



# Guyana Energy Agency

---

Guidelines for an Energy Efficient Home

# Guidelines for an Energy Efficient Home

Guyana Energy Agency



## Save Energy, Save Money

Energy is fundamental to our existence and plays a critical role in our daily routines. The rising cost of fossil-based fuels and prevailing global environmental concerns compel us to think of ways to use energy more wisely.

The design and layout of your home, appliances, lifestyles and choices can greatly impact the amount of energy you consume.

*Guidelines for an Energy Efficient Home* explores the various opportunities for reducing your energy consumption in and around your home.

Consider these guidelines and tips to help you make more efficient choices that will save you energy and money.

# Guidelines for an Energy Efficient Home

Guyana Energy Agency

Guidelines for an Energy Efficient Home

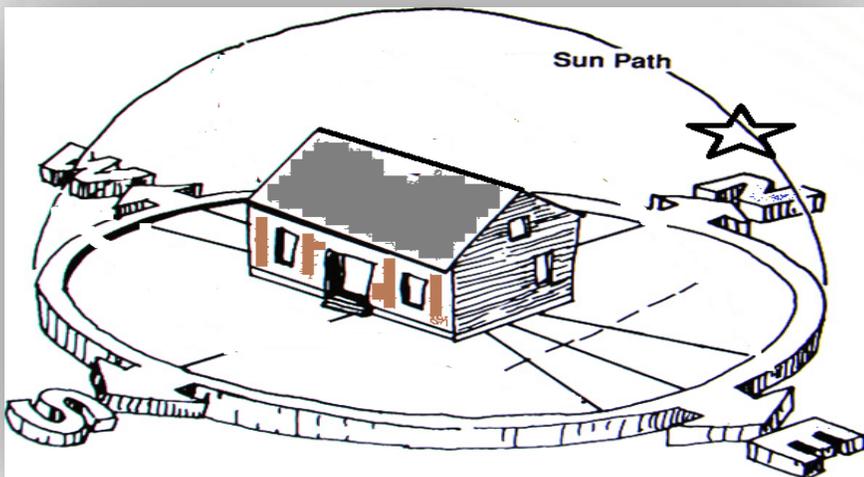
## A Truly Energy Efficient Home...

**...begins with the orientation and design of the house itself.**

**Energy efficiency is not just limited to the smart use of appliances, but extends to installation of windows, roofing and even landscaping.**



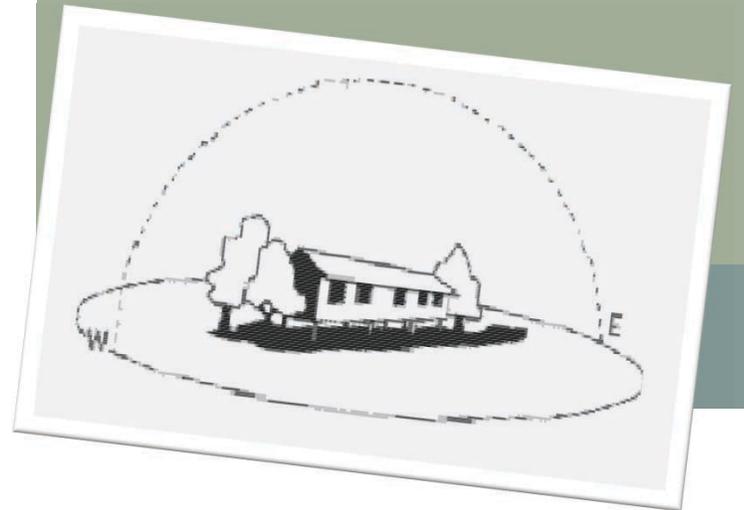
### Preferred orientation of a Home



**Buildings should be oriented in the east to west direction to minimize the effects of the sun and to maximize the wind draft.**

## Orientation

**Placement of rooms, doorways, windows and air vents should be carefully considered when planning the layout of your home.**



