

EcoVillage

homeowner handbook



Developer:



Architect:



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Architecture and Building Science
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IMPORTANT TELEPHONE PHONE NUMBERS

Contact only in an emergency or if you are unable or unsure of how to correct the problem. Fill-in the telephone numbers before you file your warranty information.

Electric or natural gas () -

Water () -

Sewer () -

Heating and Air Conditioning Systems () -

Plumbing & water heater emergency () -

Major appliances

After warranty expires, contact () -

Windows and doors

After warranty expires, contact () -

Landscaping and drainage

After warranty expires, contact () -

Roof

After warranty expires, contact () -

EMERGENCY NUMBERS

Police () -

Fire Department () -

Poison Control Center () -

Security System Center () -

YOUR DETROIT SHOREWAY COMMUNITY DEVELOPMENT HOME AND THE BUILDING AMERICA DIFFERENCE

Congratulations! Your high performance home is built to stringent Building America* criteria. It has been designed and constructed to deliver superior

- energy-efficiency,
- comfort,
- indoor air quality,
- environmental responsibility, and
- durability.

This has been achieved by treating your home as an integrated system with building materials, equipment and their installation tuned for performance and value.

But every home requires operation and maintenance. Just how well you operate and maintain your new home can determine just how superior its performance will be. **A little maintenance on a regular basis may prevent some big problems or headaches in the future.**

But fear not, this is a **short** manual. With attention to some key components, key systems, and periodic inspections, you will be spending most of your time at home **without** this manual, but be glad that Detroit Shoreway Community Development put just the right amount and type of information in **your** hands.



Continuous rigid insulation for thermal break



Cellulose insulation



Slab-on-grade insulation



Photovoltaic panels on garage roof



Groundbreaking ceremony



Building America is a Department of Energy housing initiative for innovative production home builders. For more information, see http://www.eren.doe.gov/building_america/index.html.

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GETTING STARTED IN YOUR NEW HOME

The following are suggestions for helping you settle into your new home.

- Establish new utility service to your home in your name (gas, electric, water, television, telephone).
- Check the temperature setting on your thermostat — it may have been set quite a bit outside your comfort zone while the house was not occupied. Then, be patient; if the setting you have chosen is significantly different, it could take from a couple of hours to a couple of days to reach constant temperature and humidity, depending on just how extreme the weather is outside when you move in.
- Notify the post office, insurance companies and doctor's offices, credit card companies, magazine subscriptions and newspapers, professional organizations of your new address.
- Remember to change the address on your driver's license and passport or apply for a new one if you are moving from another state.
- Update your voter registration especially if you are moving to another voting district.
- Ask if you are eligible for a homestead exemption through your local county tax office.
- Do not use the job site dumpsters for your move-in trash; recycle your moving boxes by offering them to someone else who's moving.



Helpful Hints

- Fill-out and mail the appliance warranty information cards.
- Locate the water main and gas main shut-off valves.
- Place fire extinguishers on each floor of your home, in your kitchen, and in your garage (if not provided).
- Locate the electrical service panel and main shut-off.
- Put emergency telephone numbers in an easy to reach place near the telephone or on speed dial.
- Put together a first aid kit.
- Start a basic tool kit including a hammer, pliers, screw drivers, utility knife, scissors, tape measure, duct tape, flashlight, batteries and a pencil.
- Vacuum out behind the filter grille wall assembly to remove any construction dirt or debris so it isn't blown through the house when the system is turned on.
- Store touch-up paint and other flammable items in a safe location away from the water heater, air handler, fireplace or any other combustion sources.
- Smoke detectors are located in every bedroom and common areas. See page 18 for maintenance instructions.



Important Note:

We recommend you have an emergency evacuation plan in place that everyone in your household understands and can remember. Determine which is the best way to safely escape from different parts of the house when there is a fire, threat of fire, or gas leak. Have a safe, prearranged place to meet outside the house to be sure everyone who was in the house got out safely. Also, be available to answer any questions the fire or police department or gas company may need to have answered when they arrive. Notify your babysitter and/or housesitter of the plan as well.



OPERATING YOUR DSCD DEVELOPMENT HOME

There are some key differences in how you will operate your high-performance home compared to a standard new home. This section starts with items that will likely be new to you and then continues with more conventional operational considerations.

OPERATIONAL CONSIDERATIONS

The heating and cooling requirements are not constant throughout your home; you should expect some temperature variation from room to room. Per design standards, $\pm 3^\circ$ from the thermostat location is normal. The relationship of the amount of window or glass doors to the size of a room and sun location can cause greater temperature variations. So prudent use of window shades, blinds and curtains may be needed.

Thermostat

- **Set your thermostat within the recommended ranges for heating (68° to 72°F) and cooling (75° to 78°F).** Your heating and cooling systems have been carefully sized per industry standards for optimal energy-efficiency, comfort, and long life. Be aware that setting your thermostat above the highest recommended temperature for heating and below the lowest temperature setting for cooling may compromise equipment short-term and/or long-term performance.

Programmable Thermostat



Programmable thermostat

A programmable thermostat, also called a setback or setup thermostat, has been chosen for your home to help reduce heating and cooling bills. It can be set to automatically adjust to your specific conditioning requirements. Each weekday

morning, for example, it can lower the heating set point when you are at work or school, then raise it again before you return home in the evening. There are settings for your weekend schedule, too. The thermostat may contain backup batteries which will keep your settings in case of an electrical power failure.

- **Use a setback strategy with your manual or programmable thermostat to save energy during the heating season, but “set it and forget it” during the cooling season.** Your high-performance furnace can quickly and easily bring the temperature up from a nighttime setback, allowing you to save energy when overnight comfort requirements are less demanding. Your **air conditioning system**, on the other hand, works quite differently. Its sizing and function (especially in terms of dehumidifying humid air) means that setting the thermostat up during nights or unoccupied periods during the cooling season will **not** give you optimal performance or comfort. In any case, DSCD recommends that you not use setback strategies greater than 4 degrees.
- **Leave the fan setting on your thermostat set to “auto”.** The fan or air handler that distributes heating and cooling throughout your house is also used to distribute fresh air (see mechanical ventilation below). Unless you are going to be gone for an extended period or you have your windows open for ventilation, the fan needs to be on “auto” for proper operation of your mechanical ventilation system.

