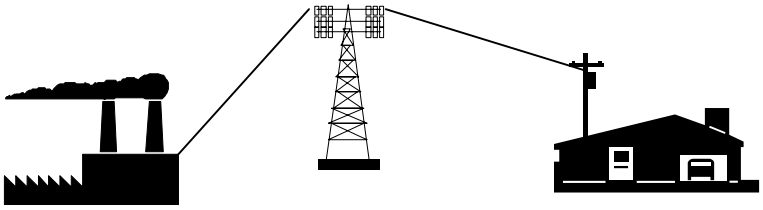
MANAGING YOUR ELECTRIC BILL

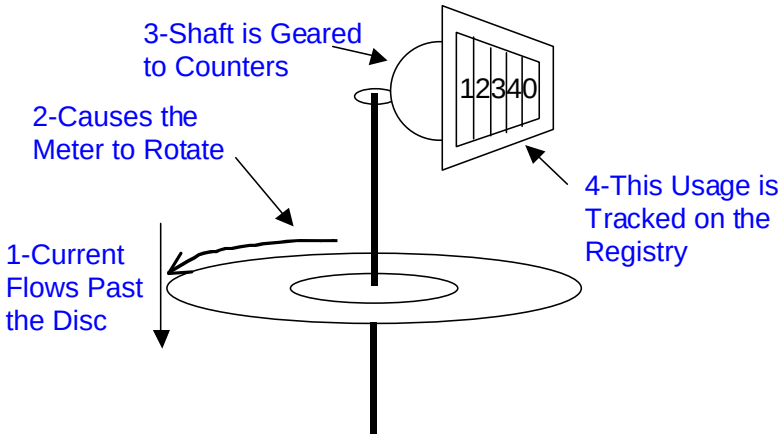
While we can't do anything to reduce the electric rates, here are some ideas on how to manage the electric usage in your household (which could lower your power bills):

BACKGROUND INFORMATION

To start with, you should understand how electricity is metered and how you are charged for this.



Crow Wing Power distributes electricity through a network of power lines that enter your home or property through an electric meter.
An electric meter is a rugged and rather simple device that was developed in the early part of the 20th century. It works like an electric motor that turns because current flows through it. The more the current, the faster the meter will turn; the less the current, the slower the meter. If no current flows through the meter, it will totally stop. Attached to this "motor" are a series of gears and dials that record how much current has passed through the meter. Each electric meter is calibrated at the factory and checked against NIST (National Institute of Standards and Technology) standards by Crow Wing Power before installation.



A recent improvement on the electric meter adds a small electronic device inside, which is called a “Turtle Meter”. This electronic device communicates with Crow Wing Power through the power lines and eliminates having to go out and read the meter each month. All electric meters record power consumption in Kilo Watt Hours (kWh). Wattage is a measure of how much power an electrical device will consume. As an example, a typical light bulb is rated at 100 watts. Run this bulb for one hour and you have used 100 watt hours. Run it for 10 hours and the consumption goes up to 1,000 watt hours. Since there are 1,000 in a kilo, in this example, the bulb used 1 kilowatt hour (abbreviated as kWh).

100 watts x 1 hours = 100 watt hours
100 watts x 10 hours = 1000 watt hours
1000 watt hours / 1000 = 1 kilowatt hour

The reason for this background is to help you understand that your power bill is dependent upon both how *big* the electric loads are, and how *long* they are left ON. The basic strategy for reducing your power bill is to either reduce the wattage of an electrical device, or turn it OFF; a device turned OFF will consume *no* electricity.

DO YOUR HOMEWORK

Now, let’s do some homework. You need to look at several months’ worth of power bills; actually a full year is better. Just pull out your old bills or call Crow Wing Power for this summary (because of confidentiality rules, you can only request this for your own bill, not your neighbor’s). This information is also available on-line through the Crow Wing Power web-site. You can simply list this on a sheet of paper, or even graph them out. You’ll need the Kilo Watt Hours used each month along with the number of days of the billing period. If you have more than one electric meter (i.e. Off-Peak) you can list these separately. A handy additional bit of information would be the kWh for each day and each hour. You can figure this by just dividing the total kWh of the month by the number of days in the billing period, and then divide by 24 hours in a day.

