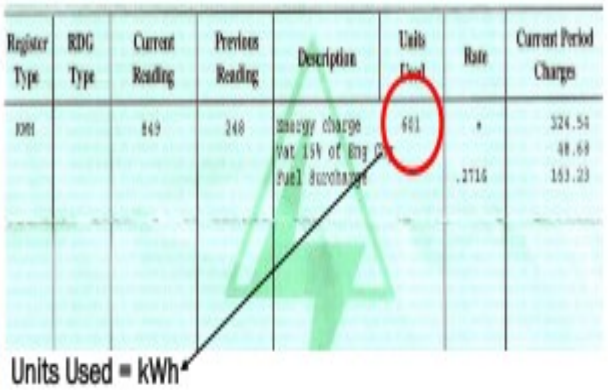

Register Type	RDG Type	Current Reading	Previous Reading	Description	Units Used	Rate	Current Period Charges
3001		849	248	Energy charge	601	*	324.54
				Vat 15% of Eng Ch			48.68
				Fuel Surcharge		.2716	163.23

Units Used = kWh

- Average monthly PV production per kw installed = 150 kWh
- Average units used monthly = 600 kWh

Calculations:

600 /150 = 4

A household consuming **600 units** will need a PV system of **4 kW** to meet its energy demand.

Investment

- Average Solar PV cost per Kw installed = EC $6,000
- Cost of 4 kW system = EC $ 24,000
- Assume monthly consumption during daylight hours = 250 kWh
- Monthly excess production = 350 kwh
- Yearly savings = ((350 x .45) + 250) x 12 = EC $4,890
- Payback = 24000 I 4890 = 4.9 years

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ENERGY UNIT

Solar Photovoltaic Energy

What is Solar Energy?

Solar energy is energy provided by the sun. This energy is in the form of solar radiation, which makes the production of solar electricity possible.

Sun's Energy Output

Just 1 second of the Sun's energy output would power the US for 9,000,000 years.

It is GREEN SUSTAINABLE ENERGY!

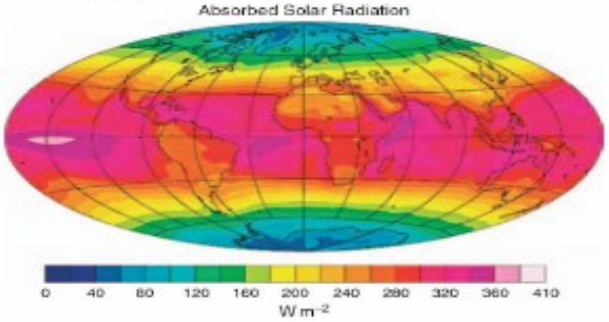
It is considered to be 'Green Energy' because:

1) The technology used to convert the sun's power into electricity does not produce smoke (carbon dioxide and other air pollutants).
2) Tapping the sun's energy does not usually destroy the environment.

Solar Radiation

The Sun's radiation is concentrated between the Tropic of Cancer and Tropic of Capricorn.

This makes the Caribbean ideal place to capitalize on the Sun's energy.

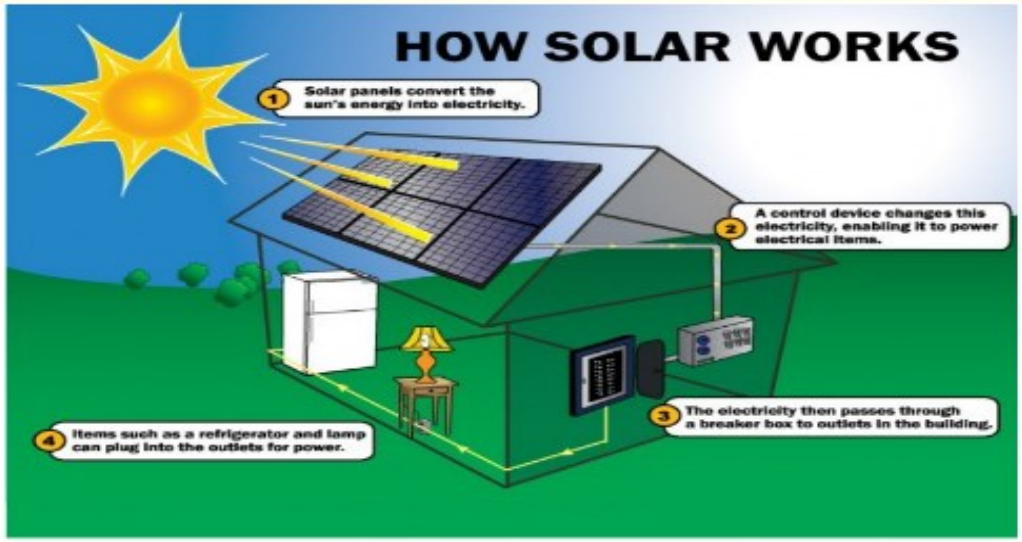


Pros

- Reduces electricity bills.
- Solar energy is not only sustainable, it is renewable.
- It is a clean source of energy.
- It can be used to generate electricity.
- Maintenance costs for solar systems are minimal.
- Solar energy can be used in remote areas where it is too expensive to extend the electricity power grid.

Cons

- Solar power is not available during the night.
- The power generated is also reduced during times of cloud cover .
- Solar panel energy output is only maximized when the panel is directly facing the sun.
- Solar cells only convert just over 20% of the suns rays to electricity.



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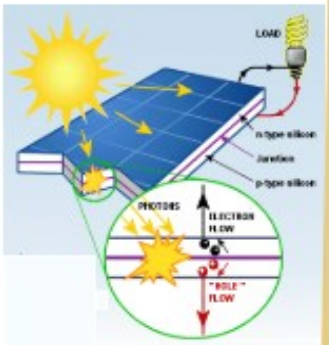
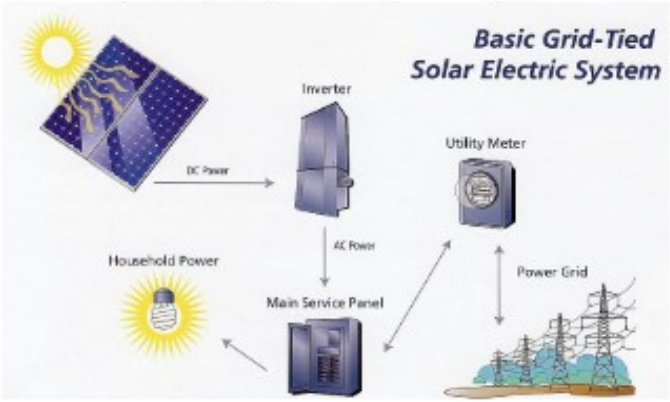


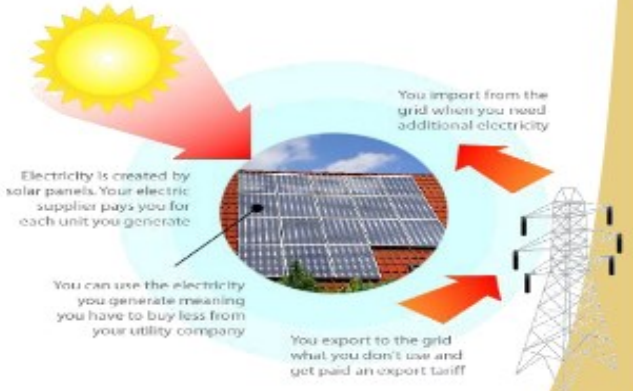
Grid Tied Systems allow you to utilize both the solar power and the utility's power at the same time. It also provides the opportunity to sell any excess power produced by the solar system



Feed-in tariff is a policy mechanism designed to accelerate investment in renewable energy technologies by providing a fee (a "*tariff*") for power provided to the utility.

