

# NCERT CBSE Solutions for Class 10 Science Chapter 14

## Sources of Energy

*In Chapter Questions: (Page:243)*

1. What is a good source of energy?

**Solution:**

A good source of energy is a source which can provide a large amount of usable energy per unit volume or mass. It should be easily available, easy to store and transport also it should be economical.

2. What is a good fuel?

**Solution:**

A fuel is said to be good fuel if it produces a large amount of heat on burning a unit volume or mass without producing a lot of smoke. It should have a high calorific value. Also, it should be easily available, easy to store and easy to transport.

3. If you could use any source of energy for heating your food, which one would you use and why?

**Solution:**

LPG (liquid petroleum gas) can be used for heating food because it is a clean source of energy, does not produce smoke while burning. Also, it is easily available easy to store and transport.



*In Chapter Questions: (Page:248)*

1. What are the disadvantages of fossil fuels?

**Solution:**

Some of the disadvantages of fossil fuels are as follow

- i) They are the non-renewable source, hence may exhaust in the near future.
- ii) They produce harmful chemicals like oxides of Carbon, Nitrogen and Sulphur are released while burning fossil fuels
- iii) They cause air pollution and acid rain
- iv) They cause a greenhouse effect.

## NCERT CBSE Solutions for Class 10 Science Chapter 14

2. Why are we looking at alternate sources of energy?

**Solution:**

As we go on using the non-renewable sources of energy at the present rate, we get a shortage of them after some years as it takes millions of years to form petroleum and coal. So, to avoid such condition now onwards we need to look for the alternate sources of energy.

3. How has the traditional use of wind and water energy been modified for our convenience?

**Solution:**

Earlier, the windmills were used to harness wind energy to do mechanical work such as lifting/drawing water from a well. Today in windmills, the kinetic energy of wind is harnessed and converted into electricity.

Water energy which was used for transportation before is now a good source to generate electricity. Dams have been constructed on the river for generating electricity. Waterfalls were used as a source of potential energy which was converted to electricity with the help of turbines

*In Chapter Questions: (Page:253)*

1. What kind of mirror – concave, convex or plain – would be best suited for use in a solar cooker? Why?

**Solution:**

A concave mirror would be best suited for use in solar cooker because it can concentrate the light ray coming from the sun to a point which will produce a lot of heat. Which is required for the solar cooker to cook the food.

2. What are the limitations of the energy that can be obtained from the oceans?

**Solution:**

Tidal energy, wave energy, and ocean thermal energy are various forms of energy that can be obtained from the sun. But there are several limitations to harness these energies. Those limitations are

- (i) Tidal energy depends on the relative positioning of sun, moon and the earth
- (ii) To harness the tidal energy large dams are needed to be built. The locations where such dams can be built are limited.
- (iii) The cost of building such dams and maintaining them is also expensive.

## NCERT CBSE Solutions for Class 10 Science Chapter 14

- (iv) For wave energy, there are very limited areas and devices to trap this of energy.
  - (v) To harness ocean thermal energy the difference in the temperature of surface hot water and the cold water at depth must be 20°C or more.
3. What is geothermal energy?

**Solution:**

Geothermal energy is thermal energy generated and stored in the Earth. It is obtained in the form of steam from under the earth's crust

4. What are the advantages of nuclear energy?

**Solution:**

The advantages of nuclear energy are

- (i) The energy released per unit mass millions of times more than burning an equal amount of coal.
- (ii) It does not produce any smoke. It is clean energy.

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*In Chapter Questions: (Page:253)*

1. Can any source of energy be pollution-free? Why or why not?

**Solution:**

Some sources of energy such as solar cell and windmill can be considered pollution-free as they don't pollute the environment when operational, but the assembly of the device would have caused some environmental damage.

2. Hydrogen has been used as rocket fuel. Would you consider it a cleaner fuel than CNG? Why or why not?

**Solution:**

Hydrogen is a cleaner fuel than CNG because hydrogen on burning/combustion form water whereas CNG that contain methane burns to produce carbon dioxide.

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*In Chapter Questions: (Page:254)*

## NCERT CBSE Solutions for Class 10 Science Chapter 14

1. Name two energy sources that you would consider to be renewable. Give reasons for your choices.

**Solution:**

The two energy sources which can be considered as a renewable energy source are (i) solar energy and (ii) wind energy.

- (i) **Solar energy:** Solar energy is energy obtained from the sun, which can be used for cooking, heating and generating electricity. The sun has a large amount of hydrogen and helium which could last over billions of years. Hence, solar energy is a renewable source of energy.
- (ii) **Wind energy:** Wind energy is harnessed by the windmill which converts the kinetic energy of wind into mechanical work or electricity. The movement of the wind is due to the temperature difference on the surface of the earth. The heating of the earth is due to the sun which will be available for billions of years. Hence, wind energy can be considered a renewable source of energy.
2. Give the names of two energy sources that you would consider to be exhaustible. Give reasons for your choices.

