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ENERGY CONSERVATION DAY- CONTRIBUTIONS FOR SUSTAINABLE LIVING FROM INDIAN SCENERIO

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ABSTRACT

India's population and economy are growing, which is driving up energy demands. As a result, the country needs to move toward sustainable energy sources. Bioenergy, which is made from organic materials, offers a practical way to satisfy this need and promote environmental sustainability. About 0.36 percent of India's primary energy consumption as of 2022 came from biofuels. Coal (55+13 percent), oil (27+58 percent), and gas (5+75 percent) were the main energy sources. It is possible for India to dramatically expand its use of biofuel (22). Forecasts suggest that by 2028, the demand for biofuel worldwide may increase by 23% to 200 billion liters, with India playing a significant role in this expansion. Sustainable development goals are being given more attention in Indian cities in order to solve issues like resource management and pollution. To accomplish these objectives, integrated urban planning and policy interventions are crucial. Installing solar panels or participating in community bioenergy projects can help households and businesses become less dependent on non-renewable energy sources. Reduce single-use plastics, choose eco-friendly products, and help out local craftspeople to help reduce carbon emissions. Take part in recycling programs and compost organic waste to help the environment and soil health. Take public transit, ride a bike, etc.

Keywords: Energy Conservation Day, Sustainable living, Alternative sources of energy, Individual contribution.

INTRODUCTION:

Energy Conservation Day is observed annually on December 14 to raise awareness about the

importance of energy efficiency and conservation. In India, this observance is known as National Energy Conservation Day and has been celebrated since 1991 under the aegis of the Bureau of Energy Efficiency (BEE), a statutory body under the Ministry of Power. The primary objective is to drive mass awareness about the significance of energy efficiency and conservation [1]. In India, Energy Conservation Day is celebrated under the auspices of the **Bureau of Energy Efficiency (BEE)**, a statutory body established by the **Ministry of Power**. Since 1991, the day has been marked by various activities such as workshops, seminars, debates, and award ceremonies recognizing organizations and individuals who have demonstrated excellence in energy conservation efforts [2].

ENERGY NEEDS AT GLOBAL SCENERION:

The need to conserve energy arises from the growing global demand for resources, the environmental impact of energy production, and the necessity to ensure sustainable development. Both globally and in India, energy conservation is critical for economic growth, environmental preservation, and securing resources for future generations. Global energy demand is expected to increase by 47% by 2050 due to population growth and economic development [3]. Non-renewable sources, such as coal, oil, and natural gas, account for the majority of energy production, leading to depletion of these resources and increased greenhouse gas emissions. Energy production is the largest contributor to global carbon dioxide (CO_2) emissions, which drive climate change. Transitioning to energy-efficient practices and renewable sources is essential to meet international goals such as the Paris Agreement, which aims to limit global warming to below 2°C [4]. Over-reliance on fossil fuels has led to their rapid depletion. Energy conservation ensures the longevity of these resources and reduces dependency on energy imports, especially for resource-limited countries.

INDIAN SCENERIO:

India is the third-largest energy consumer globally. Rapid urbanization and industrialization have increased energy consumption, with coal accounting for 70% of electricity generation [5]. Despite advancements, a significant portion of rural India still faces energy poverty.

Conservation and efficiency measures can help extend energy access to underserved regions while reducing the burden on the national grid. India is among the top five carbon emitters in the world. Energy conservation is crucial to achieving the country's commitment to reduce its carbon intensity by 45% by 2030 under the Paris Agreement [6]. Conserving energy reduces energy bills for households and industries. It also lowers the country's import dependency on fossil fuels, saving foreign exchange and enhancing energy security.

ENERGY SOURCES IN INDIA

India's electricity generation encompasses a diverse mix of energy sources. Table 1 summarizing the primary methods used to produce electricity in India, along with their respective contributions and key regions involved.

Table 1. Various sources of energy and key producers of energy in India

Energy Source	Contribution to Total Electricity Generation	Key Regions	Scholarly References
Coal-Based Thermal	Approximately 70%	Jharkhand, Odisha, Chhattisgarh, Madhya Pradesh, West Bengal	7,8
Natural Gas	Approximately 5%	Gujarat, Maharashtra, Andhra Pradesh	7, 9
Hydropower	Approximately 8%	Himachal Pradesh, Uttarakhand, Arunachal Pradesh	9
Wind Power	Approximately 4%	Tamil Nadu, Gujarat, Karnataka	10
Solar Power	Approximately 6%	Rajasthan, Gujarat, Tamil Nadu	11
Nuclear Power	Approximately 2%	Maharashtra (Tarapur), Tamil Nadu (Kudankulam), Gujarat (Kakrapar)	12

Households in India utilize a variety of energy sources for cooking and lighting. The table below

summarizes the primary energy sources and their usage percentages (13).

