



INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

RENEWABLE ENERGY IMPACT IN INDIA

Dr. SHRIHARSHA. B. S.

Associate Professor

Vidyavardhaka First Grade College
Sheshadri Iyer Road, Mysore - 570001

Abstract: The adoption of renewable energy sources in modern India has significant implications for ecology, environment, and tourism. This paper provides a comprehensive overview of the potential benefits and challenges associated with renewable energy projects in India. We discussed the environmental impact of renewable energy sources, the social and economic impact, and the impact on tourism. We also explored several examples of renewable energy projects and their impact on different aspects of Indian society. In conclusion, we emphasized the importance of a sustainable and socially responsible approach to the adoption of renewable energy sources in India, and the need for policies and regulations that prioritize environmental protection and the rights of local communities.

Introduction

India is one of the world's largest and fastest-growing economies, with a rapidly expanding population and increasing energy needs. However, the country also faces significant environmental challenges, including air and water pollution, deforestation, and climate change. To address these challenges, India has begun to shift towards renewable energy sources, such as solar, wind, and hydropower. The adoption of renewable energy sources has the potential to reduce greenhouse gas emissions, promote energy security, and create jobs. In this discussion, we explored the impacts of renewable energy sources in India in terms of their environmental impact, social impact, and economic impact. This paper will examine the opportunities and challenges associated with the development of renewable energy sources in modern India.

Renewable energy sources have been gaining momentum in India as the country seeks to diversify its energy mix and reduce its dependence on fossil fuels. The impact of renewable energy sources on ecology, environment, and tourism in modern India is significant. In this section, we will summarize the key findings and provide some specific examples to illustrate the impact of renewable energy sources on these areas.

1. Ecology

The impact of renewable energy sources on ecology in India is mostly positive. The shift towards renewable energy sources can help to reduce the pressure on natural resources and ecosystems. Let us examine some of the ways renewable energy sources are impacting the ecology in India.

a. Reduced dependence on fossil fuels: The shift towards renewable energy sources is reducing the dependence on fossil fuels, which have significant ecological impacts. For example, coal mining can cause environmental damage, deforestation, and air pollution. Oil drilling can also result in oil spills, which can harm marine life and cause water pollution. By reducing dependence on fossil fuels, the negative impact on ecology is reduced. For example, the Kutch region in Gujarat has a significant wind power capacity, which has helped to reduce the demand for coal-based power generation.

b. Preservation of biodiversity: India has a rich diversity of flora and fauna, with numerous species that are unique to the country. The preservation of biodiversity is a key concern, given the rapid urbanization and industrialization of the country. Renewable energy sources such as solar and wind power do not require significant land use and do not emit greenhouse gases that can impact biodiversity. The adoption of these sources can help to preserve ecosystems and protect endangered species. For example, the Bhadla Solar Park in Rajasthan has a capacity of 2.2 GW, which has helped to reduce the pressure on natural resources in the region.

c. Reduced emissions: India is one of the top emitters of greenhouse gases globally, and therefore, the shift towards renewable energy sources can have a significant positive impact on the environment. Renewable energy sources do not produce greenhouse gas emissions, which contribute to climate change. The adoption of renewable energy sources in India can help to reduce the carbon footprint of the country and its impact on the global environment. For example, the solar power capacity in India has increased significantly in recent years, with several large-scale solar power projects in the country.

d. Reduced water usage: Renewable energy sources such as solar and wind power do not require significant water usage, unlike fossil fuel-based power generation. This is especially important in a water-stressed country like India, where water resources are scarce. Renewable energy sources can help to preserve water resources and reduce the impact of power generation on the environment. For example, the Kamuthi Solar Power Project in Tamil Nadu is one of the largest solar power projects in the world, with a capacity of 648 MW. The project has helped to reduce the water usage for power generation in the region.

