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Clean Energy, Just Laws: Unpacking the Legal Backbone of SDG 7 in Indonesia

Yudys Zuama Pratama¹✉, Tajudeen Sani²

¹ Faculty of Law, Universitas Negeri Semarang, Indonesia

² Faculty of Law and Sharia, Villa College, Male, Maldives

✉Corresponding email: yuydszuamapratama1818@students.unnes.ac.id

Abstract

The global pursuit of Sustainable Development Goal 7 (SDG 7) — ensuring access to affordable, reliable, sustainable, and modern energy for all — demands not only technological innovation and financial investment but also a robust legal and regulatory framework. This paper examines the critical role of law in advancing clean energy access in Indonesia, a country with abundant renewable energy potential yet facing complex socio-legal and infrastructural challenges. By analyzing national energy laws, regulatory policies, and international legal commitments, this research investigates how Indonesia's legal system supports or hinders the realization of SDG 7. Special attention is given to the interplay between energy justice, environmental protection, and socio-economic equity in shaping the legal landscape. The study identifies key gaps in current legislation, such as the fragmentation of regulatory authority, the lack of legal incentives for renewable energy investment, and the limited enforcement of sustainability standards at the local level. It also highlights promising initiatives, including the Energy Transition Mechanism



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(ETM), green financing regulations, and community-based renewable energy projects. Through a legal-institutional analysis and stakeholder mapping, this research contributes to understanding how legal reforms can drive systemic change toward inclusive and sustainable energy governance. The findings offer a model for integrating legal design into national energy planning, emphasizing the importance of legal certainty, participatory governance, and policy coherence. Ultimately, this research provides actionable recommendations for strengthening Indonesia's legal framework to unlock the full potential of clean energy and accelerate the achievement of SDG 7.

KEYWORDS *Legal Policy, Energy Transition, Renewable Energy, SDGs 7, Green Energy*

Upaya global dalam mencapai Tujuan Pembangunan Berkelanjutan ke-7 (SDG 7) — menjamin akses terhadap energi yang terjangkau, andal, berkelanjutan, dan modern bagi semua — tidak hanya menuntut inovasi teknologi dan investasi finansial, tetapi juga memerlukan kerangka hukum dan regulasi yang kuat. Artikel ini mengkaji peran krusial hukum dalam memperluas akses energi bersih di Indonesia, sebuah negara dengan potensi energi terbarukan yang melimpah namun menghadapi tantangan sosial, hukum, dan infrastruktur yang kompleks. Melalui analisis terhadap hukum energi nasional, kebijakan regulasi, dan komitmen hukum internasional, penelitian ini menelusuri bagaimana sistem hukum Indonesia mendukung atau justru menghambat pencapaian SDG 7. Perhatian khusus diberikan pada keterkaitan antara keadilan energi, perlindungan lingkungan, dan kesetaraan sosial-ekonomi dalam membentuk lanskap hukum energi. Penelitian ini mengidentifikasi berbagai kesenjangan dalam peraturan yang ada, seperti fragmentasi kewenangan regulasi, ketiadaan insentif hukum bagi investasi energi terbarukan, serta lemahnya penegakan standar keberlanjutan di tingkat lokal. Studi ini juga menyoroti inisiatif-inisiatif yang menjanjikan, termasuk Mekanisme Transisi Energi (ETM), regulasi pembiayaan hijau, dan proyek energi terbarukan berbasis komunitas. Melalui pendekatan analisis kelembagaan-hukum dan pemetaan pemangku kepentingan, riset

ini memberikan kontribusi untuk memahami bagaimana reformasi hukum dapat mendorong transformasi sistem menuju tata kelola energi yang inklusif dan berkelanjutan. Temuan ini menawarkan model integrasi desain hukum dalam perencanaan energi nasional, dengan menekankan pentingnya kepastian hukum, tata kelola partisipatif, dan koherensi kebijakan. Pada akhirnya, riset ini menyajikan rekomendasi strategis untuk memperkuat kerangka hukum Indonesia dalam membuka potensi penuh energi bersih dan mempercepat pencapaian SDG 7.

KATA KUNCI *Kebijakan Hukum, Transisi Energi, Energi Terbarukan, SDGs 7, Energi Hijau*

Introduction

The issue of energy access is very important in sustainable development, as stated in the United Nations Sustainable Development Goals (SDGs). SDG 7 specifically targets to ensure access to affordable, reliable, sustainable, and modern energy for all by 2030.¹ This goal is crucial because energy is the backbone of economic development, social progress, and environmental sustainability. Energy supply affects a wide range of sectors, from health, education, industry, to agriculture, all of which are key drivers of human well-being and economic growth. In recent years, the global community has increasingly recognized the importance of energy access in reducing poverty, driving economic growth, and addressing environmental challenges. For many developing countries, access to energy remains limited or unreliable, creating obstacles to progress and perpetuating the cycle of poverty. Meanwhile, the need to

¹ Wardana, Dian Adi. "Pengaturan Hukum tentang Pemanfaatan Biogas Sebagai Energi Terbarukan Dalam Mendorong Ekonomi Hijau (Green Economy) di Indonesia." *Jurnal Bevinding* 1.05 (2023): 27-42; Imawan, Riswandha, and Al Yasir. "Hak Menguasai Negara: Konsep dan Implikasinya terhadap Penggunaan Energi Terbarukan di Indonesia: Hak Menguasai Negara: Konsep dan Korelasinya terhadap Penggunaan Energi Terbarukan di Indonesia." *Jurnal Konstitusi* 21.1 (2024): 153-168; Hasan, Muhammad H., TM Indra Mahlia, and Hadi Nur. "A review on energy scenario and sustainable energy in Indonesia." *Renewable and sustainable energy reviews* 16.4 (2012): 2316-2328.

