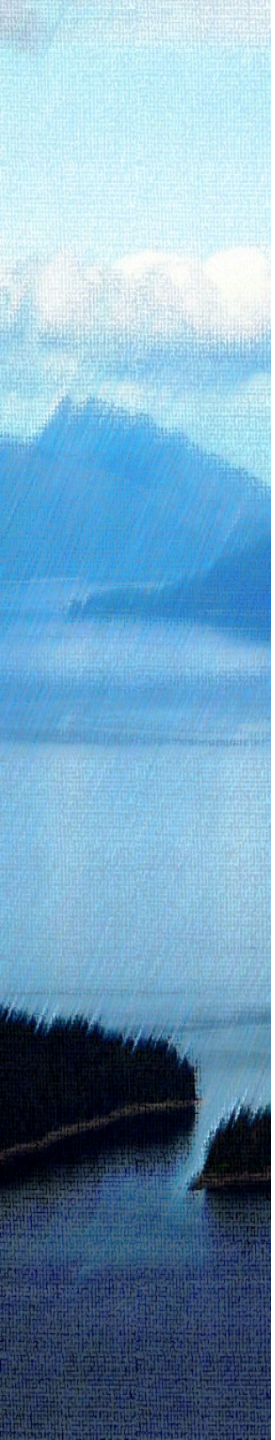

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Spending Your Energy Dollar Wisely

Craig Moore
V.P. Planning and Development
Tlingit-Haida Regional Housing Authority
Juneau, Alaska

DOE Tribal Webinar
May 31, 2017

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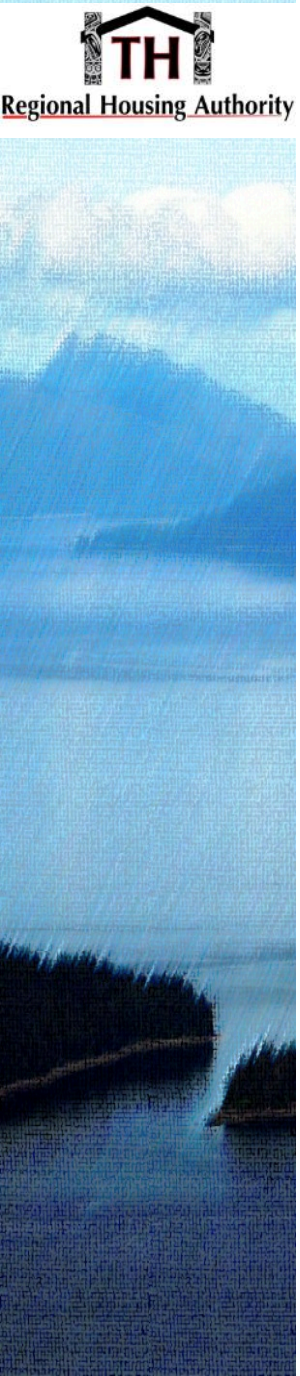
…otherwise titled…

How THRHA is tackling the **Energy Hog Problem** in our SE Alaska communities



Here is our Problem…

$ High Cost of Energy

$ Cold Maritime Climate

$ Inefficient Homes

$ Lack of Homeowner Education

$ Low incomes, few jobs

$ Not enough $$ to fix the problem

= **an Energy Hog Problem**

How we are tackling the Problem:…

(…thanks to grants from DOE Tribal Energy, USDA-RUS, and State)

- Community and Homeowner Education
- Home Energy Assessments and Energy Use Monitoring
- Professional Energy Audits on Multifamily Apartment Buildings
- Develop Energy Conservation Improvement Options
- Weatherization, appliance, heating upgrades

The Facts…..High Cost of Energy

- **ELECTRICITY** rates up to 275% above the National Average in some villages.
- Small isolated villages are on diesel generator power. Electric Cooperatives. No grids.
- Electric Rates up to $0.68/KwH in diesel-electric communities.
- State subsidy (Power Cost Equalization) for eligible households lowers rate to $0.26/kwH on first 500 Kwh/month.
- Average village household usage is 350 KwH/month
- Larger towns have hydroelectric generation, micro grids, rates as low as $0.10/KwH

The Facts……High Cost of Energy

- **HEATING OIL** costs up to $5.50/gallon in some communities.
- Heating oil is delivered to community by barge from Seattle. No pipelines, no roads.
- No coal, no natural gas.
- Many households cannot afford heating oil….they must heat with wood.

