



Measuring Energy Use

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Renewable Energy Alaska Project

To facilitate the increased development of renewable energy and energy efficiency in Alaska through collaboration, education, training, and advocacy.



We are all on Native Lands

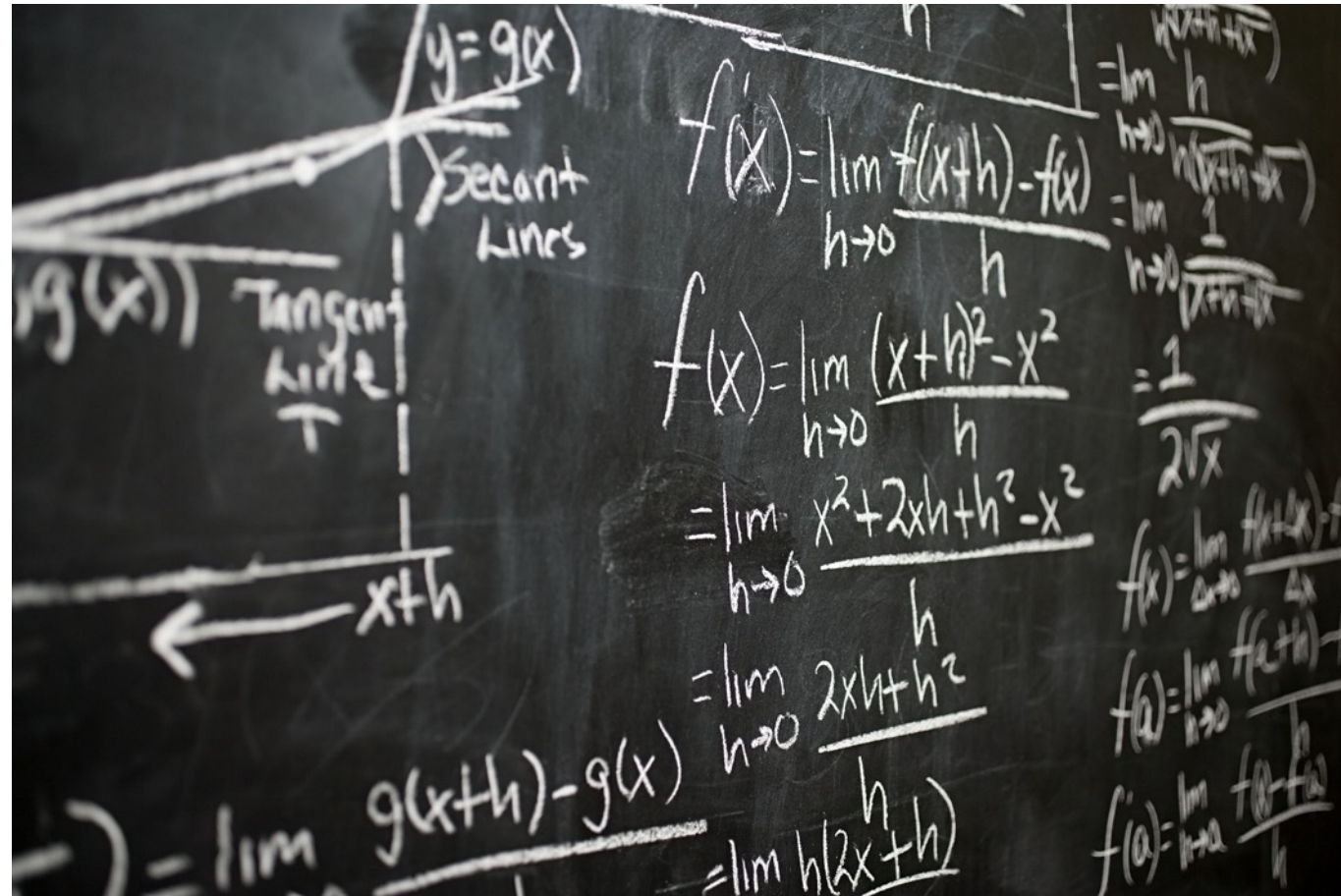
- Alaska's diverse Indigenous cultures have stewarded these lands since time immemorial
- Regardless of location, it is important to recognize and support the voices of the past, present, and future stewards of these unceded lands

Traditional territories of Alaska Native Cultures



Outline

- Intro
- Importance of Measuring
- How to Measure:
 - ✓ Heating
 - ✓ Electricity
- Q&A

