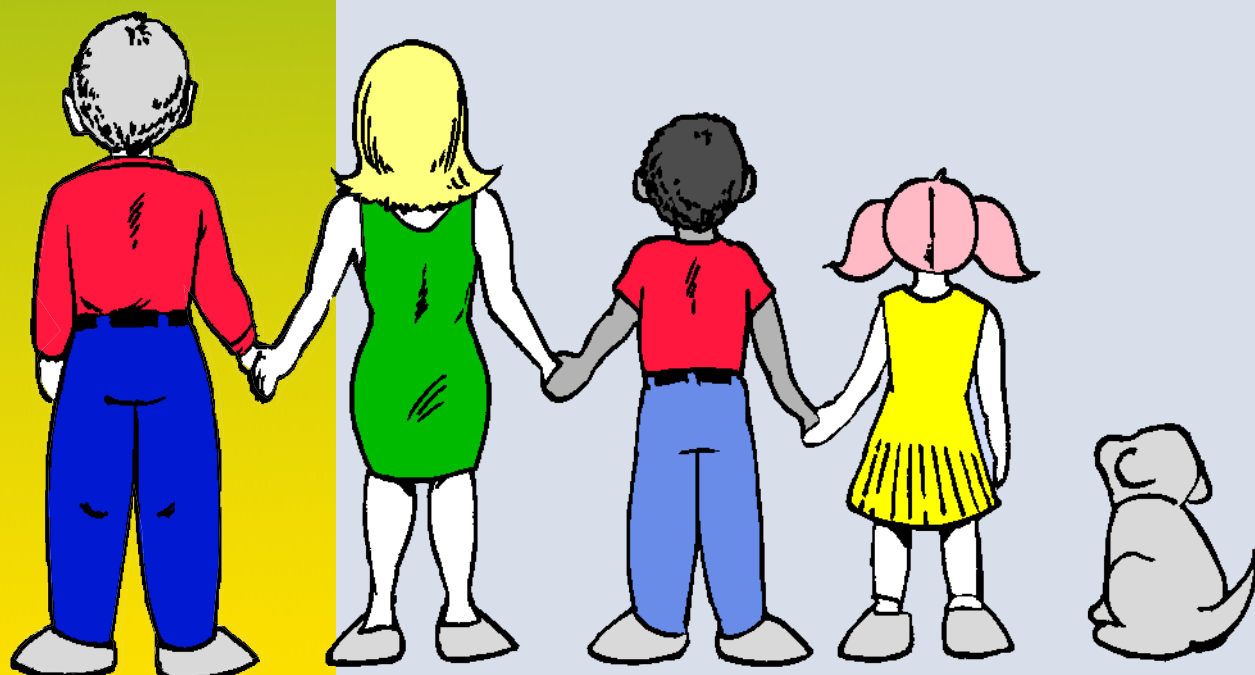




Tips For Energy Savers



SAVING ENERGY IMPROVES OUR ENVIRONMENT





Inter Office

Powertrain Operations

To: Powertrain Employees

April 15, 1996

Subject: Energy Conservation

Energy management and saving the environment are everyone's responsibility. As our demand for energy continues to increase, we must continuously look for ways to cut back our energy use.

The obvious place to start saving energy is at home. Turning off lights, efficient use of appliances and improving the insulation in your home can shave costs off your utility bills. By reducing energy consumption in your home, not only do you save money, you get involved in pollution prevention and help to improve your local environment.

Saving energy in your home is important, and forming good energy conservation habits at home can help you learn to use utilities more efficiently in your work place too. In the workplace, everyone benefits from improved energy efficiency and lowering energy costs.

Powertrain Operations has a history of designing our manufacturing sites with common utility sources to maximize energy efficiency and minimize energy consumption. Our strategy is to provide energy efficient facilities and process equipment for new programs and replace existing inefficient equipment and systems with increased efficiency while maintaining a cost-effective operation. Monitoring and audit systems are an important part of our energy management strategy but we need your involvement to make our energy conservation programs successful. Therefore, we thank you for your participation and applaud your efforts.

We hope that this booklet will be a valuable resource to help identify energy waste. We encourage you to be conscientious about saving energy and our environment for future generations.

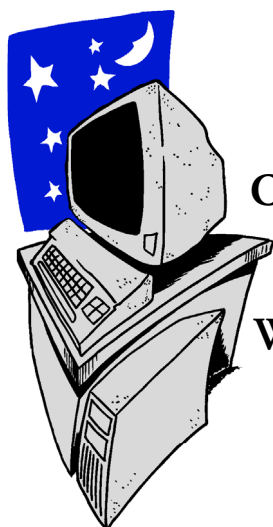
Sincerely,

A handwritten signature in black ink, appearing to read "John Huston".

John Huston
Vice President
Powertrain Operations

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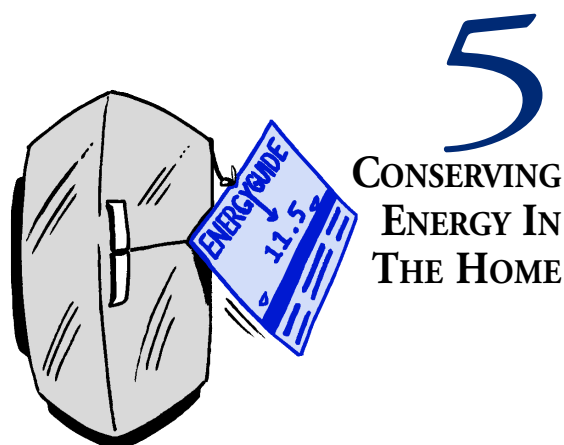
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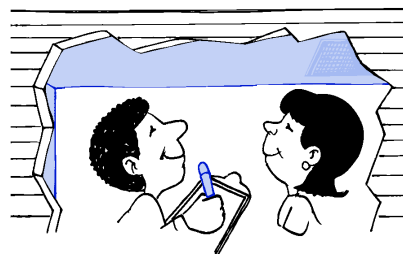
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*Thanks to Detroit Edison,
the U.S. Department of Energy
and our many client organizations
whose input contributed
to this publication.*

Good Luck!

INTRODUCTION

This “user friendly” energy conservation guide will help you save money on your energy bills by providing ideas for reducing energy usage. Lowering your energy use also helps improve the environment by reducing the drain on natural resources.

In your house or apartment, there are many opportunities to reduce energy waste by making slight changes in your day-to-day activities. There are countless examples of energy waste around the home. They range from having cracks in seals around doors and windows to the wasteful practice of allowing heated or cooled air to escape by leaving doors open.

Sometimes reducing waste takes but an investment of a couple of dollars for duct tape and in other instances, several hundred dollars for increasing building insulation. Normally, your investment can be recouped over time by the resulting lower utility bills.

When energy conservation is a family goal, better results are achieved because the goal belongs to everyone. With this in mind, the Self-Audit section of this guide was designed to help you and your family work as a team. Together, you can gather information and decide on a course of action to reduce energy usage in your home. Many of the most commonly used energy-related terms are defined in the Glossary section on page 20.

It now costs more than \$1,500 per year for the average American household to operate appliances and heating and cooling equipment.