**Carefully consider your home's orientation when constructing to avoid the harsh effects of the sun.**

**Avoid placing windows on eastern and western walls to prevent the peak hours of sunlight from heating up the house.**

**Consider internal partitions and openings in opposite walls to encourage cross ventilation through rooms in your home.**

**Rooms should be oriented to maximize airflow by taking advantage of the North Easterly Trade winds.**



## ROOFING

**When painting or installing your roof remember that the colour of a roof can impact on thermal performance.**

- Light coloured roofs reduce temperatures by reflecting the sun's rays.
- Use roof overhangs to protect exterior from moisture and sun.
- Correctly size eaves to provide permanent shade to east and west windows and walls.
- The placement of Northern verandas allow for optimal airflow.

**Ensure verandas and patios are covered with proper roofing by following the above tips!**



**ROOF SPACE VENTILATION TAKES IN COOL AIR AND REMOVES HOT AIR THEREBY MAKING YOUR HOME COOLER.**

## Dutch Hip

The design of the Dutch Hip roof allows for optimal ventilation at the top of your home by the removal of hot air and provides shade to the exterior walls and windows (as seen in the picture).



## Vented Gable

As recommended earlier, buildings should be oriented in the east-west direction.

The Vented Gable roof is therefore the preferred option for this building orientation as the large overhang provides shade to the exterior walls.

## WINDOWS

Shelter windows with canopies, shutters, fixed overhangs or awnings, so that you can enjoy the cooling effects of rain and shade.



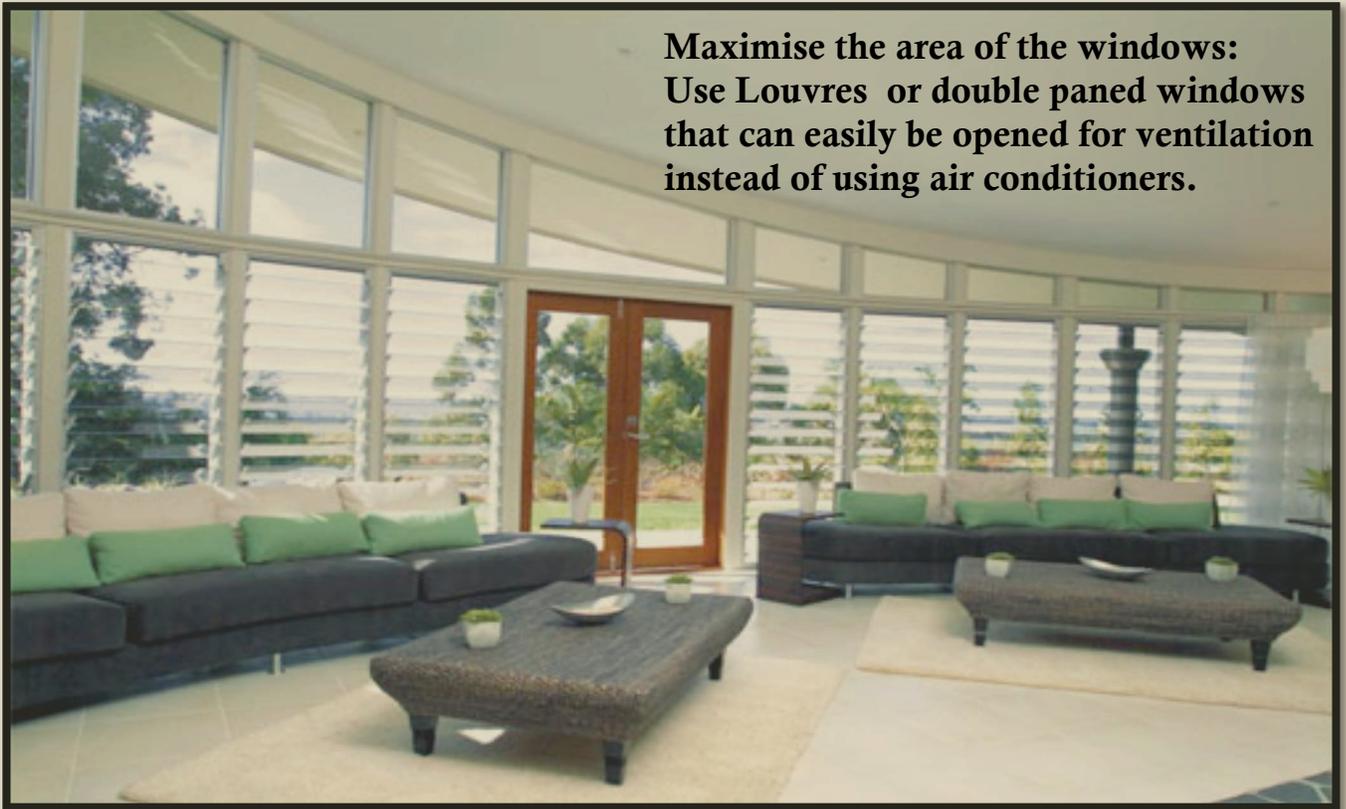
Consider the use of tinted windows or reflective film for added sun control and better privacy.

