

**DAY 10**

**TOPIC: CARBON AND FUELS.**

**Renewable sources of energy**

**Aim:**

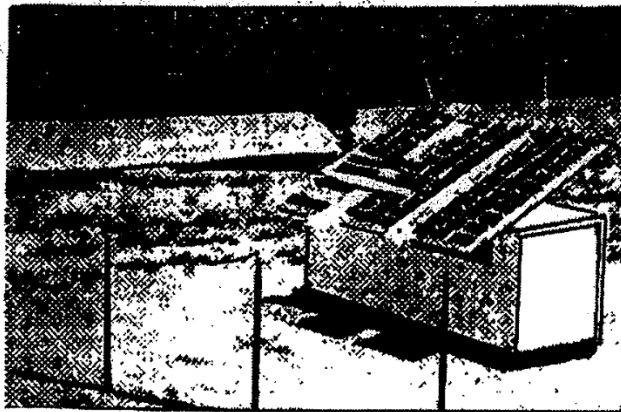
- Explain meaning of “renewable” sources of energy.
- Name some examples of Non- renewable sources of energy

**Activity 1:**

- Read pages 7-11 below.
- Watch video V. 10 – V. 15
- Answer question 11. a) – c) on page 11.

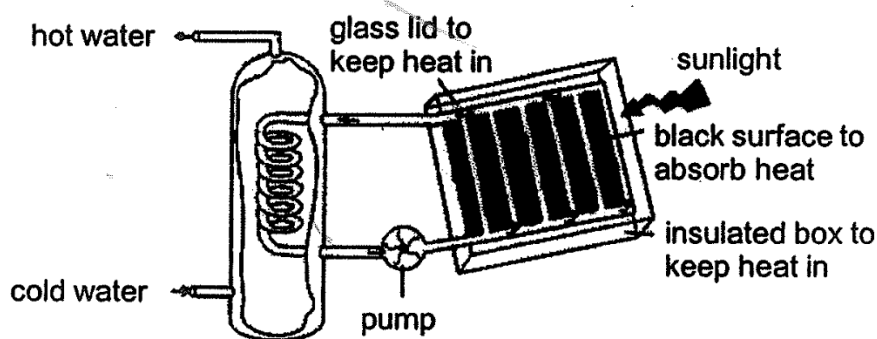
Some sources of energy will never run out. These are called **renewable** energy sources. Examples of renewable energy sources include the following:

- A. **Solar Energy:** Solar energy is energy that comes from the sun. Solar cells change light energy from the sun directly into electricity. Solar cells are used in Vanuatu for radio-telephones. They can also be used for low-power lights.



**A telecom repeater station**

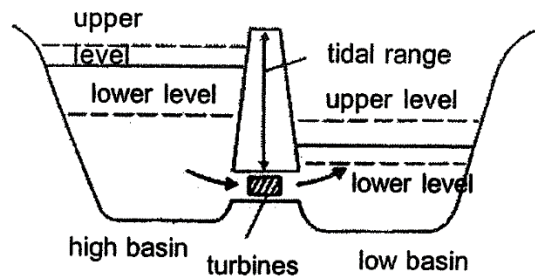
Another way to use solar energy is to heat water in a solar panel. Hot water from the solar panel is usually pumped through a “heat exchanger” to heat water for a house or hotel.