switch to renewable energy sources is increasingly urgent due to the threat of climate change which is increasingly real. Therefore, ensuring universal access to Affordable and clean energy is not only an economic imperative, but also a moral obligation.²

Laws play a critical role in achieving SDG 7 by providing a regulatory framework that can guide and facilitate the transition to cleaner and more sustainable energy sources. Legal mechanisms can encourage the adoption of renewable energy technologies, create policies that ensure energy efficiency, and promote equity in energy access. At the same time, the law can also establish protection against environmental damage, ensuring that the transition to sustainable energy does not come at the expense of the long-term health of the planet.³ One of the main ways in which laws affect energy policy is through the creation of regulations that govern energy markets. These regulations can set standards for energy production, distribution, and consumption, ensuring that they are in line with sustainable development goals. For example, laws may require the use of renewable energy in certain sectors or provide financial incentives for individuals and businesses that invest in green technologies. In addition, the law can also ensure that the energy infrastructure built is environmentally friendly and can survive in the long term.⁴

² Thapar, Sapan. "Renewable Energy in India—Policy and Regulatory Framework." *Renewable Energy: Policies, Project Management and Economics: Wind and Solar Power (India)*. Singapore: Springer Nature Singapore, 2024. 13-42; Karim, Ridoan, Farahdilah Ghazali, and Abdul Haseeb Ansari. "Renewable Energy Regulations in Indonesia and India: A Comparative Study on Legal Framework." *Journal of Indonesian Legal Studies* 5.2 (2020): 361-390.

³ Oduro, Portia, N. S. Uzougbo, and M. C. Ugwu. "Renewable energy expansion: Legal strategies for overcoming regulatory barriers and promoting innovation." *International Journal of Applied Research in Social Sciences* 6.5 (2024): 927-944; Abdmouleh, Zeineb, Rashid AM Alammari, and Adel Gastli. "Review of policies encouraging renewable energy integration & best practices." *Renewable and Sustainable Energy Reviews* 45 (2015): 249-262.

⁴ Citelli, Marco, Marco Barassi, and Ksenia Belykh. "Renewable energy in the international arena: legal aspects and cooperation." *Groningen Journal of International Law* 2.1 (2014); Liu, Jia, et al. "Legal systems, national governance and renewable energy investment: evidence from around the world." *British Journal of Management* 32.3 (2021): 579-610.

In many countries, the role of law is not only limited to the regulation of energy markets but also to the protection of the rights of marginalized or underserved communities who have not had adequate access to energy.⁵ Laws can ensure that the energy policies implemented do not add to social inequality, but on the contrary, advance social justice by providing equitable access to energy for all levels of society. Through inclusive policies, the law can provide equal opportunities for villages, remote areas, or other vulnerable groups to enjoy the benefits of clean and affordable energy. In addition, the law can also play a role in encouraging innovation in the energy sector. Countries that have legal policies that support research and development (R&D) in renewable energy technologies, for example, will have a greater chance of creating more efficient and environmentally friendly energy solutions.⁶ The government through fiscal and tax policies can provide incentives for companies that innovate in the development of renewable energy, as well as create a conducive climate for investment in the clean energy sector.

In addition to regulations and policies, supervision and law enforcement are also integral to the successful implementation of SDG 7. Without effective supervision, the energy policy that has been set may not run well. Therefore, strict enforcement of the law in issues such as environmental pollution, misuse of natural resources, or injustice in energy distribution becomes very important. Weaknesses in law enforcement can exacerbate existing energy inequality and hinder progress towards SDG 7 goals. On the other hand, international cooperation in the field of law is also crucial to achieving SDG 7, given the global challenges faced in ensuring clean and affordable energy access. Countries around the world need to work together to share technology, knowledge, and resources to

⁵ Finley-Brook, Mary, and Erica L. Holloman. "Empowering energy justice." *International journal of environmental research and public health* 13.9 (2016): 926; Sovacool, Benjamin K., and Michael H. Dworkin. "Energy justice: Conceptual insights and practical applications." *Applied energy* 142 (2015): 435-444; Sovacool, Benjamin K., Roman V. Sidortsov, and Benjamin R. Jones. *Energy security, equality and justice*. Routledge, 2013.

⁶ Zapata, Sebastian, Mauricio Uriona-Maldonado, and Milton M. Herrera. "The role of renewable energy policy and R&D in renewables diffusion." *Electricity* 5.3 (2024): 526-545.

advance a sustainable energy transition. This is where international law comes into play, by shaping global agreements and frameworks that enable the flow of investment and technology that supports the use of clean energy in developing countries.⁷

Awareness of the importance of the role of law in realizing clean and affordable energy access is deepening along with increasing understanding of the urgency of climate change and environmental sustainability. Every country in the world has a responsibility to contribute to the achievement of SDG 7, and this can be achieved through legal policies that focus on an environmentally friendly energy transition⁸. Developed countries should set an example in implementing policies that support renewable energy, while developing countries should also be given support to develop their renewable energy capacities. However, to achieve SDG 7, the challenges faced are enormous. Starting from high dependence on fossil energy sources, limited resources for investment in renewable energy, to inequality in energy distribution. Therefore, countries need to work hard to design energy policies that can address these challenges, by leveraging the power of law as a tool to drive change and transition to a more sustainable energy system.

