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New and Renewable Energy: Ensuring the Hydropower Development Policy Meets the Community and the Environmental Participation Based on the Paris Agreement

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Abstract: *Energy demand is rapidly increasing, following population growth and economic trends, including the demand for electrical energy. Indonesia seeks to transition to the use of new and renewable energy to supply its demand for electricity. The national strategic program to construct 65 dams in 2023 is the fundamental foundation for the government's ability to bring about this massive development. One of the many essential uses of reservoirs is as a source of hydropower energy. However, have been many cases of rejection by local communities that do not consider themselves to have been fairly consulted for or participating in the development process. Another premise of this rejection is founded on environmental issues related to the Paris Agreement. This article focuses on meeting challenges to community and environmental participation based on the Paris Agreement. New and renewable energy policies incorporate novel regulations pertaining to the government's authority to work on the new renewable energy projects. Hydropower development projects fall under the government's efforts to switch to new sources of renewable energy. Insufficient involvement of the local community in development and activities, to the extent that the information and comprehension on where the hydropower dams are expected to be built are exceptionally lacking but are also, due to the impact of the development toward the environment, the main source of refusal from the local community. Finally in accordance with the Paris Agreement, insufficient attention toward the landscape will likely impair the ability to create future hydropower development projects.*

Keywords: *energy; environment; community participation; hydropower plants.*

I. Introduction

Energy use in Indonesia is currently dominated by non-renewable energy derived

from fossils, especially crude oil and coal.[1] The continued use of non-renewable energy will render it more likely that it will become unavailable. Thus, switching to novel sources of renewable energy is considered the best alternative as the protection of environment action increase. [2] The use of new and renewable energy must be the main concern of the Indonesian government, not only to reduce the use of fossil energy but also to actualize a clean and environment-friendly energy. [3] This is in accordance with the ASEAN agreement, which stipulates 23% of primary energy is to derive from modern and sustainable renewable energy sources by 2025. [4] The government of Indonesia has authority over energy resource affairs in Indonesia, as stipulated in the 1945 Constitution of the Republic of Indonesia, Article 33 Paragraph (3), "Earth and water and natural resources contained therein are controlled by the state and used for the people's welfare." Article 33 paragraph (3) of the 1945 Constitution of the Republic of Indonesia explicitly specifies three important elements, that is:[5] (1) the substance (natural resources); (2) the status (controlled by the state); and (3) the main objective (for the people's welfare). Thus, affairs of natural resources that are fundamental to the life of the nation and the state are controlled and developed by the state.

The national demand for electricity is rapidly increasing. This is due to in part to the undeniably high population growth, leading to increased demand for electricity from the household sector. The national electrification ratio is still 99.40%,[6] which means that not all the regions in the Republic of Indonesia are electrified. Thus, the demand for electricity is expected to grow even more rapidly if, as is outlined in future projections, all territories in Indonesia become electrified and vehicles for private transportation also begin to use electricity.

Using data recorded by the Ministry of Energy and Mineral Resources (ESDM), the necessary coal reserves to cover national electricity demand for the next 65 years are available, for a current reserve of 38.84 billion tons, assuming an average use of 600 million tons per year.[7] This means that an electricity generation crisis could occur, based on current usage, if no other generation is brought online, such as hydroelectric power plants (PLTAs), geothermal power plants, and renewable energy power plants, if no new coal reserves are found. The government needs to reduce national

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1 Muhamad Azhar et al., "The New Renewable Energy Consumption Policy of Rare Earth Metals to Build Indonesia's National Energy Security," in *E3S Web of Conferences*, vol. 68 (EDP Sciences, 2018), 3008.

2 Omar Ellabban, Haitham Abu-Rub, and Frede Blaabjerg, "Renewable Energy Resouces: Current Status, Future Prospects and Their Enabling Technology," *Renewable and Sustainable Energy Review* 39 (2014): 749.

3 Aan Jaelani, Slamet Firdaus, and Juju Jumena, "Renewable Energy Policy in Indonesia: The Qur'anic Scientific Signals in Islamic Economics Perspective," *International Journal of Energy Economics and Policy* 7, no. 4 (2017).