**Solution:**

Two exhaustible sources of energy is as follows

- (i) **Coal:** It is produced from dead remains of plants and animals that buried under the earth's crust for millions of years ago and cannot be replenished in a short time. Hence, it is an exhaustible source of energy.
- (ii) **Petroleum:** Petroleum (also known as crude oil or simply oil) is a fossil fuel that was formed from the remains of ancient marine organisms in millions of years and cannot be replenished in a short time. Hence, it is an exhaustible source of energy.



*NCERT Back of the Book Questions*

1. A solar water heater cannot be used to get hot water on
- (A) a sunny day.  
(B) a cloudy day.  
(C) a hot day.  
(D) a windy day.

## NCERT CBSE Solutions for Class 10 Science Chapter 14

**Solution:** (B)

For solar water heater to work, sunlight is required and on a cloudy day, the sunlight is not available.

2. Which of the following is not an example of a biomass energy source?

- (A) wood
- (B) gobar-gas
- (C) nuclear energy
- (D) coal

**Solution:** (C)

Nuclear energy is not an example of a biomass energy source. The biomass energy sources are wood, coal, cow dung, gobar-gas etc.

3. Most of the sources of energy we use represent stored solar energy. Which of the following is not ultimately derived from the Sun's energy?

- (A) geothermal energy
- (B) wind energy
- (C) nuclear energy
- (D) biomass

**Solution:** (C)

Nuclear energy is related to fission or fusion of a nucleus which does not involve the sun's energy.

4. Compare and contrast fossil fuels and the Sun as direct sources of energy.

**Solution:**

The sun is the main source of energy for all living beings on this earth. Even the energy in fossil fuels has come from the sun. When green plants prepare food, they convert solar energy into chemical energy which is stored in the form of biomass. The same biomass gets transferred to the animals. Thus, the energy in the form of biomass which is stored in fossil fuels has come from the sun.

5. Compare and contrast biomass and hydroelectricity as sources of energy.

**Solution:**

Hydroelectricity is generated using the kinetic energy from moving water, while the energy from biomass is generated by decomposition of farm waste. Since biomass is composed of organic compounds so energy from biomass results in air pollution. Hydroelectricity, on the other hand, is pollution free.

## NCERT CBSE Solutions for Class 10 Science Chapter 14

6. What are the limitations of extracting energy from— (a) the wind? (b) waves? (c) tides?

**Solution:**

- (a) Wind flowing with sufficient speed is not available everywhere and all the time. Thus, wind is not a dependable source of energy. The kinetic energy of wind (wind energy) can be used only at the site of the windmill.
- (b) Wave energy would be commercially viable only at places where the waves are strong. The energy produced from waves has to be transmitted through long distances at the possibility of use.
- (c) There are very few sites suitable for harnessing tidal energy. The rise and fall of water during tides is not very large. So, the large-scale generation of electricity is not possible.
7. On what basis would you classify energy sources as (a) renewable and non-renewable? (b) exhaustible and inexhaustible? Are the options given in (a) and (b) the same?

**Solution:**

Options given in (a) and (b) are almost the same. Renewable sources or inexhaustible of energy are those which can be generated by us or which are constantly being generated by natural processes or whose supply is unlimited. On the other hand, the energy source which cannot be renewed in the foreseeable future are called non-renewable or exhaustible sources of energy.

8. What are the qualities of an ideal source of energy?

**Solution:**

Followings are the qualities of an ideal source of energy:

- It should do a large amount of work per unit volume or mass.
- Which would be easily accessible.
- Which would be easy to store and transport.
- be economical.

9. What are the advantages and disadvantages of using a solar cooker? Are there places where solar cookers would have limited utility?

**Solution:**

The advantages of the solar cooker are:

- (i) The cost of making such a cooker is very less.
- (ii) The food never gets burnt in this type of cooker and stays hot.

The disadvantages of the solar cooker are:

## NCERT CBSE Solutions for Class 10 Science Chapter 14

- (i) This type of cooker cannot be used for frying or preparing chapatis.
- (ii) This device cannot be used at night for preparing food.

In a colder climate where there is not enough sunshine all year, the solar cooker would have very limited utility.

10. What are the environmental consequences of the increasing demand for energy? What steps would you suggest to reduce energy consumption?

**Solution:**

Environmental consequences of increasing demand for energy are as follows:

- (i) Use of fossil fuels is increasing air pollution which is not good for our health.
- (ii) The greenhouse effect has resulted in global warming which is manifesting itself in strange changes in the weather pattern around the world.

Steps to reducing energy consumption:

- (i) Use public transport instead of private modes of transport, use a bicycle whenever possible.
- (ii) Avoid unnecessary use of modern gadgets which consume a lot of energy.
- (iii) Use of more renewable and eco-friendlier source of energy such as solar and wind energy.

