

Unit 11

Renewable energy



OBJECTIVES

After the completion of this unit, you should be able to –

- describe familiar objects and things.
- participate in conversation and discussion.
- read for specific information.
- read for detailed information.
- write formal letters.

OVERVIEW

Lesson 1: Sources of Renewable Energy-1

Lesson 2: Sources of Renewable Energy-2

Lesson 3: Sources of Renewable Energy-3

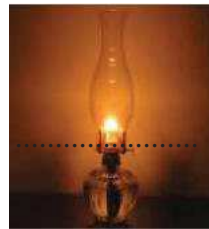
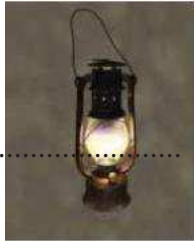
Lesson 4: Revision and Test

 **Answer Key**

Lesson 1 : Sources of Renewable Energy-1

A.

Look at the pictures, and think what they are. Discuss with your friends and family members what they are and when people use them.



Again, look at the above pictures, and write the names from the box under the pictures.

head light, gas light, hurricane lamp, electric bulb, tube light, stage light,
candle light, table lamp, charger light, search light, energy saver bulb, oil
lamp



B. Read the following passage.

Rafit lives in a village in Mymensingh. Last night he could not sleep. His sister Shoilee had the PSC examination next morning. She could not read either. There was load shedding. The summer night was sticky hot. Life became hell without electricity. Most of their locality was dark for hours due to power shortage.

In May and June, temperature shoots up to 40 degree Celsius. With almost 90 per cent of humidity in the atmosphere, it becomes all sweat, wet, damp and stinky. When you are busy fanning yourself all the time, how can you concentrate on study? At night, it is impossible to sit in the study with a candle light, table lamp, hurricane lamp, or a kerosene lamp. People simply come out of houses almost bare-bodied and sit in the open places. Some splash cold water on their faces. Fans are still, lamps are out and it is dark everywhere. It is simply unbearable.

What is the reason of frequent load-shedding? Press reports say there is a shortage in electricity production. According to the Power development authorities, the demand for electricity a few years ago was more than 6,000 MW (Mega Watt) a day while the supply remained around 4,200 MW. In the rural areas, the Rural Electrification Board (REB) could supply barely half of the total demand which was around 2,400 MW per day. In the capital city, the demand stood at around 1,400 MW while the supply amounted to 650 MW. As a result, load-shedding is unavoidable for the time being. But situation is improving very fast.



B. Read and note.

Words	Meanings
village	countryside
sticky	hot and humid
power	electricity
stinky	foul smelling
bare-bodied	without clothes
unbearable	intolerable
unavoidable	unpreventable
atmosphere	the air
situation	condition
demand	requisition



C. Answer the questions.

1. Question: What happened to Shoilee last night?

Answer:

2. Question: How was the summer night?

Answer:

3. Question: What happens during load shedding in Rafit's locality?

Answer:

4. Question: What do people use at night during load shedding?

Answer:

5. Question: What is the reason of load shedding?

Answer:

D. Read and note.

A Electricity	B Demand	C Supply	D Deficit
Nationwide	6,000 MW	4,200 MW	1,800 MW
Rural areas	2,400 MW	12,00 MW	12,00 MW
Capital city	1,400 MW	650 MW	750 MW

E. Complete the dialogues below. They are based on the nationwide demand, supply and deficit of electricity shown in the table just above.

1. Rafit: What's the nationwide demand of electricity?

Shoilee: It's Mega Watt per day.

Rafit: How much can the Power Authority supply?

Shoilee: They can supply only Mega Watt per day.

Rafit: How much is the deficit?

Shoilee: Well, it's Mega Watt per day.

2. Rafit: What's the rural area's demand of electricity?

Shoilee: It's

Rafit: How much can the REB?

Shoilee: They

Rafit:?

Shoilee: Well,

3. Rafit: What's the capital city's?

Shoilee: It's

Rafit:?

Shoilee: They

Rafit:?

Shoilee: Well,

F. Do you think load-shedding causes the same kind of problems to people both in and outside the city? Make two different lists of problems caused by the long-time load-shedding, one in the city, and the other outside the city.