Energy Source	Usage Percentage	Purpose
Electricity	Approximately 75%	Lighting
LPG (Liquefied Petroleum Gas)	Approximately 60%	Cooking
Kerosene	Approximately 15%	Lighting
Firewood and Chips	Approximately 49%	Cooking
Dung Cake	Approximately 8%	Cooking
Solar Energy	Less than 1%	Lighting

Notes:

- The percentages represent the proportion of households using each e household.

ENERGY CONSERVATION AT HOUSEHOLD:

Conserving energy at home is crucial for reducing electricity bills and minimizing environmental impact. In India, several strategies have been implemented between 2020 and 2024 to enhance household energy efficiency.

1. Adoption of Energy-Efficient Appliances: The Bureau of Energy Efficiency (BEE) promotes the use of appliances with higher star ratings, indicating superior energy efficiency. A national survey revealed that while awareness of BEE's star labeling program is growing, there remains significant potential for increased adoption of energy-efficient appliances across Indian households (14).

2. Transition to LED Lighting: Replacing incandescent bulbs with LED lighting has been a significant move toward energy conservation. LEDs consume less power and have a longer lifespan, contributing to substantial energy savings (15).

3. Implementation of Passive Design Strategies: Architectural designs that maximize natural light and ventilation reduce the need for artificial lighting and air conditioning. Planning building spaces to enable natural lighting and ventilation encourages consumers to avoid using lights during daylight hours (15)

4. Utilization of Renewable Energy Sources: Installing solar panels allows households to generate their own electricity, reducing dependence on the grid. This approach not only conserves energy but also promotes the use of clean energy (16).

5. Behavioural Changes: Simple actions, such as turning off lights and fans when not in use, can lead to significant energy savings. Educating residents about energy conservation practices is essential for fostering energy-efficient behaviours (16).

6. **Government Policies and Initiatives**: The Indian government has set targets to improve national energy intensity, aiming for a 2.5% improvement by 2024, with a higher goal of 3.5% specifically in large-scale industries. These policies indirectly influence residential energy consumption by promoting overall energy efficiency (17).

ALTERNATIVE SOURCES OF ENERGY AND SUSTAINABLE LIVING PRACTICES:

India has been actively diversifying its energy portfolio by integrating various alternative energy sources to promote sustainability and reduce dependence on fossil fuels. Concurrently, sustainable living principles rooted in traditional practices are being revitalized to align with modern environmental goals.

Alternative Energy Sources in India (18): India has made significant strides in solar power generation, achieving a capacity of 67.1 GW by July 2023. The government's initiatives, such as the National Solar Mission, have been instrumental in this growth. Wind power contributes substantially to India's renewable energy mix, with an installed capacity of 42.8 GW as of July 2023. The focus has been on both onshore and offshore wind energy projects to harness this potential. arge hydropower projects account for 46.9 GW of installed capacity, playing a crucial role in India's renewable energy landscape. Efforts are ongoing to develop small and micro-hydro projects to utilize the untapped potential in this sector. Biomass and biofuels are integral to India's strategy for achieving energy self-sufficiency and carbon neutrality. The government has set targets for blending ethanol with petrol to reduce import dependence and promote cleaner fuels.

Sustainable Living Principles: Indian culture emphasizes living in harmony with nature, as

reflected in ancient texts like the Vedas, which advocate for environmental conservation and sustainable living (19). Adopting green consumption behaviours, such as using eco-friendly products and reducing waste, contributes to a sustainable lifestyle. Studies indicate a growing awareness and adoption of green consumption in India, influenced by factors like environmental concern and perceived consumer effectiveness (20). Urban areas in India are increasingly focusing on sustainable development goals (SDGs) to address challenges like pollution and resource management. Research highlights the performance of various Indian cities in achieving SDGs, emphasizing the need for integrated urban planning and policy interventions. (21).

CONCLUSION

India's growing energy demands, driven by its expanding population and economy, necessitate a shift towards sustainable energy sources. Bioenergy, derived from organic materials, presents a viable solution to meet this demand while supporting environmental sustainability. As of 2022, biofuels accounted for approximately 0.36% of India's primary energy consumption. The primary energy sources were coal (55.13%), oil (27.58%), and gas (5.75%). India has the potential to significantly increase its biofuel usage (22). Projections indicate that global biofuel demand could rise by 23% to 200 billion liters by 2028, with India contributing substantially to this growth. Green Credit Program (GCP), launched by the Ministry of Environment, Forest and Climate Change, the GCP incentivizes voluntary environmental actions, promoting sustainability across various sectors. Indian cities are increasingly focusing on sustainable development goals to address challenges like pollution and resource management. Integrated urban planning and policy interventions are essential for achieving these goals. Households and businesses can install solar panels or utilize community bioenergy projects to reduce reliance on non-renewable energy sources. Opt for eco-friendly products, reduce single-use plastics, and support local artisans to minimize carbon footprints. Participate in recycling initiatives and compost organic waste to reduce landfill usage and promote soil health. Use public transport, cycle, or walk when possible, to reduce vehicular emissions. By embracing bioenergy and sustainable living principles, India can progress towards a greener future, ensuring energy security and

environmental preservation for generations to come.

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