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**RENEWABLE ENERGY PROFESSIONAL**

**REP OVERVIEW**

**ONLINE TRAINING BY KRISHNAJI PAWAR**

**LEED AP(BD+C), GSAS CGP, GCP, ISO 14001**

**KNOWLEDGE IS POWER**

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MODULE

**4**

# The Future of Alternative Energy

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# **RENEWABLE ENERGY PROFESSIONAL OVERVIEW**

The transition from traditional fossil fuels to alternative energy sources is crucial for addressing global energy demands, environmental degradation, and climate change. Alternative energy sources, such as solar, wind, hydroelectric, geothermal, and biomass energy, are often characterized by their sustainability and lower environmental impact.

# Learning Objectives

- Introduction
- Environmental Impacts
- Alternative Energy and Carbon Reduction
- **The Future of Alternative Energy**
- Energy Conservation and Efficiency
- Alternative Energy Strategies for Buildings
- Professional certification in Renewable Energy
- Summary and Resources
- REP Practice Test: Test Your Knowledge!



## INTRODUCTION

- Transition from traditional fossil fuels to alternative energy sources is crucial for addressing global energy demands, environmental degradation, and climate change.
- Alternative energy sources like solar, wind, hydroelectric, geothermal, and biomass energy are sustainable and have lower environmental impact.
- Transitioning to alternative energy is essential for meeting the Paris Agreement's targets and limiting global average temperature increase to below 2 degrees Celsius.
- Key alternative energy technologies include solar energy, wind energy, hydroelectric power, geothermal energy, biomass energy, energy storage, battery technology, grid infrastructure, and energy equity.
- Advancements in solar technology, wind energy, and geothermal energy are driving the future of these technologies.

# TRANSITIONING TO ALTERNATIVE ENERGY SOURCES +

- The transition to alternative energy is expected to generate millions of jobs, leading to energy equity and access to affordable energy in underserved communities. Transition from traditional fossil fuels to alternative energy sources is crucial for addressing global energy demands, environmental degradation, and climate change.
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# THE FUTURE OF ALTERNATIVE ENERGY +

## Advancements in Alternative Energy Technologies

- Solar Energy: Advancements in photovoltaic technology have improved efficiency and cost-effectiveness.
- Wind Energy: Larger and more efficient turbine designs have increased wind farms' capacity.
- Hydroelectric and Geothermal: Innovations in small-scale hydroelectric systems and enhanced geothermal systems diversify the renewable energy portfolio.

## Energy Storage Solutions

- Battery technologies are enhancing energy storage capabilities.
- Flow batteries can store large amounts of energy for extended periods, making them suitable for grid-scale applications.



# LOW- OR NO-CARBON FUEL SHIFT +

- Hydrogen Economy: Emergence of hydrogen as a versatile energy carrier.
- Biofuels: Second- and third-generation biofuels derived from non-food biomass or waste materials are gaining traction as sustainable alternatives to conventional fossil fuels.

## Redesigned Carbon Reduction Practices

- Carbon Capture and Storage (CCS): Technologies aiming to capture carbon dioxide emissions from industrial processes or power generation before they enter the atmosphere.
- Negative Emissions Technologies (NETs): Technologies aiming to remove CO<sub>2</sub> from the atmosphere.

## Current Research and Demonstration Projects

- The International Thermonuclear Experimental Reactor (ITER) and the Hydrogen Fuel Initiative: Global initiatives facilitating the transition to a hydrogen economy.





# QUESTIONABLE TECHNOLOGIES +

- Nuclear Fission: Concerns related to radioactive waste management, nuclear proliferation, and public safety.
- Carbon Capture and Utilization (CCU): The viability of CCU technologies, especially in terms of economic feasibility and scalability, is still under scrutiny.



## Government Action and Future Impacts

- Carbon pricing mechanisms, renewable portfolio standards, and subsidies for clean energy technologies can incentivize investment and innovation.
- The Green New Deal and international agreements like the Paris Agreement encourage countries to set ambitious emissions reduction targets and invest in alternative energy technologies.



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