Because one third of the electricity produced in the United States is used by consumers, you can see the significant role consumers can play in reducing energy consumption.

The tips and ideas in this guide have the potential to reduce your energy consumption, and hence, your bills by as much as 15 to 25 percent. Furthermore, it poses a challenge to every household to become an efficient energy consumer.



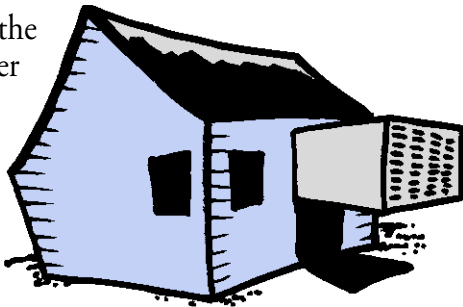
CONSERVING ENERGY IN THE HOME

AIR CONDITIONERS

Air conditioning units dry and clean outdoor air then cool it to a comfortable temperature for the indoor environment.

- If you are buying a new air conditioner, look for one with a high Energy Efficiency Ratio (EER). An EER of eight or higher is recommended.

- Make sure that the unit is the proper size for your residence. Over-size units are not recommended—*bigger is not necessarily better.*



- Minimize appliance usage to get the maximum performance from your unit. The more appliances you have running, the more heat they produce, placing a greater strain on your air conditioner.

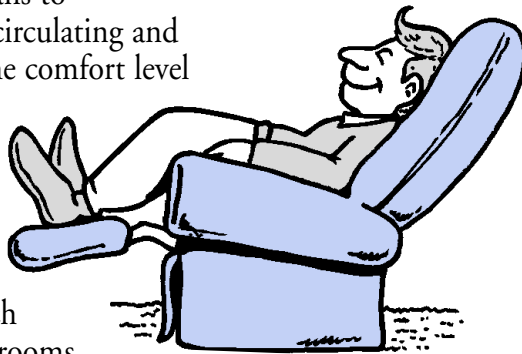
- Seal leaks in air conditioner ducts with duct tape.

- Keep your house sealed tightly during warm weather to keep the cool air in and the hot air out.



- Use ceiling fans to keep the air circulating and to increase the comfort level when the temperature is high.

- Turn off unnecessary lighting which adds heat to rooms.



- Close doors and vents of unused rooms to avoid air-conditioning these areas.

- Shade your condenser unit from direct sunlight.
- Shade windows to keep out the heat.
- When entering or exiting the house, open and close doors quickly.
- When leaving an air-conditioned room with a window unit for more than ten minutes, turn the unit off.
- Use a dehumidifier to help remove humidity from your home. High humidity makes your air conditioner work harder and it causes you to feel warmer.
- Don't forget to change the filters. Dirty filters can cause the unit to work harder.
- When your walls feel cool, consider turning off the air conditioner and turning on a fan.
- Keep central air conditioning system thermostat set at the highest comfortable setting (78°-80°F is recommended). Consider using an automatic set-back thermostat.

FURNACES/HEAT PUMPS

- Have an energy conservation auditor check your house for furnace/ heat pump efficiency and insulation needs.

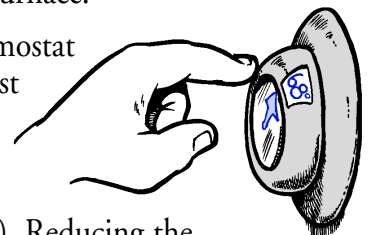
- Make sure the damper is closed when there is no fire in the fireplace.

- Close the glass doors on your fireplace to reduce heat loss up the chimney.

- Consider all the present and future costs of energy, including maintenance when purchasing a heating system.

- Consider new, more efficient add-ons to your existing furnace.

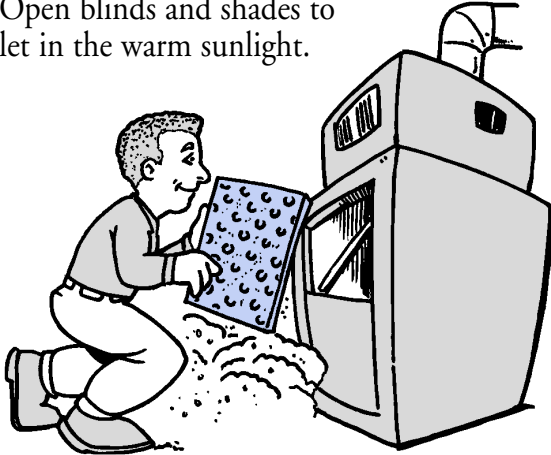
- Keep the thermostat set at the lowest possible comfort level (68°-70°F is recommended). Reducing the temperature in your home by 3°F reduces your bill by one percent.



CONSERVING ENERGY IN THE HOME

FURNACES/HEAT PUMPS

- Dress to be comfortable in your environment.
- Don't heat unused rooms.
- Open blinds and shades to let in the warm sunlight.



- Change furnace filters regularly.
- Close blinds and shades to insulate the windows at night.
- Weather-strip your windows and doors where there are drafts.
- Make sure the furnace fan doesn't run when it is not needed.

DRYERS

- Purchasing a more energy efficient unit is by far, the best investment. These models have sensors, which automatically shut off the units when the clothes are dry.
- Dry lightweight fabrics together for much faster drying.
- Avoid overdrying fabrics.
- Don't add wet fabrics to partially dry ones.
- Clean filters often. Clogged filters reduce airflow.

- Dry full loads whenever possible.
- Overloading the dryer reduces its effectiveness.
- Dry consecutive loads in order to reduce the energy required for warming the dryer to the required temperature for the next load.
- Make sure the outside exhaust vent is clean and opens and closes freely. Make sure that it seals tightly.

WASHING MACHINES

- Choose a washing machine equipped with energy conserving wash and rinse cycles.
- Select water levels to match the size of the load being washed. Only use as much water as you need.
- Remember that faster spin cycles extract more water and reduce expensive drying time.
- Use detergents that work well in cold water.
- Use warm or cold settings whenever possible.
- Pre-soak heavily soiled clothes to reduce the need for hot water washing.

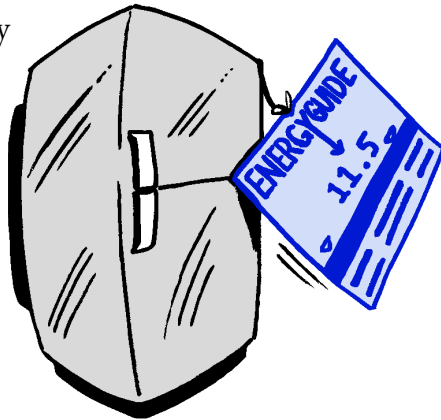
CONSERVING ENERGY IN THE HOME

KITCHEN APPLIANCES

Be sure to check on the energy efficiency ratings before purchasing kitchen appliances.