EXAMPLE

Month	Total kWh	Days	KWh/day	KWh/hour
January	1500	31	48.4	2
February	1350	28	48.2	2
March	1520	30	50.7	2.1
April	1575	31	50.8	2.1
May	1368	30	45.6	1.9
June	1560	31	50.4	2.1
July	1585	30	52.8	2.2
August	1710	31	55.2	2.3
September	1580	30	52.8	2.2
October	1580	31	50.9	2.1
November	1515	30	50.6	2.1
December	1510	31	48.5	2

Once you have this information, then you can look for trends in power usage at your home. In this example, the daily and hourly energy usage is very similar throughout the year, even if the monthly power bills are different. A typical house may use different amounts of energy at different times of the year.

INVENTORY

The next step is to take an inventory of *everything* in your household that uses electricity. While this may seem like an overwhelming job, you can break this down by room or outbuilding and assign a family member to each area. It can also be done over a period of time.

The information you are looking for is how many of each item you have, how much wattage it consumes, and how many hours it is likely to be ON each month. You may find the wattage on the unit's nameplate, or if this lists only amps, multiply by voltage to determine wattage (amps x volts = watts). For a plug-in appliance, multiply amps by 120 volts. For larger appliances, like an electric stove, you should multiply amps by 240 volts.

Amps x Volts = Watts

To determine hours of operation, you can keep a diary recording times on and off. To help you with the wattage and hours part, Crow Wing Power has available inventory sheets with standard wattages and hours for a typical family of four. This information is also available on the Crow Wing Power website.

Hours of Operation is one factor that is greatly affected by the occupants of your home. If, for example, your kids tend to leave the TV ON all the time, the lights are ON in every room, the windows and doors are left open with the A/C running, then your power bill will be much higher than your neighbor, even if your houses are identical.

Don't forget about those "hidden" items, such as your well pump, heat tape wrapped around the pipes in the crawl space, and the brooder lamps in the barn.

For each item, you want to multiply its wattage by the hours used per month and divide by 1,000 to get kilowatt hours.

Watts x Hours Operation /1,000 = Kilowatt Hours

If you have an accurate inventory, the total wattage of all your electric appliances and gizmos multiplied by their hours of usage should equal your power bill. If it doesn't, the most likely cause is your inventory is off somewhere.

APPLIANCE INVENTORY SHEET

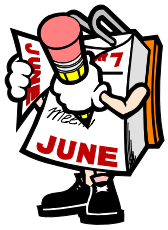
Item	Number	Wattage	Hr/Month	$ to Operate*	Kwh/Month	% of Total
Stationary Appliances				includes PCA effective 1/1/8		
A/C Central	1	2000	99	$ 18.22	198.0	3%
Bathtub spa (pump only)	1	375	9.6	$ 0.33	3.6	0%
Clothes Dryer	1	4600	24	$ 10.16	110.4	1%
Clothes Washer	1	350	14.4	$ 0.46	5.0	0%
Dishwasher	1	1600	18	$ 2.65	28.8	0%
Electronic Air Cleaner	1	40	240	$ 0.88	9.6	0%
Freezer, Chest	1	300	204	$ 5.63	61.2	1%
Furnace, electric	1	15000	240	$ 331.20	3600.0	47%
Furnace Fan	1	250	240	$ 5.52	60.0	1%
Garage Door Opener	1	300	1	$ 0.03	0.3	0%
Garbage Disposal	1	375	3.12	$ 0.11	1.2	0%
Hot Tub	1	2436	228.8	$ 51.27	557.2	7%
Humidifier, Furnace	1	20	240	$ 0.44	4.8	0%
Kitchen Fan	1	40	25	$ 0.09	1.0	0%
Lighting	1	1000	300	$ 27.60	300.0	4%
Oven	1	4000	2.4	$ 0.88	9.6	0%
Range	1	1250	120	$ 13.80	150.0	2%
Refrigerator, standard	1	600	376.8	$ 20.80	226.1	3%
Refrigerator, efficient	1	350	140.4	$ 4.52	49.1	1%
Refrigerator, frost free	1	800	225.6	$ 16.60	180.5	2%
Sewage Pump	1	100	72	$ 0.66	7.2	0%
Water Heater	1	5500	108	$ 54.65	594.0	8%
Water Pump	1	100	72	$ 0.66	7.2	0%
Portable Appliances						
A/C Room	1	1000	90	$ 8.28	90.0	1%
Blender	1	200	20	$ 0.37	4.0	0%
Bread Maker	1	600	15	$ 0.83	9.0	0%
Clock, wall	1	2	730	$ 0.13	1.5	0%
Coffee Maker	1	400	12	$ 0.44	4.8	0%
Computer	1	400	20	$ 0.74	8.0	0%
Crock Pot	1	300	10	$ 0.28	3.0	0%
Curling Iron	1	40	3.4	$ 0.01	0.1	0%
Dehumidifier	1	1500	275	$ 37.95	412.5	5%
Electronic Air Cleaner	1	16	275	$ 0.40	4.4	0%
Electronic Game	1	9	22	$ 0.02	0.2	0%
Electric Blanket	1	190	80	$ 1.40	15.2	0%