Through careful regulation, robust law enforcement, and effective international collaboration, SDG 7 can be achieved. The law is not only an instrument to regulate the energy market, but also as a key driver in realizing a fairer, more prosperous, and more environmentally friendly world. Success in achieving this goal will bring great benefits not only to the present generation but also to future generations who will enjoy a cleaner

⁷ Wibowo, Kunto. "Kontribusi Pembangkit Listrik Energi Terbarukan dalam Mengurangi Emisi Karbon." *Innovative: Journal of Social Science Research* 4.6 (2024): 5140-5153.

⁸ Niu, Xiaoyan, et al. "Environmental governance and cleaner energy transition: Evaluating the role of environment friendly technologies." *Sustainable Energy Technologies and Assessments* 53 (2022): 102669; Chen, Bin, et al. "Pathways for sustainable energy transition." *Journal of Cleaner Production* 228 (2019): 1564-1571; Ammermann, Kathrin, Jens Ponitka, and Christoph Strauß. "Combining climate protection and nature conservation: requirements for an environmentally friendly energy transition." *The European Dimension of Germany's Energy Transition: Opportunities and Conflicts*. Cham: Springer International Publishing, 2019. 311-333.

and more sustainable world.

Method

The research method used in this article is a literature study, which aims to analyze the role of law in realizing access to affordable and clean energy in accordance with SDG 7. This literature review involves the collection and analysis of a variety of relevant written sources, including scientific articles, books, policy reports, and legal documents related to energy regulation, renewable energy policy, and the implementation of SDG 7 in various countries. This research emphasizes on understanding how law can facilitate the transition to clean energy, by leveraging multidisciplinary perspectives, including international law, national law, and energy policy. In addition, this article will also examine various case studies that show the positive impacts or challenges faced in the implementation of sustainable energy policies, focusing on the role of regulation in encouraging innovation, investment, and equitable distribution of energy. In the analysis process, the researcher will identify various legal approaches that have been implemented in various countries, both successful and those that face obstacles in achieving SDG 7. This literature study also aims to explore best practices and challenges in the implementation of clean energy policies, looking at existing regulations, oversight, and the role of the private sector and society in supporting these policies. Using a qualitative approach, this study will relate findings from the existing literature with legal theories that relevant to provide deeper insights into the relationship between law, energy policy, and the achievement of SDG 7. The results of this research are expected to contribute to the development of more effective and inclusive energy policies in achieving sustainable development goals.

Results and Discussion

A. The Role of Law in Energy Access

Sustainable Development Goal (SDG) 7 emphasizes the importance of access to affordable, reliable, sustainable, and modern energy to support inclusive and sustainable global development. This energy access is key to advancing the economic, health, education, and social development sectors, and serves as a key driver for poverty reduction. In achieving this

goal, the role of law is essential, both at the national and international levels, to create policies that support sustainable energy development, regulate distribution, and ensure the sustainability of the energy resources used. The law serves as an instrument to establish a policy framework that facilitates the development of energy infrastructure that is environmentally friendly and accessible to all groups. In many countries, effective energy policies are realized through laws that regulate renewable energy sources, energy distribution, and fair and affordable tariffs. The government should design laws that not only ensure adequate energy supply, but also create incentives for the private sector to invest in the development of clean energy technologies⁹.

At the international level, global treaties and agreements, such as those listed in the Paris Agreement on Climate Change, provide a legal framework for countries in achieving sustainable energy goals¹⁰. Countries should cooperate with each other, adopt harmonious regulations, and implement policies that prioritize the transition to renewable energy. International cooperation governed by international law is essential in ensuring the distribution of the technologies and funding needed to address global energy challenges. One of the important aspects that the law must regulate is equal access to energy. Equitable access to energy requires governments to formulate policies that take into account social and economic inequalities. For example, in many developing countries, the gap in energy access between urban and rural areas is still large. Therefore, legal policies that prioritize the development of energy infrastructure in remote areas need to be implemented so that SDG 7 can be achieved comprehensively.

⁹ Fajar, Habib Ferian, Julfahmi Syahputra, and Khairun Natijah. "Advancing Legal and Policy Strategies for Expeditious Geothermal Energy Integration: A Path towards Clean Energy and Energy Security in Indonesia." *The Indonesian Journal of International Clinical Legal Education* 5.4 (2023): 473-514; Nurhidayah, Laely, et al. "Indonesia's Just Energy Transition: The Societal Implications of Policy and Legislation on Renewable Energy." *Climate Law* 14.1 (2024): 36-66.

¹⁰ Newell, Richard G., and Daniel Raimi. "Global energy outlook comparison methods: 2020 update." *Resources for the Future* (2020): 20-06; Lee, Jong-Uk. "IEA, World Energy Outlook 2020." *KEPCO Journal on Electric Power and Energy* 7.1 (2021): 25-30.