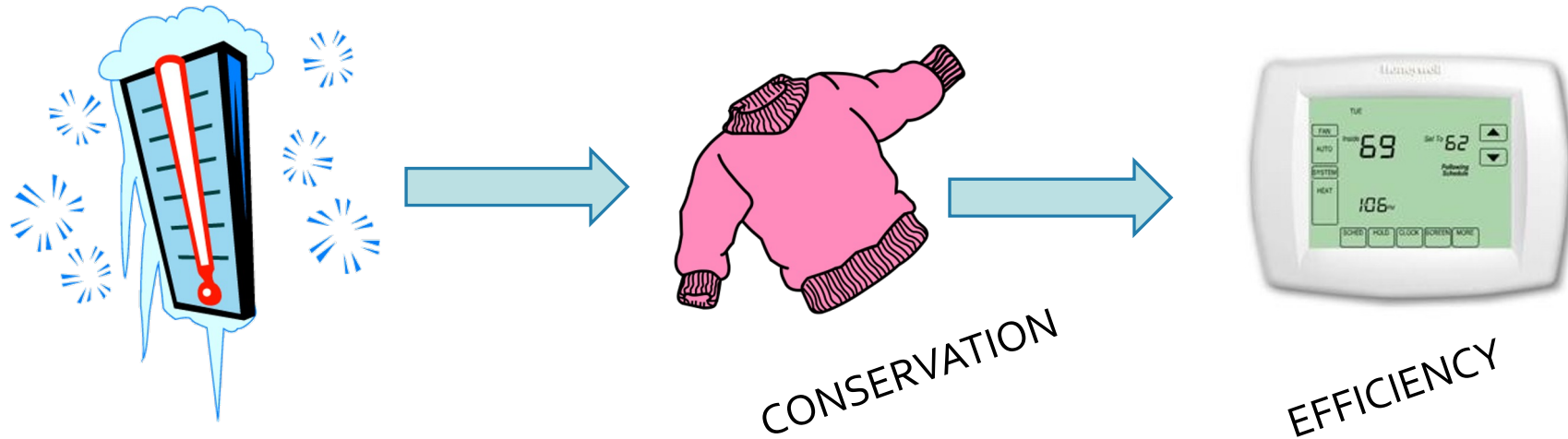


**If you can't measure it, you
can't manage it**



Energy Efficiency & Conservation

To reduce your energy use, you can **change your behavior** or **change the technology** that you're using.



*Remember:
The cheapest & lowest carbon
fuel is the fuel you never have to
use!*

Free download!

Includes top tips for heating, water, lighting, and other electricity

Home energy assessment checklist

ENERGY SAVING TIPS FOR ALASKANS



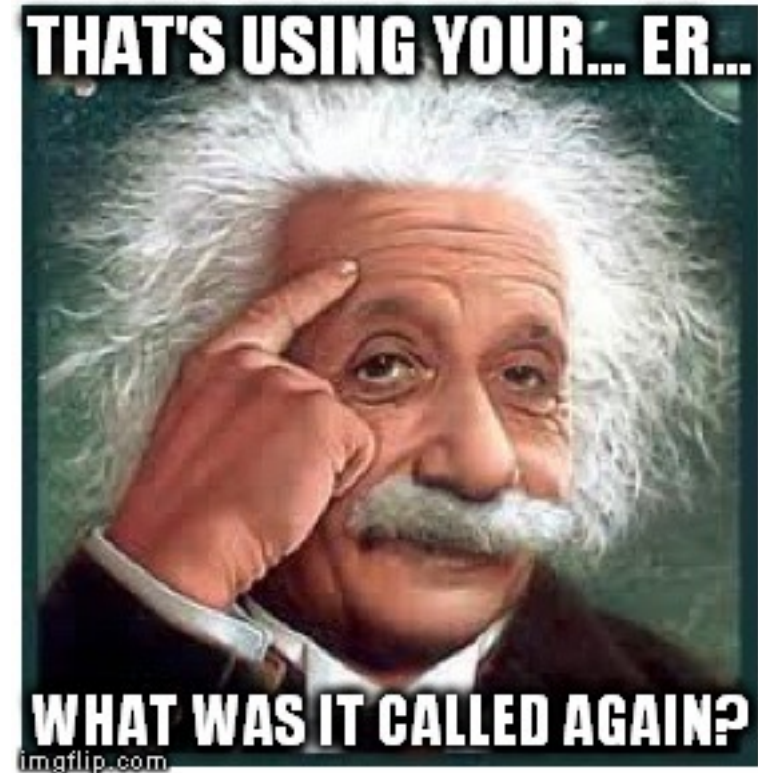
{ Ways to **Save Energy** and **Money** in your home