VINLEC offers a feed-in tariff of $0.45 per kWh.

Net billing is a practice under which a customer is billed on the basis of net energy over the billing period, taking into consideration energy sold to the utility and that which is used from the utility.



Did you know that...

The Three Gorges Dam in China is the world's largest hydro-power plant, with a total generating capacity 22,500 MW

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HYDRO-ELECTRICITY

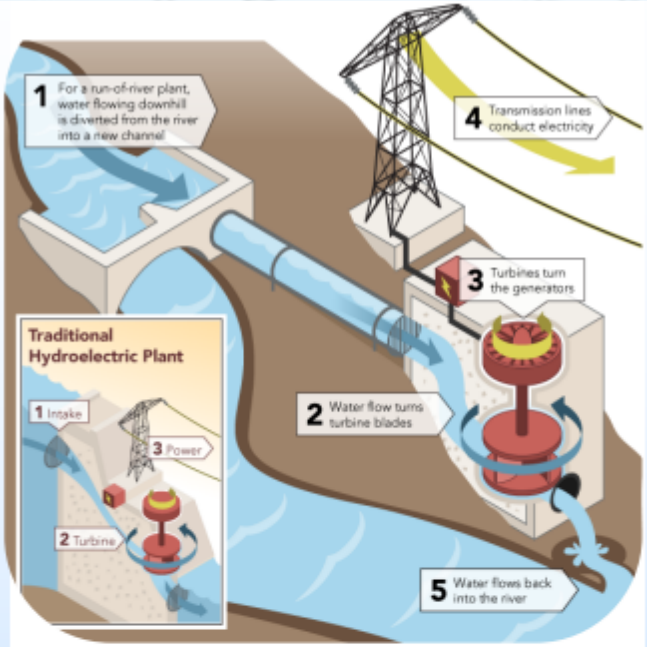
HYDRO POWER

Derived from the Greek word "hydro" which means 'water', hydro-power is the power generated by the force of falling water.

Hydroelectric energy has been in use for thousands of years. Ancient Romans built turbines, which were turned by flowing water. They were not used for electricity, but for grinding grains to make flour and breads.

Water mills provide another source of hydroelectric energy. Water mills, which were common until the Industrial Revolution, are large wheels usually located on the banks of moderately flowing rivers. Water mills generated energy that powered activities as grinding arrowroot and sugarcane.

Today in St. Vincent, hydro power is used to generate electricity. It is a **RENEWABLE** form of **ENERGY**.



To harness energy from flowing water, the river is dammed to create a reservoir. Water is channelled through tunnels in the dam. The energy of water flowing through the dam's tunnels causes turbines to turn. The turbines make generators move thereby producing electricity.

Did you know that...

- VINLEC currently generates approximately 15-20% of the country's energy demand using hydro-electricity.
- SVG has three operating hydro-plants located at South Rivers, Cumberland and Richmond.

Hydro-electricity...

- uses the energy of running water, without reducing it's quantity to produce electricity.
- can immediately respond to fluctuations in the demand for energy by controlling the intake system of the reservoir.
- will reduce SVG's contribution to Greenhouse Gas (GHG) emissions.
- will strengthen SVG's energy security.
- is clean, cheap and **GREEN** energy.
- is a **RENEWABLE** form of energy for today and tomorrow!

Solar PV Sizing Guide

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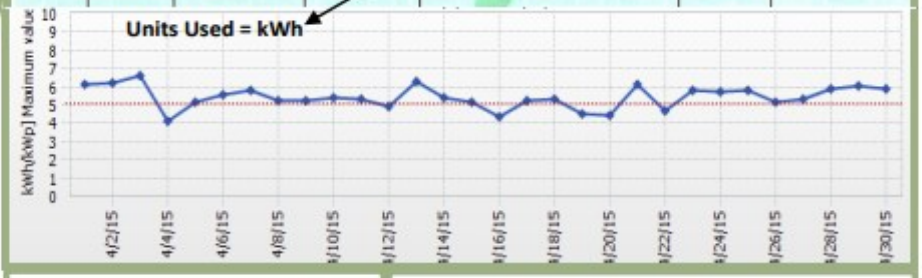

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Solar Energy

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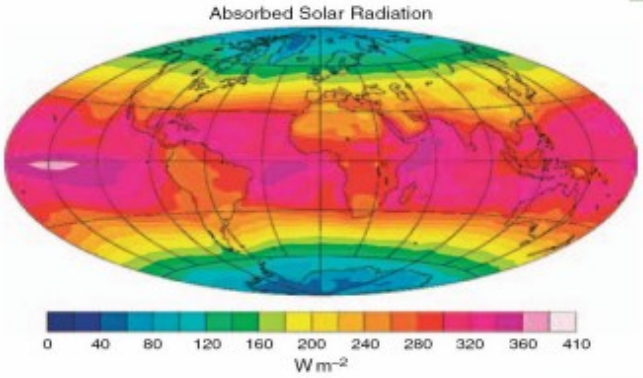

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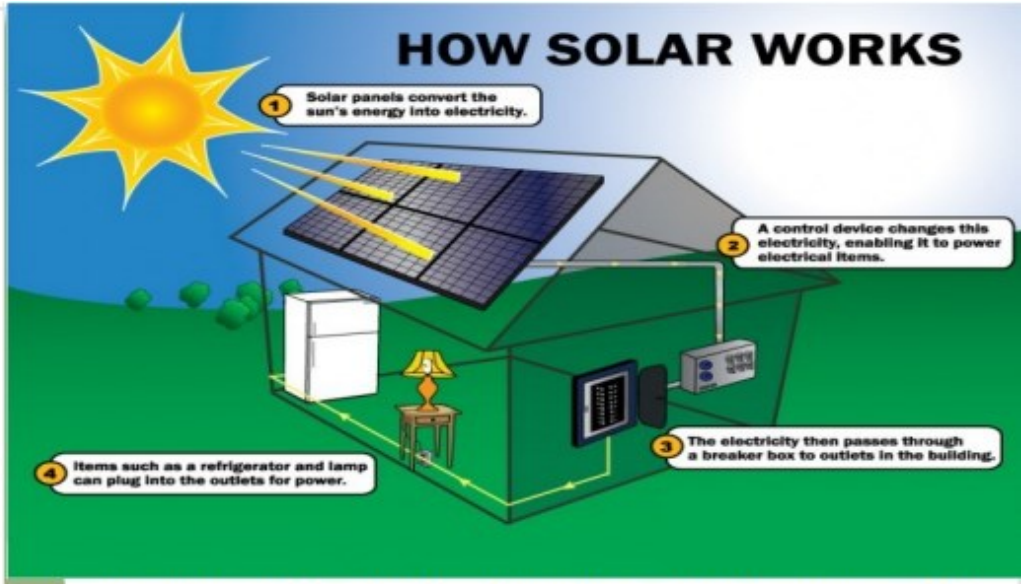

