# Collaboration of Governments in Adhering to Environmental Standards in the Global Sustainable Energy Cycle for Human Health

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**Abstract**

The sustainable energy cycle can reduce dependency on fossil fuels and contribute to environmental preservation. The use of renewable energy sources, such as wind, solar, and geothermal energy, can significantly reduce greenhouse gas emissions and limit global warming. The aim of this study is to examine the collaboration of governments in adhering to environmental standards within the framework of the global sustainable energy cycle and its impact on human health. This research is fundamental in nature and employs a descriptive-documentary method. Data were obtained from books, journals, and databases, and analyzed through descriptive methods and comparative studies to draw conclusions and test various hypotheses. Throughout the writing process, the principles of textual integrity, honesty, and accuracy have been strictly adhered to. The findings of the study indicate that international law provides a framework for the role and participation of governments in implementing the global sustainable energy cycle. The United Nations Framework Convention on Climate Change (UNFCCC) and the Paris Agreement serve as primary international agreements that outline countries' commitments to reducing greenhouse gas emissions and promoting clean energy sources. Furthermore, the role of governments in implementing sustainable energy cycles extends to infrastructure development. Governments must ensure that the necessary infrastructure is in place to support the growth of renewable energy resources and ensure that the energy grid can accommodate new clean energy sources. Energy is considered a vital resource for human progress and well-being. However, dominant energy systems are unsustainable and have a significant impact on climate change, making the role of governments in this area crucial.

**Keywords:** government participation, realization of the sustainable energy cycle, environmental standards.

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## 1. Introduction

The global sustainable energy cycle is a vital element in combating climate change and preserving the environment (Spijkers, 2018). In fact, sustainable energy is intricately linked to each of the three dimensions of sustainable development: energy security, economic progress, and environmental preservation. The global community must design appropriate solutions to achieve the objectives of these interconnected areas (Adamantiades & Kessides, 2009). Therefore, the participation of governments in implementing this cycle through the adoption of domestic policies and the creation of treaties and international agreements is critical. The central role of governments in implementing the global sustainable energy cycle includes various responsibilities. Among these responsibilities is the formulation and implementation of national energy policies that support the use of renewable energy resources and the reduction of greenhouse gas emissions. Additionally, governments play an important role in establishing international treaties and agreements that sustain the energy cycle, such as the Paris Agreement on climate change. Beyond these policies and commitments, countries also contribute to promoting sustainable energy use through financial support and investment. This includes providing financial incentives for the advancement and use of renewable energy resources, as well as investing in new energy technologies (Mashhadi & Hossein, 2016).

Considering that the foundation of sustainable energy lies in clean energy sources (Heffron, 2017; Heffron & McCauley, 2017), clean energy, which is widely accessible across the globe, serves as a sustainable and cost-effective resource that can meet the world's energy needs while reducing dependence on fossil fuels. As a result, the main challenge of sustainable development in the energy sector has always been the use of energy services benefits for the entire world and future generations without harming the environment (Lemaire, 2004). This challenge has been addressed in the evolutionary path of international energy law in various ways, sparking numerous debates in this domain. The necessity of sustainable energy in the global sphere lies in the use of renewable energies, as other energy sources, in addition to being renewable, are currently reinforced by strong and comprehensive international regulations (Roeben & Mete, 2020). From the perspective of regulating the use of renewable energies, the main concern of countries could be environmental issues, as the use of clean energy for sustainable development, while potentially beneficial for the future of countries, might lead to disruptions in international relations, particularly regarding environmental issues and nuclear pollution. These barriers can only be overcome when the energy source is deemed acceptable. In the framework of the Brundtland Commission's explanation of sustainable development, the concept of sustainable energy relates to the production and use of energy in a way that meets the needs of the current generation while safeguarding the ability of future generations to meet their own needs (Damveld & van den Berg, 2000). The Brundtland Commission asserts that sustainable energy is realized when the three realms of environment, energy, and development align. It is evident here that the ecological domain, an inventory separate from sustainable energy, is one of the triads that must be examined to achieve sustainable progress (Shapiro & Tomain, 2014). However, discrepancies between the regulations of these three domains exist, which may hinder the realization of sustainable progress.