Measuring Our Energy Use

- Transportation
 - Miles per gallon
 - Miles per kWh
- Heating: British Thermal Units (BTUs) in...
 - Cord of wood
 - Gallons of heating oil
 - Cubic feet of natural gas (ccf)
- Electricity: Kilowatt hours (kWh)
 - Amount of energy used over time (NOT per hour)
 - Charged price per kWh used by the electric utility

If you can't measure it, you can't manage it



WHERE DOES YOUR MONEY GO?

Energy bills don't come itemized showing you which appliances and systems use the most energy.

ALASKA HOUSEHOLD ENERGY COSTS %

Southeast

Space Heating.....69%
Water Heating.....14%
Appliances.....17%

Interior

Space Heating.....77%
Water Heating.....10%
Appliances.....13%

South Central

Space Heating.....73%
Water Heating.....14%
Appliances.....13%

Western

Space Heating.....68%
Water Heating.....16%
Appliances.....16%

Data from 2018
AHFC Housing
Needs Assessment
as presented in the
*Energy Saving Tips
for Alaskans*

Heating



Photo credit: Michael Penn / Juneau Empire

Heating Measurement



- British Thermal Units (BTUs)
in...
 - Cubic feet of natural gas (ccf)
 - Gallons of heating oil
 - Cord of wood
- 1 BTU ~ the amount of energy
in 1 match

Heat loss: MBh – mille BTUs per
hour

Reading your Heating Bill

103,000 BTUs per ccf of natural gas

ccf = one hundred cubic feet



ENSTAR Natural Gas Company
P.O. Box 190288
Anchorage, Alaska 99519-0288
www.enstarnaturalgas.com

UTILITY BILL STATEMENT
Customer: [REDACTED]
Account Number: [REDACTED]
Cycle: 54-01

Bill Date	Due Date	Billing Cycle	Previous Balance	Payments	Current Activity	Total Amount Due
10/10/2022	11/4/2022	9/1/22 - 10/5/22	\$33.76	\$-33.76	\$72.59	\$72.59

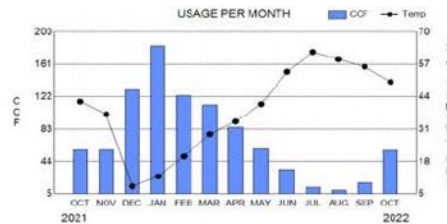
Meter # [REDACTED] Rate Class: G1 TYPE: Residential *** Auto Pay ***

Attention autopay customers:
Beginning mid-October, ENSTAR will transition to a new payment processor. This transition will require you to update your payment information and register a MyENSTAR account if you do not have one already. Please visit www.enstarnaturalgas.com or call ENSTAR Customer Services at 907-334-7600 to assist you with this transition.

Previous Activity	Previous Balance	33.76
	Payment Received on 10/4/2022	-33.76
	Adjustments	0.00
	Balance Forward	\$0.00
Current Activity		
	ENSTAR Customer Charge	16.25
	ENSTAR Service Charge (Base) 57 ccf @ \$0.1498	8.54
	Regulatory Cost Charge (RCC) @ 0.063%	0.05
	Total ENSTAR Charges	\$24.84
	Supplier Gas Cost Charge (GCA) 57 ccf @ \$0.83771	47.75
	Total Supplier Charges	\$47.75
	Current Gas Charges	\$72.59
Total Current Activity		\$72.59
TOTAL AMOUNT DUE		\$72.59

Balance drafted on due date

ccf used:
57



CURRENT READ DATE	NO. OF DAYS	CURRENT READ	PREVIOUS READ	DIFFERENCE	MULTIPLIER	TOTAL CCF
10/5/2022	33	4826	4769	57	1.0000	57.00

IF YOU HAVE ANY QUESTIONS CONCERNING THIS BILL, PLEASE CONTACT ONE OF THE OFFICES LISTED ON THE REVERSE OF THIS BILL.