---

### BUILD WITH THE RIGHT MATERIALS

Construction materials such as concrete and brick absorb and hold large amounts of heat, which is then released when the air becomes cooler in the evenings.





**Maximise the area of the windows:  
Use Louvres or double paned windows  
that can easily be opened for ventilation  
instead of using air conditioners.**



**Curtains and  
Drapery can be  
used to reflect  
heat away from  
the home while  
regulating the  
amount of heat  
entering the  
home.**



## LANDSCAPING

**Plants and trees around your home's perimeter will enhance its landscape.**

Plant trees on the east and west sides of the house to shade the walls from sunlight exposure.

*Remember to ensure that solar PV systems and solar water heaters are not shaded by trees and plants!*



### *Need Light?*

Paint exterior with light colours to keep the building cooler. Light colours and pastel shades have better natural reflectivity than dark shades.

## EFFICIENT LIGHTING



Illuminate your home with energy efficient lighting for safe navigation and added security.

Lighting can account for a large percentage of your annual electricity bill.

Lighting technology has evolved tremendously over the past two decades and has resulted in the availability of a host of exciting, high-performing and **HIGHLY EFFICIENT** new lighting products.

CFLs are available in different sizes, shapes and colours so your choice of lighting can be both attractive and efficient.

Besides high costs, inefficient choices of lighting may **NEGATIVELY IMPACT** the comfort, convenience and security of your home.



## INDOOR LIGHTING

*The Guyana Energy Agency* suggests the following energy-efficient lighting design principles:

- Use **FOCUSED** lighting instead of **GENERAL** lighting.

**UNDERSTAND** your own preferences and those of your family members before investing in unnecessary lighting solutions.

- Install task lights where needed and reduce ambient light elsewhere.

If work is concentrated in one corner of the room, for instance at a desk, consider **DIMMING** the lights throughout the room and using specific task lights while at your desk.

- Make sure that you **MATCH** the amount and quality of light to the performed function.
- When you are performing tasks that require a high degree of visual attention, ensure that there is **ADEQUATE LIGHTING** to prevent eyestrain.
- Maximize the use of natural lighting. Sunny days may help improve your mood, and they reduce your electric bill when you open the curtains and **LET THE SUN SHINE IN!**

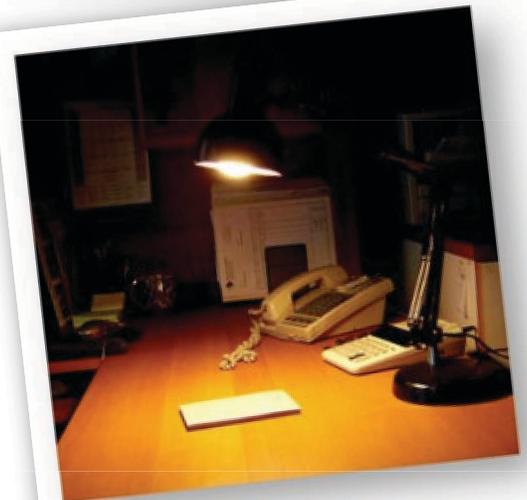




Figure 3.