4 Satya Widya Yudha and Benny Tjahjono, "Stakeholder Mapping and Analysis of the Renewable Energy Industry in Indonesia," *Energies* 12, no. 4 (February 2019): 602, https://doi.org/10.3390/en12040602.

5 Achmad Zen Umar Purba, "Kepentingan Negara Dalam Industri Perminyakan Di Indonesia: Hukum Internasional, Konstitusi, Dan Globalisasi," *Indonesian J. Int'l L.* 4 (2006): 252.

6 Perss Release Nomor: 410.Pers/04/Sji/2021, "Ministry of Energy and Mineral Resources of the Republic of Indonesia," 2021.

7 Denis Meilanova Riantiza, "Cadangan Batu Bara Indonesia Masih Cukup Untuk 65 Tahun," accessed August 30, 2022, https://ekonomi.bisnis.com/read/20210727/44/1422298/cadangan-batu-bara-indonesia-masih-cukup-untuk-65-tahun#:~:text=Bisnis.com%2C JAKARTA—Indonesia,mencapai 38%2C84 miliar to.

dependence on coal. Renewable energy that can be drawn on in an integrated and sustainable manner in its management and production for domestic demand has the potential to replace fossil fuel energy. Indonesia has the potential to produce 716 GW of energy from solar photovoltaic, hydropower, bioenergy, geothermal, ocean wave, and wind power. However, Indonesia continues to have financing difficulties, due to the high investment costs for the utilization of new and renewable technologies.[8]

The power plant development program is an electricity development project that is expected to be able to maximally implement the *Benefit Principle* in electricity development, as set forth in the Law Number 30 of 2009 Concerning Electricity. The benefit principle here means that the results of electricity development must be available, as much as possible, for the welfare and prosperity of the people.[9] Law No. 30 of 2009 Concerning Electricity states that the national work for providing electricity for the public interest is to be carried out by state-owned enterprises (SOE), regionally-owned enterprises, private enterprises, saving and credit cooperative units, and non-governmental organizations. The state-owned enterprise that is given the first priority to provide electricity throughout the nation is the State Electricity Company (PLN).

During President Joko Widodo's term in office, one of his top priority programs was the construction of dams in various areas that can be used as irrigation to support agriculture and as PLTAs to lessen state dependency on coal energy. However, during the construction of the hydroelectric dams, issues arising from the local community cannot be avoided. For instance, the construction of the Bener Dam in Purworejo Regency was rejected because of issues arising in the AMDAL documents that contained the construction permission issued by the Serayu Opa River Basin Center (BBWSSO). This made it clear that some permits had been granted without the involvement of and consent from local communities.[10] Rejection by the local community due to their lack of involvement in the development process was also seen in Rendubutowe Village, Nagekeo Regency, East Nusa Tenggara.[11] These two rejections indicate that the government is too arbitrary in its policy-making process and avoids involving the local community, especially with respect to land conversion, compensation agreements, and studies of potential environmental impacts (AMDAL) that may impact the community.

The environmental impacts that are feared by the local community must be considered by the government, as this forms part of sustainability and human rights that must be fulfilled, especially the right to have a good

[8] Udin Udin, "Renewable Energy and Human Resource Development: Challenges and Oppurtunities in Indonesia," *International Journal of Energy Economics and Policy* 10, no. 2 (January 2020): 233–37, https://doi.org/10.32479/ijeep.8782.

[9] "Explanation of Article 2 (1) a of Law No 30 of 2009 Concerning of Electricity," n.d.

[10] Rizky Nur Laily M, "Mereka Yang Tersisih Dan Terancam Pembangunan Bendungan Tertinggi Di Indonesia," https://www.merdeka.com/, 2021, https://www.merdeka.com/jateng/mereka-yang-tersisih-dan-terancam-pembangunan-bendungan-tertinggi-indonesia.html.