PLEASE DETACH HERE AND RETURN THIS PORTION WITH YOUR PAYMENT

Fuel Oil Heating



- Number of gallons delivered/days between deliveries = average gallons used per day
- 138,500 Btus per gallon
- Save ~2% on your bill for every degree you turn down your heat

Wood Heating



- BTUs per cord
- Ideal wood moisture: <20%
- Split, Stack & Store
- EPA Certified Wood Stove
- More BTUs in dry, hard wood

Heat Pumps

- Also known as geoexchange systems
- Transfer heat from air, ground, or water
- Output in Million BTUs (MMBTU)
- Still need back up heat system



Photo credit: Alaska Heat Smart

Calculating cost

Location Info

City where Building is Located:

Input method: [?](#)

Select Utility Rate Schedule
 Manual Entry
 Manual Entry (Advanced)

Select your Utility and Rate Schedule

[Click Here to change Advanced Utility Inputs](#)

Building Info

Type of Building:

Residential
 Commercial Building
 Community Building

Building Floor Area, excluding garage (square feet): ft²

- Home
- Home Heating
- Municipal Heating
- Cost Calculator
- Wood Availability
- Wood Specie Btu's
- Harvesting Wood
- Handling Wood
- Storing Wood
- Health & Safety
- Air Quality
- Types of Stoves
- Choosing a Stove
- Stove Resources
- Additional Links

Wood Heating Cost Calculator

This information is provided for educational purposes. Actual heating costs may vary for a number of reasons.

Where do you live?

[Choose the community closest to you](#)

How well is your home insulated?

[If you are unsure and your home was built since 1985, choose medium, if before 1985 choose lower](#)

How large is your home?

square feet

What kind of heating system would be used?

[Choose the system most similar the one you are considering](#)

How much does this fuel cost?

\$ per unit.

[Common prices are \\$150 per cord, \\$3.50 per gallon, \\$.12 per kWh or \\$.81 per hundred cubic foot.](#)

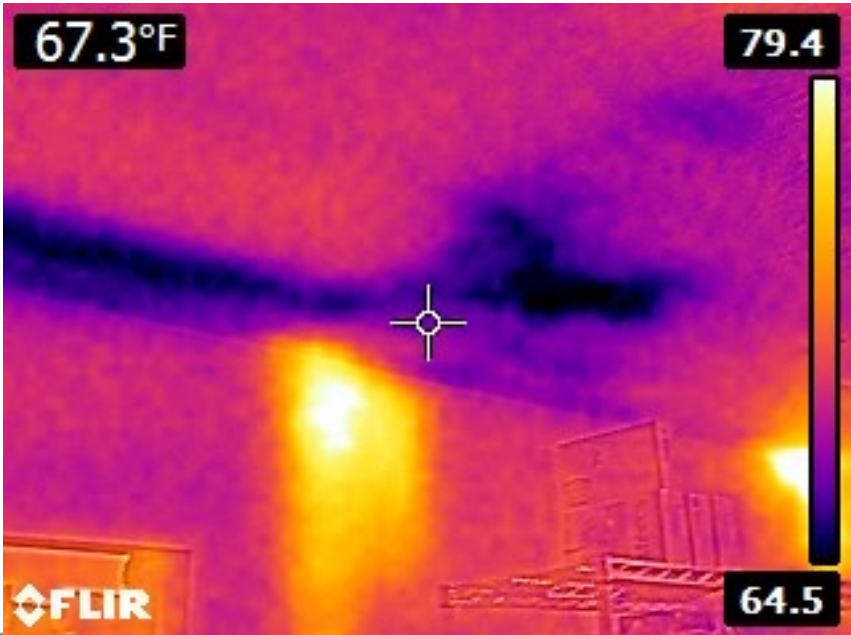
Also see:

- [On-line heat cost calculator](#)
Compare the costs of different fuels
- [Home Heating applications](#)
Learn how to heat your home most effectively
- [Wood availability by region](#)
Learn what species are available to you, and what they may cost

Scott Waterman, of Alaska Housing Finance Corporation, and Ginny Moore, of Flattop Technical Services, helped develop the cost calculator.