Item	Number	Wattage	Hr/Month	$ to Operate	Kwh/Month	% of Total
Engine Heater	1	1500	120	$ 16.56	180.0	2%
Fax Machine	1	300	170	$ 4.69	51.0	1%
Fish Tank	1	190	730	$ 12.76	138.7	2%
Food Dehydrator	1	875	35	$ 2.82	30.6	0%
Food Processor	1	360	50	$ 1.66	18.0	0%
Frying Pan, Electric	1	1150	30	$ 3.17	34.5	0%
Hair Dryer	1	600	3.5	$ 0.19	2.1	0%
Heat Lamp	1	250	10	$ 0.23	2.5	0%
Heater, Portable	1	1500	36	$ 4.97	54.0	1%
Humidifier, Room	1	60	180	$ 0.99	10.8	0%
Iron	1	1000	12	$ 1.10	12.0	0%
Kettle, Electric	1	1200	1	$ 0.11	1.2	0%
Lamp, Incandescent	1	100	90	$ 0.83	9.0	0%
Lamp, Fluorescent	1	27	90	$ 0.22	2.4	0%
Microwave	1	600	18	$ 0.99	10.8	0%
Mixer	1	150	4	$ 0.06	0.6	0%
Popcorn Popper	1	660	3	$ 0.18	2.0	0%
Radio	1	50	120	$ 0.55	6.0	0%
Rotisserie	1	1400	30	$ 3.86	42.0	1%
Sewing Machine	1	100	10	$ 0.09	1.0	0%
Shaver	1	15	2.5	$ 0.00	0.0	0%
Stereo	1	150	120	$ 1.66	18.0	0%
Sunlamp	1	400	10	$ 0.37	4.0	0%
Television, B/W	1	200	144	$ 2.65	28.8	0%
Television, Color	1	350	144	$ 4.64	50.4	1%
Toaster	1	1150	4	$ 0.42	4.6	0%
Toaster Oven	1	1200	10	$ 1.10	12.0	0%
Toothbrush	1	1	5	$ 0.00	0.0	0%
Vacuum, tank	1	600	10	$ 0.55	6.0	0%
Vacuum, upright	1	370	10	$ 0.34	3.7	0%
VCR	1	30	10	$ 0.03	0.3	0%
Waffle Iron	1	1100	1.5	$ 0.15	1.7	0%
Water Bed	1	400	300	$ 11.04	120.0	2%
Portable Tools						
Circular Saw	1	1150	2	$ 0.21	2.3	0%
Drill	1	300	3	$ 0.08	0.9	0%
Jig Saw	1	300	3	$ 0.08	0.9	0%
Lawn Mower, Electric	1	1000	8	$ 0.74	8.0	0%
Sander	1	300	3	$ 0.08	0.9	0%

METER READINGS AND ACCURACY

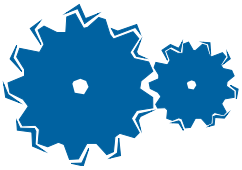
Let's take a moment to review meter accuracy, and some ways you can check the operation of your meter.

Mechanical Meter (used in most residential and commercial applications)



To begin with, you may want to write down today's date and the readings off the register on the meter. A good place to jot this down is on your calendar. Some people make it a habit to write their meter readings on their calendar on the same day as your bill is processed, this is the day the "turtle" sends its readings to CWP (more on "turtles" later). If you do this, you can see if the readings posted in your current power bill are the same as what you recorded (be sure to compare the correct month, they are listed on your bill). This will verify that the electronic turtle part of the meter is synchronized with the mechanical part. Also, you can compare today's reading to last month's and see if it is in line with your average usage (if you calculated this, see above). Remember that different number of days in a billing period can result in unexpected power bills, your daily average usage can tell you if something is really amiss.

Let's now look at the accuracy of your electric meter. As you recall, this device is similar to an electric motor running in parallel with the power flowing into your house. Since this technology has been around for almost 100 years with the accuracy of each meter first checked at the factory and then verified in the Crow Wing Power meter shop before installation (NIST standards are +-2%), you can be assured that your meter was accurate when it was installed.