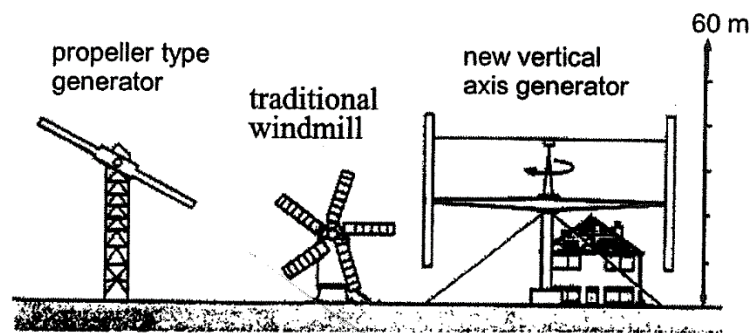
**Heat exchanger**

**Solar panel**

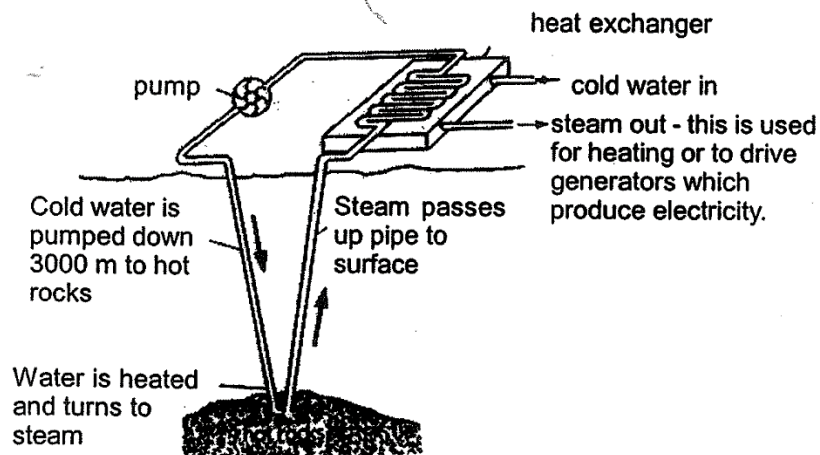
- B. Tidal Energy:** The moon (and to a much lesser extent the sun) cause huge movements of the sea called tides. The energy of this moving water can be used to drive turbines and produce electricity.



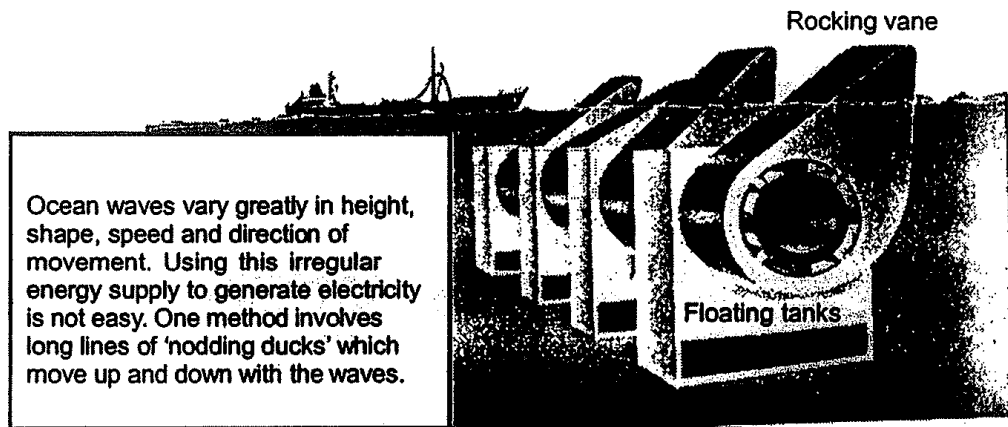
- C. Wind Energy:** Energy from the wind can be used to turn propellers which generate electricity.