Ventilation

- **Leave your controlled mechanical ventilation on, if applicable.** You probably have a small, thermostat-like panel with the name FanCycler™ located near the furnace. That’s because your home has a true HVAC system — heating, **ventilating**, and air-conditioning. The controlled mechanical ventilation system is integrated with your central cooling and heating system. Whenever the central system blower is on, a measured amount of outside air is drawn in, filtered, and delivered throughout your home. The amount of outside air drawn is a small percentage of the total air flow so its effect on the delivered air temperature is minimal (4 degrees



FanCycler™
Control Panel

CONTINUED ON PAGE 8

YOUR HIGH PERFORMANCE HVAC SYSTEM AND HOW IT SAVES YOU MONEY

Perhaps the most frequently raised concern from owners of high performance homes is:

How can I be saving energy, money, and wear and tear on my equipment if it seems as though my system is running a lot more than systems in other homes?

The neat thing about the answer to this question is that your high performance home is not only saving you energy, money, and equipment life; it's also delivering more comfort, health, and safety to boot. And you cannot split the pieces of your system up—it's an all-or-nothing performance package. Here is how and why it works for you:

Point 1

When you build a **tight thermal envelope**, you get to build in a smaller HVAC system, whether it be your furnace, you're A/C compressor, or your air handler (this is basically the fan motor that moves the heated or cooled air from the unit to the rest of your home). And a smaller system uses less energy than a larger system.

Point 2

When your HVAC is sized correctly, it can be as much as **40% smaller** than the typically over-sized HVAC system. Smaller systems may run longer to achieve the same level of conditioning, but their total energy consumption is still lower. The equipment runs more efficiently and lasts longer if it is not short-cycling. Just like a car's motor, it's in start-up that most of the wear and tear occurs and it runs the least efficiently.

Point 3

Your high performance home is equipped with an outside air intake duct and a fan cycling control that keeps track of how often your air handler has been running. The outside air duct and fan cycling control ensure that a measured amount of outside air is introduced into your home each hour and that all of the air in your home is thoroughly mixed every hour. This is key to controlling indoor pollutants and interior moisture levels, as well as keeping the temperatures even throughout all your rooms. Especially during mild weather, the FanCycler™ can make your air handler run more than air handlers in homes without active fresh air ventilation. And, since the FanCycler™ is pulling in outside air that may have to be heated or cooled, there can be additional energy associated with its use. On the other hand, during these same mild periods, the FanCycler™ may be pulling in outside air that **reduces** energy use because the outside air requires less conditioning (for example, pulling in cooler outside air at night that reduces air conditioning). For a typical 1,500 ft² home¹, the annual energy cost for just the air handler's operation due to the FanCycler™ is somewhere between \$33 and \$49, depending on your climate.

Point 4

Your home's overall performance—its energy costs, indoor air quality, thermal comfort, moisture control, combustion safety—is based on the HVAC system as a whole. Your builder and HVAC contractor have set up the system for optimal performance. Before you alter the fan cycling control settings, check with your builder or an HVAC contractor with experience in residential mechanical ventilation.² You can't take the "V" out of HVAC (**V stands for ventilating** in the Heating, Ventilating & Air Conditioning acronym). Unlike other homes, your high performance home has a dedicated and regimented system for introducing, filtering, and conditioning fresh air.

So, the next time your air handler kicks on and you hear the ring of a cash register, remember that it's the ring of savings not of needless spending, regardless of how often your system seems to run. And think about how even and consistent the comfort is throughout your home and throughout the year. Then you should go about the business of enjoying your home while the high performance HVAC system goes about its job of delivering that performance.



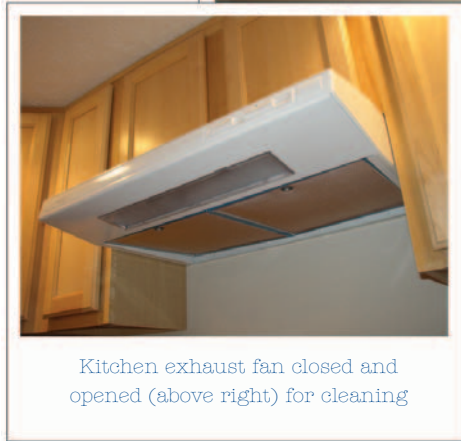
FanCycler™ located on side of furnace

¹ For the details of how these numbers were generated, see the report on the modeling study on the Building Science Corporation website: http://www.buildingscience.com/resources/mechanical/ventilation_centralfan.htm.

² Your builder may have decided, or you may decide, that the initially higher building product emissions in your new home — from paints, cabinets, furnishings — justify fan cycling control settings that introduce more outside air for a "break-in" period. This will result in a small one-time energy penalty if the fan cycling settings are subsequently re-set for more long-term and regular control of indoor pollutants.

at most). A special fan cycling control will operate the central system blower only as needed. If the house will not be occupied for days at a time, or if the house is opened up to enjoy mild outdoor conditions, the fan-cycling control can be turned off but must be turned back on when the house is occupied and closed up.

- **Use spot ventilation fans in your bathroom and kitchen.** All of these fans are vented directly to the outside to remove air contaminants and excessive humidity associated with activities in these rooms. Their use increases comfort and augments the steady operation of your automatic ventilation system.