Figure 4.

Figure 5.

### HERE ARE SOME BASIC METHODS FOR ACHIEVING ENERGY-EFFICIENT INDOOR LIGHTING:

**Use 4 feet Fluorescent Fixtures for areas that require extensive lighting.**

**For greater efficiency, use fixtures with reflective backing and electronic ballasts.**

**Replace incandescent lamps with Compact fluorescent lamps (CFLs). Ensure that you choose the correct type of CFLs for your lighting needs.**

**Use occupancy sensors for automatically turning on and off your lights as needed.**

**Consider Painting Your Walls A Lighter colour. This helps to minimize the need for artificial lighting.**



## FLUORESCENT LIGHTING



**New high efficiency T8 fluorescent lamp and electronic ballast systems can reduce total system wattage by over 45% relative to the use of older, less efficient T12 fluorescent lighting systems driven by magnetic ballasts.**

**High frequency electronic ballasts or solid-state ballasts provide significant energy savings over magnetic ballasts.**

**When changing from magnetic to electronic ballasts, the T12 fluorescent tubes (1.5 inches) must be replaced with the narrower T8 (1 inch) tube for optimal performance and light output.**

## OUTDOOR LIGHTING



- Security and utility lighting do not need to be bright to be effective.
- Make sure outdoor light fixtures have reflectors, deflectors, or covers to make more efficient use of the light source.
- Use photo sensors to automatically turn off lights during daylight hours.
- Use motion sensors to activate security or utility lighting where needed.
- As a security measure, use motion sensor lights in areas where you have walkways or where you wish to have greater security.
- Photocells are usually incorporated with outdoor lamp fixtures and can help to reduce electricity cost by installing light sensitive switches.

*Because outdoor lights are usually left on for longer periods of time, using CFLs will save energy.*



## SHOP, INSTALL, SAVE:

Consider this guide when choosing CFLs for different fixtures for use around your home.

THE BEST CFL ...	FOR THESE FIXTURES
<b>A-lamps</b> 	<b>Outdoor fixtures, ceiling and table lamps with exposed bulbs</b> 
<b>Globes</b> 	<b>Bathroom vanity bar, ceiling pendants and other open fixtures</b> 
<b>Candelabras</b> 	<b>Chandeliers and other decorative fixtures with exposed bulb</b> 
<b>Reflectors</b> 	<b>Recessed lighting, flood and track fixtures</b> 

## INVEST IN:

Light Socket Switches that carry switches, so that appliances and lights plugged into the outlets can be turned off with the flip of a switch.





## AIR CONDITIONING

### *Basic methods for selecting energy efficient air conditioning*

- ❖ Thermostats should be set between 23–25°C.
- ❖ Every 1°C lower can increase running costs by up to 5-8% or cost you for repairs as lower temperatures require the compressor to work more frequently.
- ❖ Avoid using ceiling fans because hot air will be redistributed. Rather, use floor fans to provide better airflow for added comfort and cooling.
- ❖ A properly sized air conditioning unit will remove humidity and heat effectively as it cools the room.
- ❖ Always keep units serviced and clean. Monthly cleaning of air filters will improve the performance and life span of the air conditioner and will save energy.

