift Station pumps short cycling due to fouled floats
- Electric heat trace used all winter (or all year) when designed for emergency thaw only
- Leaks in Distribution/Collection causing increased well pump/lift station run time



# Efficiency: Longer Term Energy Upgrades Identified

- Improve the building shell by adding insulation and replacing windows/doors
- Replace old and tired boilers with new appropriately sized high efficiency cold start boilers
- Replace pumps with new high efficiency pumps and variable speed drives
- Repair and or replace process pipe and hydronic system insulation
- Add remote monitoring to optimize energy performance





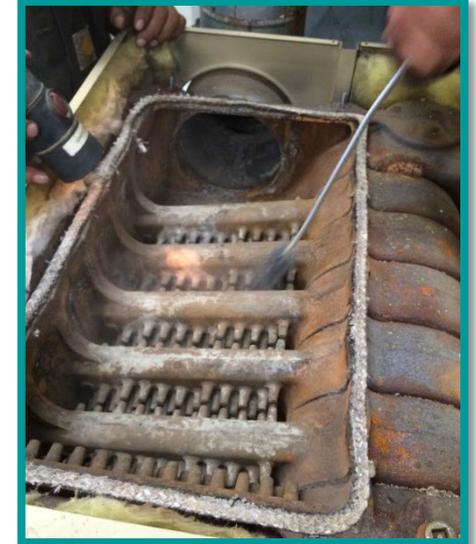
## Case Study: Energy Efficiency Retrofits – Pilot Station, Alaska

Training and small scale improvements.

- Saves sanitation system over **1,000** gallons of fuel oil and **25,000** kWh annually
- Equates to **66%** reduction in Fuel and **33%** drop in electricity
- Combined annual savings of **\$11,090**



