Lesson Plan: Energy Sources

# Target Audience:

University Undergraduate Students

# Subject:

Environmental Science / Energy Studies

# Duration:

90 minutes (1.5 hours)

# Instructor:

Dr. Manoj Thakur

# Date:

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# Learning Objectives

By the end of this lesson, students will be able to:  
1. Understand the different types of energy sources (renewable and non-renewable).  
2. Analyze the environmental and economic impacts of various energy sources.  
3. Explore the future of energy production and sustainability.

# Lesson Structure

## 1. Introduction (15 minutes)

Topic Overview: Introduction to the concept of energy and its importance in modern society.  
Key Points:  
- What is energy?  
- Overview of energy usage in everyday life.  
- The relationship between energy and development.  
- Importance of sustainable energy sources for the future.

## 2. Types of Energy Sources (25 minutes)

### Non-Renewable Energy Sources (12 minutes)

Definition and examples: coal, oil, natural gas, nuclear power.  
- Environmental and economic impacts.  
- Discussion of current global energy dependence on non-renewable resources.

### Renewable Energy Sources (13 minutes)

Definition and examples: solar, wind, hydro, geothermal, biomass.  
- Benefits of renewable sources: sustainability, lower environmental impact.  
- Case studies of renewable energy implementation (e.g., wind farms, solar power in various countries).

## 3. Energy Production and Environmental Impacts (20 minutes)

### Energy and Climate Change

The role of energy production in greenhouse gas emissions and global warming.  
- Impact of non-renewable sources on air, water, and soil.

### Sustainable Energy Solutions

Technologies and innovations for reducing environmental impact (e.g., carbon capture, energy efficiency, smart grids).  
- The shift towards clean energy and its benefits for climate change mitigation.

## 4. Energy Economics (15 minutes)

Economic Implications of Energy Sources  
- Costs of different energy sources (renewable vs. non-renewable).  
- Global energy market trends: price volatility, energy subsidies.  
- The role of governments and international organizations in energy policy.

## 5. Future of Energy (10 minutes)

### Emerging Technologies

Advancements in fusion energy, energy storage solutions, and smart grids.  
- The potential for hydrogen and its role in the future energy mix.

### Global Trends

Energy transition policies in developed and developing countries.  
- The role of the youth and innovation in shaping the future of energy.

# Assessment (10 minutes)

## Discussion/Q&A

What are the pros and cons of using nuclear energy?  
- How can countries with limited renewable resources transition to more sustainable energy practices?

## Group Activity

Students will be divided into groups to research one energy source (renewable or non-renewable) and prepare a short presentation on its benefits, challenges, and future outlook.

# Conclusion (5 minutes)

Summary: Recap the main points covered in the class.  
- Key Takeaways:  
 - The importance of transitioning to renewable energy sources.  
 - Understanding the economic and environmental impacts of energy choices.  
 - Encouraging the development of sustainable energy practices.

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