- High incidence of mold in bedrooms in homes heated with wood.
- Many residents in homes heated with wood have asthma symptoms.

The Facts……Cold Maritime Climate

7000 – 9000 Heating Degree Days

Over 160 inches/year rainfall. Pacific storms.

Freeze/thaw cycle weekly

The Facts……Lack of Homeowner Education (about Energy Efficiency)

- How to choose most efficient appliances
- How customary habits affects energy usage
- Burn lots of wet wood.
- Little exposure to building science
- Very knowledgeable about subsistence lifestyle

The Facts……Inefficient Homes

- High air-leakage
- Poor insulation
- Poor ventilation
- Inefficient heating systems
- Poor maintenance
- Old appliances

= **High cost to heat**

= **Mold in homes**

The Facts…..Low Incomes, Few Jobs

- Subsistence communities
- Almost no commercial economy
- Seasonal jobs
- Local government
- Schools
- Housing Authority

The Facts……Not enough $$ to fix the Problem

- ENERGY COSTS KEEP GOING UP
- WAGES ARE FLAT OR DROPPING
- GRANTS ARE HARDER TO FIND

Solutions and Successes …… to tackling the Energy Hog Problem

- Community and Homeowner Education
- Home Energy Assessments and Energy Use Monitoring

ENERGY CENTS PROGRAM

OBJECTIVE: "…provide home energy assessments, energy conservation education, and energy use monitoring for 400 families."

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Professional training for 28 local field assessors to conduct home assessments

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400 Energy Usage Assessments

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Community Meetings and Energy Fairs

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Energy Hog visits with school kids – Angoon, Kake, Hoonah

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Angoon kids play the Light Bulb Game – which one uses more energy?

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Angoon Energy Fair Participants

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With funding from Partners, 1500 Energy Assistance clients receive energy savings kits

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Home Energy Assessment Planning

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Community Awareness and Education plan

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Extended Energy Champion work

ENERGY CENTS PROGRAM

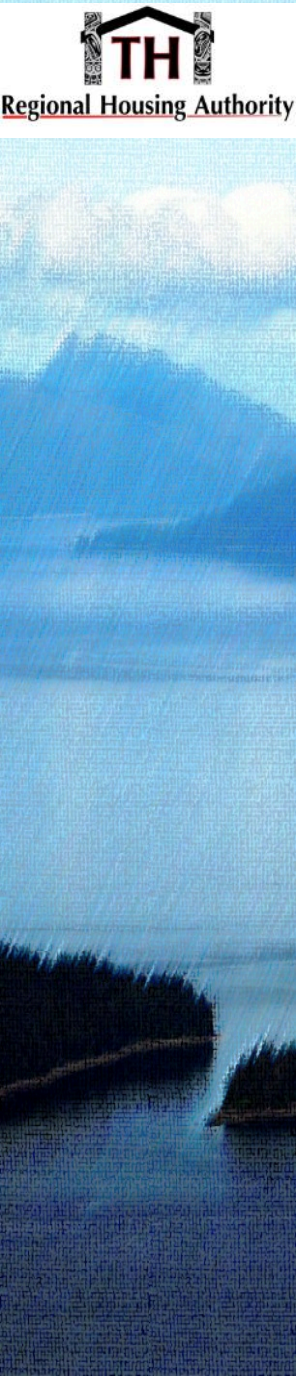
Statement of Project Objectives (sample)

5-e.)Home energy assessment results and recommendations:

Table 6. Households by Residents with Allergies or Asthma, by City

	Counts				*Percent*		
Region/City	**Yes**	**No**	**NR**	**Total**	**Yes**	**No**	**NR**
Angoon	13	22	7	42	31%	52%	17%
Hoonah	9	7	2	18	50%	39%	11%
Kake	18	36	3	57	32%	63%	5%
Juneau	14	13	3	30	47%	43%	10%
Other Cities	30	41	7	78	38%	53%	9%
Total	**84**	**119**	**22**	**225**	**37%**	**53%**	**10%**

37 percent of surveyed homes reported at least one resident with asthma or an allergy.