Air Balancing

- **Use the adjustable grilles on your supply registers to fine-tune the temperature of individual rooms in your home.**

Unlike many standard new homes, your home has a carefully designed duct system with the layout and size of each duct set up to keep temperature variations throughout your home to $\pm 3^{\circ}\text{F}$ from the thermostat location. The



regular, periodic and automatic operation of your ventilation system also assists in keeping temperatures even. But variations can still occur, due to the specific orientation of your home; position of specific rooms; internal heat gains from lights, appliances and office equipment; presence and type of window treatments; and personal preferences for different activities. You can use the following steps to tune the temperature of individual rooms. There are separate instructions for heating and cooling — realize that you may have to adjust grilles from season to season for optimal comfort for both heating and cooling.

Cooling Operation

1. Find the areas you want to adjust; for example, you would like a room cooler.
2. Let the system run for 24 hours at a set temperature. Usually around 78 to 76 degrees works well because you can feel temperature differences easily.
3. In areas that are warmer, make sure the ceiling or wall vents are wide open. Slowly close down areas that are cooler than the areas that are warmer. Let the home settle for 24 hours.
4. After 24 hours and at the same time of day, recheck the problem areas. If the rooms are still warm, continue closing the cooler areas grilles slowly in

small increments moving the air to your desired temperature in those areas.

5. Sometimes homeowners add high wattage appliances such as computers, halogen lamps or large television sets that consume 250 watts or more and add a lot of heat to an area. Areas with these appliances may be warmer even after air balancing due to the high appliance heat load.

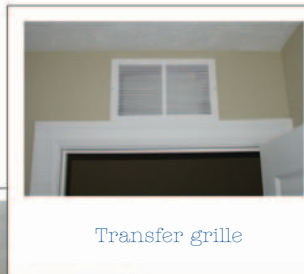
Heating Operation

1. While heating your home, sometimes you will have to adjust vents such as in upstairs open hall areas. This is because hot air rises in the winter and you do not need as much heat in that area during the winter. Reopen the vent in the spring prior to the cooling season.
2. Warm rooms may need to be dampered down in the winter to help them keep from getting too warm. Reopen those rooms again in the spring before the cooling season.

Remember that this takes time. The conditions on the outside walls and glass areas without window coverings do affect areas. The home is designed to have a light window covering closed during the hottest parts of the day. This keeps your energy consumption down and helps to maintain a balanced temperature during hot summer days. Windows without coverings may overheat a room before the thermostat can respond. Again, the fan cycling control should reduce these variations to between $\pm 3^{\circ}$ from the thermostat location.

- **Transfer grilles relieve pressure differences between spaces.**

Transfer grilles are



Transfer grille



usually located above bedroom doors into hallways and help prevent pressurization of bedrooms and depressurization of common areas. They have an interior baffle that controls sound and light infiltration. Doors are also undercut to assist in the pressure balancing.

Ceiling Fans (if applicable)

- **Use ceiling fans only when rooms are occupied.**

Cooling associated with air movement can make occupants comfortable at air temperatures several degrees warmer than otherwise. But all that ceiling fans do when rooms are empty is waste electricity and contribute heat from the fan motor. The same can be said for the lights built into most ceiling fans — turn on and off as you come and go.

Kitchen

- **Do not use the oven as a means to heat your house.**

Do not work on the stove while it is hot and turn off the “breaker” and local gas shutoff before performing any repair or maintenance. Refer to the owner’s manual for more detailed information.

- **Run cold water when operating your garbage disposal.**

Use common sense when operating this device — consider what can and cannot be rendered by the disposal and keep hard objects and body parts out of the device, regardless of whether it is running or not.

Most garbage disposals include an unjam wrench, which can be inserted into the underside of the disposal, and then rotated to clear the jammed cutters.



Garbage disposal located under kitchen sink

NEVER, UNDER ANY CIRCUMSTANCES, PUT YOUR HAND INTO THE GARBAGE DISPOSAL, ESPECIALLY WHEN IT IS RUNNING!

IF YOU ABSOLUTELY MUST PUT YOUR HAND IN THE DISPOSAL, FIRST TURN OFF ITS “BREAKER” AND PUT TAPE OVER IT AND IT’S SWITCH SO NO ONE WILL TURN IT ON BY MISTAKE WHILE YOU ARE WORKING ON IT!

Electrical System

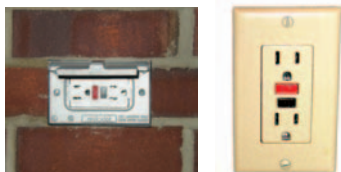
- **Use circuit breakers at main electrical panel to control current to specific parts of your house.**

Check to make sure that you understand the labeling on all the circuits on your panel. If a circuit is drawing more electrical current than it should, its “breaker” will automatically shut off the power. This is called a “tripped breaker” and probably means there are too many electrical devices being used at the same time on a single circuit. Unplug some or all of them, then “reset” the “breaker”. First push the lever to the “OFF” position, then back to the “ON” position. If this doesn’t restore power, the “breaker” itself may be faulty, or there could be an electrical short, and a qualified electrician should be called.

- **Test ground fault circuit interrupt (GFCI or GFI) outlets.**

Kitchen, baths, exterior outlets and other areas where water

and electricity are present have these special outlets that minimize the risk of electrical shock. They should be tested periodically to ensure that they are operating properly. They also have a reset button to use if the interrupt is tripped.



