Energy in Alaska, a Rural Perspective

Commission for Environmental Cooperation of North America
April 19, 2012
Yukon River Inter-Tribal Watershed Council
Energy Department

The Yukon River Inter-Tribal Watershed Council

- Established in 1997
- Treaty Based
- 70 Tribes and First Nations
- Almost Every dot Is a “micro-grid"

Major Rural Energy Challenges

- #1 Heat Energy – Fairbanks has 14,000 annual Heating Degree Days

- Any guesses as to how many heating degree days in Toronto?

Major Rural Energy Challenges

- #2 Electricity
  - Avg Price in Anchorage: .09/kW
  - Avg Price in Pedro Bay: .91/kWh
- #3 Transportation – Subsistence?
- #4 Human Nature, Perverse Incentive

Non-fuel Expenses per kWh sold cents/kWh	kWh Generated with Diesel Per Gallon of Fuel Used kWh/gal	Average Residential Rate (based on monthy usage of 500 kWh) cents/kWh	PCE Rate 06/30/2010 cents/kWh	Effective Residential Rate 06/30/2010 cents/kWh	Utility/Community
					PEDRO BAY VILLAGE COUNCIL
23.9	11.95	91.00	46.57	44.43	Pedro Bay PCE

YRITWC Energy Department

- Directive – Clean Water Needs Clean Energy
- *Efficiency First*
- *Small Scale RE Projects*
- RE and Energy Efficiency Trainings, Education and Capacity Building

Efficiency First!!!!

- Nunamiut Corp DOE Tribal Energy Project

How much is this timer worth →

Analyze options

- Waste Oil – Heat
- Efficient Lighting
- Timers/Occupancy Sensors

…w?

Insulate and Seal

- New Construction Vs. Old construction
  - Nenana School District Dormitory
- Properly Evaluate your home energy use – WHERE does it go!?
- Windows, Air Leaks, no insulation

Lighting

- What's the difference?

Heat Lamp

Flood Lamp

LED

100+ year old technology

- What's the difference?

Classic Model

Newer Model

The Economics of Energy Efficiency

Payback on Lights:

T-12 Electromagnetic:

# of Bulbs:	*X*	*kW (consumed during use)*	*X*	*Hrs/Day*	*X*	*Days/yr*	*=*	*kWh/yr*	*X*	*kWh Rate*	*=*	*Cost/yr*	*/*	*# Units*	*=*	*Operating cost- per bulb for 1yr*
132	X	.04	X	10	X	350	=	18,480	X	$.35/kWh	=	$6,468	/	132	=	$49.00

LED Bulbs:

# of bulbs:	*X*	*kW (consumed during use)*	*X*	*Hrs/Day*	*X*	*Days/yr*	*=*	*kWh/yr*	*X*	*kWh Rate*	*=*	*Cost/yr*	*/*	*# Units*	*=*	*Operating cost- per bulb for 1yr*
132	X	.015	X	10	X	350	=	6,930	X	$.35/kWh	=	$2,425.5	/	132	=	$18.375

Expected Bulb Lifespan= 50,000 hrs
@ 10hrs/day ; 14 years

Estimated SAVINGS by switching from t-12 to LED ; $4,043/yr

Savings per bulb $30.62/yr
Payback per bulb (labor not included) = 1.6 yrs

Estimated Savings per bulb over 14 yr lifetime = $428.68/bulb x 132bulbs = $56,585.76

The Economics of Energy Efficiency

Service Address: 209 AIRPORT ROAD
Mailing Address:
NUNAMIUT STORE
PO BOX 21105
ANAKTUVUK PASS ALASKA
99721

