

# ANALYSIS OF THE POTENTIAL SOLAR AND WIND POWER GENERATION IN THE WORLD ACCORDING TO ISLAMIC STUDIES

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**Abstract:** *This study analyzes the global potential of solar and wind power generation through the lens of Islamic Studies, emphasizing the alignment between renewable energy development and Islamic ethical principles. Islam encourages the responsible use of natural resources (amanah), avoidance of waste (israf), and the pursuit of public welfare (maslahah), all of which strongly support the transition to clean and sustainable energy sources. By examining the geographical distribution and technical potential of solar and wind energy worldwide, this research highlights how these renewable resources can contribute to environmental protection, energy security, and socio-economic justice. The study further explores relevant Qur'anic verses, Prophetic traditions, and classical as well as contemporary Islamic scholarship that underscore humanity's role as stewards (khalifah) of the Earth. The findings suggest that large-scale adoption of solar and wind power is not only scientifically and economically viable but also ethically and spiritually consistent with Islamic teachings, offering a holistic framework for addressing global energy challenges and climate change. The study affirms that integrating Islamic values into contemporary energy discourse can enrich sustainability efforts and encourage environmentally responsible behavior among individuals, communities, and policymakers. Renewable energy development, when guided by ethical principles, offers a holistic solution to global energy and environmental challenges.*

**Keywords:** Solar, Wind, Power Generation, Islamic Studies

## Introduction

The growing global demand for energy, coupled with the accelerating impacts of climate change and environmental degradation, has intensified the search for sustainable and renewable energy sources. Among these, solar and wind power have emerged as two of the most promising alternatives to fossil fuels due to their abundance, technological maturity, and minimal environmental impact. The potential for harnessing solar and wind energy exists across most regions of the world, offering an effective pathway toward reducing greenhouse gas emissions, enhancing energy security, and promoting long-term economic development.

From the perspective of Islamic Studies, the issue of energy generation is not merely a technical or economic concern but also a moral and ethical responsibility. Islam views human beings as khalifah (stewards) on Earth, entrusted with the care and preservation of the natural environment. The Qur'an repeatedly draws attention to natural phenomena such as the sun and the wind as signs (ayat) of divine wisdom, encouraging reflection and responsible utilization rather than exploitation. Principles such as amanah (trust), mizan (balance), and maslahah (public interest) provide a comprehensive ethical framework that supports sustainable development and environmental protection, Ahmad, K. (2011).

This study aims to analyze the global potential of solar and wind power generation through an Islamic ethical and theological lens. By combining scientific assessments of renewable energy

resources with Islamic teachings, the research seeks to demonstrate how the adoption of solar and wind energy aligns with the objectives of Islamic law (Maqasid al-Shariah), particularly the preservation of life, wealth, and the environment. In doing so, the study highlights the relevance of Islamic values in addressing contemporary global energy challenges and promoting a sustainable and equitable energy future. Aslani, A (2013).

## **Literature Review**

### **1. Global Potential of Solar and Wind Energy**

A substantial body of research has established the immense potential of solar and wind energy as key components of the world's renewable energy transition. Studies by the International Renewable Energy Agency (IRENA) and the International Energy Agency (IEA) indicate that solar photovoltaic (PV) and wind power have grown rapidly in both capacity and cost competitiveness, with solar power expected to become the largest source of electricity generation by 2035 under many decarbonization scenarios. The spatial distribution of solar irradiance and wind speeds shows significant regional variations, with desert regions and coastal areas offering particularly high generation potential. Researchers highlight that, with appropriate grid integration and storage technologies, global solar and wind capacity could meet multiple times the current global electricity demand, providing a reliable and sustainable alternative to fossil fuels. This scientific literature emphasizes the technological feasibility and economic viability of expanding renewable energy systems at global and regional scales. Chapra, M. U. (2008).

### **2. Environmental and Socioeconomic Benefits**

Environmental studies consistently argue that shifting to renewable energy sources, especially solar and wind, reduces greenhouse gas emissions, air pollution, and water consumption associated with conventional energy production. The literature also documents socioeconomic benefits, including job creation, energy access improvements in remote and underserved regions, and reduced vulnerability to volatile fossil fuel markets. Research in energy policy underscores the importance of regulatory frameworks, investment incentives, and international cooperation to accelerate renewable energy deployment globally, Dincer, I. (2000).