[11] Joni Nura, "Pro Kontra Pembangunan Waduk Lambo, 2 Suku Adat Nagekeo Nyaris Bentrok," daerah.sindonews.com, 2022, https://daerah.sindonews.com/read/723771/174/pro-kontra-pembangunan-waduk-lambo-2-suku-adat-di-nagekeo-nyaris-bentrok-1648206235.

and healthy environment.[12] If an AMDAL study does not consider the local community, then the challenge could come to pose a threat to the local community related to the environmental impact.

In addition, the Village Law 6 of 2014 states that the village has the rights of origin and traditional rights to manage the interests of the local community; therefore, every development project, especially those which have a direct impact on the village community, requires the involvement of the local community. According to Hetifah, to carry out a development project, it is necessary to have local community participation.[13] This emphasizes that in making policy, the local community that is most concerned must be involved in the activities to ensure greater cohesiveness between the community and the government.

However, some local opposition occurred because the government's decision making was hid behind the excuse that these dams are part of a national strategic program, including enhancing agricultural irrigation compliance and promoting the public interest and accelerating development. In the midst of this, the government often failed to actualize the role of the local community, and they were not given adequate space to express their own needs and aspirations. Thus, the rejections occurred during the development process, as local communities were concerned that the development was being undertaken merely to satisfy the State's interests without considering the impact on the given community. To overcome these problems, the government as a stakeholder needs to involve local communities and provide them with adequate space to express their needs and aspirations.

Azhar found that energy management requires environmental functions need to be preserved. Meanwhile, some rejections have come about from the community as the development of energy sources causes environmental damage.[14] In addition, as landscape studies in energy management are lacking, this study was conducted to fill this gap. Community involvement in new and renewable energy policies must also be investigated. Ramdani indicated that systematic policies needed to be developed with the involvement of all stakeholders for new energy projects. The stages of community participation in electricity projects have not been studied beginning from planning, preparing the AMDAL, to project implementation, causing problems in the development of electrical energy sources and community resistance. Thus, this study seeks to determine how the development of renewable energy sources can be carried out in a way that involves the community in all stages and that takes into account all of the elements of the landscape.

II. Legal Materials and Methods

This article examines policies for regulating new and renewable energy with an emphasis

[12] "Koesnadi Hardjasoemantri Stated That the Right to the Environment Is a Subjective Right That Is Owned by Everyone. The Realization of the Right to a Good and Healthy Environment Is Actually an Effort to Realize the Fulfillment of Other Human Rights, Espec," Koesnadi Hardjosoemantri, *Hukum Lingkungan* (Yogyakarta: GadjahMada University Press, 2005); Kadek Cahya Susila Wibawa, "Mengembangkan Partisipasi Masyarakat Dalam Perlindungan Dan Pengelolaan Lingkungan Hidup Untuk Pembangunan Berkelanjutan," *Administrative Law & Governance Journal* 85, no. 1 (2019): 85.

[13] "Participation as the Involvement of People Voluntarily without Pressure from Government External Interests.," n.d.

[14] Muhamad Azhar, "Implementation of New Energy and Renewable Energy Policies in the Context of National Energy Security," *Administrative Law and Government Journal* 1, no. 4 (2018): 405.

on the concept of the community and environmental involvement. The literature study was carried out with secondary data obtained from existing regulations, as well as expert opinions obtained from energy-related journals and books. Content analysis is conducted on the regulations on energy.

III. Results and Discussion

New and Renewable Energy Policy on Electricity

Energy is defined as follows in a dictionary of the Indonesian language: Energy is the ability to perform activities or works (e.g., for electrical and mechanical energy); power (strength) that can be used to carry out various activity processes—for example, it can be part of a material or not bound to a material (such as sunlight).[15] That is, energy can be used to carry out a range of activities, in forms including fuel, electricity, mechanical energy, and heat. Energy must always come from an energy source. An energy source is something that has the ability to produce energy, either directly or through a conversion or transformation process.[16]

Meanwhile, according to the Law Number 30 of 2007, listed as chapter I of the general provisions of Article 1 number (1), energy means the capacity to perform some works that may take the form of heat, light, mechanical, chemical, and electromagnetic operations.