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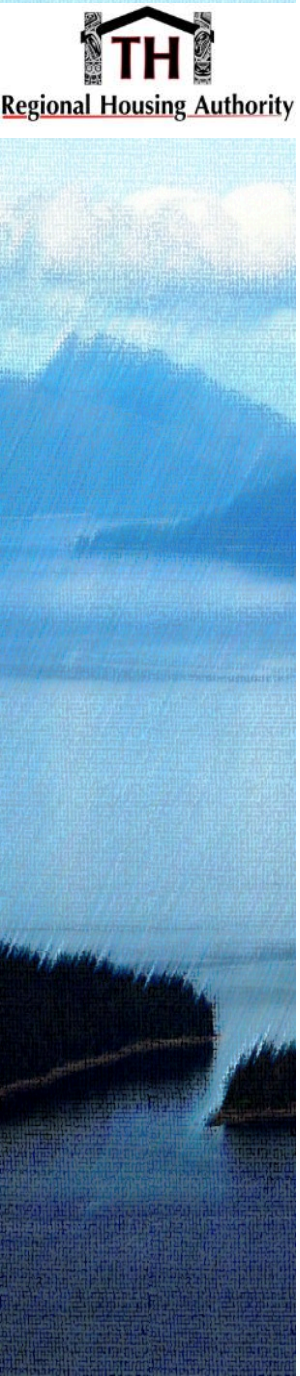
ENERGY CENTS PROGRAM

Online Homeowner Energy Modeling Tool

Calculate your monthly electric usage and costs with calculator on THRHA website at:

http://regionalhousingauthority.org/housing-programs/southeast-alaska-utility-cost-estimator/

- Can add lines for each appliance.
- Will total consumption up and estimate monthly utility bill.



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Energy Cents Program

RESULTS:

- Good data on close to 400 SE Alaska homes
- Increased homeowner awareness of energy efficiency household energy usage, and how to change habits.
- Increased youth awareness of energy efficiency
- Energy efficient light-bulbs, weather-stripping and watt meters deployed in many homes.

CONCLUSIONS:

- Household education helps save energy.
- Many homes need weatherization.
- Most homes in high-cost diesel-electric communities need renewable energy (non-fossil fuel) heating systems

Professional Energy Audits on Multifamily Apartment Buildings

Project Description: "The project will provide energy efficiency audits, energy monitoring, and energy conservation proposed upgrades for about 51 low-income, multifamily buildings in 14 southeast Alaska communities with extremely high energy costs.

Low-income Multifamily Energy Efficiency Building Audits-2014

- 50 + comprehensive EE audits, monitoring, and usage assessments on low-income multifamily buildings in 14 southeast Alaska communities

- Identify cost effective feasible weatherization options for building retrofits that can reduce energy consumption by 30% or more.

- Determine funding for buildings based on feasibility recommendations for energy upgrades /retrofits

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Energy Audit

Fireweed Place

Juneau, Alaska

Final Report
February, 2015

Alaska Energy Engineering LLC

25200 Amalga Harbor Road
Juneau, Alaska 99801

Tel/Fax: 907.789.1225
jim@alaskaenergy.us

Professional energy audits were conducted on our larger multifamily buildings by energy engineers with experience in complex HVAC systems in multi-story buildings.

