

Non-conventional Energy Sources

UNIT - 1

Short answer questions

1. What are the Examples of conventional Energy sources.

A: When we cannot reuse a source of energy after using it once we call them "conventional Source of energy" or "non-renewable energy resources". They are the most important conventional source of energy. These include Coal, petroleum, natural gas and nuclear energy. Oil is the most widely used source of energy, Fuel woods

2. Explain Energy planning and Energy management.

A: Energy planning:

• Energy plan is a strategic, rational way to examine energy investment choice using data on energy use in facilities.

→ Effective energy management planning focuses on:

- Purchasing clean and reliable energy at the lowest cost.
- Replacing old equipment and systems with new, efficient technologies

- operating energy consuming equipment efficiently.
- creating a written energy management plan that not only includes fuel purchasing and equipment replacement but equally emphasizes strategies for efficient building operation
- optimizing energy cost savings by efficiently operating existing equipment and reducing inappropriate or premature capital outlays.

Energy management:

- Eliminating unnecessary energy use
- Improving efficiency of energy use
- Buying energy at lower cost
- Adjusting operations to allow purchasing energy at lower cost.
- Energy management includes planning and operation of energy production and energy consumption units

3. Give the destructive effects of conventional energy sources.

A. Conventional energy sources can cause several different types of pollutions:

↳ Some of the most common ones are air pollution, acid and green house gases.

↳ As a result of fossil fuel combustion, chemicals and particulates are released into the atmosphere.

↳ Common examples include carbon monoxide, carbon dioxide, hydrocarbon, nitrogen oxide, and sulphur dioxide.

↳ Nuclear power is extremely expensive to produce, requires great attention to safety because of the risks from radioactivity, has the potential for catastrophic accidents (such as the one at Chernobyl in 1986), and produces waste products which require looking after for thousand years.

4. Define Energy Efficiency

A. Energy efficiency refers to a method of reducing energy consumption by using less energy to attain the same amount of useful output.

For example: An energy-efficient 12-Watt LED bulb uses 70-80% less than a 60-watt

traditional bulb but provides the same level of light.

5. What is energy planning and why do we require energy management.

A. Energy planning is a strategic, rational way to examine energy investment choice using data on energy use in facilities.

Energy management is the means of controlling and reducing energy consumption:

→ Reduce costs

→ Reduce carbon emissions and the environmental damage that they cause.

→ Reduce Risk : The more energy you consume, the greater the risk that energy price increases or supply shortages affect profitability.

6. What is Green-house Effect?

A. The greenhouse effect is a natural process that warms the Earth's surface. When the Sun's energy reaches the Earth's atmosphere some of its reflected back to space

and the rest is absorbed and re-radiated by greenhouse gases.

The greenhouse gases include water vapour, carbon dioxide, nitrous oxide, ozone and some artificial chemicals such as CFC's.

7. Explain the differences between conventional energy sources and non-conventional energy sources.

conventional Energy Sources

non-conventional Energy Sources

- | | |
|---|---|
| 1. These sources of energy are not abundant, present in limited quantity. Eg: coal, petroleum, natural gas. | 1. These sources of energy are abundant in nature. Eg: solar energy, wind energy, tidal energy, biogass from biomass etc. |
| 2. They have been in use for a long time. | 2. They are yet in development phase over past few years. |
| 3. They are not replenished continuously. They are formed over a million years. | 3. They are replenished continuously by natural processes. |
| 4. They are called non-renewable sources of Energy. | 4. They are called renewable sources of Energy. |

8. What are the advantages of conventional energy sources and non-conventional Energy sources?

A. Advantages of conventional energy sources:

- The efficiency of the Energy source is high.
- the Energy source is a well-known source.
- The production Expenses are low.