In addition, the law plays an important role in encouraging the development of renewable energy, which is now a major focus in efforts to reduce the negative impacts of climate change. Countries around the world are increasingly aware of the importance of shifting away from environmentally damaging fossil energy sources to cleaner and more sustainable energy. Through regulations that support the use of renewable energy, such as subsidies for solar or wind energy, laws can create incentives that encourage investment in green energy technologies. These policies allow countries to reduce their dependence on fossil energy, which is not only limited to sustainability issues, but also relates to global energy security issues. The role of law in encouraging the development of renewable energy is vital to mitigate the impact of climate change.¹¹ Countries that adopt clean energy policies often provide fiscal incentives, such as subsidies or tax reductions, for companies that invest in renewable energy. This paves the way for the development of more efficient and environmentally friendly technology. In addition, regulations that set strict emission standards are also a driver for companies to innovate and look for technological solutions that can reduce negative impacts on the environment. With regulations regulating emissions, companies are encouraged to reduce their carbon footprints, which further supports global efforts to tackle climate change.

Regulations that support the development of renewable energy also include providing incentives for research and development of green technologies. These research programs can produce innovations in energy storage technology, energy efficiency, and the use of more environmentally friendly raw materials. In addition, collaboration between the public and private sectors in funding and developing renewable energy technologies can accelerate a sustainable energy transition.¹² The law plays a regulatory

¹¹ Karim, Mohammad Ershadul, et al. "Renewable energy for sustainable growth and development: An evaluation of law and policy of Bangladesh." *Sustainability* 11.20 (2019): 5774; Omri, Anis, and Sami Ben Jabeur. "Climate policies and legislation for renewable energy transition: The roles of financial sector and political institutions." *Technological Forecasting and Social Change* 203 (2024): 123347.

¹² Cantarero, Maria Mercedes Vanegas. "Of renewable energy, energy democracy, and sustainable development: A roadmap to accelerate the energy transition in developing countries." *Energy Research & Social Science* 70 (2020): 101716; Saleh,

role that provides clear framework for investment and innovation in the energy sector, ensuring that the development of environmentally friendly technologies is driven in an appropriate and efficient manner. On the other hand, energy price regulation is also very crucial in ensuring energy accessibility for the wider community. In many countries, one of the biggest challenges faced is high energy prices which can be an obstacle for low-income households to access the electricity and fuel they need. Under these conditions, the law must be able to provide protection for consumers by setting reasonable energy prices and ensuring that these prices do not burden the public, especially those in vulnerable groups. Fair and transparent energy pricing policies will help reduce inequalities in energy access in society.

In this context, the law plays a role in ensuring that the energy subsidy mechanism is accessible to those who need it most. For example, the state can provide energy subsidies to low-income households or areas that are difficult to reach by energy infrastructure. These subsidies can ensure that all levels of society have equal access to energy, which is a basic necessity for daily life. The legal protections that exist for these groups of people are very important, so that they are not left behind in terms of access to affordable energy. In addition to subsidies, energy tariff regulations must also be designed to address fluctuations in energy prices that can burden consumers. A transparent tariff setting policy based on the principles of social justice will help maintain the stability of energy prices. In many countries, energy prices are often affected by external factors such as political tensions or fluctuations in global market prices. Therefore, the law needs to create a supervisory system that ensures that energy prices remain stable and do not burden consumers. These regulations should also involve protection for consumers against monopolistic practices or abuse of power by energy providers¹³.

Hosam M., and Amal I. Hassan. "The challenges of sustainable energy transition: A focus on renewable energy." *Applied Chemical Engineering* 7.2 (2024): 2084.

- ¹³ Yudiantono, Yudiantono, Jaka Windarta, and Adiarso Adiarso. "Sustainable Long-Term Energy Supply and Demand: The Gradual Transition to a New and Renewable Energy System in Indonesia by 2050." *International Journal of Renewable Energy Development* 12.2 (2023); Erdiwansyah, Erdiwansyah, et al. "Investigation of availability, demand, targets, and development of renewable

In addition, regulations related to sustainability in energy supply must ensure that the energy supplied does not damage the environment¹⁴. One of the main challenges in the provision of renewable energy is the need for suitable infrastructure, be it for solar, wind, or biomass energy. The law needs to ensure that this infrastructure development is carried out by taking into account the ecological impacts that may occur, such as impacts on local flora and fauna or potential damage to ecosystems. Regulations related to spatial and environmental planning must be involved in every stage of renewable energy development to maintain a balance between development and environmental sustainability. Furthermore, the role of law in introducing quality standards in the energy sector is essential to prevent misuse or unsafe supply of energy to consumers. Regulations governing fuel and energy quality must be in place to ensure that the energy supplied meets high safety and efficiency standards. This is particularly relevant in the renewable energy sector, where the quality of the technology and systems used can have a major impact on its performance and safety. With clear legal standards, renewable energy manufacturers can ensure that their products are safe and efficient for public use.

Furthermore, the law can also introduce policies that support changes in consumer behavior in consuming energy. For example, through awareness campaigns supported by the legal framework, people can be invited to be more energy efficient and use renewable energy sources. The government can provide incentives to households or companies that invest in green energy systems, such as solar panels or small wind turbines, by offering tax reductions or other subsidies. This kind of policy will encourage people to switch to renewable energy, thereby reducing dependence on fossil energy that is harmful to the environment¹⁵. At the

energy in 2017–2050: a case study in Indonesia." *International Journal of Coal Science & Technology* (2021): 1-17.

¹⁴ Qudrat-Ullah, Hassan. "A review and analysis of green energy and the environmental policies in South Asia." *Energies* 16.22 (2023): 7486.