List of problems caused by load-shedding	
In the city	Outside the city
1.	1.
2.	2.
3.	3.
4.	4.
5.	5.

Lesson 2 : Sources of Renewable Energy-2

A. Read the words under four groups in the box below. Think of the words that are related to energy.

Group-1	Group-2	Group-3	Group-4
foil	desert	fossil	sun
oil	forest	snow	wind
gas	valley	remnant	water
soil	waterfall	sign	coal
gold	pond	mango	wood
river	plant	leave	grass
tree	rice	moon	ice

B. Check the meanings of the new words in a dictionary, and write in the following table.

New word	Meanings
foil	thin metal sheets

C. Now, tick the odd words in each column in the above box that do not belong to the group.

B.

D. Look at the picture, and think what it is. Discuss with your friends and family members what it is and why we use it.



E. Read the passage.

In a speech at the 90th Science Congress, famous scientist and former Indian president Mr. APJ Abdul Kalam mentioned a very important aspect of mankind's future energy crisis. He pointed out that the era of wood and bio-mass has almost come to an end. The age of oil and natural gas would soon be over within the next few decades. Massive burning of world's coal reserves may lead to a worldwide ecological disaster because coal burning emits the highest amount of carbon in the atmosphere. According to Kalam, the only solution that mankind can look to is the massive use of solar energy in future because it has some advantages over other forms of renewable energies.

Now, why has Kalam put so much importance to the issue of energy? The energy sources have always been a major factor of change throughout history. The world's petroleum consumption has increased from annually 3 billion barrels in 1930 to annually 50 billion barrels today. In the next quarter century, the world's population is expected to be about 8 billion which is 30 percent higher than today. Developing countries will grow their economies about two times faster than industrialized countries. Global economic growth is expected to continue at 3 percent per year. Consequently, the global demand for energy will grow at about 1.7 percent per year on an average. It indicates a 50 percent rise of energy consumption by 2030. If the world's daily petroleum consumption is 220 million barrels now, it will rise to 335 million barrels by that time. The present reserve of

hydro-carbon energy resources is limited and it will not be sufficient to meet the future energy challenges of the world. And hence, leading industrial countries have taken initiatives to tap alternative energy sources mainly known as green or renewable energy sources. The bottom line of Kalam’s speech indicates that concern of mankind in the 21st the century. [Statistics from: Rex W. Tillerson]



F. Answer the questions.

1. Question: Who is Mr. APJ Abdul Kalam?

Answer:

2. Question: What is scientist Kalam concerned about?

Answer:

3. Question: Why may the massive burning of coal lead to an ecological disaster?

Answer:

4. Question: What according to Mr Kalam is the solution of future energy crisis?

Answer:

5. Question: Why does Mr Kalam put much importance to solar energy?

Answer:

G. Make sentences using the following substitution table.

Chernobyl disaster	have	taken	the use of renewable energy
The energy industries	has	been	sources.
The global petroleum consumption		emphasized	the potential danger of nuclear
Major industrial economies		increased	energy.
Scientists		exposed	a major factor for change throughout history.
			to three billion barrels per year.
			initiatives to tap alternative energy sources.

H. Complete the following passage with words from the box. There are more words than necessary.

suggested, radiates, would, effective, conducted, either, energy, affected, crisis, tap, were

To answer the energy..... in the world, scientist, professor, and Mr APJ Abdul Kalam has that solar energy can be harnessed by establishing space stations in outer space to..... solar power round the clock. Mr Kalam said that the sun about 10 trillion times the energy which humans consume across the world today. If we able to extract even a small portion of this energy from the sun, it be sufficient to secure the energy demands of our future. Pointing out that space based solar power plants do not get by weather, the scientist said that thus it would be far more in efficiency and power generation than the surface based systems. Professor Kalam suggested that the energy should be transmitted from space back to earth through microwave or any other technology like laser. Careful research of the impact and safety concerns would have to be in this regard.

Lesson 3 : Sources of Renewable Energy-3

A.

Look at the pictures, and think what they are. Discuss with your friends and family members how the pictures are related to each other.