On a global scale, international development strategies and laws, as well as international energy laws, are largely in conflict with international environmental laws as the cornerstone of sustainable progress. As mentioned earlier, global laws establish boundaries for the development and access to energy, as well as a framework for sustainable progress that largely addresses common global issues. However, the most significant concern among nations around the world remains environmental challenges, which are undeniable in the context of sustainable energy access (Heffron & McCauley, 2017). To address this issue, the international community must adopt appropriate resolutions to achieve the goals of the three areas of sustainable development (Adamantiades & Kessides, 2009).

The purpose of this research is to clarify the involvement and participation of governments in realizing the global sustainable energy cycle by highlighting the operations, roles, and legal personality of sustainable energy, as well as the production and consumption of sustainable energy in both developed and developing countries and its impact on human health. This requires the development and agreement on the legal and international framework of all countries and adherence to these regulations. This will create a space in which sustainable energy can be achieved and, as a result, enhance sustainable development. It should be noted that the issue examined in this study is a multifaceted domain and requires contributions from various fields. However, in this study, the discourse is approached solely from a legal perspective, and international principles and regulations are examined to clarify the importance and urgency of the issue. It is essential to emphasize that the enhancement of economic progress is one of the outcomes of energy sustainability that most countries strive for; however, it is the duty of each country

to ensure that such progress aligns with environmental goals, thus minimizing the potential harmful effects on human health (Lawrence & Ninan, 1981). Nevertheless, in the contemporary global perspective, the energy sector's reliance on fossil fuels, along with the concentration of these resources in specific geographical regions, has forced countries to commit to international laws while prioritizing energy security, particularly in the context of sustainable energy strategies. This emphasizes the necessity of international community support for energy efficiency and the transition to clean alternative energy sources. Indeed, the historical heavy reliance on oil and gas has caused instability, international disputes, and armed conflicts (Lemaire, 2004), thereby creating the need for practical recommendations for reform.

## 2. Sustainable Energy

Sustainable energy is defined as energy that is produced and used in a way that meets the needs of the present generation without compromising the ability of future generations to meet their own needs (Limer, 2004). The global challenge of transitioning to energy sustainability to meet the world's demand for electricity, heating, cooling, and transportation power has emerged as a major issue in the 21st century. Nearly one billion people worldwide lack access to electricity, and about 3 billion people rely on polluting fuels such as wood, coal, or animal waste for cooking. The use of these fossil fuels is a major source of air pollution, leading to millions of deaths annually. Additionally, the production and consumption of energy are responsible for nearly 70% of greenhouse gas emissions from human activities (Ge et al., 2020).

## 3. Energy Laws

Due to various factors, such as pressure to enhance the international market system and foreign investors' reluctance to achieve favorable profits, investments in exploration and exploitation of minerals have evolved. This situation has led developed countries to engage in regional and international struggles to protect their interests and those of their affiliated companies (Eggert, 2010). The scarcity of fossil mineral resources to meet global demands, particularly in industrialized nations, along with the environmental consequences of resource extraction and production, biodiversity loss, and the advancement of legal frameworks at the regional and international levels, has further accelerated (Meinert et al., 2016). While the apparent goal of this movement is to create a legal system that balances the interests of foreign investors and host countries, in reality, it tends to prioritize and protect the interests of foreign investors. Efforts to reconcile public and private rights often result in favoring private rights at the expense of public rights in contemporary international agreements, such as the International Energy Charter and regional treaties. These documents emphasize free trade principles and reducing trade barriers, aiming to strengthen the interests of large global investors in developing countries while undermining the sovereignty of these nations (Aalto, 2016).