**BEFORE:**  
Brushing & cleaning  
soot from boiler



**AFTER:**  
Clean flue passage

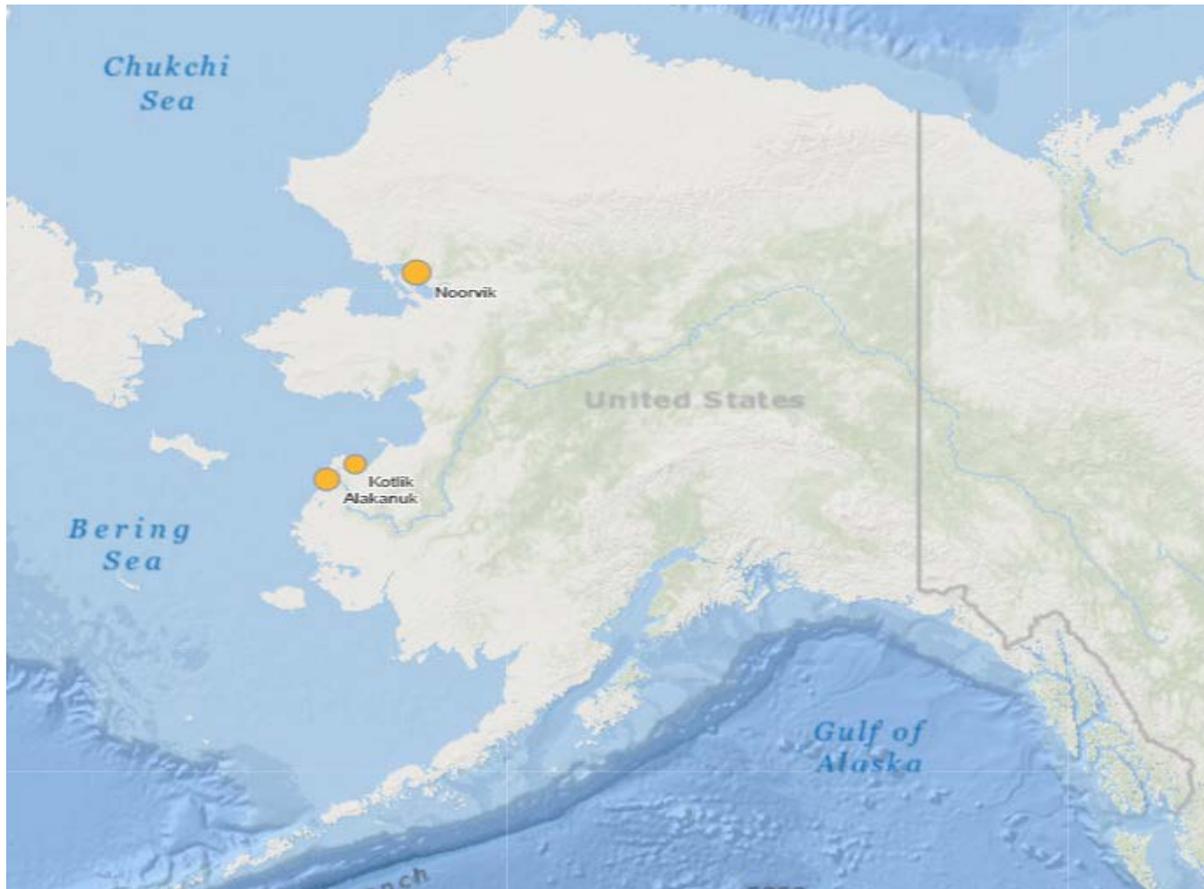


# The Project: Vacuum Sanitation System Energy Efficiency Project

- Energy Efficiency Improvements focused on reducing energy for water distribution and sewage collection
- Added Benefits: Improved Safety, Improved Performance of Home sewer service
- LED lighting, oil boiler hydronic heating system improvements, setback thermostats, etc.
- Communities Served: Alakanuk, Kotlik, Noorvik



# Project Locations: Alakanuk, Kotlik, Noorvik

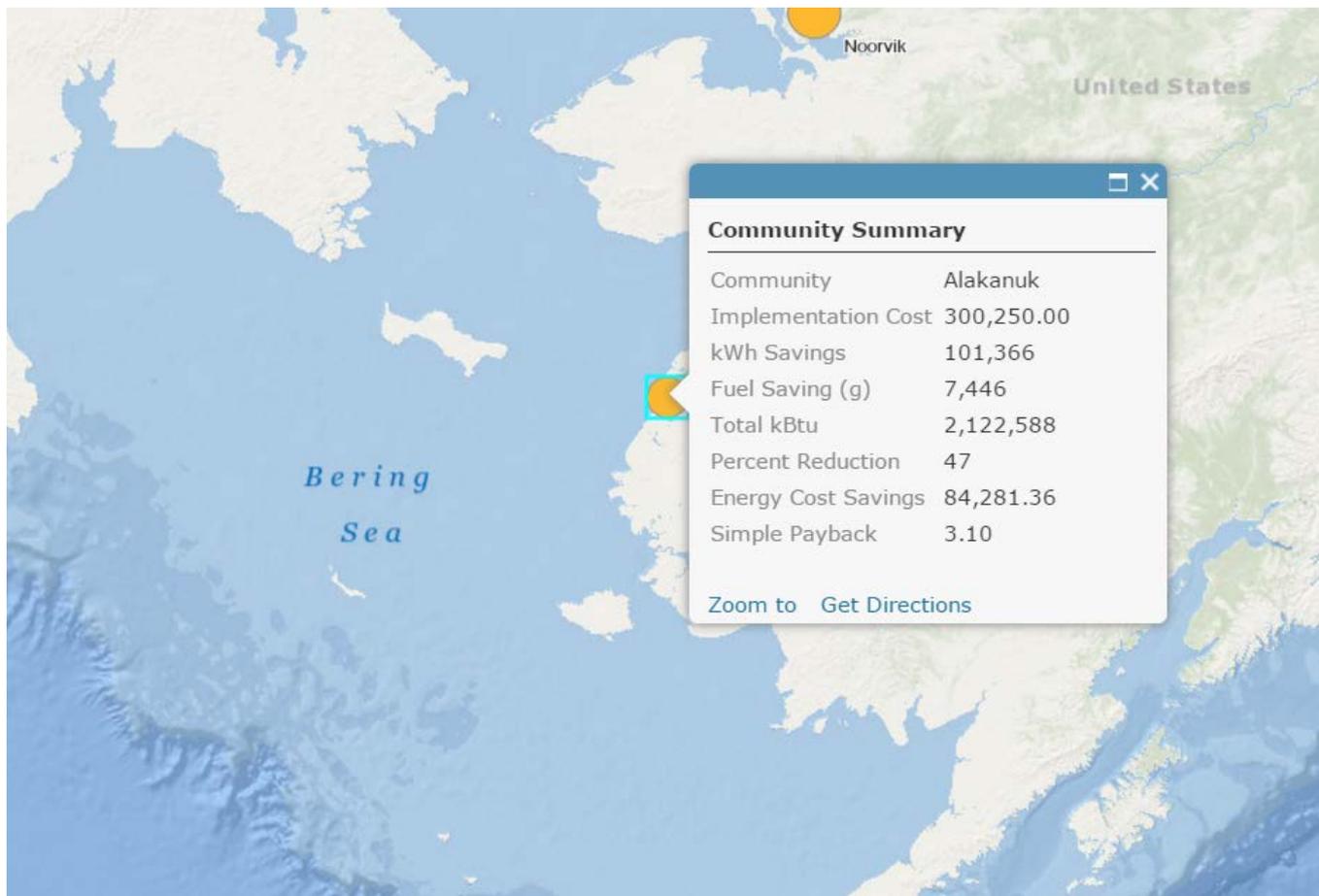


# Alakanuk Energy Efficiency

- Energy Audit Projected Savings: \$84,300 / year
- **Overall Sanitation System Energy Reduction of 47%**
- Audit Funded by Assoc. of Village Council Presidents (AVCP)
  - Water Distribution heating system Improvements
  - Vacuum Sewer System Improvements
  - LED Lighting