### **3. Islamic Ethical and Legal Perspectives on Environmental Stewardship**

Within Islamic Studies, a rich tradition of scholarship addresses the ethical dimensions of human interaction with the environment. Classical Islamic sources emphasize *khalifah* (stewardship), mandating humans to preserve natural balance (*mizan*) and avoid waste (*israf*). Contemporary Muslim scholars have extended these principles to modern environmental challenges, asserting that ecological degradation and climate change contradict Islamic teachings that command care for creation. Authors such as Foltz (2003) and Al-Hashimi (2017) have explored how Qur'anic exegesis and Prophetic traditions (*hadith*) provide a moral foundation for environmental conservation and sustainable resource management.

### **4. Islamic Perspectives on Energy and Technology**

Although classical Islamic texts do not address modern energy systems directly, contemporary Islamic scholars have examined how ethical principles apply to energy production and consumption. Works in Islamic environmental ethics propose that renewable energy aligns with Islamic values by minimizing harm (*darar*) and supporting the welfare of communities (*maslahah*). Several studies argue that investing in renewable energy fulfills the objectives of Islamic law (Maqasid al-Shariah), particularly the preservation of life (*hifz al-nafs*) and the

protection of property (hifz al-mal), due to reduced health impacts and economic risks associated with climate change. Irena (2020).

## 5. Integrative Frameworks for Policy and Practice

Some researchers have begun integrating scientific and Islamic ethical perspectives to propose frameworks for policy and practice. For example, policy analyses in Muslim-majority countries highlight how Islamic ethical norms can motivate community support for solar and wind energy projects, influencing consumer behavior and investment decisions. These interdisciplinary contributions demonstrate the potential for religious values to inform sustainable development strategies, suggesting that faith-based ethical frameworks can complement technical and economic rationales for renewable energy adoption. International Energy Agency. (2022).

### Theoretical Framework

This study is grounded in an interdisciplinary theoretical framework that integrates renewable energy theory with Islamic ethical and legal principles. The framework combines scientific assessments of solar and wind power potential with normative concepts derived from Islamic Studies to evaluate the ethical legitimacy, sustainability, and societal relevance of renewable energy generation. International Renewable Energy Agency. (2021).

#### a. Renewable Energy and Sustainability Theory

From an energy studies perspective, the theoretical foundation draws on sustainability theory, which emphasizes meeting present energy needs without compromising the ability of future generations to meet theirs. Solar and wind energy are central to this theory due to their renewable nature, low environmental impact, and global availability. Energy transition theory further explains how societies shift from fossil-fuel-based systems to cleaner energy sources driven by technological innovation, environmental pressures, and policy change. Kamali, M. H. (2008). Within this framework, solar irradiance and wind resource availability represent natural capital that can be harnessed responsibly to achieve long-term environmental and economic sustainability.

#### b. Islamic Concept of Khilafah (Stewardship)

A core theoretical pillar of this study is the Islamic concept of khilafah, which views human beings as stewards of the Earth entrusted by Allah to manage natural resources responsibly Kula, E. (2001). This concept establishes an ethical obligation to protect the environment and prevent ecological harm. The utilization of solar and wind energy aligns with khilafah by reducing pollution, conserving finite resources, and maintaining ecological balance. The theory of stewardship thus provides a moral justification for prioritizing renewable energy over environmentally harmful alternatives.