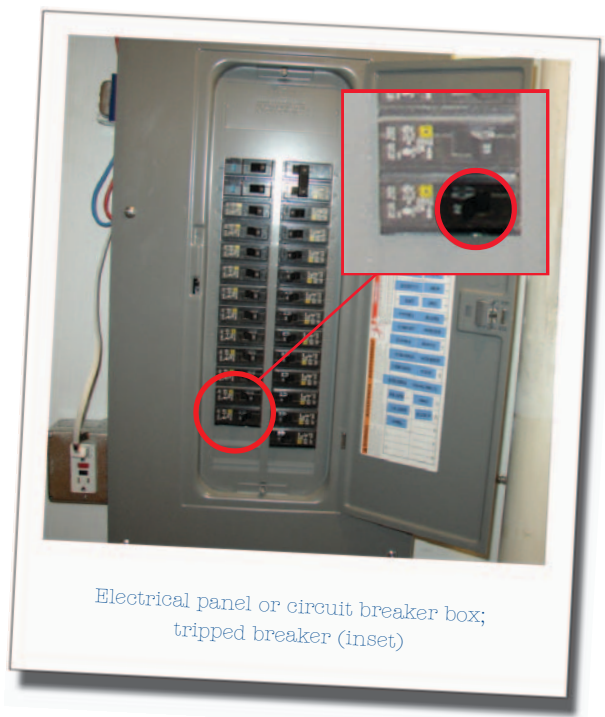
GFCI outlet inside (right) and outside (left)

- **Use the proper wattage when you replace light bulbs.** All lighting fixtures are designed for a maximum wattage — it can be dangerous to use bulbs that exceed this rating. Better yet, use EPA Energy Star compact fluorescent bulbs — they will never exceed a fixture’s wattage rating, and their energy efficiency



saves you roughly three times the money!

- **Watch your “vampire” loads.** Devices that use energy while plugged in but not functioning still use electricity. These loads can really add up, particularly for those devices with step-down transformers (adapters) — such as low-voltage under cabinet lighting — and devices with built-in clocks. See **Basic Operation of the Photovoltaic (PV) System** on pages 12 and 13 for more information.



Electrical panel or circuit breaker box; tripped breaker (inset)



Ground Fault Circuit Interrupter (GFCI or GFI) in the bathroom

- **EcoVillage homeowners should understand the Btu¹.** We use Btus to talk about heating (welcoming or adding Btus) and cooling (keeping or taking out Btus) the building. You can save heating Btus by using your setback thermostat to lower temperature settings while you are away or sleeping and by operating your blinds and shades for maximum solar gain during the day. You can save cooling Btus by using your operable windows and ceiling fans to cool yourself with air movement rather than air conditioning, and operate your window shades and blinds to minimize solar gain during the day.
- **EcoVillage homeowners should understand the watt².** We use the watt to talk about electrical power. You can minimize your use of electrical power or watts in two key ways.
 - **Treat every use of electricity with this rule—on when in use, off when not.** Remember that there are three aspects of any electrical device that are important in managing watts—how much power it draws, how long it operates, and what time of day it operates. This goes for everything from a ceiling fan to the clothes washer to the television.



Electric meters



Gas meters

- **Minimize how much you use watts to make Btus.** Making Btus with watts—heating or cooling with electricity—takes a **lot** of power. Any electrical appliance or home convenience that heats—a toaster, a hair dryer—or cools—primarily the refrigerator—requires the most “watt” diligence.

Use these guidelines with the table below to manage household energy use.

- Use fluorescent fixtures and bulbs—the quality and availability has and continues to improve—use the EPA Energy Star label as a guide.
- During the cooling season, manage watts used for Btu production; that is manage those appliances that create heat.

appliancewatts used

coffee maker	900—1,200
clothes washer	350—500
clothes dryer	1,800—5,000
dishwasher.....	1,200—2,400 (using the drying feature greatly increases energy consumption)
ceiling fan	65-175
hair dryer	1,200—1,875
clothes iron	1,000—1,800
microwave oven	750—1,100
personal computer:	
CPU (awake)	120
monitor (awake)	150
radio (stereo)	400
refrigerator (16 ft ³ frostfree).....	725
27” television	113
toaster	800—1,400
vacuum cleaner	1,000—1,400

1 A British thermal unit (Btu) is the amount of heat energy it takes to raise the temperature of one pound of water by one degree Fahrenheit (at sea level). As an example, it takes about 2,000 Btus to make a pot of coffee.

2 A watt is the basic unit of electrical power. As an example, if you took two 2-liter plastic bottle of soda, one in each arm, and lifted it up three feet in one second over and over again, you would spending the same amount of energy as it takes to pwer a 40-watt light bulb — tough way to read a book, huh?

BASIC OPERATION OF THE PHOTOVOLTAIC (PV) SYSTEM FOR HOMES IN BUILDING A

Just about the entire roof area of Building A's detached garage is covered with photovoltaic (PV) panels. Here is how your PV system works:

Photovoltaic (PV) panels

PV panels turn a portion of the sunlight (photo) they receive into electricity (voltaic). PV or solar cells are made up of silicon wafers, one layer "doped" with

a substance that tends to give up electrons when excited by incoming photons (solar energy units) and another layer doped with a substance that tends to take on excited electrons (the silicon crystal base is a great background for this exchange of electrons because silicon atoms tend to loosely share lots of electrons in this crystal structure). And whenever you create a flow of electrons, you get electricity.

The tricks to making solar cells for everyday use have been developing the technology to mass produce cells (even before "mass" demand exists),

developing the technology to boost how much sunlight they can convert into electrical current, and developing the technology to support safe and efficient integration into existing electrical systems.

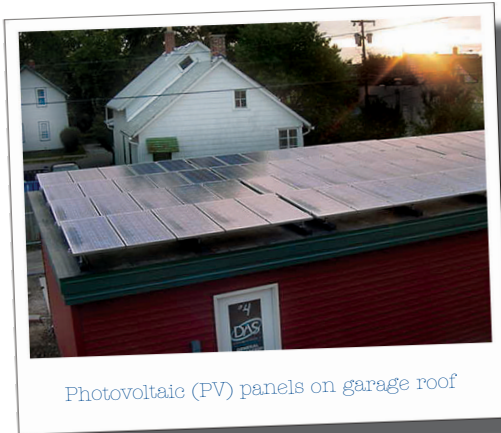
The PV system has two other important major components besides the array of panels—an inverter and a charge controller.

A long time ago, for a variety of reasons related to materials, safety, and transmission issues, we decided to run buildings, including homes, on alternating current (AC). But the PV panels produce direct current (DC). The inverter changes the DC into AC current compatible with household electrical systems. The last component, the controller, controls the flow of energy from the panels, to the house, and to and from the utility power lines. An important part of the controller's job is to prevent current from entering the line when utility linemen have interrupted the utility supply for line maintenance or repair.