# Village of Alakanuk

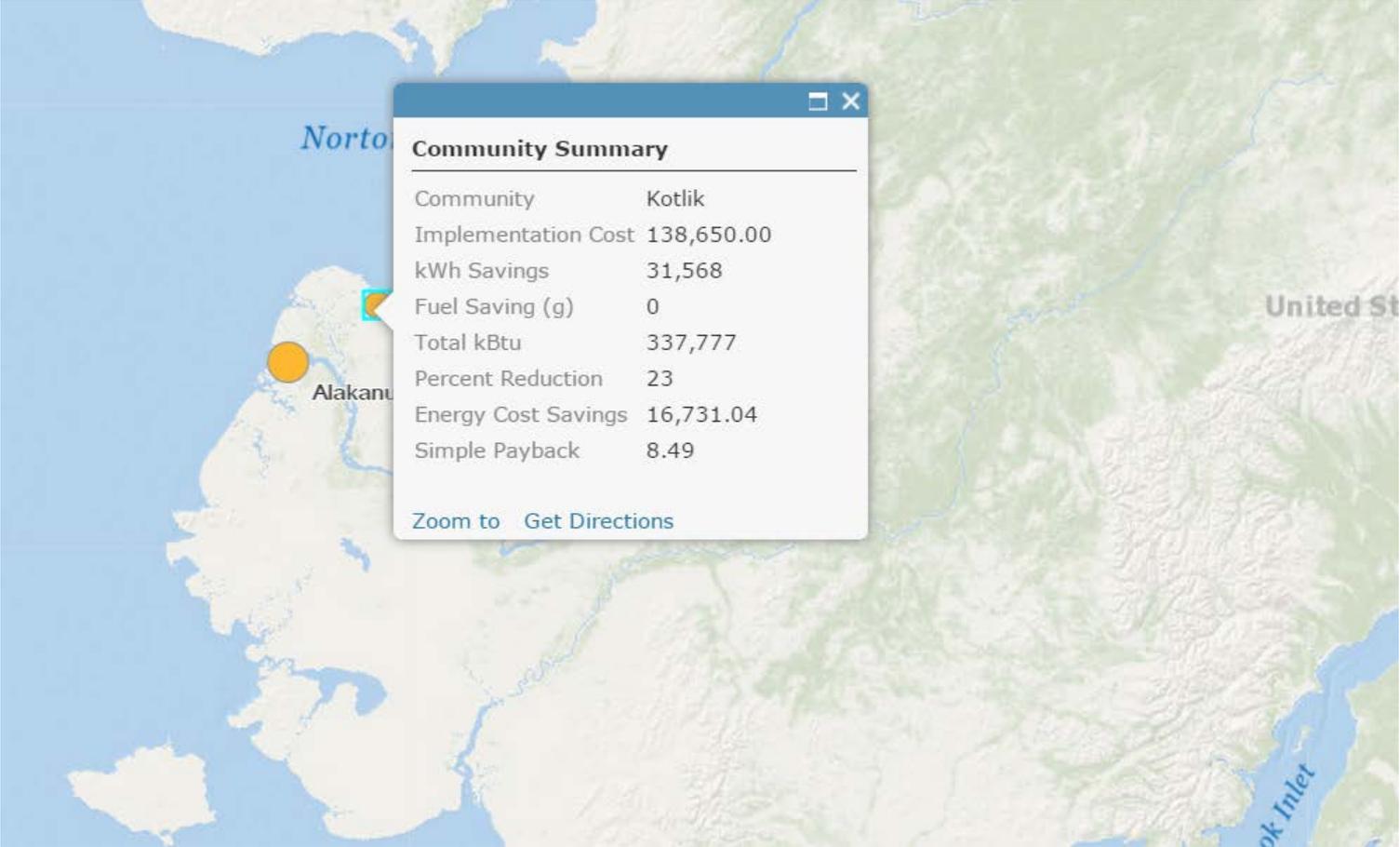


## Kotlik Energy Efficiency

- Energy Audit Projected Savings: \$16,700 / year
- **Overall Sanitation System Energy Reduction of 23%**
- Energy Audit funded by the Denali Commission
  - Vacuum Sewer Improvements
  - LED Lighting