¹⁵ Huhta, Kaisa. "The contribution of energy law to the energy transition and energy research." *Global Environmental Change* 73 (2022): 102454; del Guayo, Inigo, and Álvaro Cuesta. "Towards a just energy transition: a critical analysis of the existing

global level, international law also plays a very important role in supporting the clean energy transition. With international agreements regulating carbon emissions and more sustainable management of natural resources, countries can work together to achieve global goals in terms of climate change. These agreements provide a framework that supports the transition to renewable energy, by regulating the sharing of responsibilities between countries to reduce their carbon footprints. In addition, international agreements can also facilitate the transfer of renewable energy technologies from developed countries to developing countries.

For example, international agreements such as the Paris Agreement provide guidelines for countries to reduce greenhouse gas emissions and invest in renewable energy. International law provides a mechanism to monitor and assess the progress that countries have made in achieving their emission reduction targets.¹⁶ With this global pressure, countries are expected to be more committed to developing renewable energy and reducing dependence on unsustainable fossil energy, the role of law in the renewable energy sector is very complex and covers various aspects, ranging from fiscal incentives, price regulation, consumer protection, to environmental management policies. With comprehensive and integrated regulations, countries can ensure that the transition to renewable energy can be carried out in a fair, efficient, and sustainable manner. In addition, the law also ensures that the energy sector functions properly to meet the needs of the community, while still paying attention to environmental sustainability and social justice.

Laws can also play a role in the sustainable management of natural energy resources. Countries need to have regulations that regulate the exploitation of natural resources such as oil, gas, and coal, so that there is no environmental damage that can threaten the survival of future

policies and regulations in Europe." *The Journal of World Energy Law & Business* 15.3 (2022): 212-222.

¹⁶ Lima, M. A., et al. "Renewable energy in reducing greenhouse gas emissions: Reaching the goals of the Paris agreement in Brazil." *Environmental Development* 33 (2020): 100504; Delbeke, Jos, et al. "The paris agreement." *Towards a climate-neutral Europe*. Routledge, 2019. 24-45; Streck, Charlotte, Paul Keenlyside, and Moritz Von Unger. "The Paris Agreement: a new beginning." *Journal for European Environmental & Planning Law* 13.1 (2016): 3-29.

generations. Legal policies governing the exploitation of natural resources must prioritize sustainability and involve communities in the decision-making process to ensure wise and fair use. In many countries, governments have implemented regulations that require energy companies to conduct environmental impact assessments (EIAs) before undertaking major projects.¹⁷ This is an important step to ensure that energy development does not damage the environment, which can ultimately threaten energy security and public health. These regulations also help countries to reduce pollution and greenhouse gas emissions that contribute to climate change.

One of the key challenges in achieving SDG 7 is to raise public and private sector awareness of the importance of the transition to sustainable energy. Therefore, the law can also serve as a tool to socialize energy policy and provide education to the public. Through regular campaigns and training for the energy industry, the law can encourage communities to switch to more environmentally friendly and efficient energy solutions. Private sector participation in renewable energy development is also very important.¹⁸ Countries can design regulations governing public-private partnerships (PPPs) to encourage investment in clean energy projects. The law can provide legal certainty to energy investors and entrepreneurs, as well as regulate effective funding mechanisms for renewable energy projects. This partnership enables collaboration between the government and the private sector to achieve SDG 7 more efficiently.

Furthermore, the law plays a role in supervising the implementation of energy policies so that there are no abuses or failures in achieving goals. The establishment of an independent energy supervisory body is essential to ensure that policies taken are in accordance with the principles of sustainability and fairness. The agency can evaluate the performance of the energy sector, provide recommendations for improvement, and ensure

¹⁷ Morgan, Richard K. "Environmental impact assessment: the state of the art." *Impact assessment and project appraisal* 30.1 (2012): 5-14; Wood, Chris. *Environmental impact assessment: a comparative review*. Routledge, 2014.

¹⁸ Zografakis, Nikolaos, Angeliki N. Menegaki, and Konstantinos P. Tsagarakis. "Effective education for energy efficiency." *Energy Policy* 36.8 (2008): 3226-3232; Stagl, Sigrid. "Multicriteria evaluation and public participation: the case of UK energy policy." *Land use policy* 23.1 (2006): 53-62.

transparency in the use of energy resources. It is also important to remember that the role of law in achieving SDG 7 is not only limited to the energy sector, but is also closely related to other sectors, such as transportation, industry, and agriculture. The integration of energy policy with other sector policies will ensure that a sustainable energy transition can be achieved comprehensively and does not disrupt the social and economic balance. This means that the law should regulate all relevant sectors to create a more efficient and environmentally friendly energy system.

The law can also strengthen the development of innovation and research in the energy sector through regulations that support the research and development of new energy technologies. Countries need to have policies that encourage research in the field of renewable energy technologies, such as solar, wind, and biomass energy. Legal support in the form of tax incentives or funding for research institutions and companies investing in renewable energy technology will accelerate innovation and adoption of more efficient and environmentally friendly technologies. In this case, the law acts as a facilitator that not only provides a clear regulatory framework, but also creates an ecosystem that supports research and development in this sector. One way to encourage research and innovation is to create a legal framework that facilitates collaboration between the public and private sectors. Many technological innovations in the field of renewable energy come from partnerships between universities, research institutes, and industry. The law can ensure that there are incentives for this kind of collaboration, such as clear protection of intellectual property rights and adequate financing mechanisms. In addition, the government can also support the development of new energy technologies by providing competitive research funds, which can be used by companies and research institutions to develop new technologies that are cheaper and more efficient.