Service	Read Date	Meter #	Read Type	Previous	Current	Days	Billed Usage	ELE Billed Amount					DIFFERENCE
Electric	01/30/12	97879996	KWH	73524	84896	30	11372	$3,380.20		1/31/11 0:00	12347	$3,721.45	975
Electric	12/31/11	97879996	KWH	60343	73524	31	13181	$4,013.35		1/2/11 0:00	14260	$4,391.00	1079
Electric	11/30/11	97879996	KWH	46769	60343	30	13574	$4,150.90		11/30/10 0:00	13394	$4,087.90	-180
Electric	10/31/11	97879996	KWH	32558	46769	30	14211	$4,373.85		10/31/10 0:00	13669	$4,634.15	-542
Electric	10/01/11	97879996	KWH	17903	32558	31	14655	$4,529.25		10/2/10 0:00	14043	$4,765.05	-612
Electric	08/31/11	97879996	KWH	3047	17903	31	14856	$4,599.60		8/31/10 0:00	13706	$4,647.10	-1150
Electric	07/31/11	97879996	KWH	85754	3047	31	17293	$5,452.55		7/31/10 0:00	11712	$3,949.20	-5581
Electric	06/30/11	97879996	KWH	72790	85754	31	12964	$3,937.40		6/28/10 0:00	16065	$5,472.75	3101
Electric	05/30/11	97879996	KWH	59559	72790	29	13231	$4,030.85		5/31/10 0:00	10305	$3,456.75	-2926
Electric	05/01/11	97879996	KWH	45432	59559	32	14127	$4,344.45		4/30/10 0:00	10708	$3,597.80	-3419
Electric	03/30/11	97879996	KWH	32935	45432	28	12497	$3,773.95		4/3/10 0:00	11483	$3,869.05	-1014
Electric	03/02/11	97879996	KWH	19647	32935	30	13288	$4,050.80		3/3/10 0:00	11948	$4,031.80	-1340
Electric	01/31/11	97879996	KWH	7300	19647	29	12347	$3,721.45		1/31/10 0:00	12288	$4,150.80	-59
										1/1/10 0:00	12448	$4,206.80	
								$54,358.60				$54,774.80	

EDUCATION

…If a tree falls in the forest…

Projects!

- Solar Thermal, Solar PV, Heating upgrade Nenana Youth Rec Center

Solar PV Energy Production:

# of Panels:	20	
Panel Type:	Trinna 220watt	
Total Array Size:	4.4 kW	
Energy Produced:	5,100 kWh/yr	
Cost of Electricity in Nenana:	$.20/kWh	
Energy Value per year:	$1020	
Cost of equipment and supplies:		$15,000
Simple Payback: $15k/$1020 =		14.7yrs