2. Environment:

Renewable energy sources have a positive impact on the environment in India. The use of renewable energy sources can help to reduce air pollution, water pollution, and greenhouse gas emissions. Here are some examples of how renewable energy sources are impacting the environment in India:

a. Reduced air pollution: India has a significant air pollution problem, particularly in urban areas. Fossil fuel-based power generation is a significant source of air pollution in the country, leading to respiratory problems, allergies, and other health issues. The adoption of renewable energy sources can help to reduce air pollution and protect public health. For example, the Jawaharlal Nehru National Solar Mission was launched in 2010 to promote the use of solar power in the country, which has helped to reduce the demand for coal-based power generation.

b. Reduced water pollution: Fossil fuel-based power generation can lead to water pollution due to the discharge of toxic chemicals into water bodies. The shift towards renewable energy sources can help to reduce water pollution and protect aquatic life. For example, the Sardar Sarovar Dam in Gujarat has a significant hydropower capacity, which has helped to reduce the demand for coal-based power generation.

c. Reduced greenhouse gas emissions: India is one of the top emitters of greenhouse gases globally, and therefore, the shift towards renewable energy sources can have a significant positive impact on the environment. Renewable energy sources do not produce greenhouse gas emissions, which contribute to climate change. For example, the solar power capacity in India has increased significantly in recent years, with several large-scale solar power projects in the country. The Kurnool Ultra Mega Solar Park in Andhra Pradesh has a capacity of 1 GW, which has helped to reduce the emissions of greenhouse gases in the region.

d. Reduced waste generation: Fossil fuel-based power generation can lead to significant waste generation, including fly ash and bottom ash. The disposal of this waste can have negative environmental impacts, including air and water pollution. The shift towards renewable energy sources can help to reduce waste generation and protect the environment. For example, the Banasura Sagar Dam in Kerala has a significant hydropower capacity, which has helped to reduce the waste generation from coal-based power generation.

e. Improved waste management: Renewable energy sources do not generate significant waste products. This is in contrast to fossil fuel-based power generation, which generates significant amounts of waste. The shift towards renewable energy sources can help to improve waste management practices in the country.

3. Tourism:

Renewable energy sources can impact tourism in India positively. The natural beauty and wildlife of India attract many tourists. The shift towards renewable energy sources can have a positive impact on tourism in India. Renewable energy sources can create new opportunities for eco-tourism and sustainable tourism, which can benefit both the environment and the local economy. Here are some examples of how renewable energy sources are impacting tourism in India:

a. Eco-tourism: Renewable energy sources such as solar and wind power can provide opportunities for eco-tourism in India. Eco-tourism is a form of tourism that focuses on nature-based activities and sustainable development. The development of renewable energy projects can provide opportunities for visitors to explore the natural beauty of the country while promoting sustainable development. These projects can be used to educate tourists about renewable energy and its impact on the environment. Eco-tourism can also provide economic benefits to local communities, which can help to promote sustainable development. For example, the Bhadla Solar Park in Rajasthan has a significant capacity of 2.2 GW, which has provided opportunities for visitors to explore the region and learn about solar power generation.

b. Sustainable tourism: Renewable energy sources can help to promote sustainable tourism in India. Sustainable tourism is a form of tourism that seeks to minimize the negative impact on the environment while maximizing the economic benefits to local communities. The shift towards renewable energy sources can help to create new sustainable tourism opportunities, which can benefit both the environment and the local economy. For example, the Kamuthi Solar Power Project in Tamil Nadu has a capacity of 648 MW, which has created new sustainable tourism opportunities in the region.

c. Preservation of natural resources: The shift towards renewable energy sources can help to preserve natural resources, which are a key attraction for tourists. Renewable energy sources can help to reduce the impact of power generation on the environment, which can help to preserve the natural beauty of India. For example, the Sardar Sarovar Dam in Gujarat has a significant hydropower capacity, which has helped to preserve the natural resources in the region and promote sustainable tourism.

d. Improved infrastructure: Renewable energy projects can require significant infrastructure development, such as new transmission lines and roadways. This infrastructure development can improve accessibility to remote areas of the country, which can help to promote tourism in these areas. For example, the Kurnool Ultra Mega Solar Park in Andhra Pradesh has a capacity of 1 GW, which has improved the infrastructure in the region and provided new opportunities for tourism.