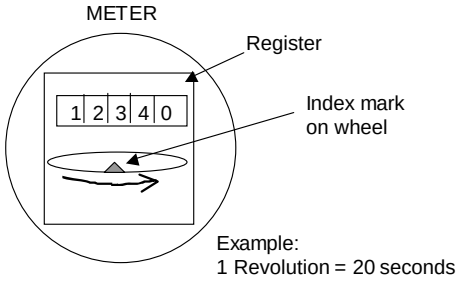


As meters get older, their bearings and gears can wear slightly, causing them to "bind", which can cause its rotation to slow down. After a number of years, a meter can become noticeably slow, which is why every electric utility tracks the age of its meters and replaces them as they age.

This natural aging can lead to customers' perception that new meters run fast. Actually, the old one it replaced had likely slowed down over the years (resulting in some electric usage that was never charged for), while the new one now runs at an accurate speed.

Also, remember that it is physically impossible for a mechanical meter to either speed up by itself, or to run when no electricity is being used in the house.

You can verify this by a simple test (which is actually a good way to isolate electric loads in your house when checking on your inventory). Find the main circuit breaker panel and switch off individual circuit breakers to isolate loads. Either you or a helper can time how long the center wheel on the meter spins around as each breaker is switched off.



As an example, assume the wheel completes a revolution every 20 seconds, and when you switch OFF the circuit breaker to your son's room, the wheel now takes 30 seconds to turn over. You can conclude your son has a lot of stuff "ON" (30 seconds – 20 seconds = 10 seconds which is a 30% reduction). Underneath the dirty clothes in his room, you may find a video game, an electric blanket, space heater, computer, aquarium, desk lamp, and other electric appliances left ON. This could be an excellent opportunity to "bond" with your offspring about how to reduce his share of the household electric usage (if this actually works, let us know!)

As you shut off the breakers, the wheel in the meter should continue to slow up, until you switch off the last one, which should cause the meter to come to a complete stop. If not, then there has to be something that is still "ON". For a typical household meter, 7.2 revolutions of the rotor equals 1 kW of electrical usage.

Try switching OFF the main circuit breaker (at the top of the panel) to see if this stops the meter. If it continues to rotate, then there is another panel somewhere with electric load on it. Depending upon your electric skills, you may be able to track the wires from the electric meter to find these additional panels (could be in other buildings on your property). If you can't find these panels, you may want to bring in an electrician.

Turtle Meter (automatically read by Crow Wing Power)
The "turtle" meter consists of the previously discussed mechanical electric meter with an added electronic module. This module communicates with Crow Wing Power over the power lines. It eliminates the need for members to record and send in their meter readings every month. In fact, the turtle meter sends in a power summary every day. As you will see, this can be very handy.

Checking the operation of a turtle meter is the same as the mechanical meter; you can switch off loads and then time the revolutions of the center wheel. You can also verify if the electronic module is synchronized with the mechanical meter by comparing the readings on the register to the readings that are posted in your bill. By figuring your average daily usage and how many days have elapsed since the bill was posted, you can get a rough idea if the turtle is sending back accurate information. You can also phone the Crow Wing Power Office with this information and we can download the readings for a particular day to compare it directly (there's about a 2-3 day delay in getting daily readings downloaded).

You can also download a daily printout of your electric usage from the Crow Wing Power web-site to see if, for example, having your cousin and his large family stay at your house last month increased your usage.

MAKING SENSE OF THIS

You may be surprised by your inventory of electric appliances; some items either use a lot more electricity than you expect, or are left ON more than you realize. If you want to reduce your electric bill, you need to either reduce appliance wattage or the hours they are being used.

Let's go back to your son's room. By proper "motivation" perhaps he could learn to turn off the desk lamp, video game and other appliances when not in use. Replace the incandescent bulb in the desk lamp with a lower wattage compact fluorescent. Maybe the neglected aquarium could be donated to your cousin's family since your son has lost interest in it? Get an inexpensive timer to switch off the electric blanket during the day. You eliminate the need for the space heater by removing the dirty clothes covering the heat vent. Now if you can only get your son to pickup his dirty clothes and place them in the clothes hamper….

MORE IDEAS

To help you with ideas on how to save energy, here's a brief discussion of the largest power users commonly found in most homes:

Electric Water Heater

If not already, you may consider an off-peak water heating system. While this will use the same *amount* of electricity, it will run at *60% less cost*. Your Crow Wing Power representative can advise you on how to install an off-peak water heating system. In addition, be sure the water temperature is not set too high (120F is normal) and you have insulated the pipes and have installed a water heater insulation jacket (modern water heaters don't usually require extra insulation).