## 4. International Energy Law Cycle

Energy carriers or energy resources used for energy production, which are regulated by national and regional laws, include oil, gas, solar energy, hydropower, wind power, uranium, coal, and steam. Consequently, natural resources like forests, manganese, cobalt, and copper, which do not directly contribute to energy production, are not considered. "International Energy Law" categorizes energy resources into non-renewable and renewable resources. Non-renewable resources such as oil, gas, and coal are depleted through production and consumption. In contrast, renewable resources maintain their value even after repeated use; therefore, the discussion of the legal framework governing energy resources refers to laws and regulations overseeing all activities related to these resources and the interactions resulting from them. These activities typically include exploration, extraction, production, storage, transportation, trade, and consumption (Roggenkamp et al., 2001).

## 5. International Law of Natural Resources

The excessive exploitation of natural resources, neglect of proper land use, and leniency in preserving these resources have posed significant challenges for both present and future generations. Contemporary issues such as the increase in greenhouse gases and global warming, ozone layer depletion, soil erosion, deforestation, industrial waste disposal into water resources,

emissions from nuclear power plants, and others have all resulted in environmental devastation. Therefore, the intelligent and ethical exploitation of resources by the present generation for the benefit of future generations is of utmost importance. This means that, given the lack of involvement of future generations in drafting international agreements, the present generation must act as the guarantor of the interests of future generations (Harvard Law Review, 2001).

The United Nations World Commission on Environment and Development (WCED) defined the concept of sustainable development in its 1987 "Our Common Future" report as "development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs." Furthermore, in the Delhi Declaration of Principles of International Law (April 2–6, 2002), the goal of sustainable development is defined as: "A comprehensive and integrated strategy for economic, social, and political processes aimed at the sustainable use of natural resources and land, the preservation of the environment, human life, and social and economic progress, conditioned on and striving to achieve the right of all individuals to an adequate standard of living based on their efforts, unrestricted and significant participation in development, and the fair distribution of the benefits arising therefrom, while considering the needs and concerns of future generations" (Schrijver, 2002; Schrijver, 2015).

Governments also play an important role in formulating an appropriate regulatory framework to shift towards sustainable energy. This includes establishing criteria for energy-efficient goods and structures, creating energy-saving schemes, and promoting the adoption of renewable energy sources. Ultimately, the role of governments in implementing the global sustainable energy cycle is central and multifaceted. From the perspective of international law, governments are obligated to reinforce and maintain the right to a safe and healthy environment, which includes access to sustainable energy, through the adoption of policies, financial support, and regulations. Therefore, the success of the global transition to sustainable energy depends on the sacrifice and cooperation of governments, the private sector, and civil society (Abbaspour, 2007).

## 6. Future Actions at the International Level

Although specific energy policies are typically formulated by national governments, international developments have the potential to influence the direction of such policies. Therefore, a fundamental transformation in the relations of international institutions is necessary. The United Nations has placed significant emphasis on promoting sustainable energy over the past decade (Büyüközkan et al., 2018); however, its efforts have often lacked coordination and involved research and policy development by bodies such as the United Nations Development Programme, the United Nations Environment Programme (UNEP), the Department of Economic and Social Affairs (UN DESA), and several regional economic commissions. What is fundamentally needed is a specialized agency dedicated to the development of sustainable energy, which could be organized similarly to the International Atomic Energy Agency. The International Atomic Energy Agency, established in 1957 with the aim of promoting global nuclear energy progress, has since expanded its focus to address a broad range of environmental and safety issues related to these advancements. While establishing a new agency would incur significant costs that countries may be reluctant to bear, an alternative approach could involve extending the mission of the International Atomic Energy Agency (with a potential name change) to encompass all aspects of sustainable energy development or, given the limited future role of nuclear energy, focusing exclusively on sustainable development.