Overall, Renewable energy sources have a significant impact on ecology, environment, and tourism in modern India. The shift towards renewable energy sources can help to reduce the negative impact on natural resources and ecosystems, protect public health, reduce greenhouse gas emissions, and create new opportunities for eco-tourism and sustainable tourism. The adoption of renewable energy sources in India can help to promote sustainable development and protect the environment for future generations. Additionally, renewable energy sources can create new opportunities for eco-tourism and sustainable tourism, which can benefit both the environment and the local economy.

Social and Economic impact in Renewable energy of modern India

Renewable energy sources have significant social and economic impacts in ecology, environment, and tourism in modern India. These impacts are complex and depend on various factors such as project location, scale, and implementation. The development of renewable energy infrastructure can have significant positive impacts, including employment generation, improved energy

Social Impact

The adoption of renewable energy sources in India can also have a significant positive impact on local communities. For example, renewable energy projects can create new job opportunities in the renewable energy sector and provide a reliable source of electricity for remote or underserved communities. In addition, renewable energy projects can help to reduce energy poverty and improve access to energy for people living in rural or remote areas. However, the development of renewable energy projects can also have negative social impacts. For example, the construction of renewable energy projects can result in the

displacement of local communities and the destruction of cultural and historical sites. In addition, the use of renewable energy infrastructure can result in conflicts over land use and resource allocation.

1. Employment generation: The development of renewable energy infrastructure has the potential to generate significant employment opportunities, both in terms of skilled and unskilled labour. This is especially true for solar and wind energy projects, which require a large number of people to build, operate, and maintain the infrastructure. For example, the development of solar power projects in Rajasthan has created numerous job opportunities for people with a wide range of skill sets, including engineering, construction, and operations. The Adani Group's Solar Power Project in Rajasthan is one such example that has provided employment opportunities for people from neighbouring villages.

2. Improved energy access: Renewable energy sources can improve energy access for communities that have limited access to traditional energy sources. This is especially true in remote and rural areas where traditional power infrastructure is either non-existent or unreliable. For example, solar-powered micro-grids can provide reliable and affordable electricity to remote villages that are not connected to the power grid. The village of Dharnai in Bihar is a good example of how renewable energy can improve energy access in remote areas. The village was without electricity for 30 years, but in 2014, Greenpeace India and BASIX installed a 100 kW solar-powered micro-grid that provides electricity to the entire village.

3. Community development: Renewable energy projects can support community development by providing infrastructure and resources that can improve the quality of life. For example, the development of renewable energy infrastructure can support the development of schools, hospitals, and other community facilities. In addition, renewable energy projects can provide resources such as clean water and improved sanitation, which can have significant health benefits for local communities. The Tata Power Solar System's project in Tilonia, Rajasthan, is one such example. The project not only provides electricity but also helps in the overall development of the village.

4. Social acceptance: Renewable energy projects can also help to build social acceptance and support for sustainable development. This is especially true in areas where traditional energy sources have had significant negative impacts on local communities and the environment. For example, the development of the Khunti Solar Power Project in Jharkhand was met with strong support from local communities due to the potential benefits of the project in terms of employment, energy access, and community development. Similarly, the wind power projects in Tamil Nadu have been widely accepted by the local communities, and they have been provided with education and employment opportunities.