The size or capacity of PV systems is generally expressed in terms of watts or kilowatts generated under peak or ideal conditions. Your PV system is

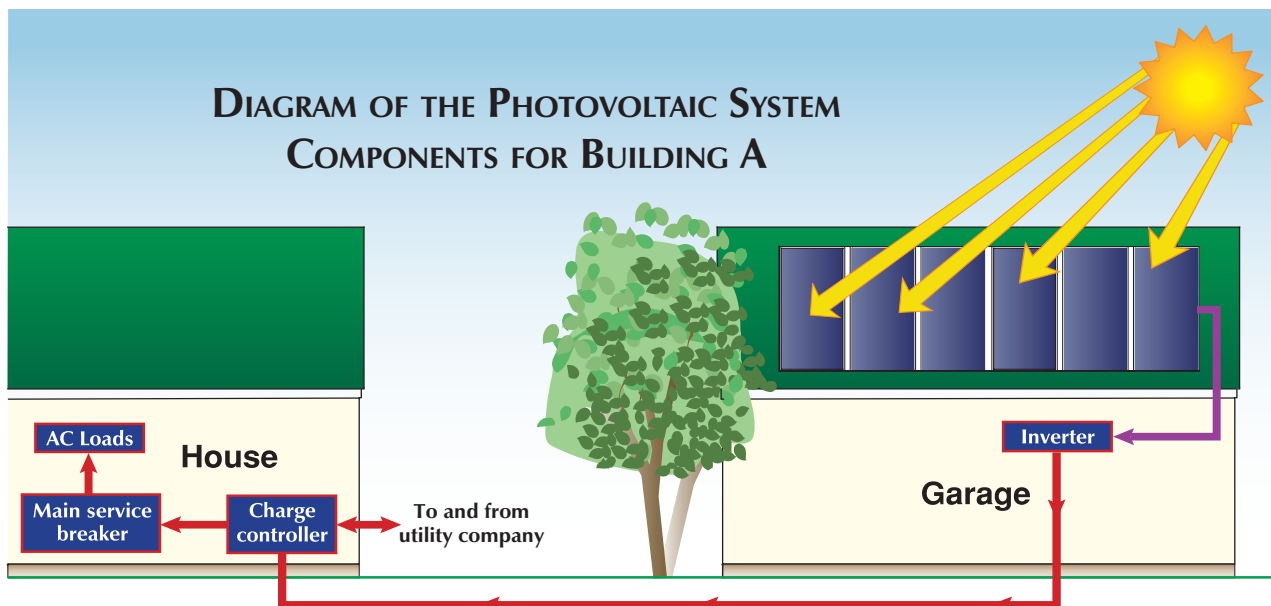


The inverters are located in the garage



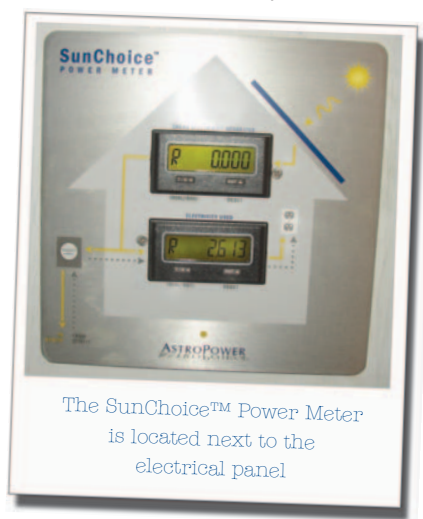
Photovoltaic (PV) panels on garage roof

DIAGRAM OF THE PHOTOVOLTAIC SYSTEM COMPONENTS FOR BUILDING A



capable of generating about 10 watts per square foot of panel. Managing the use of energy your PV system produces and keeping the panels clean and clear is pretty much all that you need to do — the PV system is virtually maintenance-free during its 20+ years of expected operation.

Net-metering When more electricity is produced than is being used, the “extra” electricity is sent to the electric company. **If you have a question or problem with your panels, contact John Witte at Integrated Solar, 419. 893.8565.** For general information, go to the Solar Electric Power Association website at www.SolarElectricPower.org.



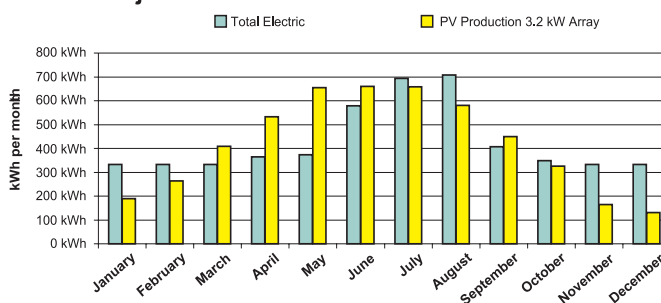
The meter displays power generated (top display) and power being consumed (bottom display)

Operation Your electrical service panel and circuit breakers are the same as an ordinary panel and operate exactly the same way. No special adapters are required for your appliances, either. When the main service breaker is off, all power to the house is turned off, just as it is in a conventional system.

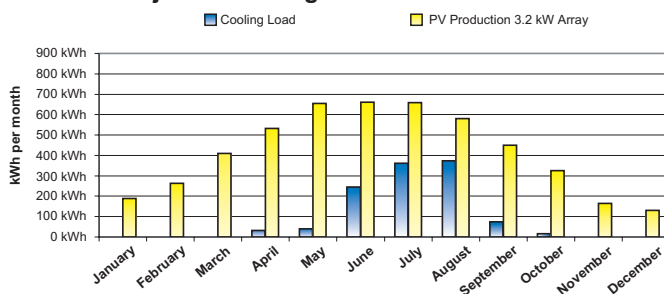
Also, the diagram on page 12 shows a buried service cable running from your garage to your house. If you plan to do further landscaping or other digging remember to call your local **DIG SAFE** program before you begin.