In response to widespread frustration among countries over the lack of international action to support sustainable development, Germany has recently taken an active stance by advancing the establishment of the International Renewable Energy Agency (IRENA). A specific law for IRENA has been approved, which is now operational and has garnered the necessary support from member countries (Asmelash et al., 2020). Although this agency has begun policy formulation and scientific research activities, it lacks the recognized standing associated with the United Nations. Nonetheless, integrating these policies into the agency provides a straightforward and cost-effective approach for the UN, potentially expanding its scope beyond renewable energy to include various aspects of sustainable energy (Adhami et al., 2014).

## 7. Attitudes Towards Energy

Generally, there are two perspectives regarding current production commitments to energy resources for the future:

1. The perspective of environmental protectors who advocate for the preservation of all resources by the present generation for the benefit of future generations.
2. On the other hand, another faction believes that there is no responsibility towards future generations and claims the unrestricted right to exploit resources (Abbaspour, 2007).
3. It seems that neither of these opposing views fully embodies the principles of environmental protection and sustainable development. A relatively recent proposal known as the theory of intergenerational fairness suggests that governments should create intergenerational rights and obligations based on inclusive principles, regardless of the specific generation to which the resources belong (Mashhadi & Hossein, 2016; Spijkers, 2018). While this theory may address the issue of aligning the interests of current and future generations, significant ambiguities remain, some of which require further examination:
4. Given the difference in life expectancy between developed and developing countries due to varying access to scientific and technological advancements, it is expected that the lifespan of future generations and the accurate estimation or definition of life expectancy will pose challenges. As a result, uncertainties regarding the classification of future generations arise. This raises the fundamental issue of drawing the boundary between current and future generations. Can all people alive at a given moment collectively be considered part of the current generation?
5. Additionally, with limited resources and global population growth, how can future priorities be determined? Despite efforts to conserve resources for future generations, there is no guarantee that future generations will maintain similar rights for their successors. Consequently, the legal framework surrounding the rights of future generations remains unclear. Even if the concept of future generations is well-defined, their rights remain ambiguous. In particular, the issue of determining the rightful claims of these future generations arises, considering that their needs and desires are unknown and may differ from current interests. Therefore, imposing rights and responsibilities on future generations that align with today's needs becomes a complex endeavor. Furthermore, given that human activities across different generations have irreversible impacts on ecosystems and planetary resources, to what extent can the current generation exploit the environment?
6. To clarify, it is essential to claim that the lifespan and presence of successive generations may not matter. Instead, it is crucial to understand a generation as a group of individuals engaged in the continuous formation of awareness, thus differentiating between its members. The focal point lies in ensuring the stable and uninterrupted existence of humanity on Earth. This essence stems from collective humanity, akin to a vast river that continually flows, extending beyond the sum of its branches and rendering individual components indistinguishable. As a result, despite the ambiguity surrounding the concept of future generations, humanity remains recognized as the entitled beneficiary of rights. To further explain the uncertainties surrounding the nature of future rights, it is recommended to adopt a practical approach to this right and emphasize the central role of the continuity of humanity’s future in advancing the principle of sustainable development, including economic, social, and cultural rights. The realization of such rights depends on the sustainable use of natural resources and ensuring their protection over an indefinite time period. Therefore, three fundamental principles form the basis of the rights framework for future generations: First, every generation must protect all forms of environmental resources, nurture them, and ensure their logical and optimal exploitation to ensure preservation for future heirs. Second, the environment must be used in a way that prevents irreversible harm and has a firm commitment to preserving cultural and natural heritage for future generations.

## 8. Scientific View on Sustainable Biomass Energy

Biomass energy, exemplified by forest biomass, is an example of a practical approach in which disconnecting scientific knowledge from legal actions can potentially undermine the effectiveness of laws and endanger the sustainability of predicted outcomes in the context of energy democracy. The European Union predicts that the future energy sector will largely depend on renewable resources and will be accompanied by the rapid elimination of conventional fossil fuel sources. This transition is expected to reach about 60% and continue after 2030 (Berndes et al., 2016). Biomass energy, in general, relates to energy derived from various forms of biomass, including forest biomass intended for biomass energy applications. In European Union regulations, the definition of biomass energy remains undefined (Berndes et al., 2016). While countries are exploring ways to

phase out fossil fuel-based energy sources, the importance of forests as providers of biomass energy resources is gradually increasing. Forests help reduce greenhouse gas emissions by serving as storage units and through the process of photosynthesis. Therefore, amid the slow progress observed in many countries regarding carbon emission regulation, greater attention is now being given to carbon emissions and their removal from the land, land use, and forests (Shapiro & Tomain, 2014).