Economic Impact

The development of renewable energy sources in India also has the potential to have a significant economic impact. Renewable energy projects can create new job opportunities and stimulate local economic growth. In addition, the development of renewable energy infrastructure can help to improve energy security and reduce India's dependence on imported fossil fuels. However, the high upfront costs associated with developing renewable energy projects can be a significant challenge, as can the need for new infrastructure to support renewable energy development. The cost of electricity generated from renewable energy sources can sometimes be higher than the cost of electricity generated from fossil fuels, although this is changing as the cost of renewable energy technology continues to decline. The development of renewable energy projects also requires skilled labour and technical expertise, which can be a challenge in some areas.

1. Energy security: The development of renewable energy sources can improve energy security by reducing dependence on imported fossil fuels. This can have significant economic benefits, including reduced exposure to volatile oil and gas markets and improved balance of trade. In addition, renewable energy sources can reduce the need for expensive energy imports, which can help to reduce the overall cost of energy. For example, India imports around 80% of its oil and gas requirements. The development of renewable energy infrastructure can help to reduce this dependence and improve energy security.

2. Cost savings: Renewable energy sources can offer significant cost savings over the long term, especially as technology continues to improve and become more efficient. For example, the cost of solar power has dropped significantly in recent years, making it increasingly competitive with traditional fossil fuel-based power sources. In addition, renewable energy sources can offer significant cost savings in terms of

maintenance and operational costs, as they typically require less maintenance than traditional power infrastructure. The Jawaharlal Nehru National Solar Mission (JNNSM) is a good example of how renewable energy can provide cost savings. The mission aims to achieve grid parity by 2022, which means that the cost of solar power will be the same as the cost of electricity from the grid.

3. Sustainable development: Renewable energy sources can support sustainable development by promoting economic growth that is environmentally sustainable. This can help to protect natural resources and ensure that economic growth is not achieved at the expense of future generations. The development of renewable energy infrastructure can also create new markets and industries, which can support economic growth in new sectors. For example, the development of the wind power industry in Tamil Nadu has created new jobs and supported the growth of new businesses.

4. Export potential: Renewable energy sources can create export potential for India, especially as the global demand for renewable energy continues to grow. For example, the Indian wind turbine industry has grown significantly over the past decade and now exports wind turbines to countries around the world. Similarly, the Indian solar industry has the potential to become a major exporter of solar panels and other solar technology.

Environmental Impact

The environmental impact of renewable energy development in India is complex and multifaceted. On the one hand, the adoption of renewable energy sources has the potential to have a significant positive impact on the environment. Renewable energy sources produce little to no greenhouse gas emissions, which can help to mitigate climate change and reduce air pollution. In addition, renewable energy projects can help to conserve water resources by reducing the need for water-intensive thermal power plants. However, the development of renewable energy projects can also have negative environmental impacts. For example, the construction of hydropower projects can result in the displacement of local communities and significant ecological impacts. Similarly, the construction of wind and solar projects can require large amounts of land, which can result in land use conflicts and the destruction of natural habitats. The manufacturing and disposal of renewable energy infrastructure can also result in the release of toxic chemicals and other pollutants.

1. Reduced greenhouse gas emissions: The use of renewable energy sources can help to reduce greenhouse gas emissions, which can help to mitigate the impacts of climate change. This is especially true for solar and wind energy, which have zero emissions during operation. The Indian government has set a target of achieving 40% of the country's electricity generation from non-fossil fuel sources by 2030. The achievement of this target would significantly reduce India's greenhouse gas emissions and support the country's efforts to address climate change.

2. Reduced air pollution: The use of renewable energy sources can also help to reduce air pollution, which is a major public health concern in India. Fossil fuel-based power sources such as coal and diesel are major contributors to air pollution in the country. The use of renewable energy sources such as solar and wind can help to reduce the use of fossil fuels and improve air quality. For example, the solar power project in Dharnai, Bihar, has reduced the use of diesel generators, which were a major source of air pollution in the village.

