



BUILDING IN ALASKA

EEM-00251

Appliance Energy Use and Costs in Alaska

Richard D. Seifert
Extension Energy Specialist

To be thrifty consumers, we need to know how much electricity, in kilowatt-hours (kwh) our appliances use. To aid in determining this, the following electric usage chart was developed. The list of appliances is shown in the first column and the average energy use in watts of such an appliance, is in the next column. In the third column, the average number of hours per year that the device is utilized is given (one full year equals 8,760 hours), and the total number of kwh used by that appliance per year is calculated in the fourth column.

Along the right side of the table the annual residential operating costs for the three major Alaska communities are given. The per kwh rate, based on a thousand kilowatt hours of use, is given under each city name. For Fairbanks, this was calculated to be 11.54 cents per kwh; for Juneau, 9.2 cents per kwh; and for Anchorage, 11.10 cents per kwh. (Juneau's electric utility rate is seasonally adjusted and hard to estimate on an annual basis. Residential electric rates are nearly 2 cents higher per kwh during winter (Nov-May) than in summer.) These are 2004 electrical costs.

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Appliance	Avg w	hours/year usage	Total kwh/year	Annual Residential Operating Costs (in \$)		
				Fairbanks	Juneau	Anchorage (avg)
Aquarium	80	8760	700	0.1154	0.092	0.1110
Blender *	386	39	15	80.78	64.40	77.70
Bottled water dispenser	-	-	300	1.73	1.38	1.67
Broiler *	1436	70	100	34.62	27.60	33.30
Cable TV boxes	-	-	80	11.54	9.20	11.10
Clock *	2	8500	17	9.23	7.36	8.88
Clock radio	5	8760	44	1.96	1.56	1.89
Clothes dryer *	4856	204	993	5.07	4.05	4.88
Clothes washer	298	104	31	114.59	91.36	110.22
Coffee maker	699	183	128	3.58	2.85	3.44
Computer	-	-	130	14.77	11.77	14.21
Crankcase heater	-	-	250	15.00	11.96	14.43
DC power wall-pack transformer	-	-	25	28.85	23.00	27.75
Deep fryer *	1448	57	83	2.89	2.30	2.78
Dehumidifier	160	4830	700	9.58	7.64	9.21
Dishwasher	1184	365	432	80.78	64.40	77.70
Electric blanket	182	960	175	49.85	39.74	47.95
Electric yard tools	-	-	10	20.19	16.10	19.43
Fan (ceiling)	-	-	50	1.15	0.92	1.11
Fan (furnace)	300	1440	432	5.77	4.60	5.55
Fan (whole house)	563	480	270	49.85	39.74	47.95
Fan (window)	200	720	144	31.16	24.84	29.97
Fan (circulating) *	88	489	43	16.62	13.25	15.98
Floor polisher *	305	49	15	4.96	3.96	4.77
Freezer (15 cu ft) *	341	3504	1195	1.73	1.38	1.67
Freezer (frostfree 15 cu ft) *	440	4002	1761	137.90	109.94	132.65
Frying pan *	1196	157	188	203.22	162.01	195.47
Garbage disposal	-	-	10	21.70	17.30	20.41
Grow light and accessories	-	-	800	1.15	0.92	1.11
Hair dryer	1099	91	100	92.32	73.60	88.80
Heat lamp (infrared) *	250	-	13	11.54	9.20	11.10
Heating pad *	65	154	10	1.50	1.20	1.43
				1.15	0.92	1.11

Appliance	Avg w	hours/year usage	Total kwh/year	Annual Residential Operating Costs (in \$)		
				Fairbanks	Juneau	Anchorage (avg)
Hot plate *	1257	72	90	10.38	8.28	9.99
Hot tub / spa	-	-	2300	265.42	211.60	255.30
Iron	1000	52	52	6.00	4.78	5.77
Microwave oven	856	104	89	10.27	8.19	9.88
Mixer *	127	102	13	1.50	1.20	1.44
Oven, self cleaning *	4800	239	1146	132.25	105.43	127.21
Pipe & gutter heater	-	-	100	11.54	9.20	11.10
Radio (stereo)	100	730	73	8.42	6.72	8.10
Radio /phonograph *	109	1000	109	12.58	10.03	12.10
Range *	8200	128	1175	135.60	108.10	130.43
Refrigerator (frostfree 16 cu ft)	220	2920	642	74.08	59.06	71.26
Refrigerator (frostfree 18 cu ft)	234	2920	683	78.82	62.84	75.81
Sewing machine *	75	147	11	1.27	1.01	1.22
Shaver *	14	129	2	0.23	0.18	0.22
Sump /sewage pump	-	-	40	4.62	3.68	4.44
Sun lamp *	279	57	16	1.85	1.47	1.78
Television (black and white)	-	-	40	4.62	3.68	4.44
Television (color, solid state)	200	1460	292	33.70	26.86	32.41
Television (color, tube) *	400	1500	600	69.24	55.20	66.60
Toaster *	1146	34	39	4.50	3.58	4.33
Toaster oven	200	365	73	8.42	6.71	8.10
Vacuum cleaner	731	52	38	4.39	3.50	4.22
VCR	21	1460	30	3.46	2.76	3.33
Vibrator *	40	50	2	0.23	0.18	0.22
Washing machine (automatic) *	521	198	103	11.89	9.48	11.43
Washing machine (non-auto) *	286	266	76	8.77	6.99	8.44
Water bed (no cover)	287	2160	620	71.55	57.04	68.82
Water heater (40 gallon)	3000	730	2190	252.72	208.48	243.09
Water pump (deep well)	1000	730	730	84.24	67.16	81.03