The use of forests and waste material for biomass energy production is a potential method for mitigating climate change. However, the range of biomass energy sources from forests, recognized as renewable energy options, extends beyond forest residues and includes whole trees. Nonetheless, biomass energy from forests should not be regarded as climate-friendly renewable energy "unless the replacement of fossil fuels with biomass leads to a substantial reduction in atmospheric carbon dioxide levels over a period of ten years or more." The concept of forest biomass energy is enshrined in current European Union laws, where forest biomass energy is classified alongside wind and solar energy within the realm of renewable energy sources. Key legal frameworks in this area include the Renewable Energy Directive (RED II) and Land Use, Land-Use Change and Forestry (LULUCF), both integral components of the EU's energy and climate framework for 2030 (Johansson & Turkenburg, 2004; Watson et al., 2000).

### 9. Principle of Sovereignty Over Onshore and Offshore Energy Resources

The concept of permanent sovereignty over natural resources is intricately linked to energy resources. Following decolonization, disputes over sovereignty over natural resources, particularly oil, arose, prompting governments to reassess production regulations. This led to significant limitations on national sovereignty and the economic benefits that could be derived from these energy resources. The post-World War II period, marked by the rise of nationalism in the post-colonial world, saw many former colonial countries advocating for change. Simultaneously, government intervention in energy operations through regulatory measures began to expand. This period witnessed the establishment of the Organization of Petroleum Exporting Countries (OPEC) and the introduction of several key United Nations declarations concerning permanent sovereignty over natural resources. United Nations General Assembly Resolution 1962 affirmed the inherent right of every state to manage its wealth and natural resources in alignment with its internal interests (Schrijver, 2015).

### 10. Principle of Environmental Protection, Human Health, and the Fight Against Climate Change

Energy and the environment are inherently connected in the natural fuel cycle. The process of exploration, extraction, processing, transportation, distribution, consumption, and disposal of natural resources for energy production has environmental consequences. As a result, the domains of energy policy and environmental policy are inseparable in terms of regulatory considerations. Notably, environmental issues have been significantly exacerbated by the phenomenon of climate change due to the substantial contribution of the energy system to carbon dioxide emissions. These environmental challenges include the destruction of natural habitats and the imposition of risks and mortality on human populations (Aagaard, 2015). Therefore, the critical balance between energy and the environment requires attention. Providing cheap, accessible, and reliable energy is a fundamental cornerstone of any complex economy, and beyond energy access, contemporary energy policy is primarily characterized by energy security concerns, alongside national security and environmental preservation (Abbaspour, 2007).

Every type of energy source carries its own set of undesirable effects on the environment, human health, energy security, and the economy. The crucial aspect of a comprehensive assessment of the effects of each energy source throughout its lifecycle lies in its execution. However, a significant disparity emerges in comparative analysis, indicating that fossil fuels pose more pronounced, numerous, severe, and enduring risks compared to most alternative sources. Additionally, moving away from a carbon-based economy extends beyond environmental concerns and has become a necessity for survival, leading to two key outcomes derived from the energy-environment relationship. Initial actions include developing policies that favor clean energy. Conventional energy strategies relying on abundant and affordable fossil fuels are no longer aligned with evolving demands on energy infrastructure. As a result, integrating renewable resources, low-carbon alternatives, and energy efficiency emerges as a core component of the energy portfolio. Subsequently, contemporary and future energy policies are deeply shaped and interconnected with the broader issue of climate change (Jonsson et al., 2013).