In this context, regulations that support technology development should also include policies that can lower the cost of producing renewable energy. Technologies such as solar panels, wind turbines, and energy storage systems often face high-cost constraints. Laws can play a role in driving these cost reductions by creating subsidy or tax relief schemes for companies that invest in the development of renewable energy technologies. By creating these financial incentives, the state can accelerate

the adoption of more efficient and affordable technologies in the energy sector, which will expand people's access to clean and affordable energy. As global dynamics change, the role of law in supporting the achievement of SDG 7 will become increasingly important. One of the major challenges facing today is the rapid global energy transition and its impact on various sectors of the economy. Countries must design policies that are flexible and adaptive to rapid technological developments and increasingly urgent climate change. This requires regular regulatory updates to remain relevant to changing conditions. For example, countries should be able to adjust their energy policies to take into account new technologies that can reduce carbon emissions or improve energy efficiency.

Climate change and the increasingly urgent energy crisis also demand a swift and effective legal response. Countries must be able to respond to these challenges with policies that not only mitigate the impact of climate change, but also mitigate the increasingly complex global energy crisis. Laws can provide a framework for a just transition, by ensuring that the transition to renewable energy is phased out and does not burden the most vulnerable groups of people. In this way, the law can help countries achieve the SDG 7 goals in an inclusive and sustainable manner, without leaving anyone behind. In addition, the law also needs to ensure that the renewable energy technology applied is not only efficient but also environmentally friendly and sustainable. Strict monitoring of the environmental impact of renewable energy projects needs to be carried out to ensure that even though the energy sources used are cleaner, the development process still takes into account other sustainability factors. The government needs to ensure that existing environmental regulations can regulate the long-term impacts of renewable energy technology, so that there is no environmental damage that can harm society in the future.

Thus, the role of law in achieving SDG 7 is very large and inseparable. Through inclusive and sustainable policies, the law can ensure that all countries, regardless of their economic and social conditions, have equal access to affordable, reliable, sustainable, and modern energy. Successful achievement of SDG 7 requires synergy between laws, government policies, and the commitment of the private sector and society to transform towards a more sustainable energy system.

B. Energy Policy Challenges and Opportunities

The implementation of legal policies to support the clean and renewable energy transition towards SDG 7 presents complex challenges, but also opens up many opportunities for countries around the world to transform towards more sustainable energy systems¹⁹. One of the main challenges is the strong reliance on established and cheaper fossil energy in many countries, which makes it difficult to transition quickly to renewable energy sources. The fossil energy industry already has extensive infrastructure and is managed by large corporations with strong political influence. Therefore, changing this system requires time and clear and in-depth policies. One of the biggest challenges in the energy transition is the need for large investments in renewable energy infrastructure. Countries that do not yet have established renewable energy systems must allocate considerable funds to build the necessary infrastructure, such as wind, solar, and biomass power plants. The law plays a role in creating a favorable investment climate through fiscal incentives, subsidies, or regulatory easements to attract investors. However, the main challenge is how to create policies that not only attract investors but also ensure environmental and social sustainability.²⁰

Slow and complex bureaucracy in many countries can also be an obstacle in the implementation of renewable energy policies. Complicated licensing processes, ambiguities in regulations, and lack of coordination between government agencies often slow down the development of clean energy projects. Therefore, reforms in the licensing process and improving administrative efficiency are key in accelerating the energy transition. In this case, legal policies that simplify the licensing process and create a transparent system can help overcome these barriers. In addition, the lack

¹⁹ Obeng-Darko, Nana Asare. "Renewable energy and power: a review of the power sector reform and renewable energy law and policy nexus in Ghana." *Africa Review* 11.1 (2019): 17-33.

²⁰ Häder, Donat-Peter, Ruth Hemmersbach, and Michael Lebert. *The law of energy for sustainable development*. Vol. 40. Cambridge University Press, 2005; Kim, Rakhyun E. "The nexus between international law and the sustainable development goals." *Review of European, Comparative & International Environmental Law* 25.1 (2016): 15-26.

of public understanding of the benefits of renewable energy is also a challenge in the clean energy transition.

In many countries, people still consider renewable energy to be an expensive and less reliable solution compared to fossil energy. Laws and policies must be able to socialize the benefits of renewable energy, both in terms of lower long-term costs, positive impacts on the environment, and the potential for new job creation in the green energy sector.

On the other hand, a significant challenge in achieving SDG 7 goals related to clean and affordable energy is the social and economic inequalities that exist in energy access. In many developing countries, especially in rural and remote areas, access to renewable energy is still limited. These inequalities are often caused by a lack of adequate infrastructure, limited funding, and low levels of public knowledge about renewable energy technologies. In this context, legal policies that can support the development of renewable energy infrastructure in these areas are essential so that SDG 7 can be achieved equitably. Without the right policies, the energy gap between urban and rural areas will widen, which will have an impact on inequality in terms of social and economic welfare. The importance of legal regulation in addressing this problem is to create policies that encourage investment in areas with limited access to energy. One way that can be done is to provide incentives for renewable energy companies to develop clean energy projects in areas that are not yet reached. For example, through the provision of tax rebates or special subsidies for renewable energy projects in remote areas. In addition, the law could introduce financing schemes that make it easier for people to invest in renewable energy technologies, such as microfinance or low-interest loans for the installation of solar panels or biogas systems in households. With this kind of legal policy, it is hoped that it can create equality in access to clean energy in all regions.