Advantages of non-conventional Energy sources:

- These sources of energy are environment friendly
- They are inexhaustible
- They are easy to operate.
- Non-polluting
- Low cost

9. What are non-conventional energy sources? Give two Examples of them.

A. The conventional sources of energy are generally non-renewable sources of energy, which being used since a long time. These sources of energy are being used extensively in such a way that their Known resources have been depleted to a

great extent. These sources of energy which are being produced continuously in nature and are in exhaustible are called non-conventional Energy sources.

Examples:

- i) Solar Energy ii) Wind Energy
- iii) Geo thermal Energy iv) Nuclear Energy

10. Define Energy Efficiency

A. An Energy Efficient system produces the same expected output power, but uses less input power than a standard efficiency system.

11. Write the differences between Renewable energy sources and Non-renewable energy Sources.

Renewable Energy Sources

Non-Renewable Energy Sources

- 1. They cannot be depleted 1. resources depleted over time.
- 2. These include sunlight, 2. These includes fossil water, wind and also fuels such as coal geothermal sources and petroleum.
Such as hot springs and fumaroles.

- Q 1
Date _____
- | | | |
|----|---|--|
| 3. | They have low carbon emissions and low carbon footprint. | 3. They have higher carbon footprint & carbon emissions. |
| 4. | can be reused or recycled and used multiple times | 4. cannot be reused or recycled. |
| 5. | Requires a large land/ off shore sea, especially for wind farms and Solar farms | 5. comparatively lower area requirements. |

12. Explain the importance of Spaghetti and pie diagrams?

- A. Spaghetti chart:
- A spaghetti chart is a method of viewing data to visualize possible flows through systems.
 - Visualizing flow in this manner can reduce inefficiency within the flow of a system.
 - spaghetti chart uses:
 - product flow
 - paper flow
 - people flow.

pie chart:

- It is a simple and easy-to-understand picture
- It represents data visually as a fractional part of a whole, which can be effective communication tool for the even unformed audience.
- It enables the audience to see the data comparison at a glance to make an immediate analysis or to understand information quickly.

13. What is Energy planning? Why do we require energy management?

A. Same as Question 5 (Refer to it)

14. What are conventional Energy Sources? Give two Examples of them.

A: These sources of energy are also known as non-renewable sources of energy and are available in limited quantity except from hydro-electric power. Further, it can be classified under commercial and non-commercial energy.

Examples: coal, oil and natural gas, Electricity → Nuclear power, Thermal power.

15. What is global Warming? Give two reasons for it.

A. Global warming is an aspect of climate change, referring to the long-term rise of the planet's temperatures. It is caused by increased concentrations of greenhouse gases in the atmosphere, mainly from human activities such as burning fuels, deforestation and farming.

1. Burning of fossil fuels:

When we burn fossil fuels like coal, oil and gas to create electricity or power our cars, we release CO₂ pollution into the atmosphere.

2. Deforestation and Tree-clearing:

Plants & trees play an important role in regulating the climate because they absorb CO₂ from the air & release O₂ back into it. Forests and bushlands acts as a carbon sinks and are a valuable means of keeping global warming to 1.5°C.

16. Distinguish between conventional and non-conventional Energy source.

A. Same as question (7).

17. Explain Energy planning and energy management.

A. Refer question 2.

18. Explain natural Energy currents on Earth.

A. Telluric current, also called Earth current, natural electric current flowing on and beneath the surface of the earth and generally flowing following a direction parallel to the Earth's surface.

- These currents are of extremely low frequency and travel large distances over surface of earth.
- It can be observed in Earth crust or mantle.
- These are geo-magnetically induced currents.
- These are induced by changes in outer part of the Earth's magnetic field.
- These are caused by interactions of Solar wind and magnetosphere or solar radiation effects on the ionosphere.

19. Give the destructive effects of conventional energy sources.

A. Same as question (3)

20. Enumerate all the non-conventional energy sources related to solar energy.

A. • Biofuel

• Biomass

• Bio gas

• Geo-thermal

• Hydro power

• Solar Energy

• Tidal Energy power

• Wave power

Long Answer Questions

Unit 1

1. Explain the differences between conventional energy sources and non-conventional energy sources.

A.