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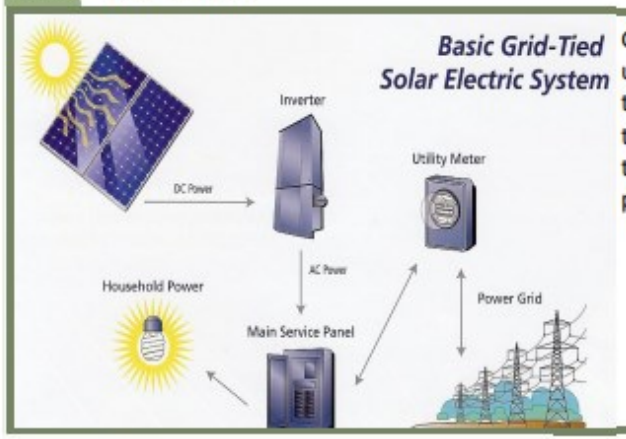

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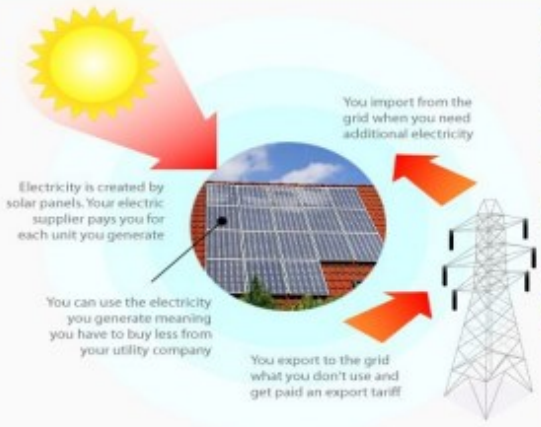

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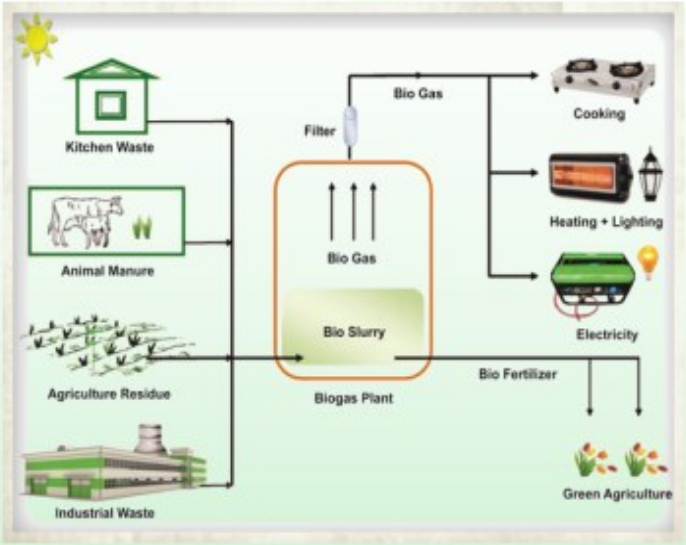
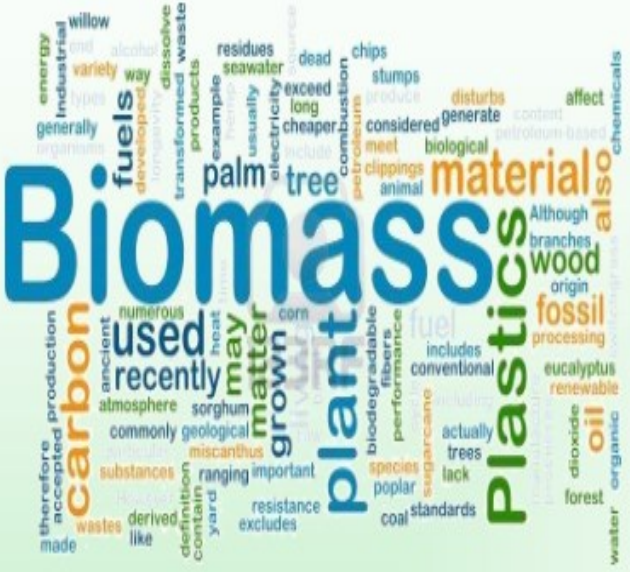
How can biomass be utilised?



BENEFITS OF BIOMASS

- It caan be produced as a RENEWABLE resource.
- It reduces need for fossil fuels for the production of heat, steam, and electricity.
- Biomass fuel from agriculture wastes maybe a secondary product that adds value to agricultural crops.
- The use of waste materials in the production of biogas reduces landfill disposal.
- Biomass is cheap and readily available source of energy. If the trees are replaced, biomass can be a long-term, sustainable energy source.



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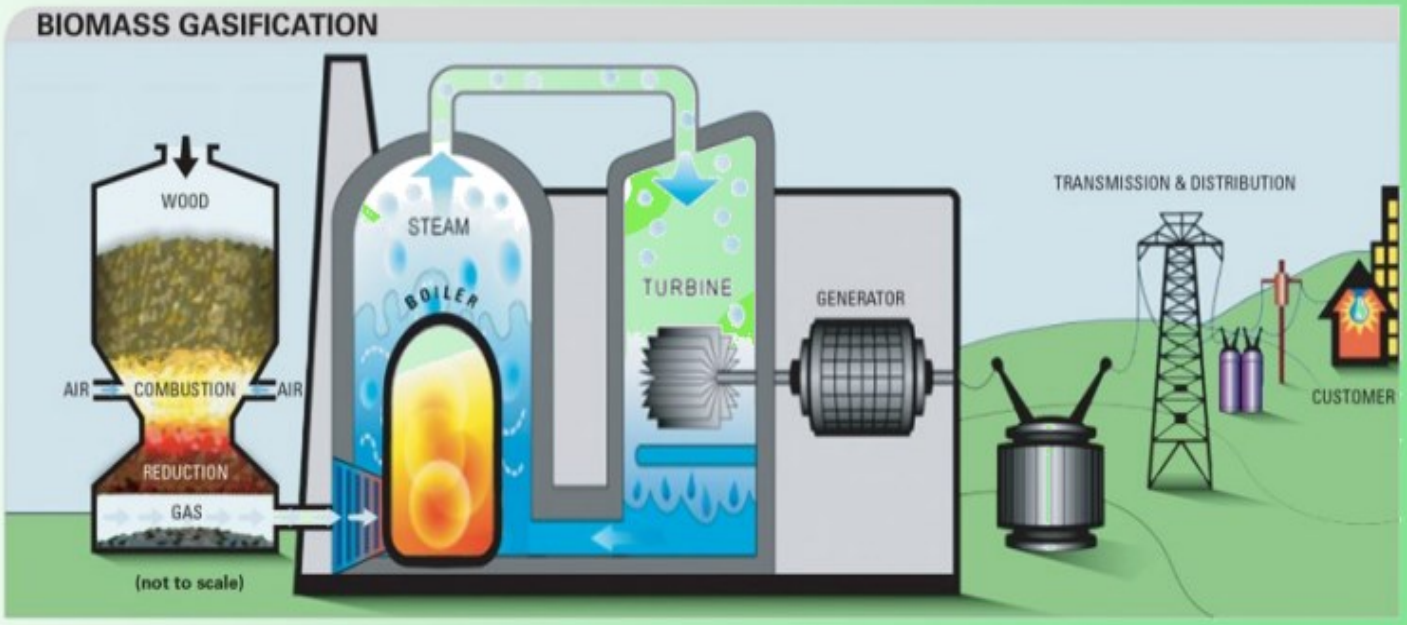
BIOMASS

What is Biomass?