Before



After

Measure Appliances

Hot Water:

- Run the water on hot for two minutes
- Use a digital thermometer to measure the temperature

Refrigerator/Freezer:

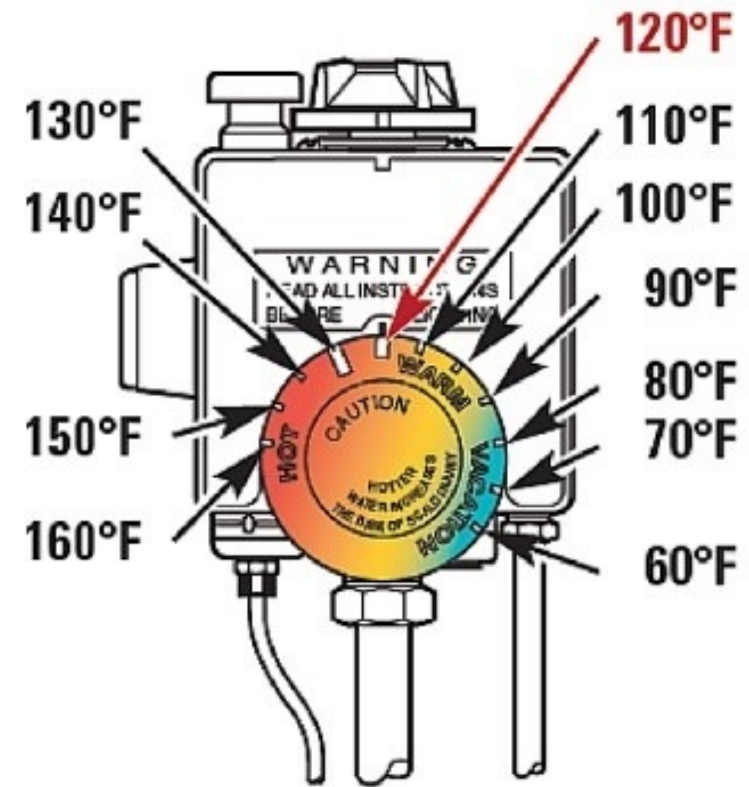
- Place thermometer on a shelf and check after it has acclimated



Photo by Tim Leach



Manage Appliances



Turn down from 140 to 120 and save 6-10% on energy bill.

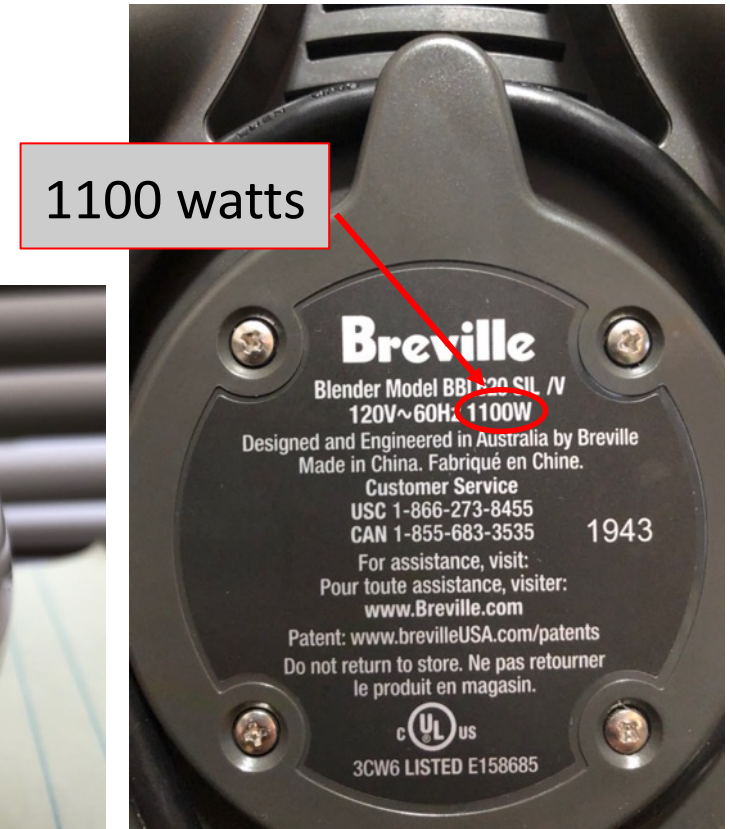
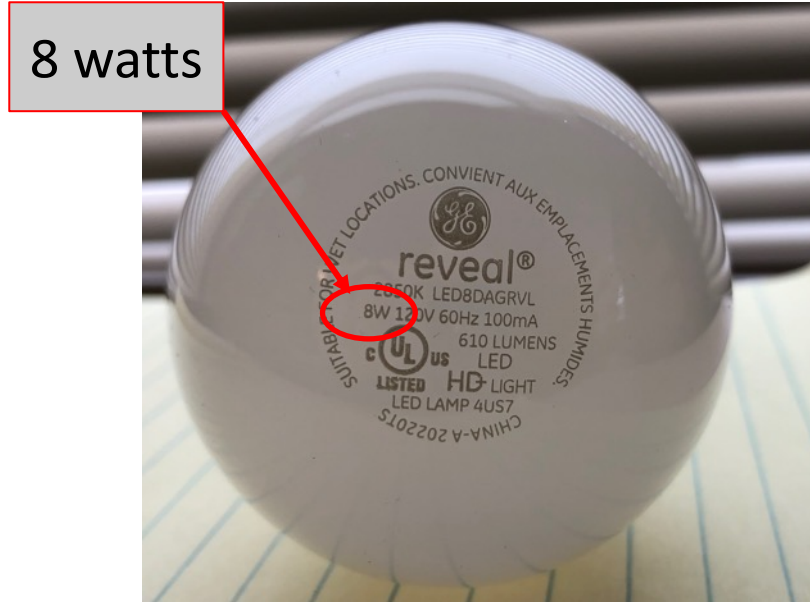