Energy resources are natural resources, whose use is to be guided by the government of Indonesia, as stated in Article 33 of the 1945 Constitution of the Republic of Indonesia, which states that the state has power over these resources, and they must be used for its people's prosperity and welfare. Article 2 of Law Number 30 of 2007 regulates the principle of conducting energy exploitation and management. This article states that energy shall be managed under the principles of beneficial use, rationality, fair efficiency, value added enhancement, sustainability, people's welfare, environmental functions preservation, national resilience, and cohesiveness by prioritizing the nation's capability.

The direction of national energy exploitation, development, and management can actualize equitable energy development. Fair energy entails providing equal access to energy for all Indonesians by means of the development of the infrastructure of the Energy and Mineral Resources (ESDM) sector, optimizing the potential of local energy sources at affordable, sustainable prices.

New energy is developed as a result of research and technological development that is not included in the fossil energy or renewable energy group, such as nuclear energy, plasma energy (magneto hydro dynamics), or fuel cell energy (fuel cells), for example for example.[17] New energy refers to types of energy whose development is driven by technological intervention. Innovation in renewable energy is determined by government policy, as it involves innovative technology that is risky and full of uncertainty.[18] This is due to interventions to

[16] Daryanto, *Problems and Its Use for Human Life* (Yogyakarta: Pustaka Widyatama, 2007).

[17] Ariono Abdulkadir, *Electricity Series Volume 2: New, Renewable Energy and Energy Conservation* (Bandung: ITB, 2011).

[18] S. K. Purwanto, Obsatar Sinaga, and Morni Hayati Jaafar Sidik, "Ensuring Renewable Energy, Consumption Through Innovation, R&D and Energy Import in Indonesia: A Time Series Analysis," *International Journal of Energy*

facilitate investment in energy infrastructure in Indonesia that must address the monopolized power market system that oversees a changing, complex malaise of electricity-pricing regulations.[19]

According to Law Number 30 of 2007 Concerning Energy, the definition of new energy is contained in Article 1 paragraph (5), which states that new energy refers to energy coming from new energy sources. Furthermore, new energy sources refer to energy sources that can be produced through new technologies, drawing on both renewable and non-renewable sources, such as nuclear, hydrogen, coal bed methane, liquefied coal, and gasified coal. According to the Law Number 30 of 2007, various types of new energy have been classified, as follows: nuclear, hydrogen, coal bed methane, liquefied coal, and gasified coal. In terms of its control and regulation, new energy sources are expected to be managed by the government and to be used as well as possible for the sake of people's welfare.

Renewable energy sources are those produced from sustainable energy resources if well managed, such as geothermal, wind, bioenergy, sunlight, motion of water, biofuels, etc. Indonesia has the potential to develop renewable energy sources in very large quantities, due to its large size geographical positioning. The renewable energy sources possibly existing in large quantities in Indonesia are geothermal energy, solar, water, sea/ocean, and bioenergy.

Local communities have the absolute right to take part in energy planning and development. The provisions of the Law Article 19 on energy stipulate that members of local communities, individually or in groups, can involve themselves in a. preparing or composing the national and regional general energy planning or b. energy development on behalf of public interest. Public participation in energy policy is required so that the community is not only an object of policy but also a subject that can convey its needs and aspirations. To avoid a top-down approach, local community participation is needed to escalate their awareness in using energy coming from renewable energy source and to see that the energy is used as wisely as possible.

The space for community involvement in the decision-making stage regarding energy sector, both at the national and local levels, tends to be limited and inadequate. By regulation, the community, both individuals and in groups, is only given the right to be able to play a role in the preparation of the National Energy General Plan and the Regional Energy General Plan.