Biomass is biological material derived from living, or recently living organisms. It can be a renewable and sustainable source of energy used to create electricity or other forms of power.

Biomass is a **renewable energy** source not only because the energy in it comes from the sun, but because biomass can be regenerated over a relatively short period of time.

Through the process of Photosynthesis, the chlorophyll in plants captures the sun's energy by converting carbon dioxide from the air and water from the ground into carbohydrates. When these carbohydrates are burned, they are converted back into carbon dioxide and water and release the energy they captured from the sun.



The biomass is collected and processed into a form that can be used at the power plant. It can even be turned into a gas, a process known as **gasification.**

The biomass is burnt. This heats water, which turns into steam. The energy from the steam turns the turbine. The turbine turns the generator and electricity is generated. The electricity is then transmitted to wherever it is needed.

Biogas

Biogas is a clean and renewable fuel (similar to LPG) that you can make yourself. The main part of a biogas system is a large tank, or digester. Inside this tank, bacteria convert organic waste into methane gas through the process of anaerobic digestion.

Each day, the operator of a biogas system feeds the digester with household by-products such as market waste, kitchen waste, and livestock manure.

The methane gas produced may be used for cooking, lighting, and other energy needs. Waste that has been fully digested exits the system in the form of organic fertilisers.

SWITCH TO

COMPACT FLUORESCENT LAMPS (CFLs)

AND

SAVE

Save

ENERGY

CFLs use up to 75% less electricity than traditional bulbs.

Save

MONEY

CFLs last up to 10 times longer than regular incandescent bulbs.

Save

THE ENVIRONMENT

In addition to lowering your electricity bill, CFLs will also reduce the amount of greenhouse gas emissions, which in turn will help to reduce global warming

CHANGE A LIGHT
CHANGE THE WORLD

MAKE YOUR NEXT LIGHT ENERGY EFFICIENT

When you conserve energy at hom you reduce green house gas emissions from power plants and help protect our environment from the risks of Global Climate Change

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Energy Efficient Lighting

ENERGY
CONSERVATION
TIPS

1 Look for ways to make use of daylight.

Take advantage of daylight (Natural Light) by using light-coloured, loose-weave curtains on your windows to allow daylight to penetrate the room while preserving privacy.

2 Turn off the lights when they are not in use.

For optimal performance of fluorescent lights, turn them off when not in use for more than 15 minutes.

3 Clean lamps regularly.

This will increase the brightness and can reduce the amount of light needed.

4 Use outdoor lights with a photocell unit.

Lights with a photocell unit or a timer will automatically turn on at night and off during the day.

5 Ensure lighting fixtures are not placed too high in the building.

Lowering them would increase the available light output and reduce the need for extra lamps.

6 Focus lights where they are needed the most.

Instead of brightly lighting an entire room; use general low lighting throughout rooms along with focused lights for reading, working etc.

COMPACT FLUORESCENT LAMPS

are PERFECT for

EXTERIOR LIGHTING

because of their long life

CFLs being used as exterior lights

Solar Panels being installed on a roof of a house

SOLAR POWER

is a renewable source of energy.

This renewable source is produced by trapping usable energy from the light of the Sun.

Explore options for the use of solar power and wind power for powering lights, equipment or other small loads.

7 Replace Incandescent lights with energy saving compact or standard fluorescent lamps.

INCANDESCENT LIGHT BULB

For a given light output, compact fluorescent lamps (CFLs) use between **one fifth** and **one quarter** of the power of an equivalent incandescent bulb and last longer.

ENERGY SAVING OR COMPACT FLUORESCENT LAMP

8 Use 4-foot Fluorescent fixtures for areas that require extensive lighting.

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

9 Use Dimmers & Sensors with interior lights

Use dimmers, motion sensors, or occupancy sensors to automatically turn on or off lighting as needed.

Light Output Equivalency Chart

Incandescent Light Bulbs	Compact Fluorescent Lamps (CFL)	Light Output
WATTS	WATTS	LUMENS
40	9-13	450
60	13-15	800
75	11-23	1100
100	23-30	1600
150	30-52	2600

The above chart clearly shows that CFLs achieve the same Light Output (lumen)while using less power (watts) than incandescent light bulbs.

Types of Light Bulbs

INCANDESCENT BULBS

This is the most common type of bulbs found in homes. They are the cheapest to buy BUT VERY INEFFICIENT.

FLUORESCENT LAMPS

Compared to incandescent bulbs, fluorescent lamps use less power for the same amount of light output and generally last longer. They come in 2, 4, 8 feet lengths. Fluorescent lamps are ideal for lighting large areas

COMPACT FLUORESCENT LAMPS (CFL)

CFLs are More ENERGY EFFICIENT than incandescent bulbs. They work like fluorescent lamps, but in a much smaller package and can easily replace incandescent bulbs.

COOL ENERGY SAVING TIPS FOR

REFRIGERATORS & FREEZERS

- **Do not unplug the unit in an attempt to save energy.**
  This does not save energy. It will actually consume more energy since the compressor must work harder each time it is plugged in.
- **Cover liquids & wrap foods stored in the refrigerator.**
  Uncovered foods release moisture and make the compressor work harder.
- **Position refrigerators & freezers in the coolest possible environment away from stove, window(sun)etc.**
- **Reduce the frequency of opening the unit**
  Each time the door is opened more energy is required to restore the temperature.
- **Regularly defrost manual defrost units**
  Frost buildup decreases the energy efficiency of the unit. Don't allow frost to build up more than one-quarter of an inch.
- **Ensure that the door is closed properly**
  Close the door so that there is no space between the rubber & the door to allow air flow. Improperly sealed doors would result in the accumulation of frost and the loss of energy. The loss of cool air and inflow of warm air would result in the compressor working excessively & result in the consumption of more energy.

Allow warm food to cool to room temperature before putting into the refrigerator or freezer.

MAKE YOUR NEXT APPLIANCE AN ENERGY STAR

CHANGE FOR THE BETTER WITH ENERGY STAR

When you conserve energy at home you reduce green house gas emissions from power plants and help protect our environment from the risks of Global Climate Change

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Appliances

ENERGY CONSERVATION TIPS

1 Unplug all appliances after switching them off.

Switch off & unplug radios, television sets, VCRs, DVD players, microwave ovens, kitchen appliances, computers, printers, fans, phone chargers and any other appliance when they are not in use.

Even when appliances are in the "off" mode they consume standby power. The only way to ensure zero power consumption is to completely unplug the device, or use a switched outlet to cut supply to the appliance.

2 Make sure appliances are properly maintained.

Appliances such as refrigerators, microwave ovens, blenders, stoves, etc should be properly maintained. Do not use defective appliances, they can cause injury and may consume **more** energy.

3 Know the Wattage of your appliances.

The amount of electrical power required for any electrical appliance or equipment is measured in WATTS. The higher the wattage, the more electricity it uses.

4 Ensure your building wiring is checked by a certified electrician.

This is to verify that the wiring in the building is safe. A general rule of thumb is to rewire the entire building after 15 years.

5 Plan building wiring.

Proper planning of building wiring can utilize sockets that carry switches so appliances plugged into the outlets can be disconnected with the flip of the switch.