Lighting Change-out

of bulbs: 132

Tube bulbType: 15 watt LED tubes

Total Time for Change-out: 12 person-hours

Energy SAVED: 12,000 kWh/yr

Cost of Electricity in AKP: $.35/kWh

Energy Value per year: $4200

Cost of equipment and supplies: $6,600

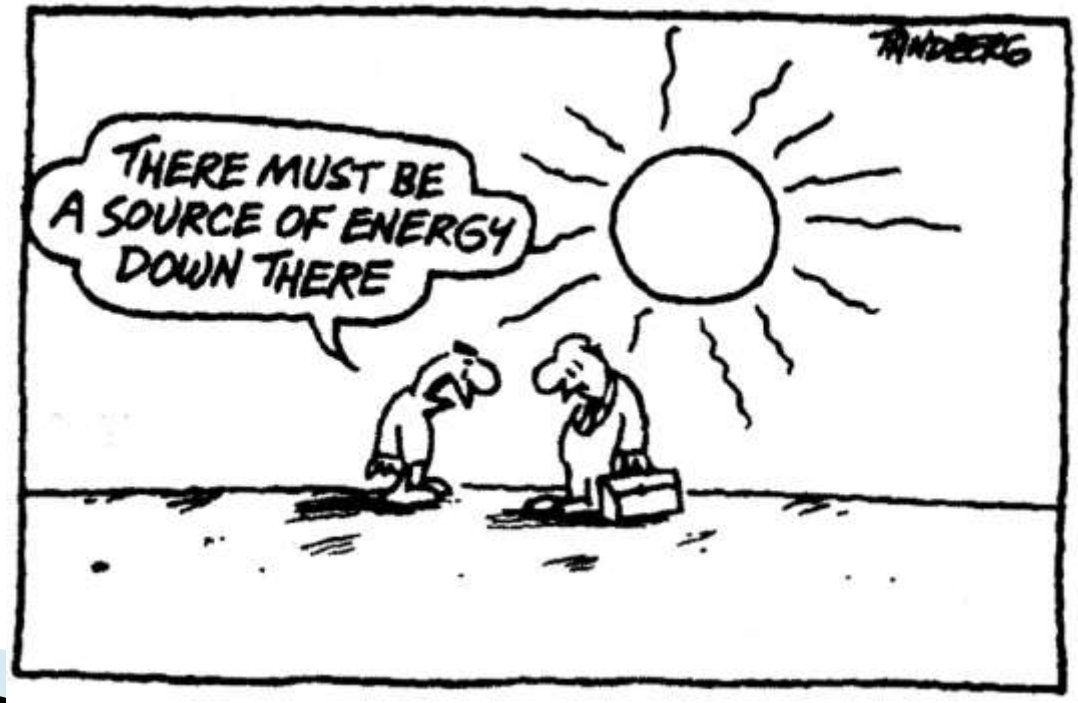
Simple Payback: $6600/$4200 = 1.6yrs

Lifetime Energy Saved (bulbs 50k hrs): $40k-50k

Solar Thermal

- Free Heat during the summer

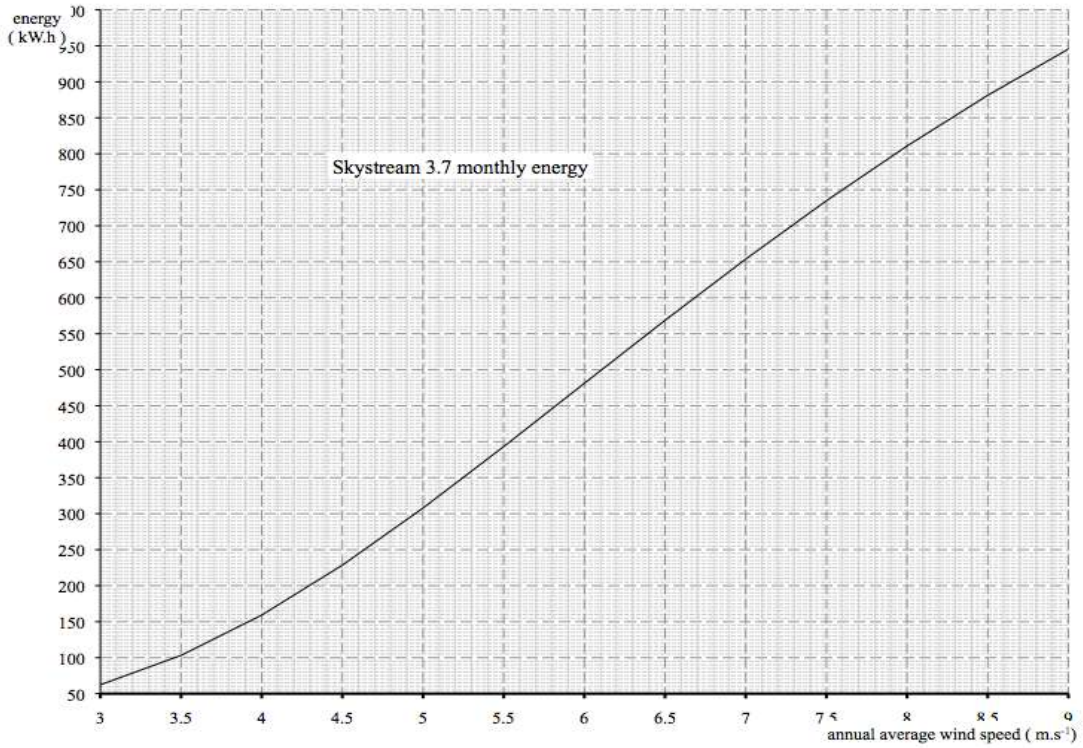
How much do we pay to heat water during the summer?



Village Scale Wind – Issues?

Hooper Bay Small Wind

- SkyStream 3.7 Wind Turbines
- Class 6 Wind
- 6.7 m/sAvg windspeed



Hooper Bay Small Wind

- 600 kWh/month
- Energy in Hooper Bay$.514/kWh
- Turbine Cost $20k
- Yearly Energy Value 600kWh X 12 mo = 7,200 kWh
- 7,200 kWh x $.514/kWh = $3,700
- PAYBACK: $20,000 / $3,700 = 5.4 yrs

How Hard is it to instal?

Take-Aways

- Every 1$ spent on Energy Efficiency is worth $5 spent on Renewable Energy Projects

- Somebody should do something about that…

Solutions?

Quyana, Merci, Gracias, Thank you