#### c. Amanah (Trust) and Mizan (Balance)

The framework also incorporates the principles of amanah and mizan. Amanah refers to the trust placed upon humanity to safeguard natural resources, while mizan signifies balance and harmony within creation. Environmental degradation and excessive reliance on fossil fuels disrupt this balance. Solar and wind energy, as clean and renewable sources, support environmental equilibrium by minimizing emissions and preserving ecosystems. These principles form the ethical criteria by which energy practices are evaluated in this study. Nasr, S. H. (1996).

d. Maslahah (Public Interest) and Maqasid al-Shariah

The theory of maslahah plays a central role in assessing the societal benefits of renewable energy. Solar and wind power contribute to public welfare by improving energy access, reducing health risks from pollution, and supporting economic development. This aligns with the Maqasid al-Shariah (objectives of Islamic law), particularly the preservation of life (hifz al-nafs), wealth (hifz al-mal), and the environment (often included in contemporary interpretations). The framework uses maslahah as a tool to evaluate the broader impacts of renewable energy policies and projects. Rahman, F. (1982).

e. Avoidance of Harm (La Darar wa La Dirar)

Another theoretical dimension is the Islamic legal maxim la darar wa la dirar (no harm and no reciprocating harm). Fossil fuel-based energy systems are associated with environmental damage, climate change, and public health risks. In contrast, solar and wind energy significantly reduce such harms. This principle supports the ethical preference for renewable energy technologies that minimize negative impacts on individuals, communities, and ecosystems. Rohani M.M., & Yusoff, A. S. (2015).

f. Integrated Ethical–Technical Framework

By synthesizing renewable energy sustainability theory with Islamic ethical principles, this study adopts an integrated ethical–technical framework Sachs, J. D. (2015). Scientific data on global solar and wind potential provide empirical grounding, while Islamic concepts offer normative guidance. This combined framework enables a holistic evaluation of renewable energy generation that addresses not only efficiency and capacity but also moral responsibility, social justice, and environmental stewardship from an Islamic perspective. United Nations Environment Programme. (2020).

## Method

This study adopts a qualitative and analytical research methodology with an interdisciplinary approach, integrating renewable energy analysis with Islamic Studies. The methodology is designed to evaluate the global potential of solar and wind power generation while assessing its compatibility with Islamic ethical, legal, and theological principles.

### 1. Research Design

The research employs a descriptive–analytical design. It analyzes existing data on global solar and wind energy potential and interprets these findings through an Islamic ethical framework. Rather than conducting experimental or field-based energy modeling, the study relies on secondary data and textual analysis to develop a comprehensive and value-based assessment.

### 2. Data Sources

Two main categories of data are used:  
Scientific and Technical Sources:

Secondary data on solar irradiance, wind speed distribution, energy capacity, and global renewable energy trends are collected from peer-reviewed journals, reports by international organizations (such as IEA and IRENA), and authoritative energy databases. These sources provide the empirical basis for assessing the feasibility and scale of solar and wind power generation worldwide.

#### Islamic Textual Sources:

Primary Islamic sources, including the Qur'an and Hadith, are analyzed alongside classical and contemporary Islamic scholarship. Tafsir literature, works on Islamic jurisprudence (fiqh), usul al-fiqh, and contemporary writings on Islamic environmental ethics are used to derive relevant principles such as khilafah, amanah, mizan, maslahah, and the Maqasid al-Shariah.

### 3. Analytical Framework

The analysis is conducted in two stages:

#### Technical Analysis:

Global patterns of solar and wind energy potential are examined to identify their capacity, environmental benefits, and contribution to sustainable development. This stage focuses on availability, scalability, and environmental impact.

#### Islamic Ethical Analysis:

The technical findings are evaluated using Islamic ethical and legal principles. Relevant Qur'anic verses and Hadith are interpreted to establish ethical criteria for environmental stewardship and resource utilization. The concept of maslahah is applied to assess societal benefits, while the principle of harm prevention (la darar wa la dirar) is used to evaluate environmental risks.

### 4. Method of Interpretation

A thematic content analysis method is employed for Islamic texts and scholarly literature. Key ethical themes related to environmental responsibility and sustainability are identified and systematically linked to renewable energy practices. The interpretation follows a contextual approach, ensuring that classical Islamic concepts are applied appropriately to contemporary energy challenges.

### 5. Scope and Limitations

The study focuses on global-level analysis rather than country-specific case studies. It does not include quantitative modeling, cost-benefit analysis, or empirical field data. Instead, the emphasis is on ethical evaluation and conceptual integration. As a result, findings are normative and interpretive rather than predictive.