SHUTDOWN AND UNPLUG

Computers when not in use.

SCREENSAVERS DO NOT SAVE ENERGY!

Explore the use of renewable energy options where appropriate.

Heat-Producing appliances are heavy energy users. The more heat generated, the more energy is used.

It is better to use an alternative source of heat such as solar for hot water.

Unplug chargers after use

Many chargers draw power continuously, even when the device is not plugged into the charger.

6 Surge Protector.

Use of an appropriate surge protector (power strip) can cut all power to the appliances plugged into the surge protector by switching off the power strip. Note that some surge protectors still consume energy even when switched off. Better surge protectors carry switches on each outlet.

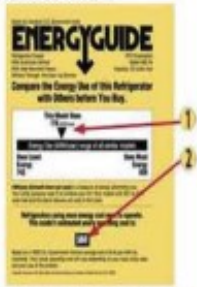
7 Reduce the frequency of ironing clothes.

Instead of ironing one outfit each day, iron all outfits for the week at one time. Each time the iron is plugged in energy is used to warm the elements. The more frequently the iron is plugged in, the more energy is used. Iron clothes that need less heat first then work up to drills and denims.

The faster a motor is working the more energy is used

8 Select appliances based on their Energy efficiency rating

Some popular ratings include the ENERGY STAR® and EnergyGuide labels.



These appliances may be slightly more expensive but will save more due to their lower energy consumption.

The EnergyGuide label gives the estimated energy consumption when comparing different brands and models.

BE A

SMART COOK

tips for conserving in the kitchen

- **Keep burners clean** they will reflect the heat better and save energy.
- **Cover pots and pans** This will consume less energy.
- When reheating foods, do not overheat. Overcooking destroys food value and wastes energy.
- When using gas (LPG) stoves, look for blue flames; yellow flames indicate the gas is burning inefficiently. This would suggest that the burners require servicing.
- **Use pressure cookers & microwave ovens** They can save energy by significantly reducing cooking time.
- Glass & Ceramic baking dishes transfer heat more efficiently.
- Soak dried peas before cooking. The absorption of moisture reduces the amount of cooking time and therefore saves energy.
- **Use the appropriate burner for the size of the pot.** A small pot on large fire wastes energy. The pot should cover the fire.
- Turn off the fire a few minutes before the food is done. The residual heat will complete the cooking.

Ensure your vehicle is properly maintained or serviced

Try the following to ensure efficient operation and optimum mileage:

Keep the vehicle engine tuned

Keep vehicle wheels properly balanced and aligned

Clean Spark Plugs regularly

A fouled plug could reduce gasoline mileage by as much as 15%.

Make sure the vehicle ignition is properly adjusted

Keep all air filters clean

Ensure the petrol tank cap is properly fitted.

A worn or ill-fitted cap will cause fuel to splash out or evaporate.

Ensure that the oil levels are correct

This includes engine, gearbox and rear axle oil

MAKE THE EXTRA EFFORT TO MAXIMIZE FUEL EFFICIENCY

Keep your vehicle in
Top operating condition
you will
SAVE
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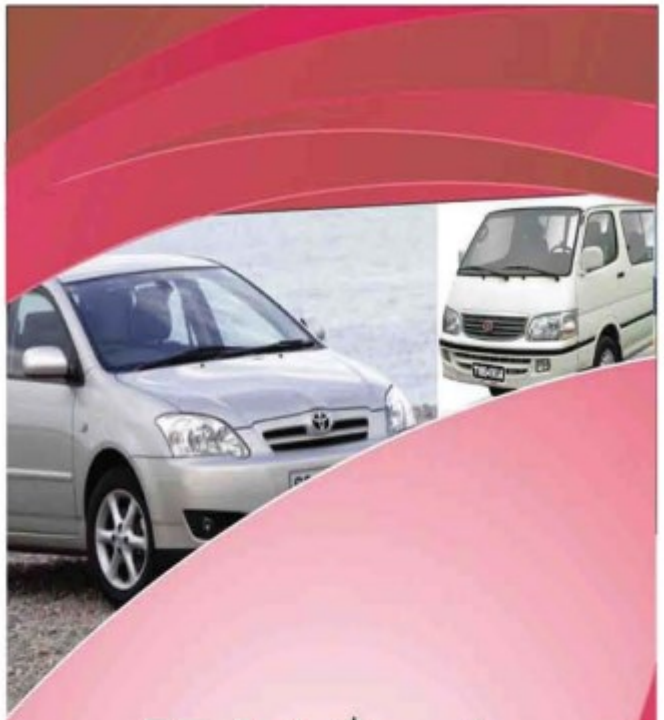

BE Auto$mart

ENERGY CONSERVATION TIPS

ENERGY SAVERS

TIPS FOR BETTER GAS MILEAGE

1 Use a bicycle or walk to reduce energy cost when appropriate.

Cycling or walking is best during heavy traffic and helps you stay fit & healthy.

2 Combine errands into one trip.

Several short trips, each one taken from a cold start, can use twice as much fuel as one trip covering the same distance when the engine is warm. Plan activities to reduce the number of trips.

3 Ensure tyres are properly inflated & aligned to improve mileage.

4 Take out unnecessary weight.

The more weight carried by the car, the more fuel it uses. Avoid external gadgets and ornaments.

5 Warm up the vehicle by driving it.

Avoid revving the engine unnecessarily. This wastes fuel.

6 Try to maintain a constant rate especially when driving long distances.

Excessive acceleration and braking waste fuel.

7 Avoid speeds above 30 mph (48 kmph) gas mileage drops rapidly.

Public transportation vehicles such as mini-buses and taxis can attain greater fuel economies by operating within prescribed speed limits. Speeding, rapid acceleration, hard and constant braking waste gas. Never exceed the legal speed limit. Whilst they are primarily set for traveling safety, better gas efficiency is achieved.

Consider buying a smaller more fuel-efficient vehicle.

It will consume less fuel and help the environment.

Use Air Conditioners only when necessary.

A car air conditioner is an added burden on your car engine. Air conditioners set at lower temperatures consume more energy.

A comfortable temperature can be about 24 to 25 degrees celcius.
Open the windows on hot days to cool the car BEFORE turning on the air conditioner.

Do not force your car to speed on lower gear.

Drive at the highest appropriate gear.

Avoid traffic jam routes.

Stop and go traffic takes a toll on your gas. If a traffic jam route is inevitable, make an effort to leave home early before the jam starts.

Use overdrive gears & cruise control when appropriate.

They improve the fuel economy of your car when you're driving on a highway.

9 Anticipate traffic stops and slow down well ahead.

Braking hard wears brakes and wastes fuel.

10 Close windows at higher speeds.

Open windows increase wind resistance and force the engine to work harder

11 Do not tailgate.

This increases the need for braking & can be dangerous.

12 Avoid unnecessary idling.

Turn off engine if you anticipate a wait for more than 2 minutes.

13 Use Windshield shade.

when parking outdoors, they can significantly reduce the heat in your car.

Park in the shade to keep your car cool and minimize fuel evaporation.

14 Do not overfill gas tank.

On hot days fuel expansion can cause an overflow.

15 Avoid diagonal parking & reversing.

Reversing requires more gas than forward movement.

COOL ENERGY SAVING TIPS FOR

AIR CONDITIONERS

Minimize the opening and closing of doors in air-conditioned rooms.

Avoid setting the temperature too low.