It can be argued that the future importance of sustainable energy is inherently valuable. Accordingly, a sustainable future aligns beneficially with the complexities of global climate change and complements it. The structural features of climate change are recognized as a highly complex issue (Levin et al., 2012). This necessitates a new regulatory approach that integrates energy policy and law with environmental policy and law. Regulators can no longer rely on their capacity to enforce regulations after an issue has occurred (e.g., an oil spill or malfunction in a nuclear facility that has already taken place). Instead, previous regulations must be revisited to reduce carbon emissions in order to mitigate further environmental damage. Energy regulatory bodies must acknowledge that the evolution of environmental energy presents complex challenges that are interdisciplinary and intergenerational, involving scientific, technological, economic, and social uncertainties. Furthermore, climate change presents a nonlinear challenge with its own complexities (such as the urgency to find timely solutions). Therefore, failing to address the issue promptly increases future costs. Nonetheless, this is a scenario that must be addressed today in light of the high costs anticipated. Addressing the climate change challenge requires understanding the relationship between energy and environmental systems, as well as the consequences of human activity and the neglect of this relationship.

## 11. Conclusion

Energy is considered a vital resource for human progress and well-being. However, dominant energy systems are unsustainable and have a significant impact on climate change, air quality, and resource depletion. The global community has established a sustainable energy framework to address these challenges and ensure access to reliable, affordable, and environmentally friendly energy for all. The participation and cooperation of all stakeholders, including governments, is crucial for the successful implementation of the global sustainable energy cycle. This study addresses the performance and participation of governments in implementing the global sustainable energy cycle from the perspective of international law. International laws play an important role in supporting sustainable energy and reducing the consequences of unsustainable energy practices. Key international legal instruments, such as the United Nations Framework Convention on Climate Change (UNFCCC) and the Paris Agreement, are crucial in promoting sustainable energy and addressing climate-related issues. These agreements obligate governments to take steps to reduce greenhouse gas emissions and facilitate the development and use of clean energy technologies. Governments play a significant role in advancing the global sustainable energy cycle by creating the necessary legal and policy frameworks to facilitate the transition to sustainable energy systems. This may include implementing regulations and standards to ensure safety, efficiency, and environmental compatibility. Additionally, governments can provide financial incentives such as subsidies and tax breaks to encourage the growth and deployment of clean energy technologies. Promoting the development and use of renewable energy sources such as wind, solar, and hydropower is also within the scope of governments, as these sources are vital to maintaining the global sustainable energy cycle. Furthermore, governments can enhance energy efficiency, which has the potential to significantly reduce energy consumption and greenhouse gas emissions. Apart from promoting sustainable energy practices, governments also bear the responsibility of protecting the rights of individuals and the environment. International human rights law, as outlined in the International Covenant on Economic, Social, and Cultural Rights (ICESCR), safeguards the right of all individuals to the highest attainable standards of physical and mental well-being, which includes the right to a healthy environment. It is the duty of governments to take measures to prevent the endangerment of citizens' welfare and the environment through energy systems.

The importance of science in the emerging energy democracy has been examined by integrating theoretical perspectives from justice and legitimacy discourses to explore the involvement of science in critical regulatory methods for sustainable energy transition. The distinction between the functions of science and law within a practical regulatory framework regarding sustainable forest biomass energy was assessed. The involvement and importance of science in regulatory procedures related to energy democracy have been evident, and science is crucial in validating the results of regulatory processes. While lawmakers have the authority to enact laws, the role of scientific knowledge as a foundation for effective legislation (especially when addressing complex systemic issues like sustainability) is critical. Regulatory choices for sustainable energy transitions that lack adequate and transparent scientific justification risk eroding trust in lawmakers' decisions to promote truly sustainable energy transitions. Additionally, such regulatory practices cannot increase legitimacy.

