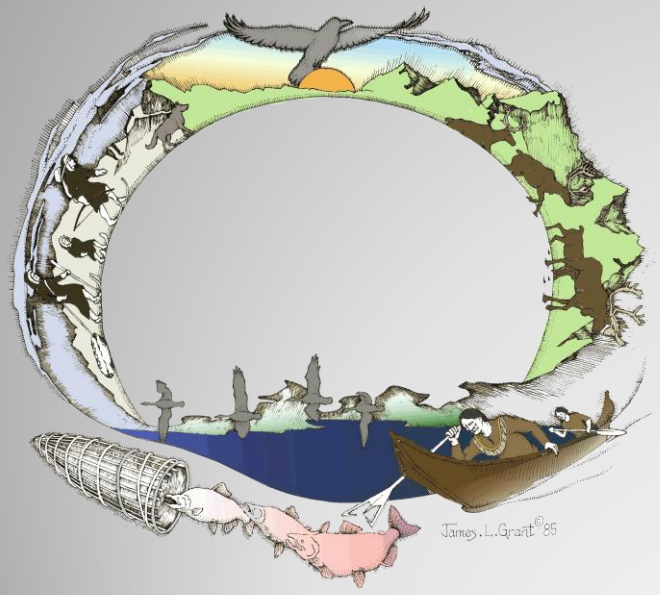


Tanana Chiefs Conference

Interior Rural Energy: Opportunities to Move Forward

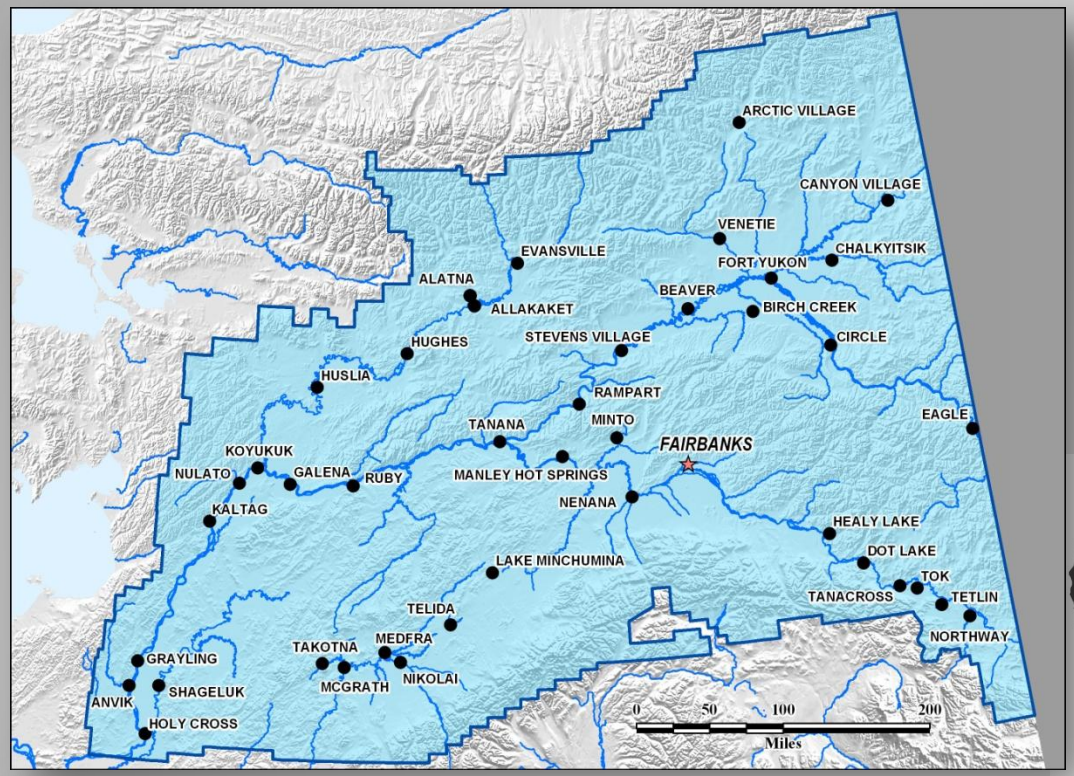
Prepared for
House Energy Committee
March 27, 2013

The Organization

Tanana Chiefs Conference is a Tribal Consortium with 42 Members, representing 39 villages and 37 federally recognized tribes.