The objective of AC Unit is to cool the room to a comfortable temperature. Lower temperatures require the compressor to work more frequently. The higher the temperature of the thermostat the less energy will be used. Recommended temperature range for air-conditioner units in Guyana is 25 to 26 degrees Celsius.

Instead of setting the temperature lower and the fan speed higher, focus the vents where needed. You will save a significant amount of energy.

Use an additional fan to help circulate air

Always keep Units serviced and clean

Monthly cleaning of the air filters will improve the performance and life span of the air-conditioner and will save energy.

Ensure the air-conditioned room is properly insulated.

Inspect air-conditioned rooms to ensure they are properly insulated. Replacement of louvre windows, use of door sweeps and other insulation techniques result in better functioning units and reduce energy consumption.

Know your Energy Costs

Electrical energy is measured by the kilowatt hour (kWh).

For residential consumers, 1 kWh of energy in 2011 cost an average of EC $ 0.90

A bulb rated at 100Watts consumes 100Watts for each hour of operation.

If a 100W bulb is on for 5 hours, the amount of energy consumed is 100Watt x 5 hours = 500 Watt hours.

If the same bulb is in operation for 5 hours per day in a 31 day month, the energy consumed in that month would be:

100W x 5 (hours per day) x 31 (days per month)
= 15,500 Watt hours per month
= 15.5 kilo Watt hours per month
= 15.5 kWh/month

The cost of operating the bulb per month at residential rates would be:
15.5 (kWh/month) x $ 0.90 (per kWh)
= $ 13.95 per month

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Building Design

ENERGY CONSERVATION TIPS

BUILDING DESIGN TIPS

A new home provides the best opportunity for energy efficient design.
It's the ideal time to take advantage of the sun's rays and natural cooling.

1 Reflect Heat away from the home
by installing white window shades, drapes or blinds.

2 Make maximum use of fresh air instead of air conditioning.

3 Grow trees and vines
around the home or office when appropriate since they provide shading and cooling.

4 Install windows with double glazing
and spectrally selective coating to reduce heat build-up.

5 Paint exterior with light colours to keep the building cooler
Light colours and pastel shades have good natural solar reflectivity than darker shades.

6 Decorate with light colours.

Look for ways to make use of daylight.

Use loose-weave curtains on your windows to allow daylight to penetrate the room while preserving privacy.

Placement of rooms, doorways, windows and air vents should be considered when planning the layout of your home.
Rooms should be oriented to maximize natural lighting and airflow taking advantage of the North Easterly winds.

Explore the use of renewable energy options where appropriate.

Solar power and wind power can power lights or equipment.

Solar Panels installed on the roof of a house.

7 Use roof overhangs to protect exterior from moisture & sun.

8 Ensure lighting fixtures are not placed too high in the building.
Lowering them would increase the available light output and reduce the need for extra lamps.

9 The colour of a roof can impact on thermal performance.
Light-coloured roofs can help reduce temperatures by reflecting the sun's rays.

10 Install ceiling fans to help circulate air in rooms.

11 Install occupancy or motion sensors
on lights in rooms that aren't used often.

12 Windows such as louvres & casements help to redirect breeze into the home.

13 Build with the right materials.
Construction materials such as concrete and brick can absorb and hold large amounts of heat.
This heat is then released when the air becomes cooler.

14 Install light sockets that carry switches,
so appliances plugged into the outlets can be turned off with the flip of a switch.

SWITCH TO

COMPACT FLUORESCENT LAMPS (CFLs)

AND

SAVE

Save

ENERGY

CFLs use up to 75% less electricity than traditional bulbs.

Save

MONEY

CFLs last up to 10 times longer than regular incandescent bulbs.

Save

THE ENVIRONMENT

In addition to lowering your electricity bill, CFLs will also reduce the amount of greenhouse gas emissions, which in turn will help to reduce global warming

CHANGE A LIGHT CHANGE THE WORLD

MAKE YOUR NEXT LIGHT ENERGY EFFICIENT

When you
conserve energy at home
you reduce
green house gas emissions
from power plants and help
protect our environment
from the risks of
Global Climate Change

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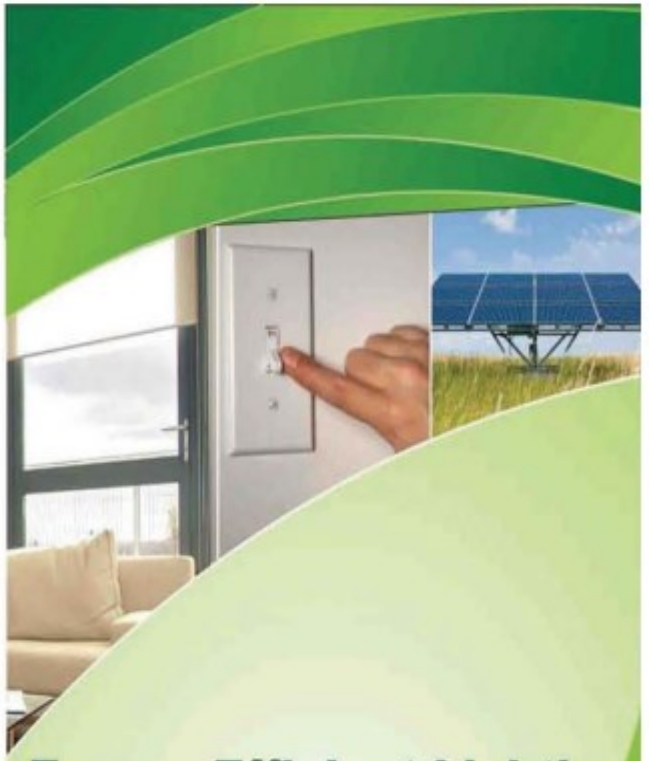


Energy Efficient Lighting

ENERGY CONSERVATION TIPS

1 Look for ways to make use of daylight.

Take advantage of daylight (Natural Light) by using light-coloured, loose-weave curtains on your windows to allow daylight to penetrate the room while preserving privacy.

2 Turn off the lights when they are not in use.

For optimal performance of fluorescent lights, turn them off when not in use for more than 15 minutes.

3 Clean lamps regularly.

This will increase the brightness and can reduce the amount of light needed.

4 Use outdoor lights with a photocell unit.

Lights with a photocell unit or a timer will automatically turn on at night and off during the day.

5 Ensure lighting fixtures are not placed too high in the building.

Lowering them would increase the available light output and reduce the need for extra lamps.

6 Focus lights where they are needed the most.

Instead of brightly lighting an entire room; use general low lighting throughout rooms along with focused lights for reading, working etc.

COMPACT FLUORESCENT LAMPS

are PERFECT for

EXTERIOR LIGHTING

because of their long life

CFLs being used as exterior lights

Solar Panels being installed on a roof of a house

SOLAR POWER

is a renewable source of energy.

This renewable source is produced by trapping usable energy from the light of the Sun.

Explore options for the use of solar power and wind power for powering lights, equipment or other small loads.

7 Replace Incandescent lights with energy saving compact or standard fluorescent lamps.

INCANDESCENT LIGHT BULB

For a given light output, compact fluorescent lamps (CFLs) use between **one fifth** and **one quarter** of the power of an equivalent incandescent bulb and last longer.