The role of science within regulatory frameworks related to energy transitions offers a valuable platform for examining energy democracy as a legal goal. The disconnect between science and lawmaking in the context of regulation, alongside the

sustainability and legitimacy risks arising from these challenges, highlights all the diverse and fundamental aspects of energy democracy. In essence, despite some ambiguities surrounding the fundamental principles of energy democracy, the distinct and identifiable characteristics that contribute to its realization can be defined. Therefore, science's involvement in regulatory processes related to sustainable energy transitions is crucial for validating regulatory decisions aimed at facilitating the transition.

Increasingly, only regulatory options supported by credible scientific evidence are acceptable to the public. This trend is attributed to science's capacity to advise lawmakers on sustainable and scientifically informed decisions. This emphasizes the significant role of science in regulatory processes with the goal of achieving a sustainable energy transition. Thus, energy democracy requires the active participation of scientific and legal experts in constructive dialogues to effectively address the most pressing sustainability challenges of our time.

Achieving a sustainable energy cycle has the potential for widespread consequences for the international community. The sustainable energy cycle, characterized by the use of renewable energy resources, efficient energy use, and reduced greenhouse gas emissions, can have a significant impact on the global economy, the environment, and the quality of life for people around the world. One of the main benefits of the sustainable energy cycle is that it helps reduce our dependence on fossil fuels. This leads to more sustainable and reliable energy provision, as well as a reduction in geopolitical tensions that often arise from competition for limited resources. Furthermore, it contributes to the reduction of greenhouse gas emissions and mitigates the effects of climate change. This process can have a substantial environmental impact and help preserve the planet for future generations. Another key advantage of the sustainable energy cycle is that it will positively affect the global economy. Investment in renewable energy resources creates new jobs and reduces energy costs, freeing up resources for other economic activities. This helps stimulate economic growth, especially in developing countries, where energy costs can be a major constraint on economic development.

The sustainable energy cycle also improves energy security and reduces energy poverty. In many parts of the world, access to energy is limited, and people are forced to rely on traditional and often hazardous energy sources such as biomass and kerosene. By investing in renewable energy sources and improving energy efficiency, access to energy for all becomes possible, regardless of where they live. However, achieving a sustainable energy cycle is not without its challenges. One of the main challenges is the cost of transitioning to a sustainable energy system. This requires investment in new technologies and infrastructure, as well as significant changes to the energy system. It also requires the development of new skills and expertise, particularly in the fields of renewable energy and energy efficiency.

Another challenge is the need for international cooperation and coordination. The sustainable energy cycle cannot be achieved by individual countries alone, as the global nature of the energy system and the impact of climate change means that a coordinated approach is necessary. This requires cooperation and coordination at the international level and the development of joint policies and strategies to support the transition to a sustainable energy system. Achieving a sustainable energy cycle will have far-reaching consequences for the international community, such as reducing dependence on limited fossil fuel resources, improving the effects of climate change, strengthening economic progress, enhancing energy security, and reducing energy deprivation. However, it requires significant investment, international cooperation, and the nurturing of new expertise. Despite the challenges, the benefits of the sustainable energy cycle make it a laudable goal and emphasize the commitment of the international community to achieving cooperation in this endeavor. Establishing the global sustainable energy cycle requires the participation and collaboration of all stakeholders, especially governments. Governments bear a critical responsibility in providing the necessary legal and policy frameworks to facilitate the transition to sustainable energy systems and advance the deployment of environmentally compatible energy technologies. International laws serve as a pivotal framework for promoting sustainable energy practices and mitigating the consequences of unsustainable energy approaches. Thus, through proactive measures to adopt the global sustainable energy cycle, governments can ensure a sustainable future for all.

**Authors' Contributions**

Authors contributed equally to this article.

**Declaration**

In order to correct and improve the academic writing of our paper, we have used the language model ChatGPT.

## Ethical Considerations

All procedures performed in this study were under the ethical standards.

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## Conflict of Interest

The authors report no conflict of interest.

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