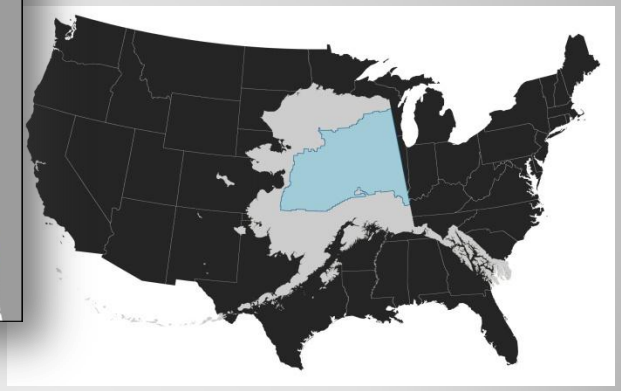
MISSION: “Tanana Chiefs Conference provides a unified voice in advancing sovereign tribal governments through the promotion of physical and mental wellness, education, socioeconomic development, and culture of the Interior Alaska Native people.”

The Region



- 235,000 Square Miles
- 37% of the State

- Extreme Subarctic
- Majority off road system

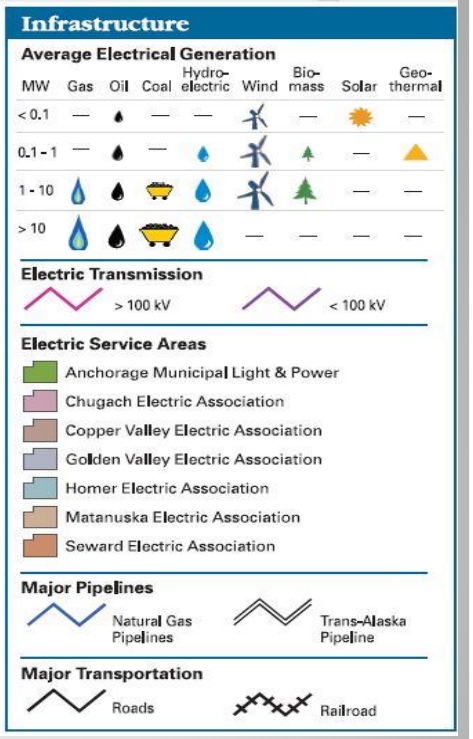


Interior Rural Energy

Some of the Highest Energy Costs in the Nation

<u>Takotna:</u>
$1.02/kWh, Or 10x the rate for Anchorage large commercial

<u>Arctic Village:</u>
$10/gal, that's roughly $60/Mmbtu, almost 6x the cost in Anchorage

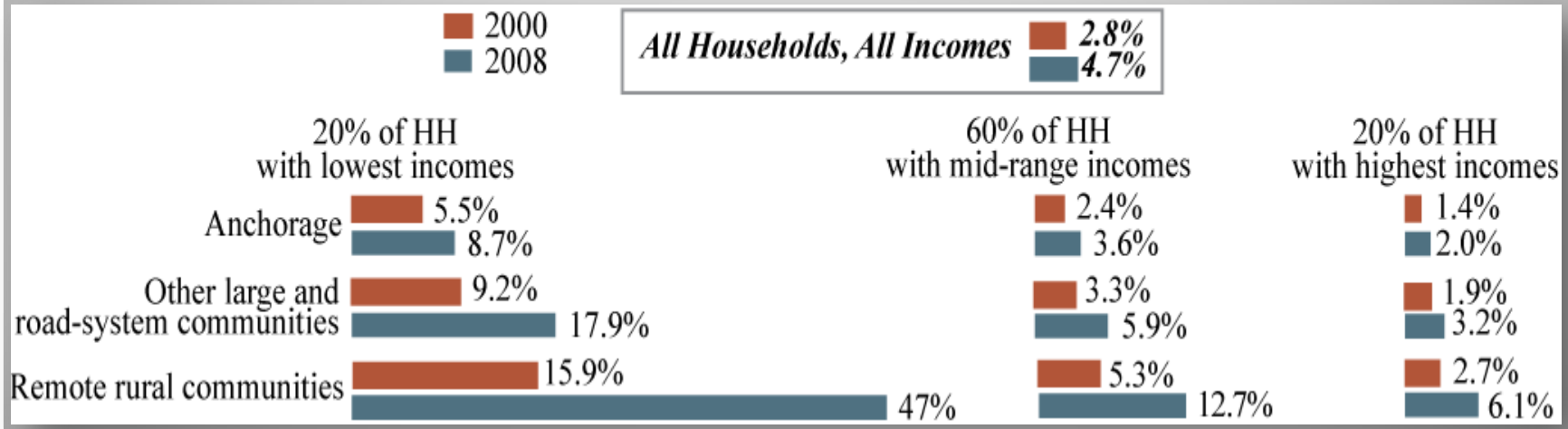


Energy Challenges

Electrical Use:

PCE report- In 2011 over 2.5 Million Gallons of diesel used for electrical generation in the TCC Region

Estimated Median Share of Income Alaska Households Spend for Home Energy Use (ISER)



Energy Challenges

Transportation:

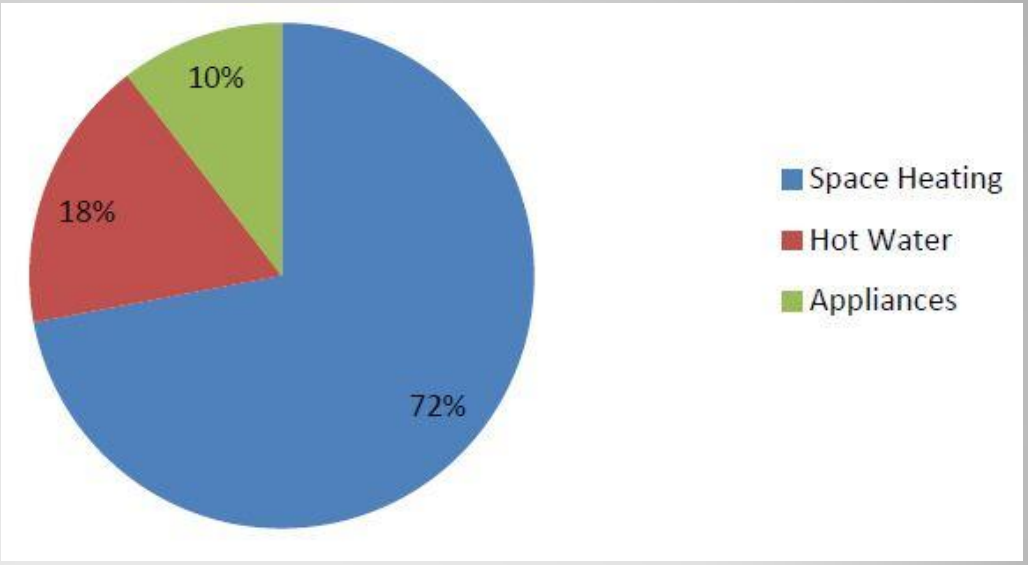
- **Effects on Subsistence Activities**
- **Increase cost of travel to/from villages**
- **Increases Cost of Goods in the Village**

Energy Challenges

Space Heating:

- Nearly $.75 of every Energy Dollar goes to Heat a home
- Schools are unsustainable to run and maintain
- Economic Development is being stifled

Average Rural Residential Home Energy



Energy Opportunities

Electrical Conservation/Solar:

- AEA – Village End Use Efficiency Program (VEEP)
- AEA- Rural Power Systems Upgrade Program (RPSU)
- Inefficient fan motors, pumps, lighting
- Renewable Energy – Solar, Biomass
- Affordable Propane → Increased Efficiency

Solar Install
Nenana Teen
Rec Center

Energy Opportunities

Space Heating Conservation:

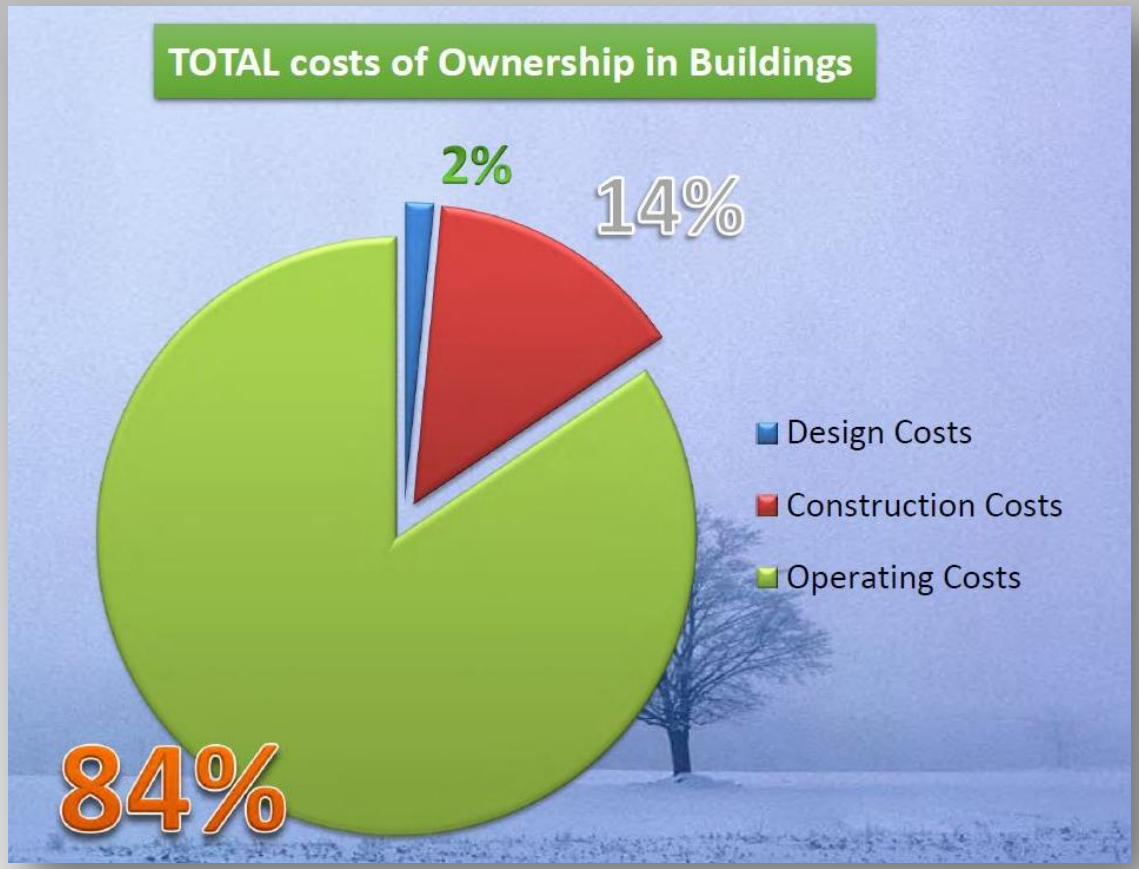
- Tanana Chiefs Conference Resolution 2013-11 established the highest energy efficiency standards for new construction in the State of Alaska

- TCC, Interior Regional Housing Authority (IRHA) Weatherization
  - Average Home Saved $1958/yr

TCC RESOLUTION: "Buildings Financed with Public Money Shall Seek To Achieve the Following Efficiency Standards…"

- Roof: R-100
- Walls: R-70
- Floor/Slab: R-50

Building Life Cycle



Biomass

Locally Produced Energy = Economic Sustainability

- **Tanana's Biomass Project:**
  - **2006: Imported 30k gal/yr @ $5/gal = $150k to Barge/Oil Companies**
  - **2013: Imported 12k gal/yr @ $5/gal = $60k to Barge/Oil Companies**
  - **2013: Purchased 150 cords @$300/cord= $45k/yr to local woodcutters**

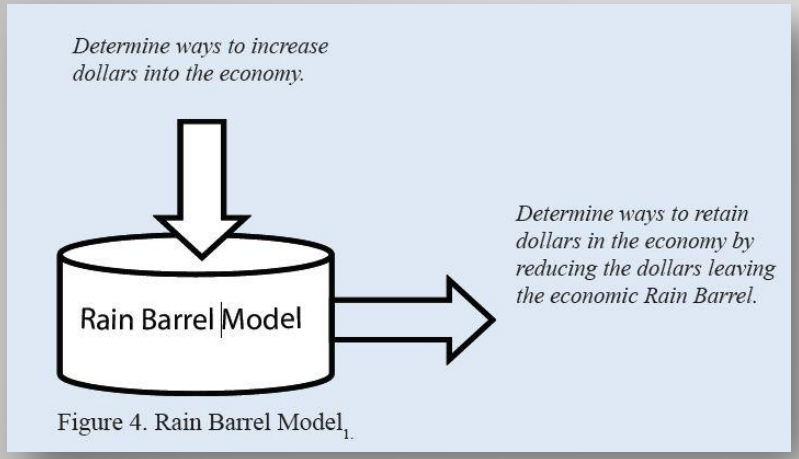


Figure 4. Rain Barrel Model[1].