Electricity

Measuring Electricity

Measuring the use of each individual electronic item

- Check out the appliance nameplate
- Use an electricity monitor
- When in doubt...Google it!



Talkin' Units

kWh

Kilo is the **MAGNITUDE** (metric system) of the unit

Watt is the unit of measure for **POWER**

Hours is the unit of **TIME** which power is measured

Kilowatt hours

Electricity Costs Across Alaska

Community	\$/kWh	Utility Name
Anchorage	\$0.20	Chugach Electric Association
Eagle River and Mat-Su Valley	\$0.20	Matanuska Electric Association
Homer/Kenai	\$0.23	Homer Electric Association
Cordova	\$0.28	Cordova Electric Association
Juneau	\$0.12	Alaska Electric Light & Power
Fairbanks & Denali Boroughs	\$0.27	Golden Valley Electric Association
Bethel	\$0.24*	Alaska Village Electric Cooperative

*Up to 700 kWh. Over 700 kWh, Bethel residents pay \$0.39/kWh

Rates as of August 2022. Sourced from utility websites and Alaska Energy Authority



Reading Your Electric Bill

Service Address		Meter Number	Member Number	Account Number
Previous Read Date 09-12-2022		Current Read Date 10-12-2022	Bill Number	Rate Class Residential
Previous Read 33120		Current Read 33388	Days of Service 30	Read Type Actual Read
		Total kWh Usage 268	Bill Date 10-13-2022	Amount Due \$62.82
			Due Date 11-07-2022	

kWh used
268

Description of Charges

Previous Balance		69.67
Payment 09-14-2022 - Thank You		-69.67
Balance Forward:		0.00
Customer Charge		8.00
Energy	268 x 0.13508	36.20
Fuel	268 x 0.040250	10.79
Regulatory Cost Charge	268 x 0.000893	0.24
FIW Renewable Energy Adj.*	268 x 0.001320	0.35
Purchased Power	268 x 0.007020	1.88
Gross Revenue Tax	268 x 0.000500	0.13
BRU Contributed Capital Surcharge	268 x 0.014970	4.01
2% Underground Charge		1.22
Total New Electric Charges:		62.82
Total Balance		\$62.82

268 x 0.13508
268 x 0.040250
268 x 0.000893
268 x 0.001320
268 x 0.007020
268 x 0.000500
268 x 0.014970

Total variable rate:
\$0.20 per kWh

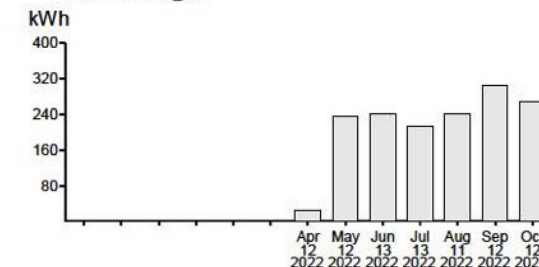
Member Corner

* Represents the cost difference of Fire Island renewable wind power compared to other generation. For more information visit www.chugachelectric.com.

Effective October 1, 2022, adjustments to COPA and BRU Contributed Capital rates will increase a typical residential member bill by 0.5%, or \$0.51.