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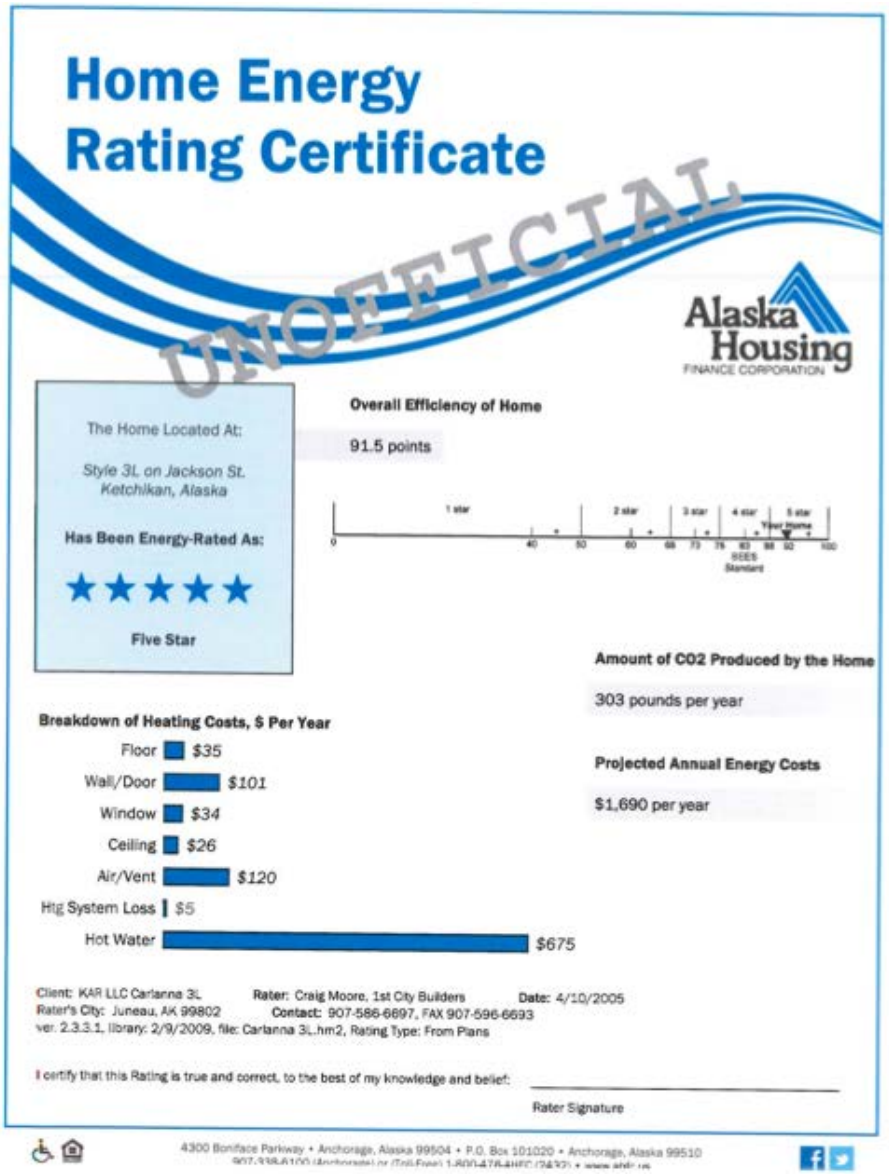

Sample AkWarm energy rating on a new building

AS-IS Energy Ratings were conducted by trained energy assessors on smaller multifamily buildings using AkWarm energy rating software. Improvement Options Reports were generated showing cost-effective improvements with a Savings to Investment Ratio (SIR) of 1 or better.