3. Conservation of natural resources: The development of renewable energy infrastructure can also help to conserve natural resources such as water and land. Fossil fuel-based power sources require significant amounts of water and land for operation and maintenance. The use of renewable energy sources can help to reduce the amount of water and land required for energy generation. For example, the development of solar power projects in Rajasthan has helped to reduce the amount of land required for energy generation, as solar panels can be installed on rooftops and other existing structures.

Tourism Impact

1. Eco-tourism: Renewable energy infrastructure can support the development of eco-tourism, which is a growing sector in India. Eco-tourism focuses on sustainable tourism that has minimal impact on the environment and supports local communities. The development of renewable energy infrastructure can help to create new eco-tourism opportunities, as renewable energy projects are often located in scenic and remote

locations. For example, the Kargil Solar Park in Ladakh is a popular destination for eco-tourists who want to experience the beauty of the region and learn about renewable energy.

2. Improved infrastructure: The development of renewable energy infrastructure can also support the development of tourism infrastructure, such as roads, hotels, and other facilities. This can help to attract more tourists to the region and support the growth of the tourism sector. For example, the development of the wind power industry in Tamil Nadu has supported the growth of tourism infrastructure in the region, as more tourists are attracted to the region to see the wind turbines and learn about renewable energy.

3. Cultural tourism: Renewable energy infrastructure can also support the growth of cultural tourism, as many renewable energy projects are located in rural areas that have a rich cultural heritage. The development of renewable energy infrastructure can help to promote the preservation of cultural heritage and support the growth of cultural tourism. For example, the Kutch Wind Farm in Gujarat is located in an area with a rich cultural heritage, and tourists are attracted to the region to see the wind turbines and learn about the local culture.

Policy and Regulatory Framework

The adoption of renewable energy sources in India has been driven in large part by policy and regulatory frameworks put in place by the Indian government. For example, the Indian government has set ambitious targets for the adoption of renewable energy sources in the country, including a target of 175 GW of renewable energy capacity by 2022. The government has also implemented a number of policies and incentives designed to encourage the development of renewable energy projects, including tax incentives, subsidies, and feed-in tariffs. However, there are also significant regulatory challenges associated with the development of renewable energy projects in India. For example, the process of obtaining permits and approvals for renewable energy projects can be slow and bureaucratic, which can delay project development and increase costs. In addition, the lack of transmission infrastructure in some areas can limit the development of renewable energy projects and limit the economic benefits that could be derived from these projects.

Advantages and Disadvantages of Renewable Energy Sources in Modern India

Renewable energy sources have gained significant attention in modern India, and the country has set ambitious targets to achieve a higher share of renewable energy in its energy mix. The shift towards renewable energy sources in India offers several advantages, including reduced dependence on fossil fuels, improved energy security, reduced greenhouse gas emissions, and new opportunities for sustainable development. However, renewable energy sources also have some disadvantages, including high upfront costs, intermittency, and potential environmental impacts. In this article, we will explore the advantages and disadvantages of renewable energy sources in modern India with suitable examples.

Advantages of Renewable Energy Sources in Modern India

1. Reduced dependence on fossil fuels: One of the primary advantages of renewable energy sources in India is that they can reduce the country's dependence on fossil fuels. Fossil fuels such as coal, oil, and natural gas are finite resources, and their use contributes to climate change and air pollution. Renewable energy sources such as solar, wind, and hydropower are abundant and can be harnessed to generate electricity without depleting finite resources. The shift towards renewable energy sources can help to ensure energy security for the country and reduce dependence on foreign oil imports. For example, the solar power capacity in India has increased significantly in recent years, with several large-scale solar power projects in the country, including the Kurnool Ultra Mega Solar Park in Andhra Pradesh, which has a capacity of 1 GW.

2. Improved energy security: Renewable energy sources can help to improve energy security in India. The country is heavily dependent on oil imports, which makes it vulnerable to fluctuations in global oil prices and geopolitical tensions. Renewable energy sources can provide a domestic source of energy, which can help to reduce dependence on foreign oil imports and improve energy security. For example, the hydropower capacity in India has increased significantly in recent years, with several large-scale hydropower projects in the country, including the Sardar Sarovar Dam in Gujarat, which has a significant hydropower capacity.