REFRIGERATORS

- Purchase an energy efficient model to replace an older refrigerator or freezer that may be more costly to operate! The cost can be recouped in lower utility bills.
- Avoid placing the refrigerator next to heat producing appliances like ovens and dishwashers. The heat from these appliances will cause the unit to work harder.
- Allow room for heat generated by the compressor and the condenser to escape.
- Keep the door gasket clean. Dried food on the gasket can break the air-tight seal.
- Clean the condenser coils periodically.
- Keep the unit as full of food as possible, but allow enough space between containers and packages so cooling is evenly distributed.
- Periodically check the temperatures in both the refrigerator and the freezer. Keep them set at a reasonable level.
- Allow hot food items to cool partially before placing them into the refrigerator or freezer.
- Clearly mark food stored in the freezer to reduce the time that the door is open.
- Think about what you want before you open the unit.
- Arrange the food in the refrigerator so you can easily get what you use the most often.

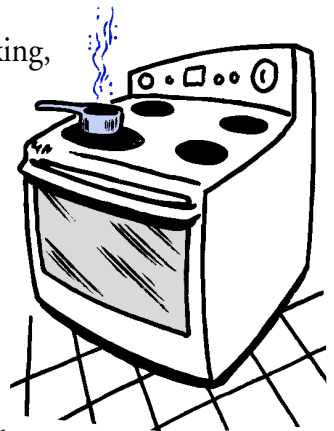


CONVENTIONAL OVENS

- Large ovens are not energy efficient for cooking small meals. Use a microwave, toaster oven, crock pot, etc.
- Keep preheating time to a minimum; not all cooking requires a preheated oven.
- Remember, when using an oven, check on food through the oven window when possible. Opening its door reduces its heat level and wastes energy.



- Cook several items at the same time as an efficient way to prepare a meal.
- Using faster cooking ceramic or glass cookware allows you to reduce the oven temperature.
- For stove top cooking, consider using a pressure cooker, because it cooks at a higher temperature, which reduces cooking time.
- Use the appropriate size burner for the pan being used.



MICROWAVES

- Use microwaves as an energy efficient way to cook.
- Keep units clean. Spills will absorb heat.

CONSERVING ENERGY IN THE HOME

DISHWASHERS

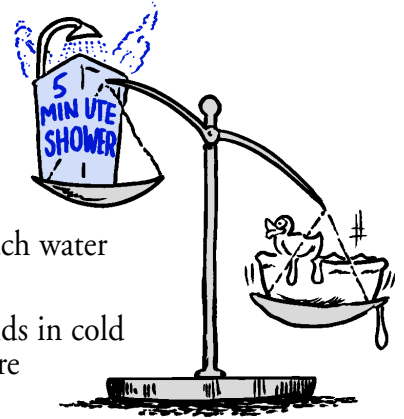
- Purchase only a highly energy efficient model, determined by comparing the energy efficiency rating of various models.
- Make sure the water temperature is hot enough to activate the detergent. Refer to the manufacturer's specifications to avoid excessive heating of water.
- Check for clogged or dirty filters, which prevent the washer from cleaning effectively.
- Let dishes air dry after the wash cycle is complete.
- Use the energy efficiency washing cycle whenever possible.
- Always have a full load when running the dishwasher.

WATER USE

- Saving water is not just a money saver, it is also the managing of a valuable resource that is often taken for granted.
- When washing your car, watering the lawn, etc., be sure to put a spray head with a shut-off valve on the hose to keep from wasting water.
- Instead of using hot water, use cool or warm water whenever possible.
- Store drinking water in the refrigerator to avoid running the faucet extensively to get cold water.
- If you hand-wash dishes, use a stopper in the sink to hold the water until all the dishes are washed.

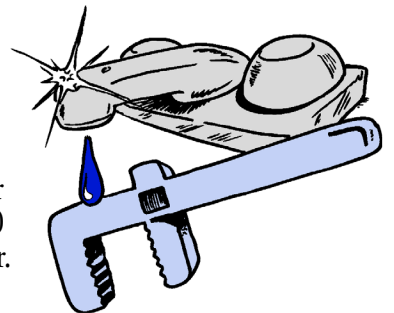
- Flush under-the-sink garbage disposals with cold water. Cold water will solidify the accumulated grease and allow it to clear easily.

- Use a pulsating shower head to reduce water usage. Taking a five minute shower uses half as much water as a bath.



- Wash your hands in cold water, if they are not too dirty.
- When brushing your teeth, turn off the water until it's time to rinse.

- Stop leaking faucets. One drop per second can amount to 200 gallons per month or 2400 gallons per year.



- Use aerator faucet heads in your showers and sinks to decrease water usage.

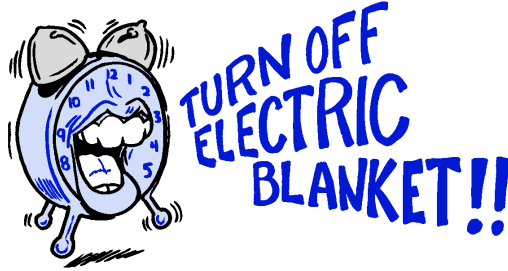
HOT WATER HEATERS

- Replacing an operating, but inefficient water heater with a new energy efficient model is sometimes a wise investment.
- Make sure the water heater is well insulated.
- Avoid overheating the water. Usually, 120/122 degrees F is considered warm enough for most families.
- If you have a dishwasher without a temperature booster, you need a higher setting.
- Drain the water heater to remove the build-up of mineral deposits. This improves the operation of the heating elements.

CONSERVING ENERGY IN THE HOME

WATERBEDS / BEDS

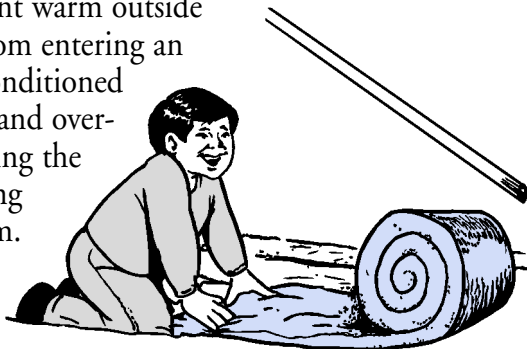
- The heaters in waterbeds use large amounts of energy. Cover the bed with a comforter to seal in heat. Also, use a timer to heat the bed only when needed.
- Remember to shut off electric blankets when you're not using them.
- Put a 1/2 to 3/4 inch foam pad over the mattress to stay warmer on very cold nights.
- Move beds away from windows in the winter.



INSULATION

It is essential to maintain proper insulation in environments that are being heated or cooled.

- Because 50 to 70 percent of energy usage in an average American home is for heating and cooling, improvements in the effectiveness of these two systems are likely to have a substantial impact on your energy costs.
- Be aware that insulation controls the heat flow from warm spaces to cooler areas. Proper insulation reduces heat loss during the cooler months. It can also prevent warm outside air from entering an air-conditioned area, and over-working the cooling system.