ENERGY SAVING OR COMPACT FLUORESCENT LAMP

8 Use 4-foot Fluorescent fixtures for areas that require extensive lighting.

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

9 Use Dimmers & Sensors with interior lights

Use dimmers, motion sensors, or occupancy sensors to automatically turn on or off lighting as needed.

Light Output Equivalency Chart

Incandescent Light Bulbs	Compact Fluorescent Lamps (CFL)	Light Output
WATTS	WATTS	LUMENS
40	9-13	450
60	13-15	800
75	11-23	1100
100	23-30	1600
150	30-52	2600

The above chart clearly shows that CFLs achieve the same Light Output (lumen)while using less power (watts) than incandescent light bulbs.

Types of Light Bulbs

INCANDESCENT BULBS

This is the most common type of bulbs found in homes. They are the cheapest to buy BUT VERY INEFFICIENT.

FLUORESCENT LAMPS

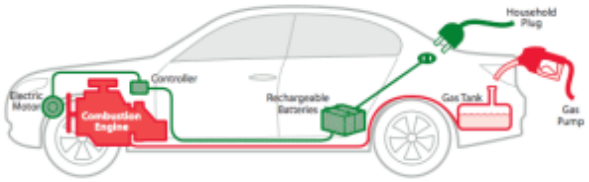
Compared to incandescent bulbs, fluorescent lamps use less power for the same amount of light output and generally last longer. They come in 2, 4, 8 feet lengths. Fluorescent lamps are ideal for lighting large areas

COMPACT FLUORESCENT LAMPS (CFL)

CFLs are More ENERGY EFFICIENT than incandescent bulbs. They work like fluorescent lamps, but in a much smaller package and can easily replace incandescent bulbs.

Electric vs. Gasoline

Electric	Gasoline
No Tailpipe Emissions	Greenhouse Gases/Pollution
Utility Company	OPEC
100+/- Mile Range	300+ Mile Range
Hours to Recharge	Minutes to Refuel



Benefits and Considerations of Electricity as a Vehicle Fuel

Energy Security Using hybrid and plug-in electric vehicles instead of conventional vehicles can help reduce reliance on imported petroleum and increase energy security.

Fuel Economy HEVs typically achieve better fuel economy and have lower fuel costs than similar conventional vehicles. For example, the 2012 Honda Civic Hybrid has an EPA combined city-and-highway fuel economy estimate of 44 miles per gallon, while the estimate for the conventional 2012 Civic (four cylinder, automatic) is 32 miles per gallon.

Costs Although fuel costs for hybrid and plug-in electric vehicles are generally lower than for similar conventional vehicles, purchase prices can be significantly higher. However, prices are likely to decrease as production volumes increase. Initial costs can be offset by fuel cost savings.

Emissions Hybrid and plug-in electric vehicles can have significant emissions benefits over conventional vehicles. HEV emissions benefits vary by vehicle model and type of hybrid power system. EVs produce zero tailpipe emissions, and PHEVs produce no tailpipe emissions when in all-electric mode.

Batteries Like the engines in conventional vehicles, the advanced batteries in plug-in electric vehicles are designed for extended life but will wear out eventually. Several manufacturers of plug-in vehicles are offering 8-year/100,000 mile battery warranties.

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ENERGY UNIT
ST.VINCENT & THE GRENADINES

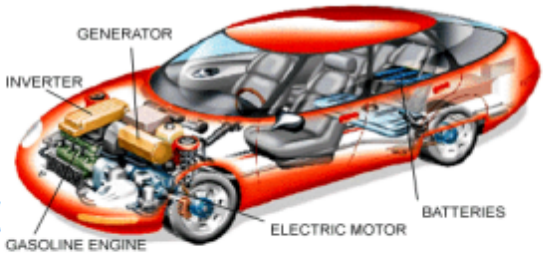
HYBRID ELECTRIC AND ELECTRIC VEHICLES

What is a Hybrid Electric Vehicle?

A hybrid electric vehicle (HEV) is a type of vehicle that combines a conventional internal combustion engine (ICE) propulsion system with an electric propulsion system.

How does it work?

Conventional vehicles use gasoline or diesel to power an internal combustion engine. Hybrids *also* use an internal combustion engine along with an electric motor and battery, and can be partially or wholly powered by electricity.



Regenerative braking - the electric motor that drives the hybrid can also slow the car. In this mode, the electric motor acts as a generator and charges the batteries while the car is slowing down.

Periodic engine shut off (Idle-Off) - when a hybrid car is stopped in traffic, the engine is temporarily shut off. It restarts automatically when the brake is released.

Full EV mode - the hybrid will use electricity when in traffic or travelling at low speeds, and will only engage the engine when additional power is needed. Eliminating the fuel waste of an idling gas engine causes overall miles per gallon (mpg) to climb significantly and tailpipe emissions to drop.

Pros and Cons

Pros:

- Clean energy
- Regenerative braking
- Lower fossil fuel dependence
- Lighter weight
- A smaller engine
- Higher resale values

Cons:

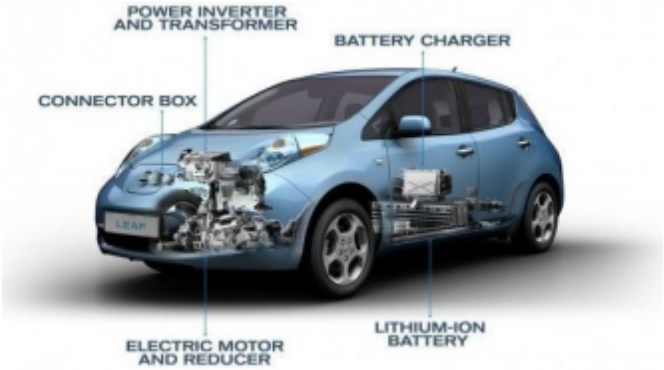
- Lower power output
- Poorer handling
- Higher maintenance costs

What is an Electric Vehicle?

An electric vehicle (EV) is an automobile that is propelled by one or more electric motors, using electrical energy stored in rechargeable batteries or another energy storage device. Electric motors give electric cars instant torque, creating strong and smooth acceleration.

How does it work?

Battery electric vehicles, or BEVs, use electricity stored in a battery pack to power an electric motor and turn the wheels. When depleted, the batteries are recharged using grid electricity, either from a wall socket or a dedicated charging unit.



Like other electric and hybrid-electric vehicles, EVs minimize wasted energy by turning the car off when stopped (idle-off) and by charging the battery when braking (regenerative braking).

Pros and Cons

Pros:

- Quiet and Quick
- Home Recharging
- Cheaper to Operate
- No Tailpipe Emissions

Cons:

- Limited Range
- Long Recharging Time
- Higher Cost
- Lack of Consumer Choice

Charging Your EV at Home

All electric cars have what is termed an "onboard charger" in the car itself. One can simply plug into a standard electricity outlet using the charging cord you get with your car to connect it to a source of electricity.

However, simply plugging into the wall won't charge your car very fast — you'll add just about 4 miles of charge or driving range in one hour of charging. If you want to charge faster, you probably want a home "Electric Vehicle Service Equipment" (EVSE).

An EVSE is a "home charger" or "wall charger" or "home charging station." It brings AC power to your car, where it is then turned into DC power and charges your car's battery — via the car's onboard charger.

Public Charging Stations

An electric vehicle charging station, is an element in an infrastructure that supplies electric energy for the recharging of electric vehicles.

These can be placed at various points across the country. A fee (much less than that of gas) is charged for using the facility.