The graph at right is an estimate of an average household's total electricity demand by month (green columns) in relationship to the predicted amount of electricity generated by the photovoltaic panels by month (yellow columns). In this example, during March, April, May, June and possibly September, your system could generate more electricity than you use. Realistically, during the cloudiest and shorter days of November, December, January and February you would not generate as much electricity as you use.

Projected Total Electric Load and PV Production



Projected Cooling Load and PV Production



The graph at left is an estimate of an average household's electricity requirement to run **only** the central air conditioner by month (blue columns) in relationship to the amount of predicted electricity generated by the photovoltaic panels by month (yellow columns).

MAINTAINING YOUR HOME

The simplest way to keep your home at peak performance is to follow a maintenance schedule, just as you do with your vehicles. This handbook contains just such a schedule so that you know when to:

- inspect,
- clean,
- paint or seal, or
- consult and/or engage a professional.

DSCD suggests that you place this schedule in a convenient place, such as the inside of a cabinet door in your utility room or garage.

And just for the record, here is a list of durable features built into your home, keeping your home maintenance schedule minimal:

- Eave and gable overhangs (reduce the likelihood of water intrusion possibly leading to mold)
- Perimeter foundation drainage (reduces the likelihood of water damage) below grade
- Long life/low maintenance doors and windows
- Composite exterior trim that will not rot, rust or burn
- Concrete driveways, patios, sidewalks and floors with expansion joints to reduce or eliminate cracking
- Maintenance-free exterior claddings

The following information provides a brief explanation of the limited maintenance your home requires.



Porch overhang detail



Mulched landscaping

INSIDE MAINTENANCE CHECKLIST



* POWER WASHING IS NOT RECOMMENDED. SEE PAGE 22 FOR MORE INFORMATION.

** OVER TIME, LEAKS CAN ACCOUNT FOR 15-20% OF TOTAL INDOOR WATER USE.

ITEM	WHEN TO CHECK	HOMEOWNER ACTION
Sinks		 Check under kitchen and bathroom sinks (in vanity cabinet) for leaks.**
Faucets		 Clean screens annually. Check for leaking seals.** 
Toilets		 Keep free of debris. Check tank seal for leaks.** 
Clothes washer		 Check hoses for leaks or disconnects. Recommend braided no-burst hoses.**Clean drum occasionally. 
Clothes dryer		 Clean lint filter regularly. Periodic professional cleaning will reduce risk of fire.  
Dishwasher		 Remove all food from dishes before placing in unit. Clean the drain filter regularly. 
Refrigerator		 Keep interior condensation drains clean. Allow room behind and inside for air circulation. 
Smoke detectors		 Test and check batteries. Replace batteries annually.

CONTINUED ON PAGE 16

INSIDE MAINTENANCE CHECKLIST (CONTINUED FROM PAGE 15)

SEASON



VISUALLY INSPECT



MAINTENANCE RECOMMENDED


















PROFESSIONAL MAINTENANCE RECOMMENDED



* POWER WASHING IS NOT RECOMMENDED. SEE PAGE 22 FOR MORE INFORMATION.

** OVER TIME, LEAKS CAN ACCOUNT FOR 15-20% OF TOTAL INDOOR WATER USE.

ITEM	WHEN TO CHECK	HOMEOWNER ACTION
Water heater		<div> Keep clean of household items. Annual professional maintenance.</div> <div></div>
Drywall		<div></div> <div></div>
Insulation		<div></div> <div>Inspect blown insulation in attic.</div>
Wood floors		<div></div> <div>Clean and refinish when necessary.</div> <div></div>
Carpeting		<div></div> <div>Clean annually.</div> <div></div>
Furnace/air handler		<div> Keep clear of household items. Annual professional maintenance. Inspect/replace filter according to manufacturer's recommendations.</div> <div></div> <div></div>
Wood framing		<div> Yearly inspection.</div>

REQUIRED MAINTENANCE INSIDE YOUR HOME

Most of the maintenance inside your home deals with equipment. There are simple things that you can do as a homeowner to manage how often you need to call for professional service on your equipment. There are other maintenance procedures that you should almost certainly leave to the professionals. Let's start with the short list of items you should defer to the experts and close with items you can tackle.

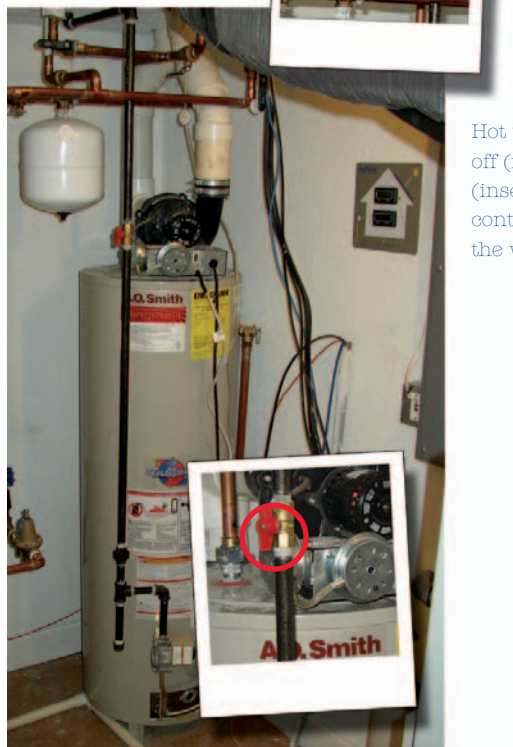
- **Service your HVAC system at least once a year.** A qualified technician will clean, adjust, lubricate, test the coolant charge, test the performance, and troubleshoot your air handler, compressor, heat exchangers and furnace. You will need to retain a company familiar with high performance systems that include mechanical ventilation and right-sized equipment and ducts. Refer to the list of numbers in this handbook, or contact North American Technician Excellence (NATE) for a certified HVAC professional in your area (<http://www.natex.org>).
- **Service your water heater at least once a year.** A qualified technician will check for pipe fitting leaks, test the pressure relief valve, drain water to reduce sediment buildup, and test the combustion efficiency (of gas water heaters). It is likely that the technician you use to service your HVAC system is also qualified to service your water heater.