**Air conditioning does more than cool the air.**

**It truly "conditions" it by removing dust and dirt as the air is drawn through a filter.**

**Air conditioning also lowers the humidity, making the air more comfortable at any temperature.**

### **Did You Know:**

An oversized air conditioner is actually less effective and wastes energy at the same time. If the unit is too large, it will cool the room quickly, but only remove some of the humidity.

# HOW TO SIZE YOUR AIR CONDITIONING UNIT

## Window Size and Position

If, your room has no windows, you can ignore this part of the calculation. If, however there are windows you need to take the size and orientation into account.

South Window BTU = South Facing window Length (m) x Width (m) x 870

North Window BTU = North Facing windows Length (m) x Width (m) x 165

If there are no blinds on the windows multiply the result(s) by 1.5.

Add together all the BTUs for the windows.

Windows BTU = South Window(s) BTU + North Window(s) BTU

## Floor Area of Room

The amount of cooling required depends on the area of the room. To calculate the area in square metres:

Room Area BTU = Length (m) x Width (m)  
x 337

## Occupants

You will have to take that into account people who normally working in the space. The heat output is around 400 BTU per person.

Total Occupant BTU = Number of occupants x 400

## Equipment

Equipment in use generates heat. The wattage on equipment is the maximum power consumption rating; the actual power consumed may be less. However it is probably safer to overestimate the wattage than underestimate it.

Equipment BTU = Total wattage for all equipment x 3.5

## Lighting

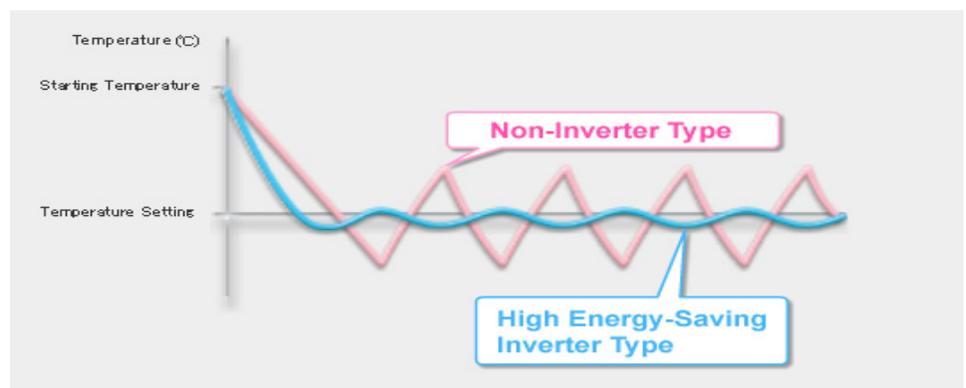
Take the total wattage of the lighting and multiply by 4.25.