Biomass

18,100,000 btus/cord (White spruce) according to *www.alaskawoodheating.com*

130 gallons of fuel oil ($552 at $4.27/gal)

Biomass

Cord Wood/Oil Have been the main heat sources in Rural Alaska since Villages were established

KISS Principle – “Keep It Simple Stupid”

Propane

TCC Resolution 2013-12 Support for HB-74/SB23

- Affordable Energy Is KEY to a Sustainable Economy
- Gas Trucking Plan could decrease the cost of Propane in Fairbanks by up to 50%
  - As cooking/water heating/dryers convert could lower microgrid baseload

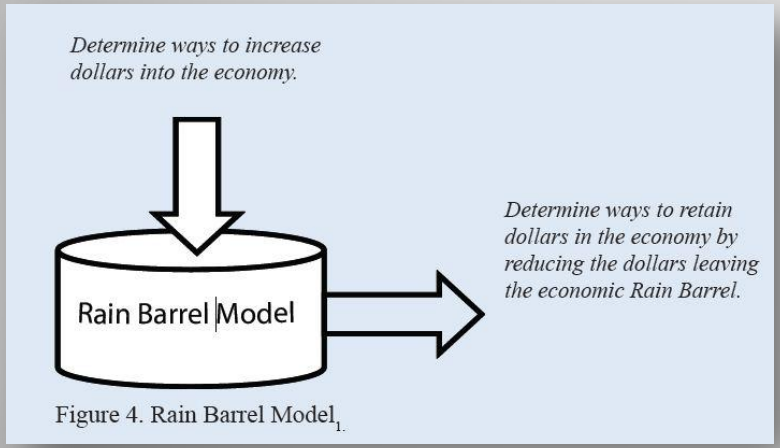


Figure 4. Rain Barrel Model[1].

Project Overview

- Hydrokinetics = Power Generation from flowing water
- 3 yrs, $350k spent, less than 500kWhs generated
- $700/kWh

Lets be on the cutting of technology NOT the Bleeding edge…

Nenana Rec Center

Technology	5 yr $ Savings	Cost of Materials/Install	5 yr Energy Savings
Electricity	$4,400	$20,000	22,000 kWh
Hot Water	N/A	$7,000	N/A
Zone Valves, Programmable Thermostats	$19,150	$2,000	5,000 Gallons of Diesel
TOTAL	$25,270	$29,000	

Energy Model

1. Collect Data & Plan!

2. Efficiency First

3. Renewable Energy
(BIOMASS! SOLAR!)

Lets Put that Model into Practice

Manley Hot Springs Tribal Council

- 4 Buildings
- 35kW Max Load Generator @ ~2gal/hr
- 17,000 gal/yr

$70,000 in Diesel/yr

1. Collect Data and Plan

- Main Electric Loads:
  1. 6kW Electric Heat
  2. 9kW Electric Dryer
  3. 4kW Lighting
  4. Double Coil 3kW Electric water heater
  5. Freezers/computers
  6. Well Pump

2. Efficiency!

- Main Electric Loads:
  - 6kW Electric Heat → 92% Efficient Toyo Stove!
  - 9kW Electric Dryer → 80% efficient propane dryer
  - 4kW Lighting → LED lighting
  - Electric water heater → on Demand Propane
  - Freezers/computers
  - Well Pump
  - Air Compressor

New Max Load: 35kW – 19kW = 16kW

3. Renewable Energy

- THE GOAL: Add Solar PV to the System!
  - Store Energy During the Day In Batteries → TURN GENERATOR OFF AT NIGHT
  - Potential Diesel Savings: $40k+/yr

Main Take-Aways

"We cannot solve our problems with the same thinking that we used when we created them"
-A. Einstein-

1. **Local/Cheaper Energy → Sustainable Communities**

2. **Energy is Expensive, Cheaper to Conserve than to Produce**
   - **Weatherization**
   - **Rural Power Systems Upgrade**
   - **Village Energy Efficiency Program**

3. **Renewables are only a part of the solution**

1. Collect Data and Plan → 2. Efficiency First → 3. Renewable/Local Energy