3. Reduced greenhouse gas emissions: Renewable energy sources can help to reduce greenhouse gas emissions in India. The country is one of the top emitters of greenhouse gases globally, and therefore, the shift towards renewable energy sources can have a significant positive impact on the environment. Renewable energy sources do not produce greenhouse gas emissions, which contribute to climate change. For example, the wind power capacity in India has increased significantly in recent years, with several large-scale wind power projects in the country, including the Muppandal Wind Farm in Tamil Nadu, which has a capacity of 1500 MW.

4. New opportunities for sustainable development: Renewable energy sources can create new opportunities for sustainable development in India. The development of renewable energy projects can provide employment opportunities, promote local entrepreneurship, and create new markets for products and services. For example, the Banasura Sagar Dam in Kerala has a significant hydropower capacity, which has created new opportunities for sustainable development in the region.

5. Reduced environmental impacts: Renewable energy sources can help to reduce the negative environmental impacts of power generation in India. Fossil fuel-based power generation can lead to significant environmental impacts, including air and water pollution and habitat destruction. Renewable energy sources can help to reduce these impacts and protect public health and natural resources. For example, the Kamuthi Solar Power Project in Tamil Nadu has a capacity of 648 MW, which has helped to reduce the negative environmental impacts of power generation in the region.

Disadvantages of Renewable Energy Sources in Modern India

1. High upfront costs: One of the primary disadvantages of renewable energy sources in India is that they can have high upfront costs. The cost of building and installing renewable energy infrastructure can be significantly higher than that of traditional fossil fuel-based infrastructure. This can make renewable energy sources less attractive to investors, and can also limit access to renewable energy for low-income communities. For example, the cost of building and installing a solar power plant can be significant, which can limit access to renewable energy for low-income communities.

2. Intermittency: Renewable energy sources such as solar and wind power can be intermittent, which can make it difficult to provide a consistent and reliable source of energy. The availability of solar and wind power depends on weather conditions, and the variability of these conditions can lead to fluctuations in energy output. This can make it difficult to integrate renewable energy sources into the power grid and can require the use of backup power sources such as fossil fuels. For example, solar power generation can be affected by cloudy weather, and wind power generation can be affected by changes in wind patterns. **3. Land use:** Renewable energy infrastructure can require significant land use, which can lead to conflicts with other land uses such as agriculture or conservation. Large-scale solar and wind power projects can require significant land use, which can impact natural habitats and biodiversity. For example, the development of the Kudankulam Nuclear Power Plant in Tamil Nadu was met with opposition from local communities due to concerns about the impact of the project on local agriculture and fishing industries.

4. Potential environmental impacts: Renewable energy sources can have potential environmental impacts, including impacts on wildlife and habitats. Large-scale hydropower projects can have significant impacts on river ecosystems, including changes in water flow and sedimentation. Solar power projects can impact local ecosystems, including changes in land use and impacts on wildlife habitats. For example, the construction of the Teesta hydropower project in Sikkim was met with opposition from local communities due to concerns about the impact of the project on local wildlife and habitats.

5. Energy storage challenges: Renewable energy sources can be challenging to store, which can limit their ability to provide a consistent and reliable source of energy. Energy storage technologies such as batteries are still relatively expensive and can have limited capacity, which can make it difficult to store large amounts of energy. This can make it challenging to integrate renewable energy sources into the power grid and can require the use of backup power sources such as fossil fuels. For example, the availability of solar power can be limited by the ability to store excess energy generated during the day for use at night.

Conclusion

The development of renewable energy sources in modern India has the potential to have significant environmental, social, and economic impacts. The adoption of renewable energy sources can help to reduce greenhouse gas emissions and improve air and water quality. It can also create new job opportunities and stimulate local economic growth. However, the development of renewable energy projects also poses significant environmental and social challenges, including land use conflicts, displacement of local communities, and the destruction of natural habitats.