Furthermore, there the General Plan for National Electricity and a General Plan for Regional Electricity (RUKN and RUKD, respectively also play a role). With reference to this important document, the mechanisms for public participation are insufficiently regulated. The only opportunity for involving is through consultation with the RUKN and RUKD in the House of Representatives and the Regional People Representatives Assembly, taking into account that the legislature is the body that nest represents the public. Unfortunately, the authority to

Economics and Policy 11, no. 1 (December 2020): 577–83, https://doi.org/10.32479/ijeep.10715.

[19] Marta Maulidia, "Rethinking Renewable Energy Targets and Electricity Sector Reform in Indonesia : A Private Sector Perspective," *Renewable and Sustainable Energy Review* 101 (2019): 231, https://doi.org/https://doi.org/10.1016/j.rser.2018.11.005.

conduct consultations was removed by to Law no. 11 of 2020 concerning Job Creation.[20]

Aside from the issue of local community participation, environmental issues are also tied in with pros and cons in policy making regarding the development projects of power plants. The construction of a power plant may ignore the landscape of the area being utilized, such that presence of old-growth forests or the necessity of an AMDAL permit is often ignored, although the relevant law clearly states in Article 8 that "every energy management project is expected to prioritize environmentally friendly technologies and to satisfy the conditions required by the laws and regulation concerning environmental issues." Hence, environmental considerations are crucial and must be considered in the development of electric power.

In implementing renewable energy projects, the authorities are the central and regional governments, by area of responsibility and authority. This is stated in the Energy Law, Article 20, paragraph (4), which indicates that the provision of new energy and renewable energy must be increased by the State Government and the Regional Governments in accordance with their respective authorities. (5) The provision of energy from new energy sources and renewable energy sources by business enterprises, permanent enterprises, or individuals may lead to obtaining facilities and/or incentives from the Indonesian government and/or the regional government in regard to their respective authority for a certain period of time until the economic value is obtained. Thus, the provision of new and renewable energy is a joint agenda between both the national and regional governments.

In Government Regulation No. 37 of 2010, a dam is defined to mean a building in the form of backfill, stone filling, concrete, and/or masonry which is built to hold and accommodate mining waste or accommodate mud, resulting in the formation of a reservoir is formed. A reservoir is defined as an artificial container filled with water formed as a result of the construction of a dam. The purpose of building dams and reservoirs is to provide water for irrigation activities, raw water supply, hydroelectric (electricity) power, recreational areas or habitats for fish and animals, flood prevention, and waste discharge retainer from industrial sites. A total of 24 dams were built in 2015–2021, and 65 more are expected to be built by 2023. This plan seems difficult to achieve, as many challenges have arisen in its implementation, such as community rejection, where the development is perceived as being unsuitable, due to the presence of a conservation area or some other issue regarding the AMDAL permit.

The Ministry of Energy and Mineral Resources's Regulation of the Minister of Energy and Mineral Resources No. 04 of 2012states in Article 1 that, "PT. PLN Persero is required to purchase electricity from power plants which use small and medium-scale renewable energy with a capacity of up to 10 MW (megawatt) or excess electricity from SOE, regionally-owned enterprises, private enterprises, cooperatives and non-governmental organizations to strengthen local energy supply systems." This provision is intended

[20] Grita Anindarini, "Urgensi Partisipasi Publik Dalam Mendorong Transisi Energi Yang Berkeadilan," in *ICEL* (Jakarta: ICEL, 2021), 5.

to facilitate the use of renewable energy by creating small-scale power plants while ensuring that the people who are in need of electricity receive it.

Local Community Participation

The community's rejection of infrastructure development can come about due to a mismatch between the developed infrastructure and their needs. Thus, community involvement is an effective way for everything necessary to be communicated and for the best possible solutions to be found to problems. Community participation can provide solution to these two problems.[21] However, actively involvement of the local community in the development programs is easier said than done. The concept of participation as a concept in community development shows general and wide-scale application. It is a central concept and basic principle of community development, as effective development requires initial and real involvement (in the form of participation) from all groups of stakeholders in programs that will affect them. When the people involved feel that their participation is important, the quality, effectiveness and efficiency are greater.