October is Energy Awareness and National Cooperative month. To celebrate, we're hosting Efficient Fridays in October, 10:30 am – 1:30 pm. Stop by our lobby for energy saving tips.

Your Usage





Matanuska Electric Association, Inc.
 PO Box 2929
 Palmer, Alaska 99645-2929

Office Hours: Monday-Friday 8:00am - 5:00pm
 Phone: (907) 745-3231 or (907) 689-9300
 Website: www.mea.coop



Account Summary	
Previous Balance	115.71
Payment Received - Thank You!	-115.71
Balance Forward	0.00
Current Charges	93.70
Paid by Credit Card by 07/05/22	93.70

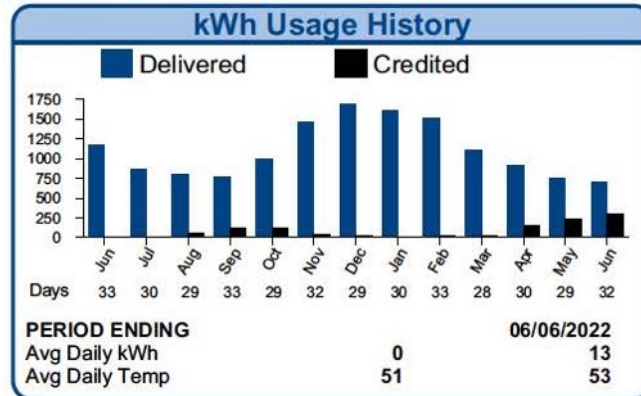
Member Number	[REDACTED]
Account Number	[REDACTED]
Billing Date	06/07/2022
Rate	Residential Net Metering

Thank you for keeping your account current.

Message from MEA
 Call 811 before you dig for utility locates

Electric Bill with Solar

Meter #	Read Dates		Meter Readings		Days	Meter Multiplier	Demand	kWh Usage	Meter Type
	From	To	Previous	Present					
AE2000365	05/05/2022	06/06/2022	11054	11760	32	1	0.000	706	kWh DELIVERED
AE2000365	05/05/2022	06/06/2022	789	1088	32	1	0.000	299	kWh CREDITED
AE2000365					32	1	9.160	407	TOTAL BILLED



Current Service Details		
Facility Charge		13.00
First Step	407 kWh @ 0.12702	51.70
Demand Charge	9.160 kW @ 0.000000	0.00
COPA	407 kWh @ 0.0702400	28.59
Regulatory Cost Charge	407 kWh @ 0.0010160	0.41
Total Current Charges		93.70
Total Amount Due		93.70

You will save a late fee of \$6.56 if payment is received by 07/05/22

kWh delivered: 706
 kWh credited: 299
 kWh billed: 407

You are opted Out of Operation RoundUp®.

Voting District: Susitna East

Watch for Phantom Loads

- Phantom loads are appliances that draw electricity even when they are in use or not needed
 - Heat tape left on in summer
 - Malfunctioning appliances
 - Cable boxes
 - Etc
- Keep an eye on your electric bill, set reminders, use timers, and replace with Energy Star Appliances, to help reduce these phantom loads

Arctic Star

How much money does it cost to power the Arctic Star?

Arctic Star

Presently, the Arctic Star uses 370 10W **LED** light bulbs that stay on for 16 hours a day.

Chugach Electric charges \$0.20/kWh

$$\boxed{3,700} \times \boxed{16} \times \boxed{116} \times \boxed{0.20} \div 1,000$$

Watts x hours x days x \$/kWh

=\$1,373.44 per winter!

Arctic Star, pre-2020

Before 2020, the Arctic Star used **Incandescent** lightbulbs!

At 75W per bulb, the Arctic Star used to cost...

=\$10,300.80 per winter!

Just by switching to LEDs, the base saves almost \$9,000 every winter!