However, these achievements will not be realized without strong cooperation between the government, the private sector, and local communities. The government must play a role as a policy director and the main driver in creating a legal framework that supports the development of

renewable energy²¹. The private sector, on the other hand, has the capacity to provide technology and innovation in the renewable energy sector. For this reason, collaboration between the two is very important in creating the right solution for each region. In remote areas, for example, a community-based approach that involves local communities in the planning and implementation of renewable energy projects can improve the effectiveness and sustainability of such projects. The community involved early in this process will feel ownership and responsibility for the success of the project, which will increase the rate of adoption of the technology. At the policy level, governments can involve local communities in determining the type of renewable energy that best suits geographical conditions and local needs. For example, in areas with high wind potential, the construction of wind turbines can be a better option than solar panels. Therefore, policies based on local needs, involving community participation, will accelerate the process of renewable energy transition and reduce energy access gaps between regions. In addition, it is important for the government to ensure adequate training for local communities so that they can manage and maintain the renewable energy infrastructure that is being built²².

The biggest opportunity in the implementation of legal policies for the renewable energy transition is the potential to create new jobs. The renewable energy industry, such as solar, wind, and biomass, requires a skilled workforce for infrastructure construction, installation, and maintenance. This provides an opportunity for local communities to get better and sustainable jobs, which will have a direct impact on improving

²¹ Maulidia, Martha, et al. "Rethinking renewable energy targets and electricity sector reform in Indonesia: A private sector perspective." *Renewable and Sustainable Energy Reviews* 101 (2019): 231-247.

²² Lestari, Setyani Dwi, et al. "Comparison and implementation of environmental law policies in handling climate change in ASEAN countries: a comparative study of Indonesia, Malaysia, and Thailand." *International Journal of Energy Economics and Policy* 14.2 (2024): 687-700; Yuliyanto, Eko, Maftukhatul Muna Alatiqoh, and Ahmad Husain Alfaruq. "Inter-correlation between Human Rights and Environmental Justice: A Discourse of Right to a Good and Healthy Environment in Indonesia." *Indonesian Journal of Environmental Law and Sustainable Development* 1.2 (2022): 213-236.

the local economy. Governments can design policies that support the training of skilled workers in the field of renewable energy, such as technical training programs for the installation of solar panels or wind turbines, which will open up new job opportunities in the sector. Training of skilled workers in the renewable energy sector not only improves people's ability to manage new technologies, but also helps them adapt to a greener and more sustainable energy sector. These training programs can involve collaboration between governments, educational institutions, and the private sector to provide a curriculum that is relevant to the needs of the renewable energy industry. Thus, the legal policies that support this training will contribute to reducing unemployment, improving job skills, and accelerating the transition to a green economy. The government can also provide incentives for companies that invest in workforce training or that create jobs in the renewable energy sector.

By creating new jobs in the renewable energy sector, the government not only supports the achievement of SDG 7 but also contributes to the achievement of SDG 8 goals, namely decent work and economic growth. The renewable energy sector offers sustainable economic opportunities, which not only reduce dependence on fossil energy, but also reduce the social and economic impacts of inequality of energy access. For example, in some countries that have adopted green energy policies, such as Germany and Denmark, the renewable energy sector has created thousands of new jobs, which has a positive impact on the local economy.²³ In addition, legal policies must also encourage increased collaboration between countries in the development of renewable energy. Given that many countries are in a geographically interconnected position and have the same renewable energy potential, such as wind or solar, international cooperation in building renewable energy infrastructure is essential. Countries with greater capacity in the development of renewable energy technologies can assist developing countries in technology transfer and

²³ Wang, William Hongsong, Vicente Moreno-Casas, and Jesús Huerta de Soto. "A free-market environmentalist transition toward renewable energy: The cases of Germany, Denmark, and the United Kingdom." *Energies* 14.15 (2021): 4659; Shuvalova, Olga V., and Maria-Joana Stoyanova. "Successes of Denmark and Germany in the field of transfer of its economies from fossil to alternative energy sources." *RUDN Journal of Economics* 28.2 (2020): 315-333.

capacity building. International agreements that support the development of renewable energy, whether in the form of funding, technology transfer, or technical cooperation, will accelerate the global transition to cleaner energy use.

Taking into account all the challenges and opportunities that exist, a comprehensive and sustainability-based legal policy is essential in ensuring that the renewable energy transition can run smoothly. The law should provide a solid foundation for governments, the private sector, and communities to work together in developing sustainable energy infrastructure, upskilling the workforce, and reducing energy access inequalities. Legal policies in favor of renewable energy will ensure that the transition to green energy not only benefits a small minority, but benefits the entire community, including those living in remote and underdeveloped areas. In addition, proper regulation in the renewable energy sector must also include effective monitoring and evaluation mechanisms to ensure that the renewable energy projects that are carried out are not only efficient, but also sustainable. Good oversight can ensure that funds used for the development of renewable energy infrastructure are on target and used efficiently. Periodic evaluations of renewable energy projects are also important to assess their impact on the local, social, and environmental economies, so that policies can be adapted to evolving needs.