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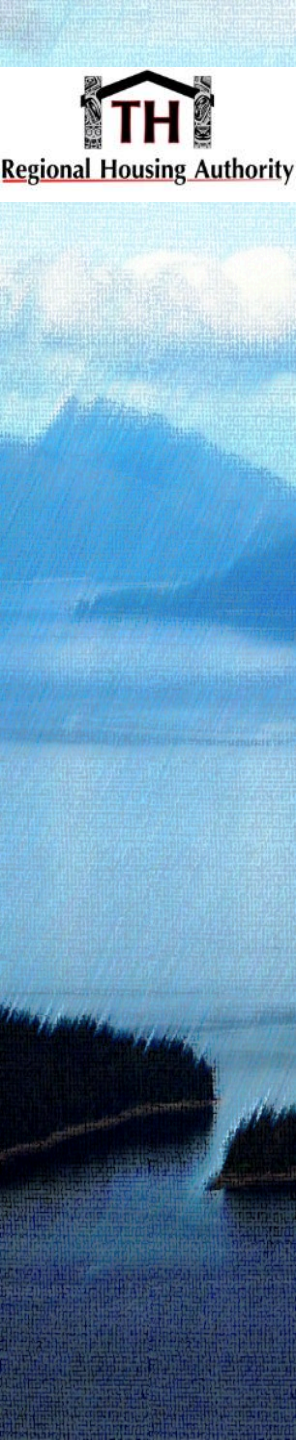
A typical energy cost comparison chart, for the community of Craig. The cost of locally produced Bio Bricks is less than half the cost per mmBtu than oil.

Table 2.2-1 : Craig Cost of Energy Comparison

Technology, Unit	Input Btu/Unit	Cost/Unit	Assumed Efficiency	Output Btu/Unit	Cost/ mmBtu Output
#1 Fuel Oil, Gallon	134,000	$4.10	80%	107,200	$38.25
Electricity, kWh (Resistance)	3,412	$0.23	100%	3,412	$67.41
Electricity, kWh (Heat Pump)	3,412	$0.23	300%	10,236	$22.47
Wood Pellets, Ton	15,200,000	$330.00	80%	12,160,000	$27.14
Bio Bricks, Ton (Palletized Unboxed)	15,200,000	$200.00	75%	11,400,000	$17.54
Bio Bricks, Ton (Palletized Boxed)	15,200,000	$250.00	75%	11,400,000	$21.93
Seasoned Hemlock, Full Cord	18,100,000	$250.00	70%	12,670,000	$19.73

Note: Fossil fuel prices provided by AkWarm software based on the 3/30/2015 library. Biomass prices obtained from local providers.



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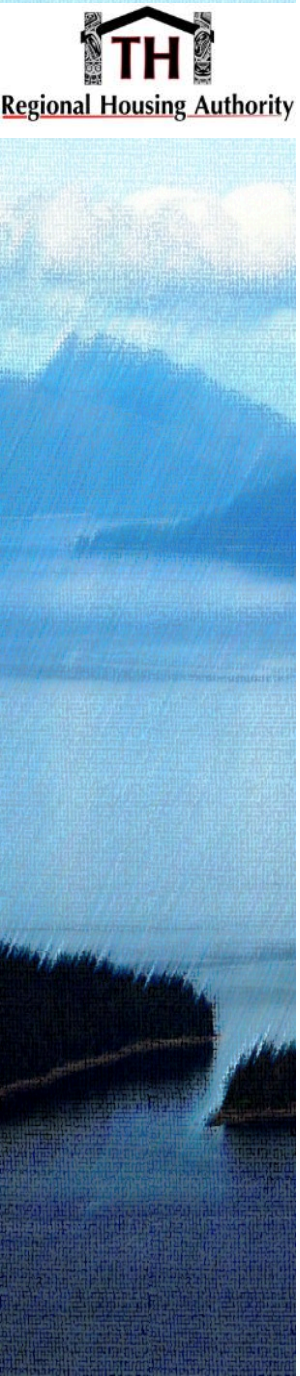
A sample Cost of Energy Comparison for Ketchikan. Ketchikan is a hydroelectric community. Heat pumps (both air source and ground source) are far less costly per mmBtu output than oil or wood pellets