For further reduction in green house gases (GHG) and cost, renewable energy solutions such as solar PV can be used to provide electricity to the station.

Geothermal energy . . .

* is heat energy from the Earth
* is renewable
* is clean, and reliable
* has existed form of hot springs for thousands of years.

FUN FACT:

In some parts of Iceland, hot water from geothermal power plants flow under pavements and roads to help melt ice.

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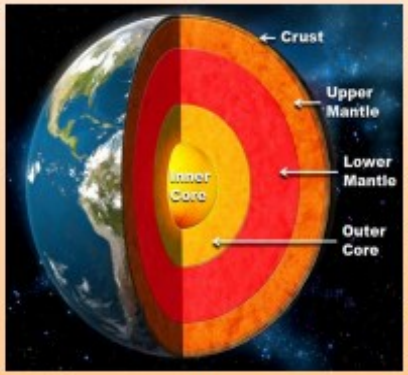
GEOTHERMAL ENERGY

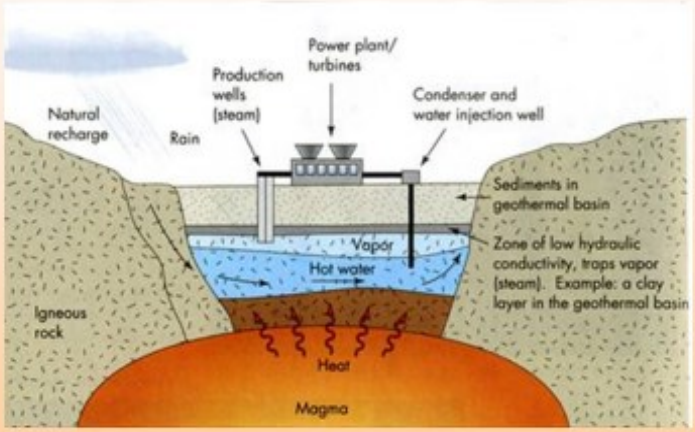
GEOTHERMAL ENERGY

Derived from the Greek word " ***GEO*** " meaning earth and " ***THERMAL*** " meaning heat.

Geothermal energy refers to heat energy obtained from hot rocks present inside the Earth. During the formation of the Earth, heavy elements like iron to sunk to the core while lighter elements such as uranium and potassium rose to the surface of the earth. The nucleus of these radioactive materials is very unstable and therefore give off radioactive particles which bombard one another producing immense heat. The Crust or outermost surface of the Earth is broken up into several pieces called plates. Magma comes up through the Crust near the edges of these plates resulting in volcanoes. These areas of volcanic activity allows heat energy from the earth to be harnessed and converted into electricity for powering our daily activities.



Geothermal Energy is a **RENEWABLE** form of **ENERGY**.



Conditions necessary for a viable geothermal resource include: **water, permeability, and heat**. These three components create a geothermal reservoir. Geothermal power plants convert the hot water trapped in the reservoir into steam which drives the turbines inside the plant to generate electricity.

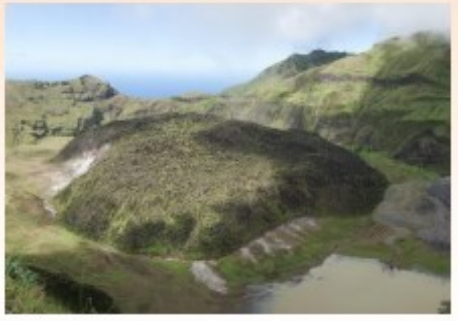
Geothermal Energy can …

* Reduce and stabilize electricity prices in St. Vincent
* Provide a reliable supply of electricity for VINLEC customers
* Increase St. Vincent's national energy security
* Reduce foreign exchange outflows
* Reduce greenhouse gas emissions and protect the natural environment
* Be built and operated in a safe manner
* Provide investors with a fair and reasonable return on their investment

Geothermal Exploration in St. Vincent

* The Government of St. Vincent (GoSVG) has engaged experienced partners **in Emera Caribbean (Emera) and Reykjavik Geothermal (RG)** to undertake the project.

* The Clinton Foundation is providing policy and strategy support
* The project is estimated to cost approximately US$76 million ($80 M including finance costs)
* The GoSVG has obtained a US$15 Million concessional loan from the Abu Dhabi Fund.
* Additional concessional loans and grants are being sought .

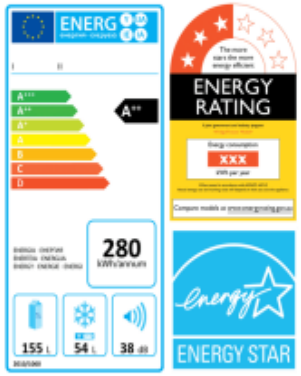


ENERGY LABELS CAN HELP YOU TO SAVE MONEY!

- When you buy new household electrical appliances, only buy energy labelled products to determine whether you are getting the most energy efficient appliance.
- Look at the energy label of the appliance you want to buy and ask your retailer for assistance if you need further explanation.
- The energy label helps you to compare the price of different models by comparing the overall cost over the appliance's life time, i.e. purchase price + operating cost.

Money Isn't All You're Saving

ENERGY UNIT



ENERGY LABELS

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EXPLANATION OF COMMON ENERGY LABELS

What are Energy Labels?

Standards and labels are particularly effective policy tools for accelerating the penetration of energy-efficient technology into the market-place. They provide information on the energy consumption of a labelled product

USA

Originated in the USA, ENERGY STAR is an international standard and endorsement label for energy-efficient consumer products. In the USA, ENERGY STAR qualified refrigerators/freezers are required to use 20% less energy than models not labelled with the ENERGY STAR logo.

EU

A = Supplier's name

B. Coloured arrows are used to differentiate energy-efficient from less energy efficient products: dark green represents a highly efficient product and red a low-efficiency product

F= Supplier's model identifier

G= Energy efficiency class

C. Annual energy consumption in kWh

D. Capacity of all storage compartment in litres

E. Capacity of frozen food storage compartment in litres

H=Noise emissions

USA

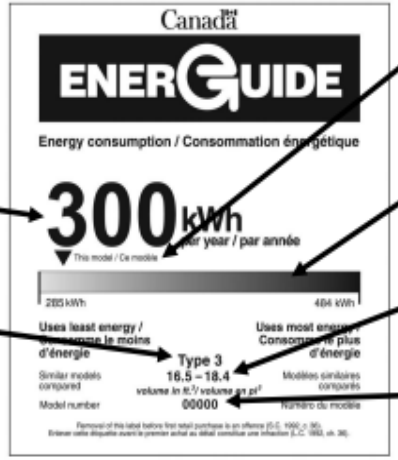
A. Lists key features of the appliance you are looking at and the similar models that make up the cost range below.

B. This figure represents the estimated annual electricity cost of using this appliance based on the national cost for electricity in the USA. The cost range depicted helps to compare the energy use of different models with similar features.

C. An estimate of how much electricity an appliance uses in a year based on typical use. Multiply this by your local electricity rate on your utility bill to determine what your actual electricity cost might be.

D. The make, model and size tells you exactly what product this label describes.

CANADA



A. Avg. annual consumption (kWh)

B. Refrigerator type

C. Energy efficiency of the appliance compared to similar models

D. Annual consumption range for models of this type and size

E. Size of appliance

F. Model number