**Alternative power sources**

**Read the texts about alternative power sources and complete the table with the missing information.**

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| --- | --- |
| Environmental problems such as the **greenhouse**  **effect** and air pollution have led scientists to find  alternative power sources which are renewable and  less polluting.  **SOLAR ENERGY**  Sunlight can be directly converted into electricity by  solar cells made of silicon. When light strikes the  cells, a part of it is absorbed by the semiconductor  material. The energy of the absorbed light **knocks**  electrons loose, allowing them to flow freely and  produce electricity. The process of converting light  (photons) into electricity (voltage) is known as the  photo-voltaic process (PV). Solar cells are usually  combined into panels and grouped into **arrays.** Even  if the initial costs can be high, the PV system provides  an independent, reliable electrical power source. It  can produce energy for more than 15 years and its  routine **maintenance** is simple and cheap.  **WIND ENERGY**  Wind energy is one of the cheapest renewable  technologies available today. The wind turns the  blades of giant turbines, producing in this way kinetic  energy which is then converted into mechanical  power and electricity by a generator. The main  disadvantage of wind energy is that there are few  suitable wind sites where it is possible to have a  constant production of electricity.  **TIDAL ENERGY**  This alternative power source, which is typically used  in coastal areas, turns the potential energy of **tides**  into electricity. Tidal power generators use rising and  falling tides in much the same manner as hydroelectric | power plants. Large underwater turbines are placed  in areas with high tidal movements and are designed  to capture the kinetic energy of rising and falling  tides. The turbines are driven by the power of the sea  both when the tide comes in and when it goes out.  The problem with tidal power is that only massive  increases in tides can produce energy and there are  very few places where this occurs. Moreover, the  aquatic ecosystem and the **shoreline** can be **damaged** by the changes in the tidal flow.  **GEOTHERMALENERGY**  In the past, people used **hot springs** for bathing,  cooking and heating. Geothermal energy is based on  the fact that the Earth is hotter below the surface.  The hot water which is stored in the Earth can be  brought to the surface and used to drive turbines to  produce electricity or it can be **piped** through houses  as heat. This energy is cheap and has a low impact  on the environment, but there are few sites where it  can be extracted at low cost.  **BIOMASS ENERGY**  Biomass is a renewable energy source deriving from  plant material and animal waste. When it is burnt, it  releases its chemical energy as heat. Biomass fuels  include forest residues (such as dead trees, branches  and tree **stumps), straw, manure** and even municipal  solid waste. Biomass energy is a natural process, it is  carbon neutral and has low initial costs. It used to be  the main source of heating at home in the past and it  continues to be highly exploited in the developing  world. The main disadvantage of biomass is that it  has a smaller potential than other energy sources and  requires excellent maintenance skills. |

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| **Type of energy** | **How it works** | **Advantages** | **Disadvantages** |
|  |  |  | High initial costs |
| Wind energy |  |  |  |
|  |  | It is a natural process because it exploits the potential energy of tides |  |
|  |  |  |  |
|  |  |  |  |

**Match the words with their definitions.**

1 array

2 kinetic

3 tide

4 hot spring

5 to pipe

6 manure

7 waste

8 maintenance

**A** a spot where hot water comes up naturally from the ground

**B** unwanted material left after using

**C** a group of things arranged in a particular way

**D** waste material from animals used as fertiliser

**E**  the process of keeping something in good condition by regularly checking it

**F**  produced by motion

**G**  to send a liquid or a gas through a tube

**H** the regular change in the level of the sea caused by gravitational attraction of the

moon and the sun