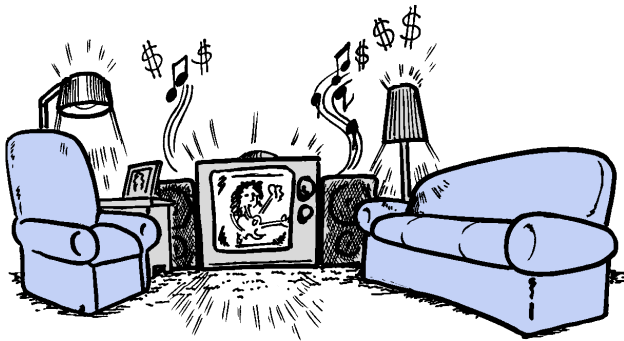


- Check your home for heat loss due to poor insulation. Check insulation in your roof, ceilings, outside walls and floors.
- Today, most homes and buildings have some amount of insulation already in place. If you are considering adding more insulation, it is wise to consult with insulation specialists who would have the latest information on installation, R-value, types and costs. These specialists are available for consultation at most outlets selling the products.
- As a rule of thumb, get several detailed estimates from licensed contractors, if you are planning to have insulation done professionally. Get involved to become more knowledgeable and to assure proper installation of the product purchased.
- Check doors and windows for appropriate weather stripping.
- Install storm windows and doors.
- Use plastic insulators on windows.

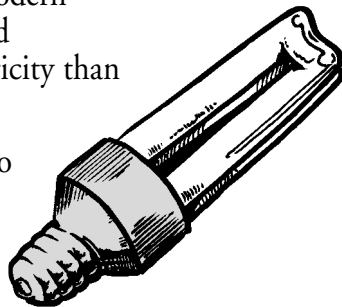
LIGHTING

- Reduce overhead lighting and make more use of task lights, e.g. reading lamps, desk lamps, piano lights.
- Make use of natural daylight whenever possible.
- Use energy efficient bulbs whenever possible. They may cost a little more to purchase, but you save more in the long run.
- Use electronic dimmers to control the intensity of lights.
- Turn lights off when you leave the room or use occupancy sensors to deactivate lights.

CONSERVING ENERGY IN THE HOME



- It's cheaper to use one 100 watt bulb than two 60 watt bulbs.
- Use a 50 watt reflector bulb which will concentrate as much light as a 100 watt standard bulb. The 50 watt reflector bulb costs half as much to operate.
- Make sure that lighting fixtures can safely handle the wattage of the replacement bulbs installed in them.
- Use timers to turn lights on and off at predetermined times.
- Contact your utility company for information on replacement fluorescent bulbs. Modern fluorescent lamps and ballasts use less electricity than incandescent bulbs.
- Use a reading lamp to direct light downward.
- Keep light fixtures and bulbs clean and dust free because dirt reduces their effectiveness.
- Replace bulbs that become dark, even before they completely burn out.

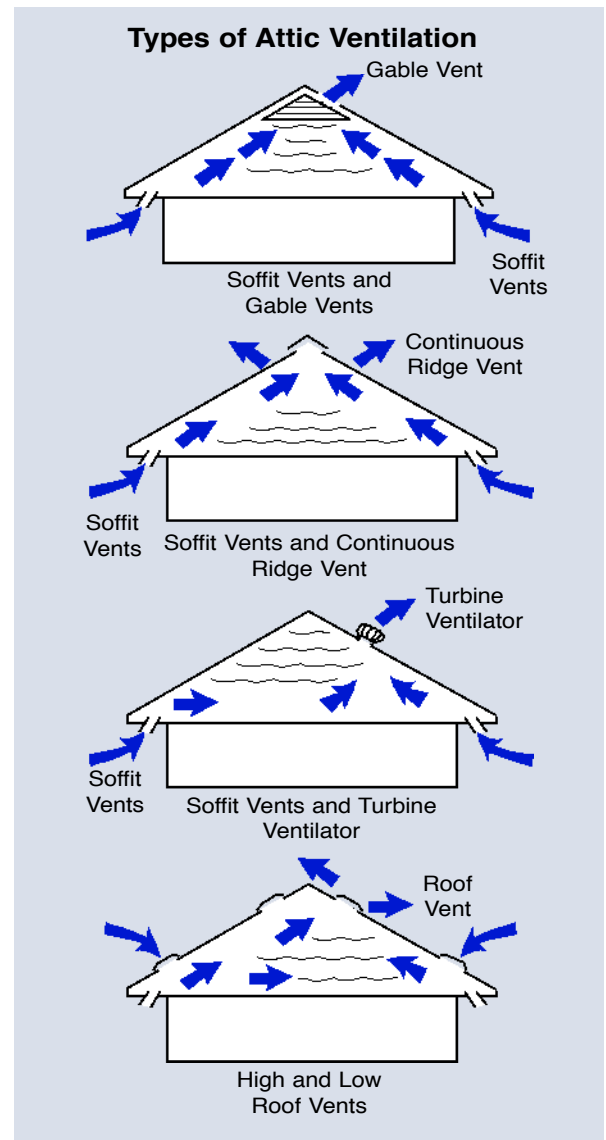


VENTILATION

In spite of the emphasis on insulating thoroughly, don't entirely block the movement of air in attics. Attic ventilation is very important. It helps to prevent structural damage to the house that could be caused by excessive high summer temperatures and by trapped moisture. Overheated attics also will cause air conditioners to work harder and use more energy.

If you find your attic to be excessively hot during the summer months, you may want to consider additional ventilation. Remember good ventilation is essential.

The chart below illustrates the ventilation layouts common to most homes in the area.



Conserving Energy in the Workplace

The results of your efforts to reduce energy waste at your residence will be reflected in lower utility bills, less out-of-pocket expenses and an improved environment. In the workplace there are many opportunities to stop energy waste.

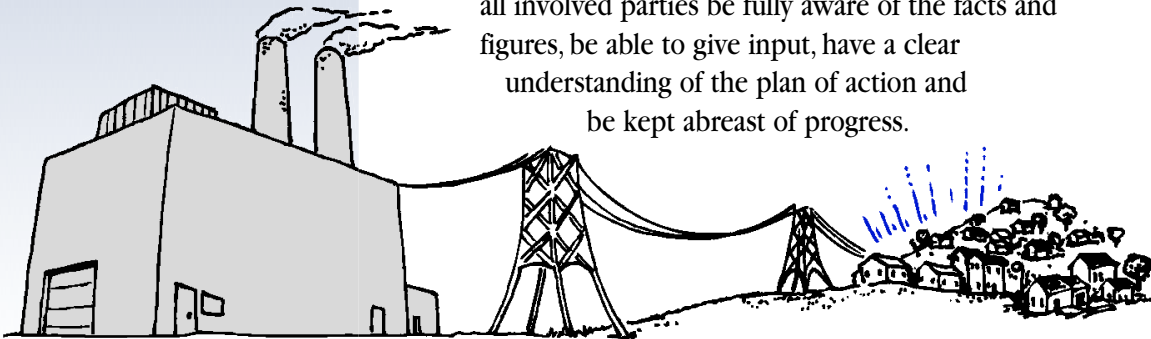
Your help is needed to also make the workplace energy efficient.

M

ost workplace energy costs have not been tracked by job or operation. Yet, in facilities where an extraordinary amount of power is used, the potential for energy savings is astronomical. The energy saved by a large industrial plant can sometimes be enough to supply the needs of a small community.

Dealing with energy waste at the work-site becomes a bit more complex than handling a similar concern at home. This is due to the complexity of most work environments. However, what has proven effective is the *establishment of energy reduction teams*. These teams tend to be composed of a cross section of persons sharing a common interest in reducing energy usage in a specific area.