The potential for community participation as an inspiration to empower, inspire and revitalize the culture of local wisdom in the transformation of the paradigm of fossil-based energy management to non-fossil based can be actualized through a culture of community participation that is also a form nationalism. This community participation can support the sustainability of energy use, encourage the creation of energy independence, and achieve the actualization of the renewable energy mix target in accordance with Government Regulation No. 79 of 2014 concerning national energy policies.[22]

To achieve this type success in developments, many aspects need to be considered, including community involvement. Some experts argue that the greater the community awareness or participation in the planning processes, the more optimal the output that ultimately appears. The higher the level of community participation in development, the higher the level of success. Thus, community participation is the main indicator in determining the success of development itself.[23]

The Electricity Supply Business Plan (RUPTL) is a blueprint that should be considered public, as it regulates substances that have major impacts on the people's right to have a healthy environment. More than this, prior determinations of the locations of power plants will also contribute to changes in land use, if the project is approved for development. For this reason, consideration of the local environment should begin from this planning stage. Community involvement regarding decision-making regarding electricity can only be performed during the process of organizing the AMDAL analysis. In fact, the EIA and community involvement on the electricity planning level are still lacking.

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[21] Faisal Nur, "Community Participation in the Village Infrastructure Development Process," Pascasarjana Unhas, n.d.

[22] Khusnus Khotimah, "The Realization of State Defense Awareness through a Culture of Community Participation in Renewable Energy Management," *Jurnal Pertahanan Dan Bela Negara* 8, no. 2 (2018): 62.

[23] Angelius Hendry Sigalingging, "Community Participation in the Implementation of Development," *Jurnal Administrasi Publik* 2, no. 2 (2014): 117.

In the electricity sector, especially in the planning stage, as in the preparation of the Regional Spatial Plan (RTRW), community involvement can be performed. This is because in the preparation of the RTRW, especially in the Regency/City RTRW, business or activity plans can be allocated to the regions, including questions of electricity. In the preparation process of the Regency/City RTRW, there will be indications of the location that will be allocated as a place for the development of electricity infrastructure. In the preparation of this RTRW, community involvement can occur in the preparation process of the Strategic Environmental Assessment (KLHS), as well as in the preparation of the RTRW itself.

German Watch (2015)[24] noted that public involvement in electricity planning is important, especially in relation to the transmission development, due to its high complexity and massive impact. The purpose of community involvement is not only to provide input on a draft policy, but also to enforce its role in the most effective way. Maastricht recommended that effective community involvement be acquired in decision-making, particularly with respect to environmental protections.

One example of community involvement in the decision-making process can be seen in the case of Vietnam within its electricity planning document (Vietnam's Power Development Plan / PDP). The preparation of this PDP required an SEA study to ensure the application of the principles of sustainable development in the document. In general, problems identified in electricity planning in Vietnam are similar to those encountered in Indonesia. The absence of studies of social and environmental issues from the planning stage of the electricity policy led electricity power planning in Vietnam to become too dependent on coal. The space for community involvement in Vietnam at the decision-making stage was still quite lacking. However, due to the mandatory preparation of SEA in the PDP process, spaces allotted to community involvement became more adequate. Vietnam's Environmental Protection Law provides the right for organizations and individuals to provide comment or input during SEA assessment. In addition to the preparation of SEA, in the preparation of the PDP documents themselves, public consultation was conducted to determine how this plan would impact social and environmental aspects.[25]

Public involvement must be fundamental for decision-making processes in the energy and electricity sector. Not only is it necessary to gain public support for implementing the policy, but is also required to achieve larger aims, such as ensuring that the functions of the energy and electricity sector is closely related to the fulfillment of people's right to live in a good and healthy environment.

Environmental Studies for Optimizing Renewable Energy

Forests have an essential position and play a vital role in supporting development. Recognizing their necessity and uniqueness in developmental and environmental issues, most countries seek the stable and sustainable

[24] German Watch, *Public Participation and Transparency in Power Grid Planning* (German: Germanwatch e.V, 2015).