Online Electricity Calculator

Electricity Use Calculator

Utility Rate /kWh

Item Name / Location

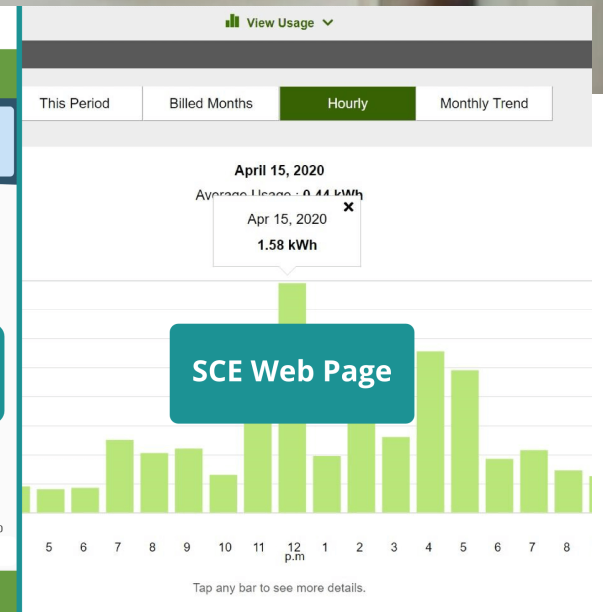
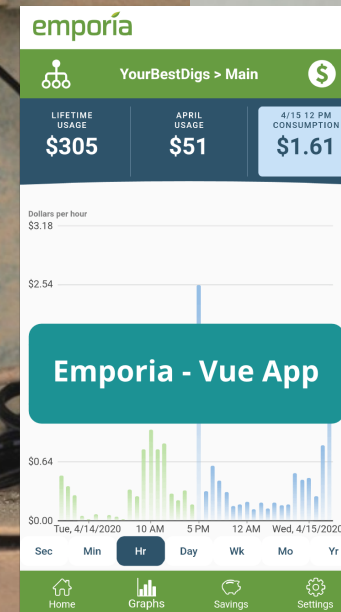
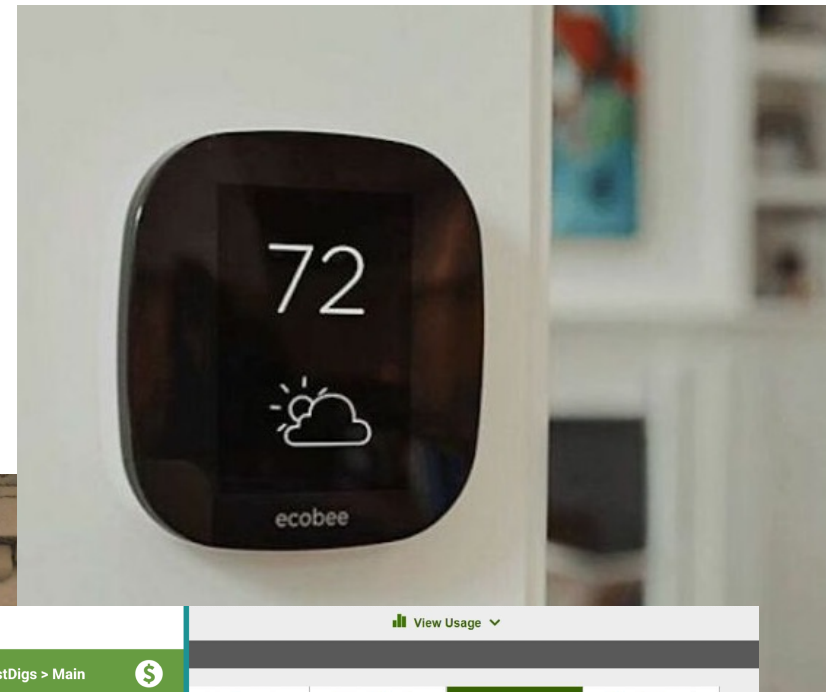
of items × watts

Usage / day / month / year

Item Cost:

Gadgets

- Smart thermostat
- Energy monitor or sensor
- Infrared camera



You can't manage what you don't measure

- Look at your energy bill each month
 - Online portal & usage data
- Become aware of habits and usage
- Measure and monitor
 - Electricity monitor
 - Freezer/fridge thermometer
 - Digital thermometer
- Reduce and save!



Additional Resources

- Alaska Housing Finance Corporation (AHFC)
 - ✓ To learn about energy efficiency programs, visit the Research Information Center (RIC), & sign up for free class www.ahfc.us
- Alaska Heat Smart
 - ✓ <https://akheatsmart.org/>
- UAF Sustainable Energy Classes
 - <https://uaf.edu/academics/programs/occupational-endorsements/sustainable-energy.php>
- Renewable Energy Alaska Project (REAP)
 - ✓ Clearing house for clean energy resources www.alaskarenewableenergy.org/library



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