Conserve on your hot water usage by washing clothes in cold or warm water only. Turn down the mixing valves in the toilets (if equipped). Install low-flow shower heads and

faucet aerators. Limit the time your teenagers spend in the shower (if you find a way to do this, please share with everybody)

Major Appliances

If you are replacing any major appliances, buy the most energy efficient ones you can afford. Energy costs or ratings should be readily visible on the new ones. The Government "Energy Star" label indicates energy efficiency. Efficient appliances may cost slightly more to purchase, but have a quick payback in energy saved.

Clean the coils on your refrigerator and freezer regularly. Check the door gaskets and clean, adjust or replace them if they don't fit tightly. Check the interior temperatures and adjust per manufacturer's recommendations. Use the "summer" or "defrost" settings only when needed. If you have a "garage sale special" in the basement holding a few cans of soda, maybe you could clean it out, unplug it and use it only the few days needed this summer. For safety sake, if the doors latch shut, either block them open, disable the lock mechanism, or chain the doors shut.

When doing your laundry, use warm or cold water only; modern detergents and clothes don't typically need hot water for proper cleaning. Adjust the water level to the size of the loads so you don't waste water.

Dry clothes on a lower heat setting, or outdoors if the weather permits. Clean the lint filters and vent pipe regularly. Also inspect and clean the outside vent cover as needed because lint build-up can reduce the air flow and prevent the vent from closing. This allows warm air to escape and critters to enter.

Load dishwashers properly and use their energy saving feature (which disables the built-in dryer). If the dishwasher has an in-line water heater, you can set your main water heater temperature at a lower level.

Lighting

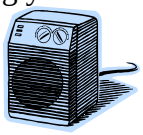
Replace your most commonly used incandescent lamps with compact fluorescent lamps or regular fluorescent fixtures. These can save 50% or more in energy, will last many times longer and can improve light quality. If using a screw-in fluorescent adaptor, measure before buying to be sure it will fit in the fixture, since these can be larger than ordinary incandescent lamps.

Air Conditioners/Dehumidifiers

You may be able to reduce or even eliminate the need for air conditioning with portable or ceiling fans. Intelligent use of window coverings like awnings can also really help to beat the heat. Work with Mother Nature by opening up the windows at night to cool the house down, and then shut them before it gets hot the next day.

If you run an air conditioner, make sure it is clean and serviced so it runs most efficiently. If you replace an air conditioner, buy the most efficient one you can. The SEER (Seasonal Energy Efficiency Ratio) should be 14 or higher. Look for the "Energy Star" label, this also indicates an energy saving model. Set the room thermostat at a higher temperature; cooling your house down to 72F costs a lot more than running at 76F. Keep the air moving with the A/C blower or with separate fans.

If you use a dehumidifier to control the humidity in your home, this can use a lot of energy. A dehumidifier functions as a stand-alone air conditioner. Its cold coils cause water to condense out of the air, but you get no cooling benefit from it. Instead, you should be able to control humidity in the house by ventilation, reducing sources of moisture, or by running your air conditioner instead. An air conditioner does the same job as a dehumidifier, while giving you the added benefit of cooling the house.



Portable Electric Heaters

Plug-in electric heaters are useful for areas your regular heating system doesn't cover. These come in many different styles, such as baseboards, forced fan, heating tapes, and tank heaters.

Portable heaters can use a lot of energy usage in cold weather. Here are a couple of ideas on managing their electrical consumption:

1. Is this heater really necessary? Can you insulate or seal the area so that supplemental heat is not necessary? Can you modify your regular heating system to cover this area?
2. Is this heater running as efficiently as it can? Can the temperature be set down? Can you shield the area from the wind? Can you wrap insulation around the heating tape (be sure to check manufacturer's recommendations) to reduce heat loss?
3. Is the heater operating correctly? Is the thermostat stuck "ON" or switching ON/OFF erratically? If you switched a 2-level heater to the lower setting, did the switch really work?
4. When the temperatures finally warm up, remember to switch "OFF" or unplug the heater. Don't depend upon a sticky thermostat. One way to remember to do this is to put a reminder note in your calendar to unplug the heater.

"Stand-by Power"

Modern appliances typically have a digital display, remote control, or a battery charger (for cordless devices). Even when switched "OFF", these appliances still consume some electricity. By itself, each device only draws a little current, but taken together, this can be a sizable load for a typical house. If you want to control this, you can either unplug the appliance or switch it "OFF" with an outlet strip (however, you'll have to reset the clock). When you purchase new appliances, look for models that have a reduced stand-by power usage.