Re-thinking Energy Efficiency in Rural Alaska

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Re-thinking Energy Efficiency in Rural Alaska

Kwethluk

Prototype Community

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Start with a free energy audit

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Finance upgrades with Grant Funds

…wait for Grant Funding

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…wait for Grant Funding

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Use an Energy Audit as part of your overall strategy

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Use an Energy Audit as part of your overall strategy

Develop a financially viable project that can be funded via grant OR debt

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"If we can't implement the retrofits, don't bother with the analysis…"

Building by Building, Owner by Owner…

- In last 5 years, more than 450 state and federally funded energy audits on individual buildings…
- Uncaptured potential savings in 156 audited schools is $5.2 million with a 4 year payback (*Energy Efficiency of Public Buildings in Alaska: Schools*; Wiltse, Madden, Valentine, CCHRC, November 21, 2014)
- AHFC 2015 follow up on 249 of the 327 audits performed in 2011/2012 - 84% said they implemented recommendations, 53% said energy costs were reduced, but only 34% are tracking their energy costs…?
- Performed more than 250 audits on Alaskan buildings, estimate less than 15% have implemented recommendations

Achieving Energy Reduction

- Create an energy efficiency strategy, plan and goals
- Appoint an energy champion & authorize
- Establish a baseline and monitor consumption
- Perform Portfolio analysis and Energy Audits
- Develop a financeable project (grant and/or debt)
- Implement retrofits
- Ongoing monitoring and “course corrections”

Achieving Community Wide Energy Reduction

- Create an energy efficiency strategy, plan and goals, get buy-in across the community
- Appoint an energy champion & authorize
- Establish a baseline and monitor consumption
- Perform Portfolio analysis and Energy Audits; perform community-wide analysis
- Develop a financeable project (grant and/or debt)
- Identify funding sources and repayment mechanisms
- Ongoing monitoring and “course corrections” - provide ongoing service and training

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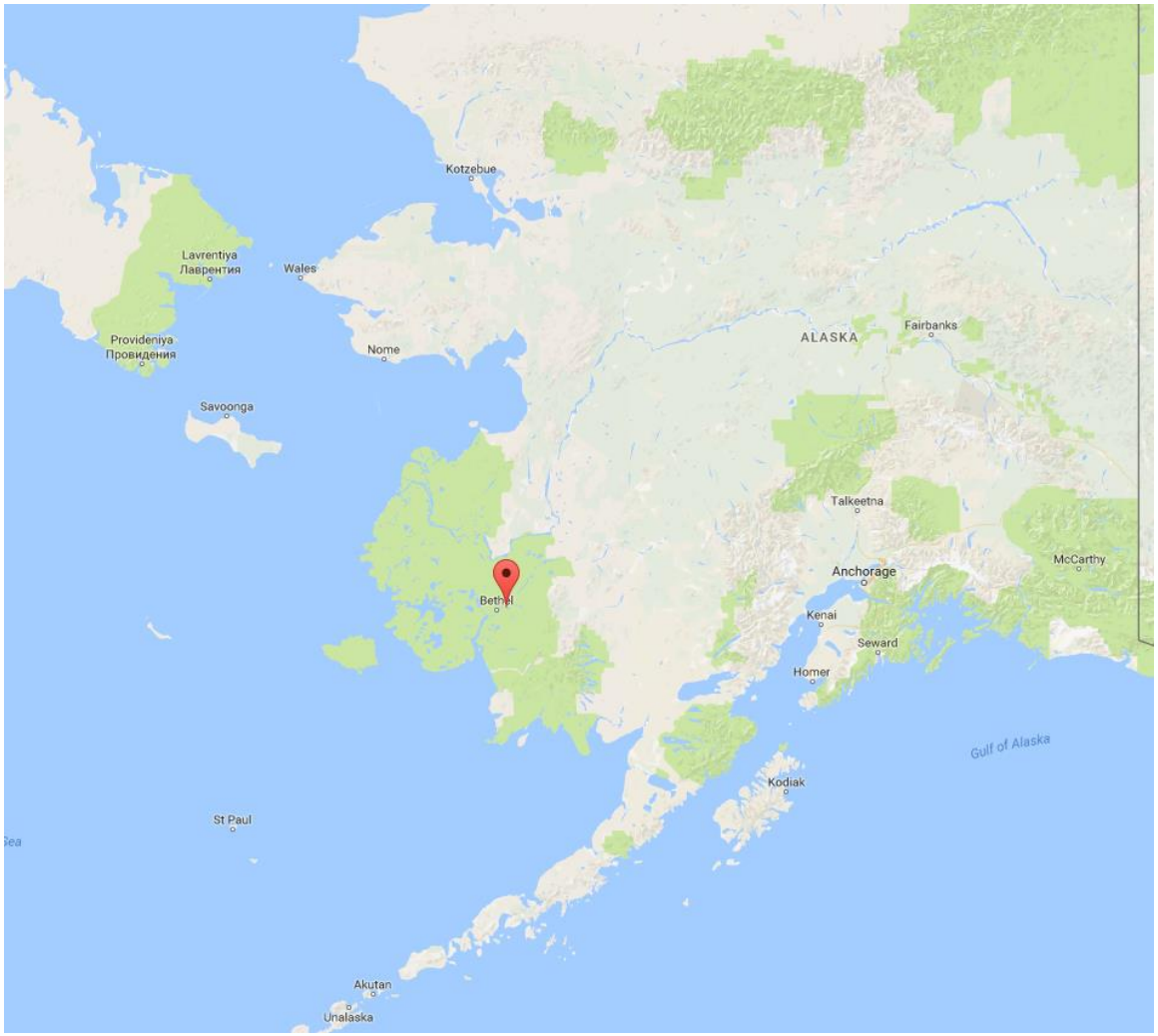