* from Cooperative Extension Service 1994 publication EEM-00251: values from Underwriter Laboratories, based on a family of four. The figures for the rest of the appliances were calculated using data from Lawrence Berkeley National Laboratories (based on a national average). Assumptions: Year = 365 days; Day = 24 hours;

Note on refrigerators: although they are plugged in 24 hrs. a day, they run at average wattage for only one third of the day (8 hrs.).

If you have appliances that are not listed in the table, or desire a more exact figure based on your household's actual energy consumption, you can use the formulas given below to estimate the amount of energy each appliance consumes and the annual cost for each appliance:

Annual kilowatt-hour consumption
 $(\text{kwhours / year}) = (\text{avg w}) \times (1\text{kw} / 1000\text{w}) \times$
 $(\text{hours used per day}) \times (\text{days in use per year})$

Annual cost for appliance = $(\text{kwhours/year}) \times$
 $(\text{cents per kwhour})$

The Calculation Follows In steps: Average appliance wattage (avg w) divided by 1000w (1 kilowatt (kw) = 1000 watts(w)) multiplied by hours used per day (hours/day) equals daily kilowatt-hour consumption.

$(\text{Avg w} / 1000\text{w}) \times (\text{hours} / \text{day}) =$
 Daily kilowatt-hour consumption

Multiply this result by the number of days you use the appliance during a year. Now you have the annual energy consumption.

$(\text{Daily kilowatt-hours}) \times (\text{days} / \text{year}) =$
 Annual kilowatt-hour consumption

To arrive at the annual cost for each appliance, multiply the annual kilowatt-hour consumption by your local utility's kilowatt-hour rate (see below).

$(\text{kwhours} / \text{year}) \times (\text{kilowatt-hour rate}) =$
 Annual cost for appliance

The following formulas were used to determine the average kilowatt-hour rate for utilities in Anchorage, Fairbanks, and Juneau.

Average kilowatt-hour rate in \$ per kwh =
 $(1000 \times ((\text{peak rate in } \$ \text{ per kwh} + \text{off peak rate in } \$ \text{ per kwh}) / 2) + \text{user fee}) / 1000$

Fairbanks:

$$(1000 \times (.1004 + \$15) / 1000 = 0.1154$$

Juneau:

$$(1000 \times [(.0922 + .0758) / 2] + \$8.50) / 1000 = 0.0925$$

Anchorage (MLP):

$$(1000 \times (.0993) + \$6.56) / 1000 = 0.1059$$

Anchorage (Chugach):

$$(1000 \times (.1074) + \$8.42) / 1000 = 0.1158$$

N.B. Both Anchorage utilities have a flat rate. Juneau rate is varied between summer and winter.

An Example Calculation Using a 200 Watt Fan: Window fan: 200 watts (avg w) divided by 1000 equals .2 kw. Then multiply by 4 hours per day and 120 days per year, which equals 96 kwh (annual kwh consumption). If you live in Fairbanks then multiply by 11.54 cents per kwh (Fairbanks kilowatt-hour rate) which is \$11.08 a year.

You can usually find the wattage of most appliances stamped on the bottom or the back of the appliance, or on its "nameplate." The wattage listed is the maximum power drawn by the appliance. Since many appliances have a range of settings, the actual amount of power consumed depends on the setting used.

Estimating Wattage: If the wattage is not listed on the appliance, you can still estimate it by finding the current draw (in amps) and multiplying that by the voltage used by the appliance. Current \times voltage = wattage (Most appliances in the U.S. use 120 volts. Larger appliances, clothes dryers, electric cooktops use 240 volts.) The amps might be stamped on the unit in place of the wattage.

Also note that many appliances continue to draw power even when switched off. These "phantom loads" occur in most appliances that use electricity, such as VCRs, TVs, computers and kitchen appliances. Most phantom loads will increase the appliance's energy consumption a few watts.

Text based on information provided by Michael Lamb, Energy Efficiency and Renewable Energy Clearinghouse. Assistance in preparing this publication by Andrew C. Pascale, Cooperative Extension Service, University of Alaska Fairbanks.