Lighting BTU = Total wattage for all lighting  
x 4.25

**TOTAL COOLING REQUIRED = SUM OF ALL OF BTUS**

**Total Heat Load = Room Area BTU + Windows BTU + Total Occupant BTU + Equipment BTU + Lighting BTU**

# INVERTER TECHNOLOGY IN AIR CONDITIONING UNITS



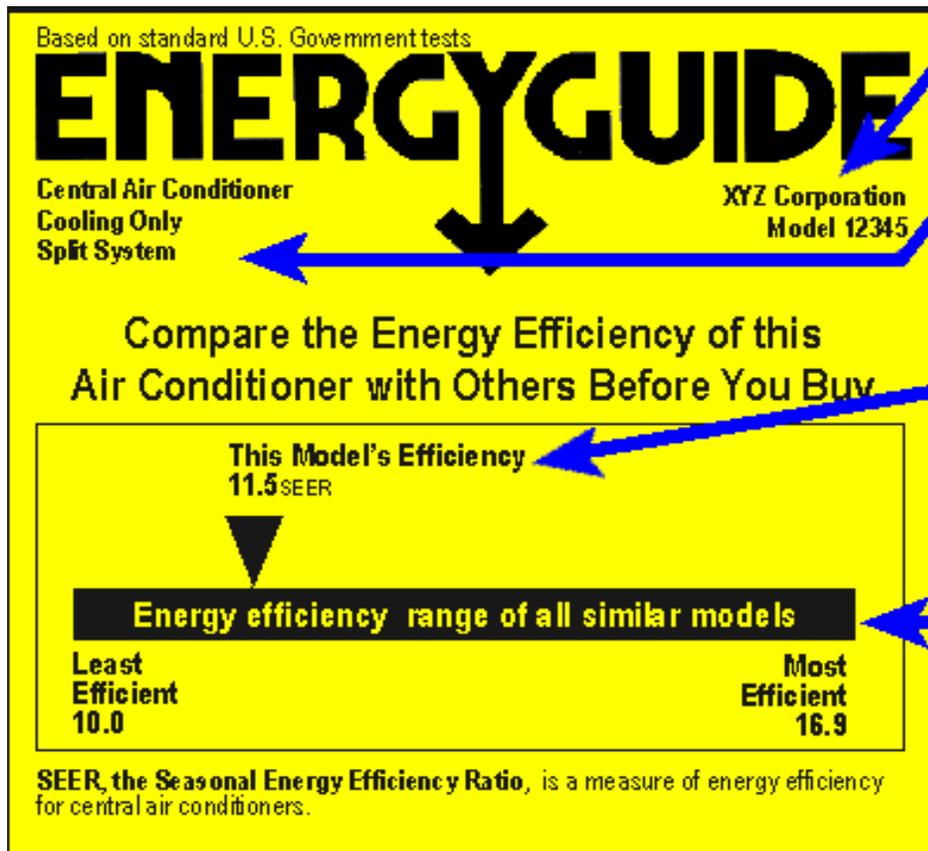
Air conditioners convert a large amount of thermal energy and therefore have high power consumption...

...at the same time, they must allow the user to keep power costs as low as possible.

Unlike ordinary Conventional air conditioners inverter air conditioners can vary the speed of compressors to control cooling. When indoor temperatures reach desired levels, inverter air conditioners can operate their compressors at low speeds and maintain desired temperatures.

1 Inverter systems vary the speed at which the compressor works within the system which can save up to 44% on energy costs!

2 The inverter systems ensure quieter and more efficient operations compared to on/off systems.



Manufacturer and model number.

Information about features, capacity and size helps you compare brands.

The energy efficiency rating for the product. The higher the number, the more energy-efficient the product, and the less it costs to run.

The range of ratings for similar models, from "less efficient" to "more efficient." This scale shows how a particular model measures up to the competition.

Energy Star certified energy efficient air conditioning units have a higher seasonal efficiency rating (also known as a SEER rating) than less efficient standard air conditioners. Their higher seasonal efficiency rating results in big savings over time due to less energy usage.

The easiest way to identify the most energy-efficient products is to look for the ENERGY STAR and ENERGY GUIDE labels.

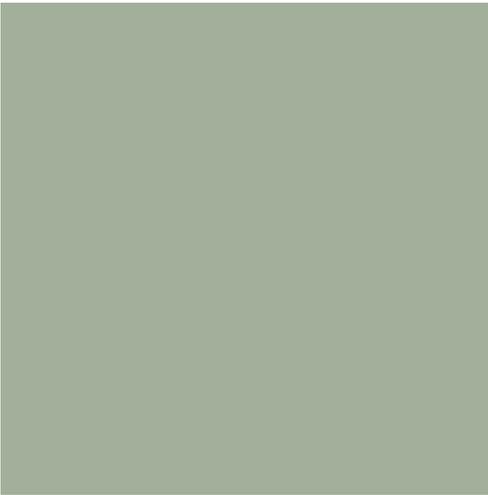


## EFFICIENT PLUMBING

### Patterns and Consumption

In most buildings, plumbing fixtures provide essential services to occupants . In all applications, water consumption depends on usage patterns and consumption per use.