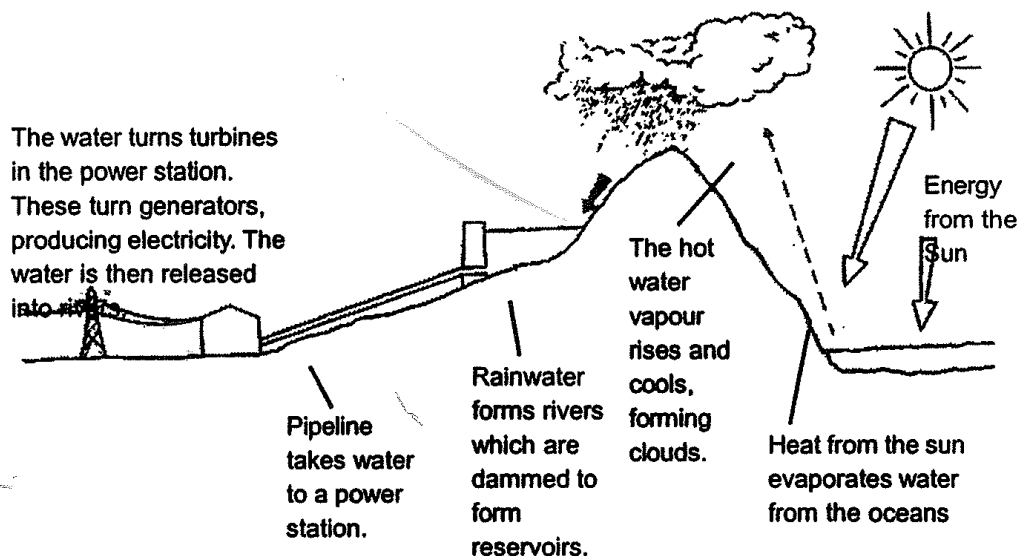
- D. Geothermal Energy:** Energy from the heat of the earth can be used to change water into steam. The steam then drives generators and produces electricity.



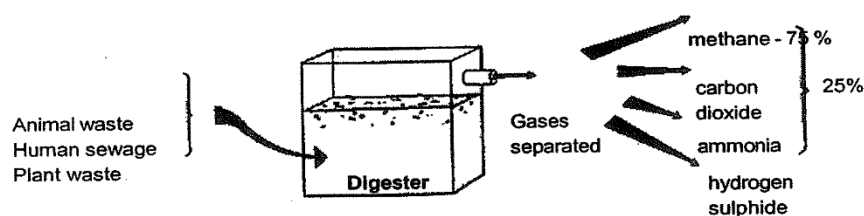
- E. **Wave Energy:** The energy of waves at sea can be used in various ways. The picture below shows one of these.



- F. **Hydro-Electric Energy (HEP):** Rain water forms rivers which are dammed to form reservoirs. This water has a lot of potential energy! Huge pipes allow the water to run down hill. Its potential energy is turned into kinetic energy. The fast moving water is led to turbines which turn generators and produce electricity.



- G Energy from Biomass:** Biomass is anything produced by living things. All living things depend on plants (producers) which grow by using the energy in sunlight (photosynthesis). Biomass is therefore a sort of stored-up solar energy. Firewood is a good example of biomass. Energy can be obtained from biomass either by burning it to obtain heat (for example for cooking) or in other ways. For example, fuel gases may be obtained in a “digester”.



Biomass is broken down by bacteria

Another way to obtain fuel gases from biomass is by heating it, as in the wood gasifier that runs the school generator at Onesua High School. Fermentation of biomass, for example corn or sugar cane, may produce alcohols which can be used in cars and trucks in place of petrol (“benzene”). Many trucks in Brazil run on alcohol produced from biomass.

## SOURCES OF ENERGY FOR VANUATU

**Q11.** Read the following passage from the Prospectus for the Vanuatu National Conservation Strategy, Phase 1. Afterwards, answer the questions below.

**ENERGY:** “Vanuatu is dependent on expensive imported petroleum products (benzene and mazut) for energy in the modern sector. Wood is still the principal energy source in the rural areas. Consideration is being given to wood-fuelled electricity generation for Port Vila and Luganville, using waste products from industrial forestry plantations. Geothermal potential is also being investigated on Efate.

A variety of studies are underway or planned on appropriate energy supplies for rural areas, including wood gasifiers, wood-fired steam power, small scale hydro-electric power and solar energy.”

- a. *Copy the table and complete it. Refer to **all** the energy sources mentioned in the passage above.*

SOURCES OF ENERGY FOR VANUATU		
Renewable sources used / Planned	Non-Renewable sources	Being
-	Petroleum products	
Being used		

- b. *List places you know where any of the renewable energy sources are being used.*
- c. *Which of these energy sources (renewable and non-renewable) come, ultimately, from the sun?*