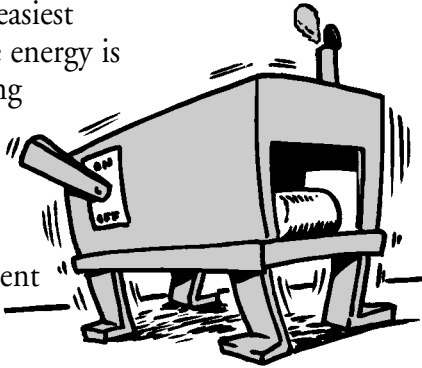
Having an effective energy reduction program requires that all involved parties be fully aware of the facts and figures, be able to give input, have a clear understanding of the plan of action and be kept abreast of progress.



CONSERVING ENERGY IN THE WORKPLACE

VENTILATION

- One of the easiest ways to save energy is by conserving electricity. Be sure to shut your machines and equipment off when appropriate.



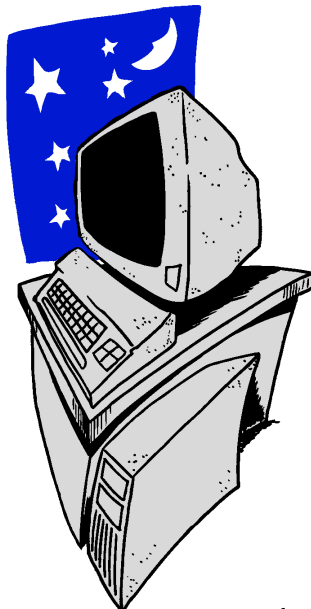
- Provide dedicated circuits for essential equipment.

- Turn off lights that aren't being used.

- Allow for more natural light to enter your work area.

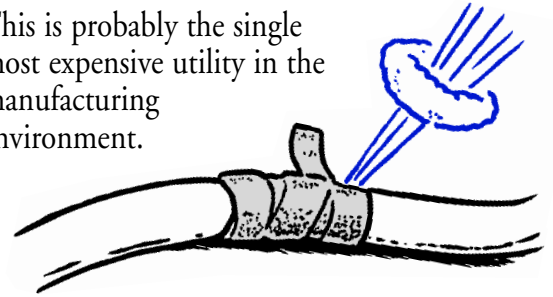


- Look into replacing your lighting system with a more efficient one.
- Where continuous lighting isn't necessary, opt for timers and activity sensitive controls.
- Use photocells to control outside lighting.
- Use energy saving bulbs in difficult to reach areas.
- Turn off office equipment such as computers, printers, copy machines, etc. when appropriate.



COMPRESSED AIR

- This is probably the single most expensive utility in the manufacturing environment.

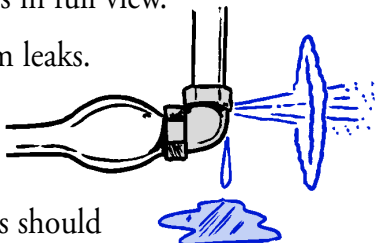


- Identify and repair all air leaks.
- Make sure that air pressure is only at the level needed. The undertaking to determine the needed level of pressure may be one of "trial and error," and it will require the involvement of the end users.
- Consider air booster units that only operate when activated.
- Check to make sure that compressed air is only being used for the purpose it is intended.
- Consider allowing products to air dry, versus compressed air drying.
- Check your existing air pressure by reading the gauge in the discharge line of the compressor or holding tank.
- Adjust the pressure controller to reduce the discharge pressure to the minimum requirement. If this adjustment is complicated, consult with the manufacturer of the unit.

CONSERVING ENERGY IN THE WORKPLACE

STEAM

- Leaks in steam lines are usually obvious when the line is in full view.
- Listen for steam leaks.
- Periodic checks of all steam lines and steam traps should be scheduled to ensure there is no wasting of this costly utility.
- Ensure steam lines have proper insulation.



AIR AND STEAM COST MONEY: *Don't Waste Them*

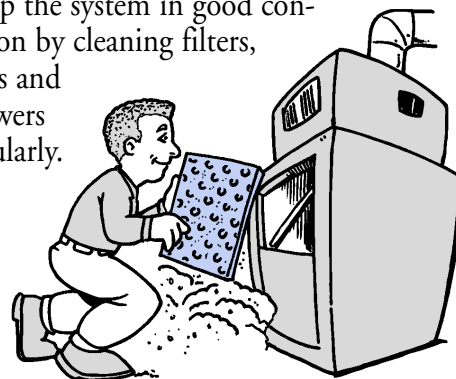
Leaks in compressed air lines and steam lines waste energy and cost money. The following table shows the monthly losses for various opening sizes.

COMPRESSED AIR			STEAM	
Size of Opening	Cu. Ft./ Month @100 P.S.I.	* Cost/ Month @ \$.30/M.C.F.	Lbs./ Month @100 P.S.I.	Cost/ Month @ \$5/M Lbs.
1/2"	17,800,000	\$ 5,340	805,500	\$ 4028
3/8"	9,980,000	\$ 2994	462,000	\$ 2310
1/4"	4,450,000	\$ 1335	203,500	\$ 1018
1/8"	1,114,800	\$ 334	56,000	\$ 280
1/16"	278,000	\$ 84	13,000	\$ 65
1/32"	69,850	\$ 21	3,200	\$ 15

* Costs for M.C.F. is based upon electricity at \$0.075/kWh and other assumptions which vary from plant to plant.

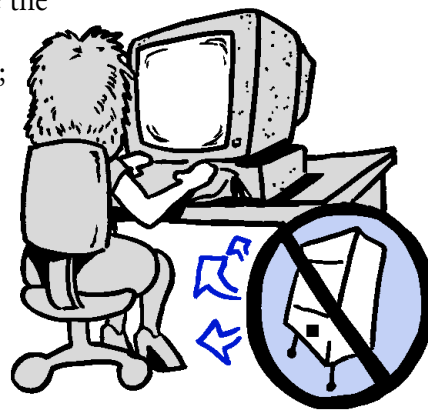
AIR CONDITIONING

- Keep the system in good condition by cleaning filters, coils and blowers regularly.
- Turn off the air conditioners in unoccupied areas.
- Seal windows, doors and cracks.
- Encourage the wearing of light-weight clothing.
- Balance the system by closing certain vents to make sure that the flow of air is going to the area that needs it the most.



HEATERS

- Discourage the use of electric heaters; they are an electricity drain.
- Whenever possible, do not use doors that exit directly to the outside. Each time a door opens from the outside, there is immediate heat loss.
- Check into the use of ceiling fans. They push the rising warmer air to the working areas of the rooms.
- Do not heat unoccupied rooms or areas.
- Look into using infrared heaters in high bay areas and warehouses. They provide comfort and reduce condensation.



CONSERVING ENERGY IN THE WORKPLACE

ELECTRIC MOTORS

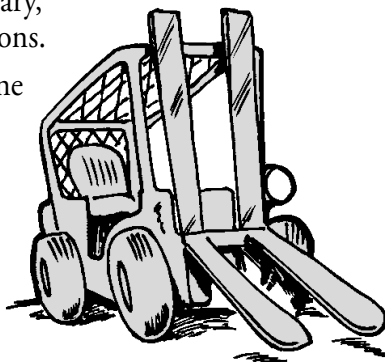
- Electric motors account for about three-quarters of total electricity use in industry and half of electricity use in commercial and industrial buildings.
- New motors are available in standard and high efficiency models. A high-efficiency motor will cost more than a standard one, but electricity savings can quickly pay back this cost difference if the motor is used a lot.