B. Read the text.

The countries of the world heavily rely on petroleum, coal, and natural gas for their energy sources. There are two major types of energy sources: renewable and non-renewable. Hydro-carbon or fossil fuels are non-renewable sources of energy. Reliance on them poses really big problems. First, fossil fuels, such as oil, coal, gas, etc are finite energy resources, and the world eventually will run out of them. Secondly, they will become too expensive in the coming decades and too damaging for the environment to repair. Thirdly, fossil fuels have direct polluting impacts on Earth's environment causing global warming. In contrast, renewable energy sources, such as wind and solar energy are constantly and naturally replenished and never run out.

Most renewable energy comes from the sun either directly or indirectly. Sunlight or solar energy can be used for heating and lighting homes, for generating electricity and for other commercial and industrial uses.

The sun's heat drives the wind, and this wind energy can be captured with wind turbines to produce electricity. Then the wind and the sun's heat cause water to evaporate. When this water vapour turns into rain or snow and flows downhill into rivers or streams, its energy can be captured as hydroelectric energy.

Along with the rain and snow, sunlight causes plants to grow. Plants produce biomass which again can be turned into fuels, such as fire wood, alcohol, etc identified as bio-energy.

Scientists have identified Hydrogen as another form of renewable energy source. It is the

most abundant element in nature. But it does not exist separately as a gas. It is always combined with other elements, such as with oxygen to make water. Hydrogen, separated from another element, can be burned as a fuel to produce electricity.

Our Earth's interior contains molten lava with tremendous heat. This heat inside the Earth produces steam and hot water which can be tapped as geothermal energy to produce electricity, for heating home, etc.

Ocean energy comes from several sources. Ocean's force of tide and wave can be used to produce energy. The surface of the ocean gets more heat from the sun than the ocean depths. This temperature difference can be used as energy source, too. (Source: the Internet)



C. Answer the questions.

1. Question: What do you mean by renewable energy sources?

Answer:

2. Question: What is bio-energy?

Answer:

3. Question: How can hydrogen be used to produce electricity?

Answer:

4. Question: What do renewable energy sources differ from non-renewable energy sources?

Answer:

5. Question: How is hydroelectric energy captured?

Answer:

D. Read the dialogue between Raju, a student of Class X, and his uncle, Mr Barua working at Sangu Gas Field.

Mr Barua: What are you reading, Raju?

Raju: English, uncle. A chapter on renewable energy sources.

Mr Barua: I see. Do you know renewable energy is also called green energy?

Raju: Green energy? ... No uncle, I don't know. Nothing is there about green energy in our text either.

Mr Barua: Are you sure? Anyway, renewable energy sources provide us energy which doesn't harm environment during its production or consumption. Say, solar energy. You see, there's no burning, no smoke, no emission of gasses. It's a sort of clean technology and clean energy source.

Raju: Oh exactly. That's what our teacher said, I remember.

Mr Barua: On the other hand, burning fossil fuels say, oil or coal emits greenhouse gases that harm the environment.

Raju: O... I see. Yes, I've got the clue, uncle. Thanks a lot. I now understand the relation between the two pictures in Section A above. Green energy sources make a green globe. Excellent! Now I've got the point.

E. Now, complete the following dialogue taking cues from the above dialogue.

Rafit: What's wind energy?

Shoilee: It's one of the

Rafit: Why's it called?

Shoilee: Well, it's green energy because the Earth green. I mean it doesn'twhen we produce and use it.

Rafit: I see. Then it source of energy.

Shoilee: Exactly. And that's why clean energy.

F.



Dhaka City Corporation is installing solar panels instead of conventional lights to illuminate roads in many areas. Write a letter to the editor of a daily newspaper appreciating this initiative and saying why this should be followed by other city authorities, too.

Lesson-4 : Revision and Test



Look at the pictures below, and complete the sentences against each picture. No. 1 is completed for you.

1.



- a. A hurricane lamp is usually used in a rural area.
- b. A hurricane lamp is used where there is no electricity.
- c. A hurricane lamp is used when there is load-shedding.

2.



- a. An
- b. An
- c. An

3.



- a. An
- b. An
- c. An

4.



- a. A
- b. A
- c. A

5.