Conventional sources of energy	Non-conventional sources of energy
These sources of energy are not abundant, present in limited quantity, e.g. coal, petroleum, natural gas.	These sources of energy are abundant in nature, e.g. solar energy, wind energy, tidal energy, biogas from biomass etc.
They have been in use for a long time.	They are yet in development phase over the past few years.
They are not replenished continuously. They are formed over a million years.	They are replenished continuously by natural processes.
They are called non-renewable sources of energy.	They are called renewable sources of energy.
They can be exhausted completely due to over-consumption except for hydel power.	They cannot be exhausted completely.
They pollute the environment by emitting harmful gases and also contribute to global warming.	They are environment-friendly, do not pollute the environment.
They are commonly used for industrial and commercial purposes.	They are used commonly used for household purposes.
Heavy expenditure is involved in using and maintaining these sources of energy.	Using these sources is less expensive.
They are used extensively, at a higher rate than the non-conventional sources.	They are not used as extensively as conventional sources.

2. What are the advantages of non-renewable energy sources and renewable energy sources?

A. Renewable energy sources:

- **They'll never run out.** That's right - these natural energy sources can replace themselves, making them sustainable and abundant natural resources.
- **They don't damage our planet.** These clean energy sources are non-pollutant, produce minimal or no waste products, and don't contribute to global warming - great news for the environment.
- **They're low-maintenance energy sources.** Renewable energy facilities tend to require less maintenance than traditional generators. And as they come from natural, abundant resources, the operating costs are generally lower too.
- **They're good news for regional areas.** As most renewable energy projects are located in regional areas - away from the big cities - they can bring economic benefits to these places. For example, this could come from more people using local services.

Non-Renewable Energy sources:

- **We can prepare non-renewable supplies at almost any location.** If we want to control energy from renewable, then we must identify regions globally that support this outcome.
- **Non-renewable produce more power after the refinement process.** When we process non-renewable to seize the energy potential offered, we can generate more power from crude oil, natural gas, and other fuels than what they provide in their raw format.
- **Thousands of unique products come from non-renewable.** We can refine the hydrocarbons found in fossil fuels to create numerous products that we use every day.
- The global economy depends on the presence of non-renewable.
- Non-renewable energy provides a stronger energy output.
- It is cheaper to obtain non-renewable energy than other resources.

3. Explain the importance of Spaghetti and Pie diagrams.

A.

➤ Spaghetti diagram

- A spaghetti chart is a method of viewing data to visualize possible flows through systems.
- Visualizing flow in this manner can reduce inefficiency within the flow of a system.
- As a process analysis tool, the continuous flow line enables process teams to identify redundancies in the work flow and opportunities to expedite process flow.

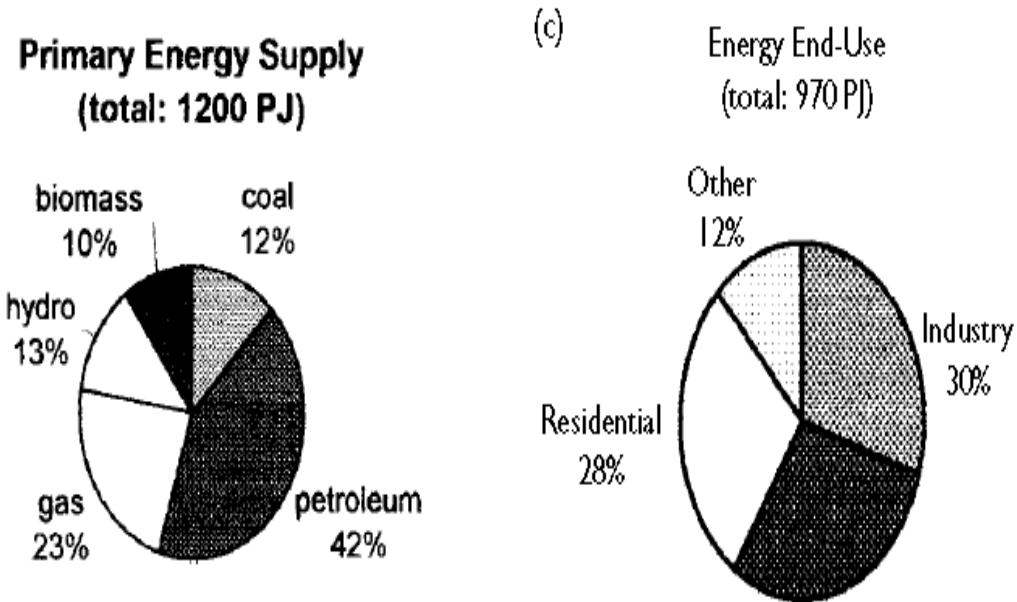
Spaghetti chart steps:

- 1) Record the processes on the side and ask questions if not clear on the activity.
- 2) Start at the beginning of the process. Use directional arrows for the routes that are drawn on the paper.
- 3) Do not leave out any flow movement even if the paper becomes cluttered and difficult to follow.
- 4) Record the amount of time within each activity.
- 5) Show stop points in the process.
- 6) Record the names of those involved, dates, times, and other relevant information.
- 7) Calculate the distance, times, shift, starts, stops, to provide baseline performance.
- 8) Create a separate diagram showing the ideal state of flow for each that eliminates as much non-value added tasks.

Pie diagram

- A simple and easy-to-understand picture.
- It represents data visually as a fractional part of a whole, which can be an effective communication tool for the even uninformed audience.
- It enables the audience to see a data comparison at a glance to make an immediate analysis or to understand information quickly.
- The need for readers to examine or measure underlying numbers themselves can be removed by using this chart.

- To emphasize points you want to make, you can manipulate pieces of data in the pie chart.



4. What is energy planning? Why do we require energy management?

A.

- Energy Planning is a strategic, rational way to examine energy investment choices using data on energy use in facilities
- Effective energy management planning focuses on:
 - Purchasing clean and reliable energy at the lowest cost.
 - Replacing old equipment and systems with new, efficient technologies.
 - Operating energy consuming equipment efficiently.
- Creating a written energy management plan that not only includes fuel purchasing and equipment replacement but equally emphasizes strategies for efficient building operation.
- Optimizing energy cost savings by efficiently operating existing equipment and reducing inappropriate or premature capital outlay.

Energy management is the means to controlling and reducing your organization's energy consumption... And controlling and

reducing your organization's energy consumption is important because it enables you to:

- **Reduce costs** – this is becoming increasingly important as energy costs rise.
- **Reduce carbon emissions** and the environmental damage that they cause - as well as the cost-related implications of carbon taxes and the like, your organization may be keen to reduce its carbon footprint to promote a green, sustainable image.
- **Reduce risk** – the more energy you consume, the greater the risk that energy price increases or supply shortages could seriously affect your profitability, or even make it impossible for your business/organization to continue. With energy management you can reduce this risk by *reducing* your demand for energy and by *controlling* it so as to make it more *predictable*.

5. Explain the destruction effects of conventional energy sources in detail.

A.

Conventional energy sources can cause several different types of pollution:

- Some of the most common ones are air pollution, acid rain, and greenhouse gasses.
- As a result of fossil fuel combustion, chemicals and particulates are released into the atmosphere.
- Common examples include carbon monoxide, carbon dioxide, hydrocarbon, nitrogen oxide, and sulphur dioxide.
- Extracting coal, oil and gas is dangerous and can be polluting; and these fossil fuels are non-renewable.
- As we use up easily-accessible sources of coal, oil and gas extracting them becomes harder, more expensive and more dangerous.
- Burning fossil fuels (both for heating and as fuel for vehicles) is the main source of 'greenhouse gases', carbon dioxide and others which affect the atmosphere and are altering the climate.