ELECTRIC MOTOR EFFICIENCIES

Motor Horsepower Rating	Average Nominal Efficiency	
	Standard Motor	Efficient Motor
10	85.0	89.0
20	87.5	90.5
30	88.5	92.0
40	89.5	92.5
50	90.0	93.0
60	90.5	93.0
75	91.0	93.5
100	91.5	94.0

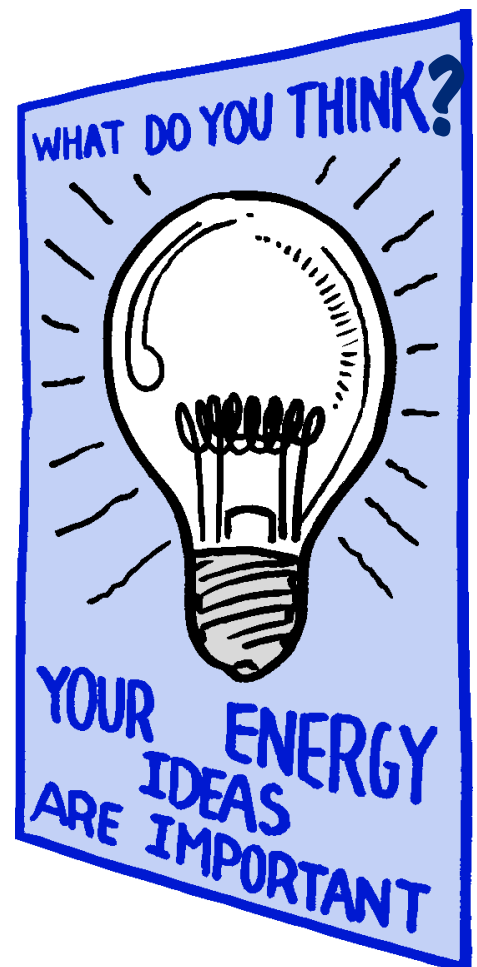
TRANSPORTATION

- Change the batteries in electric trucks at the recommended times.
- Keep vehicle tires properly inflated. Under-inflated tires cause vehicles to be less fuel/energy efficient.
- Avoid unnecessary, rapid accelerations.
- Don't idle engine for a long period of time.
- Keep the engine tuned. Proper maintenance is the key to having an efficiently operating vehicle.



GENERAL

- After starting an energy conservation program, continue to share suggestions/tips to help improve practices.
- Repair insulation for ceilings, walls and roofs.
- Develop shut down procedures for all machinery and equipment.
- Use a cold wash for parts.
- Use a direct air supply for exhaust hoods.
- Recycle air for air conditioners, heating and ventilation as much as possible.
- Use blinds or shades to reduce energy usage.
- Use heat curtains to reduce heat loss where outside doors must remain open for long periods of time.
- Industrial doors should not be left open when inside temperature is being controlled.

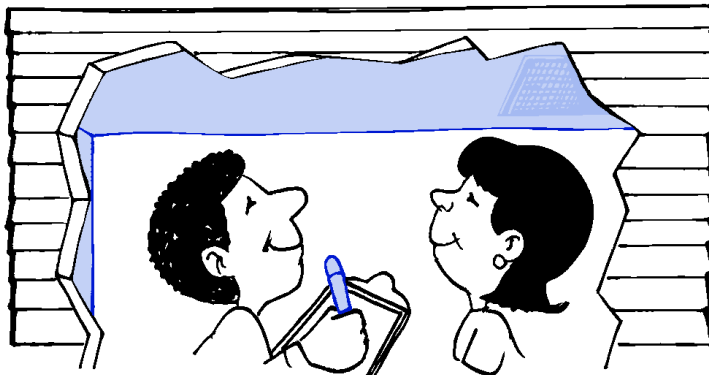


Home Self-Audit

“Walk-Through”

Now it's time to take
a look at your home.

This section provides you with a checklist to guide you in determining the level of energy efficiency in your home.



SUGGESTION:

List the last 12 months of energy usage, shown on your past utility bills as CCF (100 Cubic Feet) for natural gas and kilowatt hours (kWh) for electricity. Your local utility provider should be able to help you gather this information. Knowing your previous usage will help you establish realistic goals and better track your progress. However, the immediate unavailability of these figures should not delay beginning your walk-through audit.

SELF-AUDIT WALK-THROUGH

This self audit will encourage you to take a closer look at your residence, equipment, practices, and expenditures related to energy. It will allow you to highlight areas of concern and help you make plans to reduce unnecessary energy consumption.

HVAC

(Heating, ventilation, air conditioning)

HEATING

System last checked _____

Status of filters ☐ Clean ☐ Dirty

Present concerns about system:

Unusual noises _____

Running excessively _____

Unusual odors _____

Check thermostat settings _____

Other _____

Energy Action Plan/Ideas

AIR CONDITIONING

Central _____ Heat Pump _____

Number of room units Windows _____ Wall _____

Date of last service _____

Status of filters ☐ Clean ☐ Dirty

Present concerns about system:

Unusual noises _____

Running excessively _____

Unusual odors _____

Check thermostat settings _____

Other _____

Energy Action Plan/Ideas

INSULATION



Insulation is essential to the effectiveness of any HVAC system. Failure to have proper insulation results in energy waste and unnecessary costs to you.

Insulation is typically sold in bats, blankets, or loose fill (poured in). The thickness of bats or blankets, and the depth of loose fill will determine the R-value. The insulation charts below are provided as a guide to help you evaluate your present situation and consider your options. Consult with a specialist before undertaking your project.

INSULATION GUIDELINES

Uninsulated Area	Recommended R-value To Be Added
Ceilings	R-30 (R-38 if house has electric resistance heat)
Exterior Walls	R-11
Knee Walls	R-11 (add R-19 if there is room – do not compress into wall cavity).
Basement Walls	R-6
Floors Above Heated Basement, Garage or Crawl space	R-19
Crawl space Walls	R-19

The table below identifies the number of inches of common kinds of insulation needed to achieve various R-values. Note: R-values of rigid board insulation vary according to type. Consult manufacturers' literature for R-value per inch rating.