- a. A
- b. A
- c. A

B. Write the meanings of the words in the following table.

Words	Meanings
supply	
demand	
damp	
shortage	
disaster	
renewable	
replenished	
constantly	
tremendous	
tapped	

C. Complete the following dialogue between Mintu and Imran, two classmates.

Mintu: Good morning! How're you, Imran?
 Imran: Good morning! Thanks. Last evening was
 Mintu: Terrible? Why, friend?
 Imran: There was I couldn't read even a single page.
 Mintu: Sorry! I faced, too. It's now a
 Imran: Well, don't you have anything to use during load-shedding?
 Mintu: Yes I have. I've got a It's useful indeed.
 Imran: Good! I think I should I badly need it.
 Mintu: Right. Let's attend the class now. The teacher is
 Imran: That's fine! Let's.....



D. Answer the questions.

1. Question: Where do you live – in a village or town?

Answer:

2. Question: Do you face load-shedding?

Answer:

3. Question: What are the main reasons of load-shedding in your area?

Answer:

4. Question: What problem does load-shedding cause to you?

Answer:

5. Question: What do you do during load-shedding?

Answer:



E. Write a letter to the editor of a national daily expressing the sufferings of the ordinary people of your locality caused by load shedding.



Answer Key:

Lesson 1

B.

1. Though Shoilee had the PSC examination next morning, she could not read last night because of load shedding.
2. The summer night was sticky hot.
3. During load shedding, most of Rafit's locality becomes dark for hours.
4. During load shedding at night, people use candle lights, table lamps, hurricane lamps, or kerosene lamps.
5. A shortage in electricity production is the reason of load shedding.

C.

4. Rafit: What's the nationwide demand of electricity?

Shoilee: It's 6,000 Mega Watt per day.

Rafit: How much can the Power Authority supply?

Shoilee: They can supply only 4,200 Mega Watt per day.

Rafit: How much is the deficit?

Shoilee: Well, it's 1,800 Mega Watt per day.

5. Rafit: What's the rural area's demand of electricity?

Shoilee: It's 2,400 Mega Watt.

Rafit: How much can the REB supply per day?

Shoilee: They can supply only 12,00 Mega Watt per day.

Rafit: How much is the deficit?

Shoilee: Well, it's 1,200 Mega Watt per day.

6. Rafit: What's the capital city's demand of electricity?

Shoilee: It's 1,400 Mega Watt per day.

Rafit: How much can the Power Authority supply?

Shoilee: They can supply only 650 Mega Watt per day.

Rafit: How much is the deficit?

Shoilee: Well, it's 750 Mega Watt per day.

D.

List of problems caused by load-shedding	
In the city	Outside the city
1. hampering hospital services	1. hampering road communication
2. causing water crisis	2. hindering study
3. stopping publishing newspapers	3. interrupting business
4. stopping television centres	4. obstructing irrigation
5. stopping traffic control systems	5. encouraging snatching, robbery, etc

Lesson-2

B.

1. Mr. APJ Abdul Kalam is a famous scientist and former president of India.
2. Scientist Kalam is concerned about mankind's future energy crisis

3. The massive burning of coal may lead to an ecological disaster because coal burning emits the highest amount of carbon in the atmosphere.
4. According to Mr Kalam, the massive use of solar energy is the solution to future energy crisis.
5. Mr Kalam puts much importance to solar energy because it has some advantages over other forms of renewable energies.

C.

Chernobyl disaster has exposed the potential danger of nuclear energy.
The energy industries have been a major factor for change throughout history.
The global petroleum consumption has increased to three billion barrels per year.
Major industrial economies have taken initiatives to tap alternative energy sources.
Scientists have emphasized the use of renewable energy sources.

D.

To answer the energy crisis in the world, scientist, professor, and Mr APJ Abdul Kalam has suggested that solar energy can be harnessed by establishing space stations in outer space to tap solar power round the clock. Mr Kalam said that the sun radiates about 10 trillion times the energy which humans consume across the world today. If we were able to extract even a small portion of this energy from the sun, it would be sufficient to secure the energy demands of our future. Pointing out that space based solar power plants do not get affected by weather, the scientist said that thus it would be far more effective in efficiency and power generation than the surface based systems. Professor Kalam suggested that the energy should be transmitted from space back to earth either through microwave or any other technology like laser. Careful research of the impact and safety concerns would have to be conducted in this regard.