In order to ensure the successful and sustainable transition of renewable energy, it is important for the law to create a system that allows for the active participation of communities at every stage of the process. By directly involving the community, legal policies will be easier to accept and implement, and have a greater positive impact. Community participation in decision-making will give a sense of ownership to renewable energy projects, which will increase awareness of the importance of sustainability and the use of clean energy. Another opportunity lies in technological innovation that can be driven by legal policies that support research and development. Countries can regulate incentives for companies or research institutions that focus on the development of renewable energy technologies. This policy will not only accelerate the energy transition but also open up opportunities to create new technologies that are more efficient and environmentally friendly. It also allows countries to become leaders in the green energy industry, which has enormous global market potential. Legal policy

can also play an important role in creating a fairer tariff system for renewable energy. Many countries, especially those that are still dependent on fossil energy, have energy tariff systems that do not reflect the true costs of renewable energy production. Through policies that adjust tariffs and tax carbon emissions or fossil energy, governments can provide economic incentives for consumers and producers to switch to cleaner, more efficient energy sources. It also has the potential to reduce dependence on fossil energy subsidies that strain the state budget²⁴.

On the other hand, legal policies that support the renewable energy transition can encourage the creation of stronger public-private partnerships. Countries can design regulations that allow collaboration between governments and the private sector in building clean energy infrastructure. These partnerships can accelerate the construction of renewable energy projects, reduce the burden on the country's budget, and provide opportunities for companies to invest in this rapidly growing sector. However, one of the major challenges that needs to be faced is the impact of the energy transition on sectors that depend on fossil energy. In some countries, the oil and gas industry recognized as a major source of income and employment. Therefore, legal policies must be able to regulate a just and responsible transition, by providing retraining for affected workers and supporting economic diversification so that other sectors can develop. It also requires attention to social welfare for communities that depend on the fossil industry.²⁵

An equally important opportunity is in terms of creating a more efficient renewable energy market. Policies that support green energy trade between

²⁴ Chhachhar, Varun, and Niharika Kumar. "Balancing Digital Rights with Environmental Sustainability: A Move Towards Climate Justice." *Lex Scientia Law Review* 8.2 (2024): 637-676; Putro, Widodo Dwi, and Adriaan W. Bedner. "Ecological Sustainability from a Legal Philosophy Perspective." *Journal of Indonesian Legal Studies* 8.2 (2023): 595-632.

²⁵ See also Wijayanto, Adi, Hatta Acarya Wiraraja, and Siti Aminah Idris. "Forest Fire and Environmental Damage: The Indonesian Legal Policy and Law Enforcement." *Unnes Law Journal* 8.1 (2022): 105-132; Arsyiprameswari, Natasya, et al. "Environmental Law and Mining Law in the Framework of State Administration Law." *Unnes Law Journal* 7.2 (2021): 347-370; Nyekwere, Empire Hechime, et al. "Constitutional and judicial interpretation of environmental laws in Nigeria, India and Canada." *Lex Scientia Law Review* 7.2 (2023): 905-958.

countries, such as carbon emissions trading systems, can accelerate the energy transition globally. Countries can create policies that regulate renewable energy trading mechanisms or provide incentives for countries that produce more green energy. It can open up new markets and accelerate the adoption of clean energy technologies around the world. Challenges in the energy transition are also related to the need for flexible and intelligent energy grid systems. Renewable energy, such as solar and wind energy, has an intermittent (irregular) nature, which means the energy supply can vary depending on weather conditions. For this reason, legal policies must include the development of power grids that can accommodate renewable energy efficiently and can regulate its distribution fairly. Smart grid technology is one of the solutions that can be applied to manage energy supply more efficiently and minimize waste²⁶.

With regard to climate change, legal policies can also include regulations governing the reduction of greenhouse gas emissions. The transition to renewable energy is an important part of efforts to reduce emissions of carbon dioxide and other greenhouse gases that contribute to global warming. The law can set ambitious emission reduction targets and impose sanctions on countries or companies that fail to meet those targets. This incentivizes all parties to adapt to more environmentally friendly energy policies. Overall, the implementation of legal policies to support the clean and renewable energy transition has interrelated challenges and opportunities. With the right regulations, countries can mitigate these challenges and optimize opportunities to create a more sustainable and inclusive energy future. The success of implementing this policy will depend heavily on political will, international collaboration, and commitment from all sectors to support a just and environmentally friendly energy transition.

²⁶ Hasan, Muhammad H., TM Indra Mahlia, and Hadi Nur. "A review on energy scenario and sustainable energy in Indonesia." *Renewable and sustainable energy reviews* 16.4 (2012): 2316-2328; Taqwa, Ahmad. "Higher education role in supporting Indonesian government policy in developing renewable energy." *Journal of Physics: Conference Series*. Vol. 1167. No. 1. IOP Publishing, 2019; Arifin, R., R. Rodiyah, and R. Wulansarie. "Climate Justice in Indonesian Environmental Protection: Past, Present and Future Challenges." *IOP Conference Series: Earth and Environmental Science*. Vol. 1248. No. 1. IOP Publishing, 2023.

Conclusion

The implementation of legal policies to support the clean and renewable energy transition has significant challenges and opportunities. On the one hand, dependence on fossil energy, inequality of energy access, and the need for large investments in renewable infrastructure are the main obstacles. However, on the other hand, policies that support investment, workforce training, technology development, and fair tariff setting can open up great opportunities for the growth of the renewable energy sector. In addition, collaboration between governments, the private sector, and communities, along with equitable policies, can create a more efficient, sustainable, and inclusive energy system to achieve SDG 7.

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The authors state that there is no conflict of interest in the publication of this article.

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