Batts or Blankets			Loose Fill (Poured-In)		
					
	Glass Fiber	Rock Wool	Glass Fiber	Rock Wool	Cellulose Fiber
R-11	3 1/2" - 4"	3"	5"	4"	3"
R-19	6" - 6 1/2"	5 1/4"	8" - 9"	6" - 7"	5"
R-22	6 1/2"	6"	10"	7" - 8"	6"
R-30	9 1/2" - 10 1/2"	9"	13" - 14"	10" - 11"	8"
R-38	12" - 13"	10 1/2"	17" - 18"	13" - 14"	10" - 11"

SELF-AUDIT WALK-THROUGH

CEILING INSULATION

Recommended R-value _____ Present (estimated) _____

Kind: Glass fiber _____ Rock wool _____

Cellulose _____

Blanket _____ Loose fill _____

Estimate thickness _____ inches

EXTERIOR WALL INSULATION

Recommended R-value _____ Present (estimated) _____

Room _____ Room _____ Room _____

BASEMENT INSULATION

Walls _____

CRAWLSPACE INSULATION

Walls _____

FLOOR INSULATION

Floors above heated basement _____

Floors above heated garage _____

Floors above heated crawl space _____

Energy Action Plan/Ideas _____

HOT WATER

Type of water heater Gas _____ Electric _____

Tank storage capacity _____

Temperature setting _____

Tank insulated Yes _____ No _____

Tank last drained _____

Aerators installed

Shower heads _____ Kitchen sink _____

Bathroom sinks _____

Leaks in faucets or diverters _____

Energy Action Plan/Ideas _____

BUILDING STRUCTURE

Outside:

Storm or thermal windows Yes _____ No _____

Storm doors Yes _____ No _____

List windows and doors needing repair or replacement _____

Caulking where needed _____

Weather stripping where needed _____

Inside:

Drafts from doors and windows (Check inside and around frames for leaks.)

Locations needing attention _____

Drafts around electrical outlets
Locations needing attention _____

Energy Action Plan/Ideas _____

LIGHTING

Room	Status of lighting (problems/concerns)	Where can incandescent bulbs/fixtures be replaced with lower wattage or fluorescents?
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Energy Action Plan/Ideas _____

BUYING GUIDE TO ENERGY SAVING DEVICES & PRODUCTS

This section is a catalog for the energy conscious. The costs are approximate, and will vary depending on where you shop. The types of stores where these items are available are also listed in the guide.

Most of the items can be found in hardware stores, home improvement centers and appliance stores. Usually, the sales associates are able to assist you in choosing the correct product. They can also offer advice on installation.

Read product labels before leaving the store; make sure the directions are clear and that you have the necessary tools.

KEY TO CODES USED BELOW:

Sources Available:

H Hardware Store
HC Home Improvement Center
D Department Store
E Electrical Equipment Store
L Lumberyard

Installation:

Y Do It Yourself
C Contractor

Always consider your skill level and existing local codes before deciding to install these items yourself.

WHERE TO GO AND WHAT YOU NEED TO KNOW

SOURCES

ITEM	\$ COST RANGE	H	HC	D	E	L
Air Conditioning						
Filters	4.50 - 5.00	✓	✓	✓		
Indoor Cover	3.50 - 4.00	✓	✓	✓		
Outdoor Cover	5.50 - 11.00	✓	✓	✓		
Caulking						
Caulk	.99 - 10.00	✓	✓	✓		✓
Caulking Gun	2.00 - 5.00	✓	✓	✓		✓
Draft Containment						
Door & Window Guards	5.00 - 6.00	✓	✓	✓		
Blockers for Electric Outlets	2.00 - 3.50	✓	✓	✓		
Ventilation Fans						
Window/Box Fans	30.00 - 60.00	✓	✓	✓	✓	✓
Wholehouse Fans	140.00 - 500.00	✓	✓	✓		✓
Fireplace						
Glass Doors	80.00 - 200.00	✓	✓			
Tubular Grates	60.00 - 125.00	✓	✓			
Insulation						
Ceiling	.20 - .40/sq. ft.	✓	✓			✓
Duct	1.00 - 3.00/roll	✓	✓			
Insulation Blankets for Water Heaters	11.00 - 40.00	✓	✓			

INST'L.

Y	C	COMMENTS
✓		Know the model and manufacturer of the unit.
✓		Sturdy plastic can be used.
✓		Measure unit for size.
✓		Many types are available.
✓		Can also be used when applying glue and other adhesives.
✓		Block drafts around sills and doors.
✓		Be sure to cut-off power when installing.
✓		Can reduce need to use air conditioning.
✓	✓	To install, carpentry & electrical skills needed.
✓		Reduce room heat loss.
✓		Return hot air to room.
✓	✓	Research your needs, also consider wall and floor insulation.
✓		Focus on attics and basement.
✓		Don't cover wiring, air openings or gas heaters with automatic vent dampers. Read the water heater manufacturer's literature and abide by it.

BUYING GUIDE TO ENERGY SAVING DEVICES & PRODUCTS

WHERE TO GO AND WHAT YOU NEED TO KNOW - Continued...

		SOURCES					INST'L.		COMMENTS
ITEM	\$ COST RANGE	H	HC	D	E	L	Y	C	
Lighting									
Fluorescent	1.25 - 40.00	✓	✓	✓	✓		✓	✓	More efficient; not all lamp shades are wide enough to handle new circular screw-ins.
Dimmer	9.00 - 25.00	✓	✓	✓	✓		✓	✓	For installation, check with local authorities
Motion Sensor	19.00 - 25.00	✓	✓	✓	✓		✓	✓	Activated by motion, otherwise, lights are off.
Outdoor Security Lighting	7.50 - 79.00	✓	✓	✓	✓		✓	✓	For installation, check with local authorities.
Photoelectric Switch	9.00 - 11.00	✓			✓	✓	✓		Offers convenience & flexibility. Light-sensitive device screws into light socket.
Temperature Controls									
Thermostat	15.00 - 100.00	✓	✓	✓	✓		✓	✓	Keeps heat consistent in all rooms.
Automatic Setback Thermostat	80.00 - 200.00	✓	✓		✓		✓	✓	Changes temperature at pre-set times. For installation, check with local authorities.
Electric Timers									
Timer for Lamps & Small Appliances	6.50 - 35.00	✓	✓	✓	✓		✓		Plug timers into wall outlets. Check installation with local authorities.
Timer for Air Conditioners & Pools	30.00 - 200.00	✓	✓		✓		✓	✓	Check installation with local authorities. (Heavy Duty Type)
Water Savers									
Faucet Aerator	1.40 - 9.00		✓	✓			✓		Saves between 2 and 3 gallons per minute.
Showerhead	7.00 - 30.00	✓	✓	✓			✓		Be sure it delivers less than 3 gallons per minute.
Windows									
Inside Storm Window Kit	3.00 - 40.00	✓	✓				✓		Check windows; seal all cracks before installing.
Weather Stripping For Doors	1.00 - 22.00	✓	✓				✓		Door sweeps and threshold installations are most commonly used.
For Windows	1.50 - 9.00	✓	✓			✓	✓		Seals air leaks to keep in the heat, comes in a variety of materials.
Miscellaneous									
Air Flow Deflector	1.00 - 3.00	✓	✓				✓		Deflects air flow in desired direction.
Circulating Fan	12.00 - 43.00	✓	✓		✓		✓		Maintains constant air movement.
Ceiling Fan	60.00 - 200.00	✓	✓		✓		✓	✓	Redirects the rising warm air. For installation, check with local authorities.
Heat Reflector	4.25 - 6.00	✓	✓				✓		Reflects heat that would normally be absorbed in walls.
Storm Door	75.00 - 150.00	✓	✓			✓	✓		Acts as barrier to hot air moving in or out of the residence.