That's it for the out-of-pocket maintenance assistance.

Now on to your list!



Air handler filter replacement



Hot water heater with main water shut-off (inset top) and gas shut-off to unit (inset bottom). Note the SunChoice™ control panel on the wall to the right of the water heater.

- **Replace filters on your HVAC system.**

There are two places that you may have filters: at your air handler and on one or more return grilles. You should replace these filters at least every month, or as your programmable thermostat indicates.

If you choose to use a one-inch pleated filter for higher efficiency, it should be replaced at least every three months. Or, if you choose to use an extended service pleated filter (four or five inches thick) it should be replaced at least every six months.

- **Replace backup batteries in smoke detectors and programmable thermostats.** Each of these devices operates off of house current during normal operation, but relies on batteries if and when your home loses power. Each should receive fresh batteries at least every year. When you change batteries, check to make sure that the devices are free of dust as this can interfere with proper operation. Incidentally, you probably have one or possibly two thermostats and a smoke detector in each room (except the bathroom since water vapor can inappropriately trip this detector).



Smoke detector

- **Test your home's smoke detectors.** Each device comes equipped with a test button. Test these each at least once a year.
- **Test all shut-off valves in your home.** Your home has three piping systems: one for water, one for gas and one for waste water. (There are no valves anywhere for your waste water system, just a clean-out. Leave its use to a qualified plumber.) It's important to:
 1. Know the locations of all shut-off valves. There will be a shut-off at every point-of-use for gas (behind a gas stove, for example), cold water (behind the toilet, for example) and hot water (under the kitchen sink, for example). Hot and cold shut-offs may be in



Central return filter grille

a central "home run" panel (typically in the laundry room or utility room); it functions like a circuit breaker panel for the water supply.

2. Work the valves to at least a partially closed position to "exercise" their function and ensure that they can indeed be shut off.
3. Check around each shut-off for leaks; this is particularly important for those that are hidden and out of the way (as most of them tend to be, such as under sinks, inside cabinets, etc).

The most important shut-offs are the main shut-offs for water and gas. Make sure that you and your family members know their locations, and how to use them in the event that the water or gas needs to be shut off for the entire house.

A WORD OF CAUTION

IF YOU SMELL GAS IN THE HOUSE, OR THINK YOU DO, HAVE EVERYONE LEAVE IMMEDIATELY AND MEET IN YOUR EMERGENCY ASSEMBLY PLACE TO BE SURE EVERYONE GOT OUT SAFELY. USE A NEIGHBOR'S PHONE TO CALL 911. EXPLAIN THE PROBLEM TO THE OPERATOR AND WAIT FOR A GAS COMPANY REPRESENTATIVE TO ARRIVE BEFORE RE-ENTERING YOUR HOME.

It's good practice to close the shut-offs for outdoor water spigots during seasons when they are not in use and if your house is unoccupied for an extended period of time (giving you, not just a passerby, control of outdoor water use).



Outside water spigot

- **Do not caulk around tub.** To allow the wall behind the bathroom tile to dry and to reduce the chance of mold do not caulk the space separating the bottom of the wall tile and the top of the tub.
- **Check your attic insulation.** It's good practice to periodically inspect attic insulation to make sure that it is still properly placed and to inspect its top surface for any evidence of water or insect/small animal activity. You can access the attic by way of an access hatch located in your master bedroom closet or



Attic access hatch in the master bedroom closet

hallway. Make sure that your attic hatch fits securely when you exit.

- **Clean the water filter screen on the kitchen faucet regularly.** The water filter will help to remove small mineral deposits that can come from your water pipes. To replace the filter, simply unscrew the aerator from the end of the faucet and remove the gasket. Remember to replace the the gasket before reassembling.



Hot and cold water shut-offs
under the kitchen sink



Clearly labeled plumbing
pipes entering the house



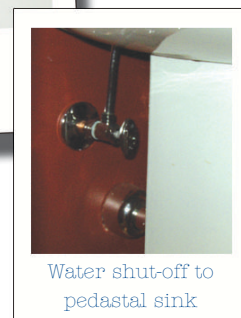
Hot and cold water shut-offs
under the bathroom sink



Gas shut-off behind dryer;
dryer exhaust vent at right



Water shut-off
to toilet



Water shut-off to
pedestal sink



water shut-off lever at
washer hose connection

OUTSIDE MAINTENANCE CHECKLIST

SEASON		VISUALLY INSPECT	MAINTENANCE RECOMMENDED	PROFESSIONAL MAINTENANCE RECOMMENDED
				
		<p>* POWER WASHING IS NOT RECOMMENDED. SEE PAGE 22 FOR MORE INFORMATION.</p> <p>** OVER TIME, LEAKS CAN ACCOUNT FOR 15-20% OF TOTAL INDOOR WATER USE.</p>		
ITEM	WHEN TO CHECK	HOMEOWNER ACTION		
Exposed concrete slabs		 	Inspect for cracking. Seal to prevent water penetration.	
Roof	 	 	Inspect for missing or deteriorated tiles/shingles.	
Windows	 	 	Inspect for broken seals in insulated windows. Clean exterior window frames and screens.*	
Exterior doors		 	Clean and refinish when necessary. Check weatherstripping and seals.	
Garage doors		 	Clean garage door and lubricate moving parts. Paint or seal as necessary.	
Central air conditioning (outside condensing unit)	 	  	Keep free of plants and debris. Annual professional maintenance.	
Gutters	 	 	Inspect for leaks or cracks. Keep clear of debris to prevent water damage to roof.* Professional cleaning or maintenance recommended.	