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2016 START grant for technical assistance to

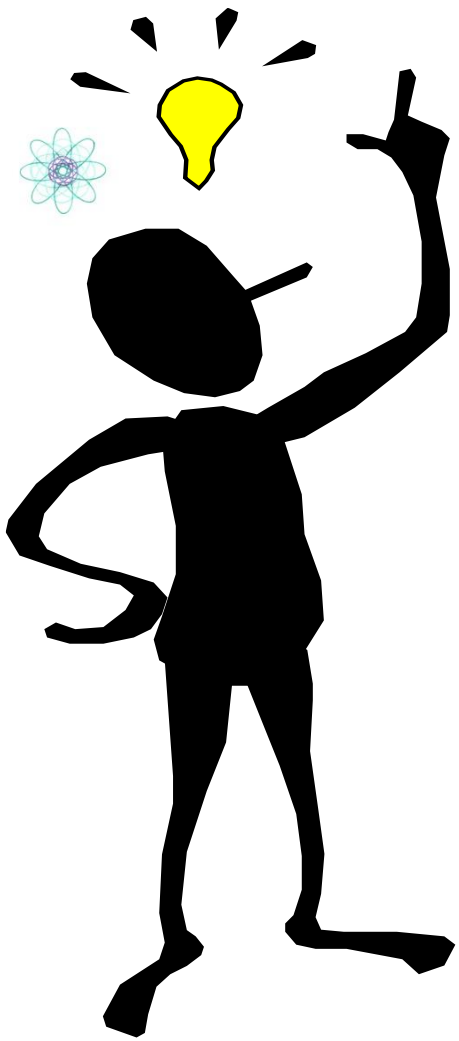
Kwethluk, Inc. – Village Corp, Electric Utility & Oil Distributor

188 residences, spending $515,000/yr in energy costs

25 non-residential buildings, spending $990,000/yr in energy costs

$.52/kWh, $.21/kWh with PCE discount

$5.00/gallon fuel oil



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What if we replaced ALL the bulbs and lamps in the village with LED's?

What if we replaced the thermostats in every building with programmable models?

What if the community bought a blow-in insulation machine and increased attic insulation to R-60 in every building?

What if we trained a couple folks and air-sealed every home?

How much would that cost?

How much would it save?

COMBINED EFFICIENCY AND WORKFORCE DEVELOPMENT PROGRAM…

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PROCESS

1. Preliminary Analysis using AkWarm-C to determine ROM savings and costs to vet the idea
2. Presented to Joint Council
   - City of Kwethluk
   - Organized Tribe of Kwethluk
   - Kwethluk, Inc.
   - 8 home owners
3. Level 1 energy audits of 25 commercial buildings
4. Level 1 audits of 10 residences
5. Modeled commercial buildings in AkWarm-C, residences in B-Opt (NREL)
6. *Identify potential financing sources and repayment mechanisms*
7. *Scope the project*
8. *Implement*

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ISSUES & OBSTACLES:

- No utility data, so no initial calibration of models
- Small sample size (10) for 188 residences
- Level 1 audits
- No access to some buildings
- Multiple owners
- Some buildings not operational or changing use and occupancy
- Resistance to debt financing
- Unknown penetration into community
- Out of the box financing…multiple disparate programs