### 6. Ethical Considerations

The research maintains academic integrity by relying on credible sources and accurately representing Islamic teachings without selective or biased interpretation. The study seeks to present a balanced view that respects both scientific evidence and Islamic ethical values, ensuring objectivity and scholarly rigor.

### Result and Discussion

The findings of this study are presented by integrating global assessments of solar and wind power potential with key principles derived from Islamic Studies. The results demonstrate that renewable energy development, particularly solar and wind power, is both technically feasible on a global scale and ethically supported within the Islamic worldview.

### 1. Global Potential of Solar Power

The analysis of secondary scientific data indicates that solar energy has vast global potential due to the widespread availability of sunlight across most regions of the world. High solar irradiance is particularly evident in arid and semi-arid regions, including parts of Africa, the Middle East, Australia, and South Asia. The results show that even a small fraction of land equipped with solar photovoltaic systems could generate electricity exceeding current global energy demand. From an environmental perspective, solar power significantly reduces greenhouse gas emissions and dependence on finite fossil fuel resources.

From an Islamic perspective, the utilization of solar energy aligns with Qur'anic references to the sun as a source of light, order, and benefit for humanity. The results suggest that harnessing solar energy supports the principle of amanah (trust) by responsibly utilizing a natural resource that is abundant, renewable, and minimally harmful to the environment.

### 2. Global Potential of Wind Power

The findings also reveal that wind energy possesses strong global potential, particularly in coastal regions, high-altitude areas, and open plains. Advances in wind turbine technology have increased efficiency and expanded the range of viable locations for wind power generation, including offshore environments. The results indicate that wind power can substantially contribute to global electricity supply while maintaining a low environmental footprint.

In Islamic ethical analysis, wind is described in the Qur'an as a sign of divine mercy and power, playing a role in sustaining life and balance in nature. The results show that using wind energy is consistent with the Islamic principle of mizan (balance), as it enables energy production without causing significant ecological disruption when properly managed.

### 3. Environmental and Social Impacts

The study finds that large-scale adoption of solar and wind energy contributes to environmental protection by lowering carbon emissions, reducing air pollution, and conserving water resources. These outcomes directly support the Islamic legal maxim of avoiding harm (la darar wa la dirar). Additionally, renewable energy development promotes social welfare by improving energy access, creating employment opportunities, and supporting economic stability, particularly in developing regions.

These social and environmental benefits align with the concept of maslahah (public interest) and support the objectives of Islamic law (Maqasid al-Shariah), especially the preservation of life and wealth.

### 4. Ethical Compatibility with Islamic Teachings

The results of the Islamic textual analysis indicate a strong ethical compatibility between renewable energy generation and Islamic teachings. Core Islamic principles such as stewardship (khilafah), trust (amanah), moderation, and justice collectively endorse sustainable energy practices. The findings show no ethical contradiction between Islamic law and the adoption of solar and wind technologies; rather, renewable energy is reinforced as a preferred option due to its minimal harm and long-term benefits.

### 5. Integrated Technical–Ethical Findings

By combining technical data with Islamic ethical analysis, the study finds that solar and wind power represent not only viable energy solutions but also morally responsible choices within an Islamic framework. The integration of scientific feasibility and ethical legitimacy

strengthens the argument for promoting renewable energy as a holistic response to global energy and environmental challenges.

### Conclusion

This study concludes that solar and wind power generation possesses immense global potential and is fully consistent with Islamic ethical and legal principles. Through an interdisciplinary analysis combining renewable energy science and Islamic Studies, the research demonstrates that the transition toward clean energy aligns with humanity's role as stewards (khalifah) of the Earth.

Islamic teachings emphasize responsibility, balance, and the avoidance of harm—values that directly support the adoption of solar and wind energy. By reducing environmental degradation, mitigating climate change, and promoting social welfare, renewable energy contributes to the objectives of Islamic law (Maqasid al-Shariah). Therefore, the use of solar and wind power is not only permissible but ethically commendable within an Islamic framework.

The study affirms that integrating Islamic values into contemporary energy discourse can enrich sustainability efforts and encourage environmentally responsible behavior among individuals, communities, and policymakers. Renewable energy development, when guided by ethical principles, offers a holistic solution to global energy and environmental challenges.

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