REQUIRED MAINTENANCE OUTSIDE YOUR HOME

Detroit Shoreway Community Development has designed and constructed your home's exterior to minimize the impact from the three primary destructive agents — water, sunlight, and insects. There are just a couple of key things that you can do to follow-up on Detroit Shoreway Community Development's lead. Let's start off by following water on its way down and around your home's exterior.

- **Visually inspect all elements of your roof.** This



Roof shingle detail

means the overall surface, all flashings around roof penetrations, drip edge details, and ridge caps. You are just taking a look to see if anything appears out of place, if there are any punctures or penetrations, or if

there is evidence of water getting past the roof cladding and flashings. It's best to do this inspection from a ladder (you pretty much should avoid walking on your roof if at all possible for both your sake and the roof's!). This inspection is particularly important after major weather events — high wind, hail, heavy snow, etc.

- **Maintain drainage around your foundation.** This means keeping water moving **away** from your home, once the above elements have moved it **off** your home.
 1. Keep the ground sloped gently away from your home, even as you add landscaping or other exterior ground-level features.
 2. Keep splashblocks directly under the turned-out end of downspouts, or, check to make sure that downspouts are properly connected to subsurface drainage pipes.
 3. After a heavy rain, check for pooling or ponding of water around your home. Some settling of the soil around your home is almost inevitable and simple regrading will keep the water moving away from your home's foundation.

4. Keep all irrigation or hand watering directed **away** from your home.

- **Keep your landscaping and your home separate.** Vegetation can interfere with drainage and drying of your home's exterior. Trim all existing plantings to eliminate direct contact between the vegetation and your home. Keep all new plantings at least 18 inches away from your home.
- **Landscape maintenance.** To reduce the possibility of pests in your home and injury to your family and visitors, keep the landscaping and grass around your home trimmed.

The time to be most diligent about maintaining your landscaping is at the very beginning, when vegetation is the most stressed from transplantation, and when it requires extra resources for establishing roots.

ANY TIME YOU DIG ON YOUR PROPERTY, YOU SHOULD MAKE SURE THAT THERE IS NO POSSIBILITY OF STRIKING BURIED PIPES, CONDUIT, ELECTRICAL LINES. MOST AREAS HAVE A DIGSAFE PROGRAM, MANY ARE MANDATORY, AND MOST GIVE RELATIVELY RAPID IDENTIFICATION SERVICE ([HTTP://WWW.DIGSAFE.COM/COMPANY_ONECALLDIRECTORY.HTM](http://www.digsafe.com/company_onecalldirectory.htm)). ONCE YOU HAVE IDENTIFIED SUCH OBSTACLES, MARK THEM ON YOUR FLOOR PLAN FOR FUTURE REFERENCE.

- **Inspect the weatherstripping on and operation of all doors and windows.** It's the weatherstripping that seals out water and air in doors and windows. While the weatherstripping is very durable, it's good practice to make sure that it is maintaining a good seal and does not require adjustment or replacement. And since operable windows are often the only direct egress in some rooms, it's good practice to check their proper operation, particularly the ones that are used the most infrequently.



Tilt-wash windows make cleaning and maintenance easier

While power-washing of homes has become popular, it is almost always a bad idea. It's particularly hard to avoid driving water in against the normal gravitational flow for which your exterior has been designed, and it can result in moisture being driven into wall assemblies, never a good thing. If there are parts of the outside of your home that require cleaning, do it the same way that you would resurface — start at the top, work your way down, and apply, rather than drive, soap and water.

In addition to (and often in combination with) water, it's the ultra-violet (UV) radiation, high temperatures, and wide temperature swings associated with direct sunlight that make the exterior of your home work hard. Here are a few things you can do to make its work a bit easier.

- **Inspect all stucco for cracks or chips.** Your stucco

has been formulated and applied to the proper substrate to resist the impacts of sunlight, but you still need to inspect this surface because of the entry path any chip or crack (larger than $\frac{1}{16}$ "") can provide for water. It's a lot easier to correct the surface flaw than to deal with subsurface damage if the surface flaw goes undetected.



Exterior stucco detail

- **Use quality paints, sealants, and caulks.** At some point for either aesthetic or general aging reasons, you will be resurfacing some exterior elements of your home.

1. Resurface using the same type of material. Detroit Shoreway Community Development selected the paint, or sealant, or caulk because of its properties: how it bonds with the material to which it was applied, its durability, and its environmental friendliness. In general, you should resurface previously painted materials with acrylic latex paint and reapply penetrating stains on wood with a "natural" finish.
2. Make sure that all surfaces are clean and dry before resurfacing. Nothing affects the bonding and hence the service life of surface materials more than dirt and moisture.
3. Use a quality primer with a quality topcoat. The primer you use is as important as the topcoat, in terms of durability and ultimately, appearance.

4. Use a quality latex caulk to fill gaps before you resurface. While you resurface exterior components for appearance, the surface treatment is the first line of defense against moisture and sunlight. Quality latex caulk maintains its bond and flexibility longer, and again, has the right performance properties to match substrates.

There is just one piece of equipment on the outside of your home that requires maintenance — your HVAC system's compressor.

- **Keep the compressor free and clear of all materials.** How efficiently your compressor exchanges heat depends in part on how easily air moves around it. Keep it free of any materials or objects that restrict air flow around it.
- **Cover the compressor during seasons when it is not in operation.** This completely depends on your climate, but you can extend the service life of your compressor by sheltering it from rain and snow when it is not in operation. Of course, **don't forget to remove the cover during the seasons it is in operation!**
- **Keep the outside air intake clear of debris.** The outside air intake supplies outside air to the return side of the air handler where it is mixed with inside air, heated or cooled and filtered before being supplied to the house. Keep the intake clear of obstructions and pollutants such as an outdoor barbeque grill or other exhaust fumes.



Outside condensing unit
or compressor