# Village of Kotlik

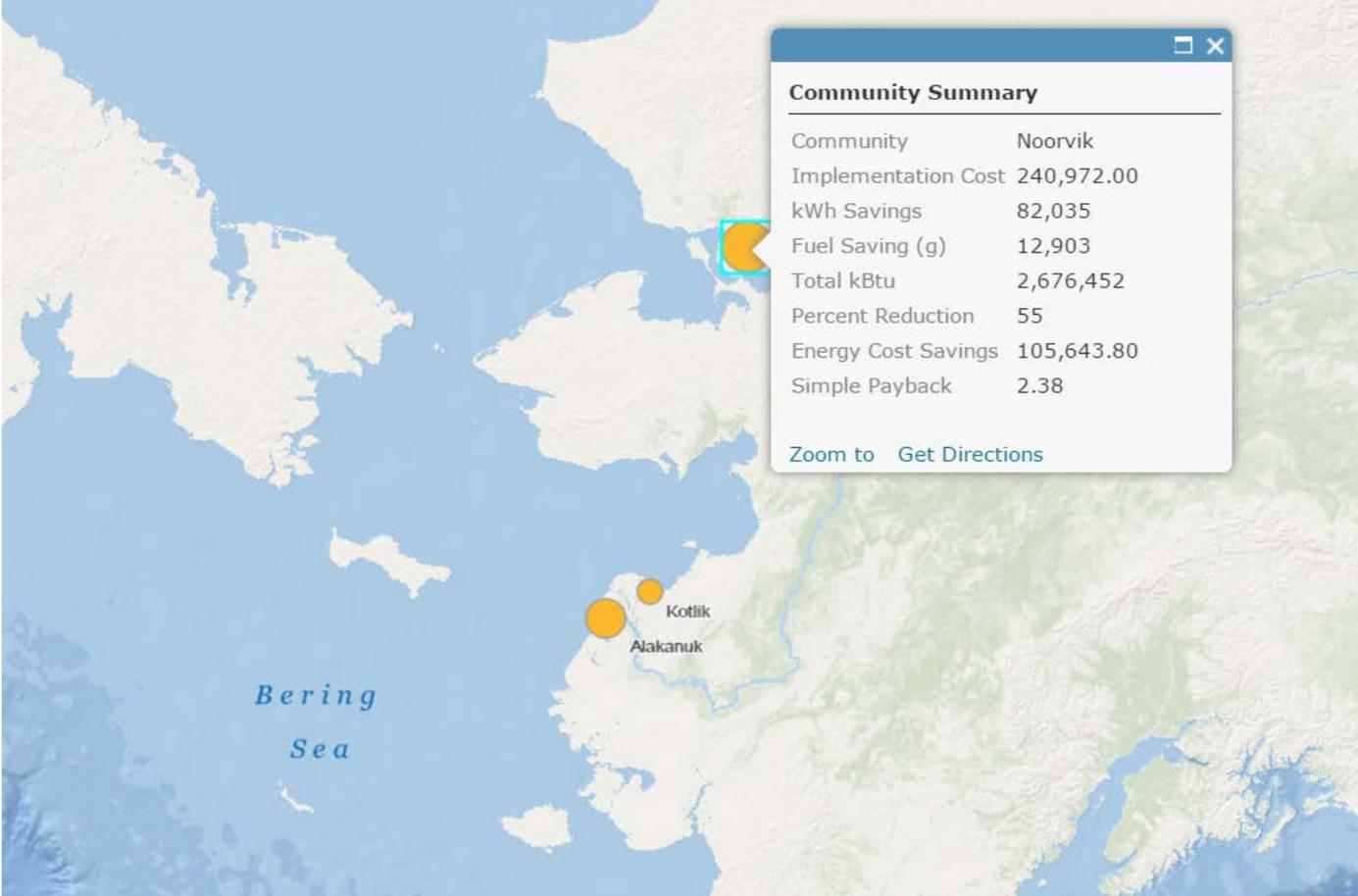


# Noorvik Energy Efficiency

- Audit Projected Savings: \$105,600 / year
- **Overall Sanitation Energy Reduction: 55%**
- Energy Audit funded by Denali Commission
  - Water Treatment & Distribution heating system Improvements
  - Vacuum Sewer System Improvements
  - LED Lighting



# Noorvik Native Community



# Project Status and Way Ahead

- **August 2016:** Funding Awarded
- **September 2016:** Long-Lead Materials Ordered
- **January 2017:** Complete Training and Efficiency Retrofit Plans
- **April 2017:** Purchase Additional Materials
- **June 2017:** Ship Materials to Communities
- **September 2017:** Implement Improvements and Provide Training
- Monitor Performance through **December 2018**



# Thank You

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For more information, please visit:  
<http://anthc.org/what-we-do/rural-energy/>