Usage patterns are largely a matter of personal preference. For the most part, lowering your water use in plumbing fixtures means improving your fixture technology to lower the consumption per use. For flow-type fixtures this means lowering the gallons per minute (GPM), and for flush-type fixtures, lowering the gallons per flush (GPF). This is water efficiency, which means getting the same or better service for less water by using better technology.



- Repair leaky faucets immediately
- Use less Water
- Buy more efficient models of water heaters and faucets
- Consider using Solar Water Heaters

→ Consider using Aerator Faucets and showerheads for a smooth and continuous flow of water. The aerator adds air and spreads the water stream into many little droplets that volumizes water.

→ Electronic faucets: Electronic Faucets allow control via motion and are turned off when motion ceases. The sensor features for these faucets prevent the faucet from being left open and require less servicing over time.

→ Low flow toilets: Low flow toilets are yet another popular energy efficient plumbing product. Low flow toilets use different technologies like larger drainage passages, redesigned bowls and tanks, which flush out less water than conventional toilets.

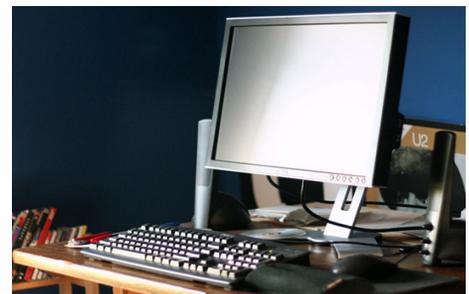
# Home APPLIANCES



major appliances... consumer electronics...  
home office products...miscellaneous tools and  
devices...

Consumer electronics and home office products continue to dominate our homes as we try to satisfy our entertainment and networking interests.

It is estimated that the average home has more than 20 consumer electronic products and many of these devices are left on 24 hours a day.



**Manufacturers are bringing more efficient models to the market all the time, so choose wisely.**

**Look for Energy Guide tags, which show a model's expected annual energy use and how they rank against other models.**

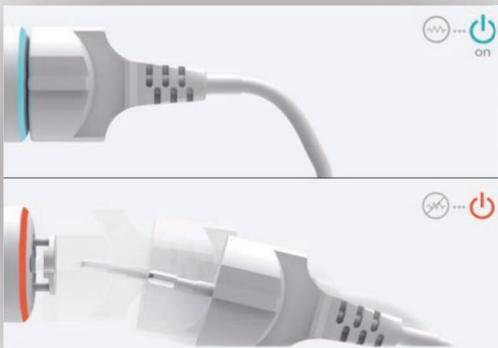
**Turn off equipment when not in use: televisions, printers, scanners and copiers included.**



**Avoid using a screensaver when your computer monitor is not active.**

**Set equipment automatically to sleep mode to keep equipment cooler and prolong their life.**

**Connecting appliances to a power strip can maximize savings and is good energy management.**



**Unplug all power adapters (phone chargers, laptop chargers, etc.) when not in use.**



## Save more energy in the Home:

### **Laundry:**

- Preferably air dry clothes. Guyana is perfect for this on its sunny days.
- Wash and dry full loads of laundry. Try to use appropriate water settings if you are washing less than a load to prevent wasting water.
- If you are using a dryer, ensure the lint tray is cleaned and periodically inspect the dryer vent to avoid any fire hazard and blockages.

### **Kitchen:**

- Use smaller appliances for cooking when necessary: microwaves, toaster ovens, small pans rather than the entire oven or stove to cook or warm food.
- Make sure refrigerator doors are sealed airtight when closing.
- Practice defrosting your refrigerator and freezer as built up frost decreases the energy efficiency of the unit.

**ENERGY STAR PRODUCTS** can be used to guide the purchase of appliances such as computers and refrigerators.

**Choose the most efficient, not the cheapest!**

# Renewable Energy

Renewable energy is sustainable, so it can provide for your present and future energy needs without doing great harm to the environment, human health and your pockets.