To maximize the benefits of renewable energy development and minimize the negative impacts, it is important to ensure that renewable energy projects are developed in a sustainable and socially responsible manner. This will require the implementation of strong policies and regulations that prioritize environmental protection and the rights of local communities. It will also require the development of new technologies and infrastructure to support the growth of renewable energy sources and ensure that they can be integrated into the existing energy system.

In addition, it is important to recognize that the adoption of renewable energy sources is just one part of a broader shift towards a more sustainable and equitable energy system. This will require not only the development of renewable energy sources, but also the implementation of energy efficiency measures, the phasing out of fossil fuels, and the development of new energy storage technologies.

Overall, the development of renewable energy sources in modern India represents both a significant opportunity and a significant challenge. If done in a sustainable and socially responsible manner, it has the potential to provide significant environmental, social, and economic benefits to India and its people.

References & Bibliography

- Bhattacharyya, S. C. (2016). The clean energy-environment-tourism nexus in India. *Renewable and Sustainable Energy Reviews*, 58, 396-405.
- Chakraborty, S., Mukherjee, S., & Chakraborty, M. (2020). A review of the social and Environmental impacts of renewable energy projects in India. *Renewable and Sustainable Energy Reviews*, 117, 109508.
- Agnihotri, G., & Sharma, V. (2019). A review on the environmental impact of Renewable energy sources. *Renewable and Sustainable Energy Reviews*, 105, 241- 248.
- Central Electricity Authority, Government of India. (2021). Monthly Power Sector Reports. Retrieved from <https://cea.nic.in/reports/monthly/power-sector-reports/>
- Government of India, Ministry of Environment, Forest and Climate Change. (2021). National Clean Air Programme. Retrieved from <https://ncap.mefcc.gov.in/>
- Government of India, Ministry of Power. (2021). National Electricity Plan. Retrieved from <https://powermin.gov.in/en/content/national-electricity-plan>
- Ministry of New and Renewable Energy, Government of India. (2021). Grid- Connected Solar Power Projects. Retrieved from <https://mnre.gov.in/grid-connectedsolar-power-projects>
- Government of India, Ministry of New and Renewable Energy. (2021). Annual Report 2020-21. Retrieved from <https://mnre.gov.in/file-manager/annualreports/2020-21/English/AR-2020-21.pdf>
- International Energy Agency. (2020). India 2020 Energy Policy Review. Retrieved from <https://www.ica.org/reports/india-2020-energy-policy-review>
- Ministry of Tourism, Government of India. (2021). Annual Report 2019-20. Retrieved from https://www.tourism.gov.in/sites/default/files/2021-02/Annual_Report_2019_20_English.pdf
- Ministry of New and Renewable Energy, Government of India. (2021). Renewable Energy and Energy Efficiency Partnership. Retrieved from <https://mnre.gov.in/renewable-energy-and-energy-efficiency-partnership>
- National Institute of Wind Energy, Government of India. (2021). National Wind Resource Assessment: India. Retrieved from https://niwe.res.in/assets/Docu/NWRA/NWRA_India_2021.pdf
- Planning Commission, Government of India. (2014). Report of the Expert Committee on Low Carbon Strategies for Inclusive Growth. Retrieved from https://niti.gov.in/planningcommission.gov.in/docs/reports/genrep/rep_expert_low.pdf

- Renewable Energy Policy Network for the 21st Century. (2020). Renewables 2020 Global Status Report. Retrieved from https://www.ren21.net/wpcontent/uploads/2020/06/Full-GSR-2020_Low-Res.pdf
- United Nations Development Programme. (2021). India and the 2030 Agenda for Sustainable Development. Retrieved from <https://www.in.undp.org/content/india/en/home/sustainable-development-goals.html>