Table 2.7-1 : Ketchikan Cost of Energy Comparison

Technology, Unit	Input Btu/Unit	Cost/Unit	Assumed Efficiency	Output Btu/Unit	Cost/ mmBtu Output
#1 Fuel Oil, Gallon	134,000	$4.05	80%	107,200	$37.78
#2 Fuel Oil, Gallon	138,800	$4.05	80%	111,040	$36.47
Electricity, kWh (Resistance)	3,412	$0.11	100%	3,412	$32.24
Electricity, kWh (Air Source Heat Pump)	3,412	$0.11	300%	10,236	$10.75
Electricity, kWh (Ground Source Heat Pump)	3,412	$0.11	500%	17,060	$6.45
Wood Pellets, Ton	15,200,000	$400.00	80%	12,160,000	$32.89

Note: Fuel prices provided by AkWarm software based on the 3/30/2015 library



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EXAMPLES OF MEASURES THRHA HAS BEEN TAKING TO IMPROVE ENERGY EFFICIENCY AND REDUCE DEPENDENCY ON FOSSIL FUELS:

- Weatherization Program
- Super-insulated building shells (outside insulation)
- Air Source Heat Pumps
- Biomass Heating
- Solar PV
- Improved ventilation systems
- Client education

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Dense-packing floors with cellulose

Since 2008, THRHA has trained a highly skilled local work force to perform weatherization on homes under the State of Alaska's Weatherization program, with an average cost per unit of $11,000.

This program has helped many homeowners immensely, yet is not adequate for installing new renewable energy heating systems.

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THRHA crew lead demonstrates proper window flashing on this house with outside insulation technique.

THRHA Crews have become proficient at building energy-efficient and durable buildings for our climate, with specialized training in cold-climate construction, proper weather-flashing, outside insulation technique, rain-screen siding, airtight construction, and proper ventilation.

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THRHA's newer subdivisions are highly energy efficient and durable construction.

Our new homes are 5 Star Plus energy rated, with non-fossil fuel heating systems and improved ventilation systems for good indoor air quality.

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Our new all-electric Saxman Senior Center is a state-of-the-art building with outside insulation technique and air-source heat pumps. It requires less than 5 BTU/square foot to heat.

This is a hydro-electric community at $0.10/kWh rates

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The new energy efficient THRHA warehouse in Juneau is heated with a wood pellet boiler. It is clean burning, quiet and as maintenance free as any equipment we have used. It has a 10-ton silo. We do not have to worry about any fuel spills. It is saving us about $9,000/year over oil on heating costs.

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Kake Senior Center Modernization Project. Kake is a high-cost diesel electric community.

The newly modernized Kake Senior Center is highly energy-efficient, and is heated with a wood pellet boiler. Based on our energy audits, we also installed a 9KW solar PV system to help displace some of the high cost ($0.65/kWh) electric rates.

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In some of our hydroelectric communities we are replacing electric resistance heat and oil heat with new “mini-split” ductless air-to-air heat pumps. With efficiencies to 300%, ranges down to -15 F, and installed costs of less than $5,000, they are a becoming a hot item in hydroelectric communities.

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FINAL OUTCOMES provided energy data, improvement options, and cost-effective recommendations for making our multifamily building in SE Alaska more energy efficient, our communities more sustainable.

Testimonials

- Thank you for what you offered for my hometown of Wrangell!! All the clients are happy by what we taught them and what we all learned- Byron Cady and Sue Stevens, EC Crew
- I never use too much heat, I never leave my lights on, but I will get rid of that damn toaster- Helen Adams, Hydaburg resident

Testimonials

- You helped me save energy and money, which will help my children learn how to conserve energy-Michelle Mingmins-EC client
- It teaches kids how important it is to be conscious of what is going on in the home, and I am able to pay my energy bill on time instead of being behind!-Lorena Cano EC client

Testimonials

- I learn little things matter. Lights matter, my home is not wasteful, but small things make a difference, I'm saving much more than before!- Harold Frank-EC client
- You are a blessing, thank you for your time. I save money now on my energy, I can afford to do more, I am happier. Henrich Kadake-EC client

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https://www.youtube.com/watch?feature=player_embedded&v=h4cqqyEHeeA

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Gunalchéesh!

Haw'aa!

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