GLOSSARY

Air Conditioning - The process of treating air to control simultaneously its temperature, humidity, cleanliness and distribution to meet the requirements of the conditioned space.

Ampere - The rate of flow of electricity through a conductor.

Ballast - The transformer for fluorescent and HID lamps. It provides the necessary current, voltage, and wave form conditions for operating the lamps.

Btu - (British Thermal Unit) - The amount of heat energy required to raise the temperature of one pound of water, one degree Fahrenheit. (Also shown as BTU.)

Circuit - A conductor or a system of conductors through which an electric current flows.

Circuit Breaker or Fuse - A load limiting device that automatically interrupts an electric circuit if an overload condition occurs.

CCF - 100 Cubic Feet.

Conditioned Space - Spaces in the building that are heated or cooled with mechanical equipment.

Cost-Effective - The term that describes an investment that pays for itself in an acceptable period of time.

Cycle - Frequency of alternating current expressed in Hertz. 60 cycles per second = 60 Hertz.

Damper - A device that controls airflow in a ventilation system.

Delamp - To remove unneeded lamps, usually as an energy conservation measure.

Demand - Rate at which electric energy is used during a given time period, usually 15 or 30 minutes. It is measured in kilowatts (kW).

Dimmer - A device that lowers the light level of the lamps it controls. New electronic dimmers also lower the fixture wattage.

Efficiency - Ratio of usable light output to energy input for a lamp or lighting fixture. Expressed in lumens/Watt (lm/W).

E.E.R. - (Energy Efficiency Ratio) - Used to rate room and central air conditioner efficiency. $E.E.R. = Btu \div Watts$.

Exfiltration - The flow of air from the inside of a building to the outside through gaps, cracks, and other leaks in the building's structure.

Fixture - A common term used to describe the lamp, lamp housing, and electrical connections.

Fluorescent Lamp - A lamp that produces light by passing electricity through mercury vapor which causes the fluorescent coating on the inside of the tube to glow.

Footcandle - A common unit of measure for light, equal to one lumen distributed over an area of one square foot.

HVAC - Heating, ventilating, and air conditioning.

HVAC System - A system that provides either collectively or individually the process of heating, ventilation and/or air conditioning within, or associated with, a building.

Heat Gain - An increase in temperature caused by direct or reflected sunlight, indoor lighting, machinery, or other heat sources. If not controlled, heat gain can substantially increase cooling needs.

Heat Pump - A year-round air-conditioning system employing refrigeration equipment in a manner that enables usable heat to be supplied to a space during the winter period, and by reversing the operation cycle to be absorbed from the same space during the summer period.

High Intensity Discharge Lamp (HID) - A lamp that produces light by passing electricity through gas which causes the gas to glow. Examples of HID lamps are mercury vapor lamps, metal halide lamps, and high pressure sodium lamps.

Incandescent Lamp - A lamp that produces light by electrically heating a filament so that it glows.

Infiltration - The flow of air from the outside to the inside of the building through gaps, cracks, and other leaks in the building structure.

Insulation - A material having relatively high resistance to heat transfer.

Kilowatt - 1000 watts (kW).

Kilowatt Hour - The use of one kilowatt of electricity for one hour (kWh).

Lamp - A term generally used to describe a man-made source of light. The term is often used when referring to a "bulb" or "tube."

Photocell - A device that senses the natural or incident light present and turns lamps on or off according to the light level.

Register - Slotted frame used to control the direction and flow rate of air delivered to the space.

Relamp - To replace a lamp with a similar or different lamp.

S.E.E.R. - (Seasonal Energy Efficient Ratio) - The total cooling of a central air conditioner's Btu's during the normal cooling period (not to exceed 12 months) divided by the total electric energy input in watt-hours during the same period.

Therm - A measurement of gas containing 100,000 Btu. There are 1,000 Btu Per cubic foot. and 100 cubic feet of gas Per therm.

Thermostat - An instrument that measures changes in temperature and controls devices to maintain a desired temperature.

Unconditioned Space - Parts of the building that are not heated or cooled with mechanical equipment.

Ventilation Air - That portion of supply air that comes from outdoors plus any recirculated air that has been treated to maintain the desired quality of air within a designated space.

Volt - The push that moves electrical current through a conductor.

Watt - The rate of flow of electrical energy. One watt equals the flow of one ampere at a pressure of one volt. (Watts = Volts x Amperes).

This image shows a full-page view of a blank sheet of lined notebook paper. At the top center, the word "NOTES" is printed in a large, bold, blue serif font. Below the title, the page is divided into two equal-width columns by a vertical line down the center. Each column contains horizontal ruling lines spaced evenly apart, providing space for handwritten notes.

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IMPORTANT NUMBERS TO REMEMBER

Safety is important to you and to your utility company. Your local utility providers are concerned about the safety and welfare of their customers.

They welcome calls if there is any concern about your safety or the effectiveness of their products or services.

- Your utility company's phone number is listed on your monthly billing. You may want to keep it handy.

Phone Numbers:

SPECIAL PROGRAMS AND SERVICES

Utility companies, sometimes in conjunction with state or local agencies, offer numerous special programs and services geared to assist their customers during difficult times.

Generally, these programs are explained in the materials included with the monthly utility bills. Interested parties should call the utility for more detailed information.

- Most utility companies offer special rates to qualifying senior citizens. Contact your local utility for more information.
- Some utility customers with a physician documented medical condition are protected from shut-off for non-payment of utility bills for a grace period of up to 21 days.
- Free or low-cost energy audits may be offered through some utility companies. The qualifying criteria vary.



BEFORE YOU DIG

- To ensure that the locations of underground cables are identified prior to digging, there are several services available.

In Michigan, contact:

MISS DIG: 1-800-482-7171

In Ohio, contact:

The Ohio Utility and Protection Service (OUPS): 1-800-686-3344 (Bay Area)

OUPS will also inform you of those companies who are not participants in the notification program.

MINIMIZING SHUT-OFFS

**Department of Social Services (DSS):
1-800-292-5650 (MI)**

- Unfortunately, there are those who, due to hard times, have had their utilities shut off. The Department of Social Services may be able to help people who have had their utilities shut off, even if they are not clients.

**THAW: 1-800-866-THAW
1-800-866-8429 (MI)**

- THAW is a non-profit, last resort agency that offers payment assistance to people who have exhausted all other means of paying their bills. The program covers 11 southeastern Michigan communities.

**Home Energy Assistance Program (HEAP):
1-800-282-0880 (OH)**

- Provides assistance, guidance and directions for those needing help in handling utility bills.

OTHER SERVICES

Eldercare: 1-800-677-1116

- Eldercare Locator Service is a nationwide referral service that can help locate local agencies that provide senior citizens with transportation, legal services, meals, help with tax forms and other services.

POWERTRAIN OPERATIONS

INLINE / DIESEL ENGINE OPERATIONS

“V” ENGINE OPERATIONS

AUTOMATIC TRANSMISSION OPERATIONS

MANUAL TRANSMISSION OPERATIONS

CHASSIS OPERATIONS

CASTING & FORGING OPERATIONS



FORD MOTOR COMPANY
POWERTRAIN OPERATIONS

SPECIAL THANKS TO...The Automotive Components Division - for their input into this publication.