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Overview of results:

	Annual Energy Costs	Annual Savings without Residential PV Systems	Annual Savings with Residential PV Systems	Simple Payback without Residential PV Systems (years)	Simple Payback with Residential PV Systems (years)
25 Commercial Buildings	$515,816	$121,896	N/A	3.8	N/A
188 Residences	$991,944	$101,294	$277,137	3.8	23.6
TOTALS	$1,507,760	$223,190	$287,797		

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Break down by EEM:

EEM	Residential			Non-Residential		
	Cost	Savings	Payback	Cost	Savings	Payback
Air Sealing	$90,743	$36,716	2.5	$36,377	$27,189	1.3
Setback Thermostats	$20,003	$36,002	0.6	$23,330	$30,676	0.8
Attic Insulation	$258,269	$20,172	12.8	$172,243	$7,367	23.4
Lighting	$14,100	$8,404	1.7	$149,678	$31,276	4.8
Other				$82,583	$25,388	3.3
Subtotals	**$383,115**	**$101,294**	**3.8**	**$464,211**	**$121,896**	**3.8**
Community-Wide Total Costs	**$847,326**					
Community-Wide Total Savings	**$223,190**					
Payback	**3.8**					

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14.8% Community-wide energy cost reduction without residential PV

3.8 year payback

18.4% Energy cost reduction with residential PV

19.6 year payback

Average home owner:

Spends $5,276/year in energy costs today (calculated)

Saves $539/year without PV, $1,531 with PV

Upgrades cost $2,037/home without PV

Average non-residential building owner:

Spends $20,632/yr in energy costs (calculated)

Saves $4,876/yr

Upgrades cost $18,568/building

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Commercial Building Owners:

Owner	Number of buildings	Total Annual Energy Costs (calculated)	Total Annual Savings	Percentage savings
Lower Kuskokwim School District	7	$237,207	$37,303	16%
Organized Village of Kwethluk	8	$130,464	$45,327	35%
(Russian) Orthodox Church in America	2	$17,774	$4,467	25%
Alaska Moravian Church	2	$20,600	$5,453	26%
Kwethluk, Inc.	1	$9,638	$3,574	37%
City of Kwethluk	3	$56,601	$20,630	36%
US Postal Service	1	$13,063	$1,694	13%
Head Start (Unknown owner)	1	$30,469	$3,448	11%
TOTALS	**25**	**$515,816**	**$121,896**	**24%**

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Break down by Building Owner:

Owner	Estimated ECM Implementation Costs	Estimated Annual Savings	Simple Payback (years)
Lower Kuskokwim School District	$130,987	$37,303	3.5
Organized Village of Kwethluk	$179,614	$45,327	4.0
(Russian) Orthodox Church in America	$16,668	$4,467	3.7
Alaska Moravian Church	$14,806	$5,453	2.7
Kwethluk, Inc.	$17,463	$3,574	4.9
City of Kwethluk	$81,787	$20,630	4.0
US Postal Service	$2,124	$1,694	1.3
Head Start (Unknown owner)	$20,762	$3,448	6.0
TOTALS	**$464,211**	**$121,896**	**3.8**

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FINANCING POSSIBILITIES BEING EXPLORED:

- Combination of USDA grants and loans
  - Residential loans
  - Residential grants to low income/seniors
  - Community Facility loans
  - REAP 25% grants
- On-bill repayment mechanism through Kwethluk, Inc.
- Loans managed and guaranteed by NuVista Light & Electric Coop.
- Operating capital - TBD

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NEXT STEPS – IN PROCESS:

- Continuing to pursue and resolve financing issues
  - Credit verification for principals
  - Operating capital
- Visit to Kwethluk to present program to Joint Council, Kwethluk, Inc. and to the building owners
  - Determine reception/resistance
  - Identify issues and penetration into community & existing resources
- Refine project scope
  - Identify existing conditions
  - Walk through all residences & commercial buildings
- Refine savings estimates by calibrating models
- Refine cost estimates based on detailed scope
- Identify training needs and resources

Community-Wide Energy Efficiency

Use the Kwethluk project to identify processes, resources, issues and obstacles

Complete the Kwethluk project, validate results, then implement a Beta project in 2-3 other communities

Create scalable, statewide program to reduce energy consumption and costs by 15% in every rural Alaskan Community

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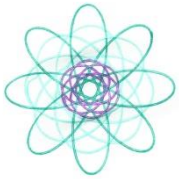
Community-Wide Energy Efficiency



Thank you!

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