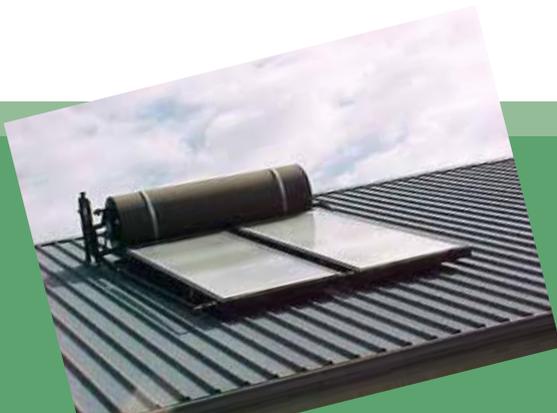
## Benefits

- **Energy Savings:** sunlight is free, so once you've paid for the initial installation your electricity costs will be reduced.
- **Maintenance:** After the installation of solar electricity, there is little to no maintenance that needs to be done to the panels. They are usually positioned on a rooftop, so they do not take up any parts of your yard or home.
- **No Greenhouse Gas Emissions**

## How does Solar Power Work?

Solar photovoltaics (PV), capture the sun's energy using photovoltaic cells. The cells convert the sunlight into electricity, which can be used to run household appliances and lighting.

Ensure future savings and financial independence from your utility company by investing today in solar PV systems.



Solar water heaters are popular as the water is passed through solar panels that face the sun. The water gets heated with the heat and light from the sun thereby enabling us to save energy otherwise consumed by electric heaters.



## Wind Turbines

With good, consistent wind flow, wind energy is an economical form of renewable energy available today.

Wind turbines can still be an excellent addition to a solar system.

With advancing technology, wind turbine designs have become more effective and more energy efficient.

Rain water tanks can be used to collect water which can be used in the house for washing and cleaning purposes.

Tanks can be mounted on trestles so that you can make use of gravity flow, thus reducing the need to use electric or fuel-driven pumps.



## Rain Water Harvesting

# Did you know...

1. Did you know that you can use dimmers, motion sensors, or occupancy sensors to automatically turn on or off lighting and prevent energy wastage?
2. When buying appliances, compare energy labels, not just prices, to make sure you buy an energy efficient unit.
3. Instead of brightly lighting an entire room, focus your lights where they are needed the most. Fewer lights mean you save energy and money.
4. Reduce energy used to pump water by turning off the tap when not in use. Save Water, Save Energy, Save Money.
5. Imagine wasting an entire 5 gallon bottle of water every day just by leaving the water running when you brush your teeth! Save Water, Save Energy, Save Money.
6. Decide what you want before opening the refrigerator door. Each time the refrigerator door is opened more energy is required to restore the temperature.
7. Replace incandescent light bulbs with compact fluorescent lamps or CFLs. CFLs use up to 75% less energy than incandescent bulbs. Same brightness, less energy, more savings.
8. Replacing a 60 Watt incandescent bulb with a 13 Watt compact fluorescent lamp can save up to nine thousand dollars per year for each bulb replaced.
9. Replacing outdoor lights such as mercury vapour lamps with compact fluorescent lamps can save up to thirty five thousand dollars per year for each bulb replaced.
10. Air conditioners set at low temperatures use more energy. Adjust air conditioner temperatures between 23°C and 25°C for a cool but not cold environment.
11. When selecting an air conditioning unit, keep in mind the size of your room. A properly-sized air conditioner will operate more efficiently and dehumidify more effectively.
12. Plant trees along the sides of your home most exposed to the sun but avoid shading your solar and wind systems. This form of shading is a simple inexpensive way to cool your home.
13. Did you know that activating power management on your computer helps you save energy?

## Guyana Energy Agency

295 Quamina Street  
South Cummingsburg  
Georgetown.