Lesson-3

B.

1. Renewable energy sources mean wind and solar energy.
2. Bio-energy means the energy coming from biomass produced by plants, for example, fire wood, alcohol.
3. Hydrogen can be burned as a fuel to produce electricity.
4. Renewable energy sources never end while non-renewable energy sources eventually end.
5. Hydroelectric energy is captured by using ocean's force of tide and wave.

C.

SSC Programme

Rafit: What's wind energy?

Shoilee: It's one of the renewable energy sources.

Rafit: Why's it called green energy?

Shoilee: Well, it's green energy because it doesn't affect the Earth green. I mean it doesn't harm environment when we produce and use it.

Rafit: I see. Then it provides a clean source of energy.

Shoilee: Exactly. And that's why it's a sort of clean energy.

D.

January 9, 2016

To:
The Editor
The Daily Star
Dhaka

From:
Rafit M. Manir
Savar, Dhaka-1342

Dear Sir,

I am writing to appreciate the initiative taken by Dhaka City Corporation to install solar panels instead of conventional lights to illuminate roads in many areas.

The initiative is a good step because solar panels use a natural energy source, that is, the sun. The energy source is renewable. It is friendly to our environment. It does not harm the Earth green. It is also cheap.

Therefore, I recommend that other city authorities should follow the step taken by Dhaka City Corporation.

I would be happy if you would publish this letter in your daily.

Yours sincerely,

[writer's signature]

Rafit M. Manir

Lesson-4

A.

2.
 - a. An electric bulb is used in rural and urban areas.
 - b. An electric bulb is used where there is electricity.
 - c. An electric bulb is used when there is no load-shedding.
3.
 - a. An energy saver bulb is used in rural and urban areas.
 - b. An energy saver bulb is used where there is shortage of electricity.
 - c. An energy saver bulb is used when there is load-shedding.
4.
 - a. A charger light is used in rural and urban areas.
 - b. A charger light is used where there is crisis of electricity.
 - c. A charger light is used when there is load-shedding.
5.
 - a. A candle light is used in rural and urban areas.
 - b. A candle light is used where there is no electricity.
 - c. A candle light is used when there is load-shedding.

B.

Words	Meanings
supply	to provide something
Demand	require something, need
Damp	slightly wet
Shortage	deficiency, crisis
disaster	calamity, damage
Renewable	to be used again and again
Replenished	to supply with fresh fuel
Constantly	no changing, the same
Tremendous	huge, much
Tapped	made use of something

C.

Mintu: Good morning! How're you, Imran?

Imran: Good morning! Thanks. Last evening was terrible.

Mintu: Terrible? Why, friend?

Imran: There was load-shedding. I couldn't read even a single page.

Mintu: Sorry! I faced load-shedding, too. It's now a big problem.

Imran: Well, don't you have anything to use during load-shedding?

Mintu: Yes I have. I've got a charger light. It's useful indeed.

Imran: Good! I think I should buy one. I badly need it.

Mintu: Right. Let's attend the class now. The teacher is coming.

Imran: That's fine! Let's attend the class.

D.

1. I live in a village.
2. Yes, I face.
3. The main reasons of load-shedding in your area are shortage and misuse of electricity.
4. Load-shedding hinders my study and prevents me from watching television.
5. During load-shedding, I use a candle light.

E.

January 9, 2016

To:
The Editor
The Daily Star
Dhaka

From:
Maliha M. Manir Shoilee
Savar, Dhaka-1342

Dear Sir,

I am writing to inform the readers of the sufferings of the ordinary people of my locality caused by load shedding.

Load-shedding causes a lot of problems to the people of my locality. It hampers irrigation and business. It prevents the students from studying at night even before examinations. It makes life almost impossible when humidity in the atmosphere is very high. It also encourages snatching and robbery at night.

Therefore, I would like to request the authority concerned to take proper steps to reduce the sufferings of the ordinary people of my locality caused by load shedding.

I would be pleased if you would publish this letter in your daily.

Sincerely yours,

[writer's signature]

Maliha M. Manir Shoile