[25] Anindarini, "Urgensi Partisipasi Publik Dalam Mendorong Transisi Energi Yang Berkeadilan," 11.

management of all forests. [26] One issue related to countries' development and environment is that of climate change. An international agreement on global warming was negotiated in Kyoto in December 1977.

Subsequently, the Kyoto Protocol of 2005 proposed an agreement to reduce greenhouse gas (GHG) emissions globally. The obligation to reduce GHGs, however, only applied to developed countries and ignored the fact that developing countries could also be major contributors to the world's GHGs. In the 2015 Paris Agreement, signed by 196 countries including Indonesia, it was agreed to reduce all national GHG emissions and assist developing countries in combating the worst impacts of the climate crisis. [27] Transformative change in the energy sector, the source of at least two-thirds of GHG emissions, is essential to reach the objectives of the agreement. The changes already underway in the energy sector, demonstrate the promise and potential of low-carbon energy and in turn lend credibility to meaningful action on climate change.[28]

Indonesia ratified the Agreement on October 31st, 2016, in its Law Number 16 of that year. An archipelagic country with a very large forest area, Indonesia is very concerned with the impact of the climate change, as it has the potential to undermine Indonesia's ability to meet its sustainable development goals. For state parties such as Indonesia, there is an obligation to take steps to prevent climate change, as outlined in the Nationally Determined Contributions (NDCs). The NDCs reflect the latest conditions in terms of data, analysis, and future scenarios projected by the Indonesian government. It is undeniable that Indonesia, a developing country, will experience dynamic changes due to national and global economic change. As a consequence, the NDC document will be reviewed and adjusted as needed in reference to national conditions, capacities, and capabilities, as well as the provisions of the Paris Agreement.

Law Number 16 of 2016 covers the optimization of renewable energy through efforts to control climate change. Indonesia made the commitment, through these laws, to optimize renewable energy, which is sustainable and environmentally friendly, in the forms of geothermal, wind, biological, sunlight, and water flow energy. Drawing on these sources will be a crucial step in realizing the main purpose of the Paris Agreement. Among Indonesia's areas of greatest potential for renewable energy is hydro power.[29] Driven by its commitment, the government planned a program called the 2021–2030 RUPTL, which includes a power plant development plan, projected electricity demand, and a target for the power plant energy mix. The government plans to build 18 dams throughout Indonesia.

Law Number 30 of 2007 includes an outline of energy regulations or energy management and energy buffer reservations. The electricity supply sourced from fossils, such as coal, crude oil, and natural gas, will

[26] Wartiningsih, *Forestry Crime-Involvement and Accountability of Forestry Policy Operators* (Surabaya: Setara Press, 2014).

[27] Melaty Anggraini, "Renewable Energy Policy as Indonesia's Energy Security Strategy," *Mandala: Jurnal Ilmu Hubungan Internasional* 5, no. 1 (2022): 24–47, https://doi.org/http://dx.doi.org/10.33822/mjihi.v5i1.4108.

[28] IGAKR Handayani et al., "Relationship between Energy Consumption in International Market and Indonesia Prices Regulation" 7, no. 5 (2017): 9–15.

[29] KOMINFO, "Potensi Energi Terbaharukan Besar, Presiden: Kalkulasi yang Detail", accesed September 6 2022, https://www.kominfo.go.id/content/detail/38274/potensi-energi-terbarukan-besar-presiden-kalkulasi-yang-detail/0/berita

gradually run out, so hydropower will be useful as a future buffer.

Hydropower processes the potential energy of water into kinetic energy in the presence of a *head*; this kinetic energy turns into mechanical energy with the flow of water that drives a turbine. Following this, the mechanical energy becomes into electrical energy through the rotation of the rotor on the generator. The amount of electrical energy that can be generated depends on two things: i.e., the distance of the water height (*head*) and the quantity of the water flow (*water discharge*).

It is unfortunate that the establishment of hydropower plants being carried out or being planned are generally located in forest areas. WALHI Aceh indicated that they intend to choose a location in the forest, due to water needs and to their knowledge that the rate of deforestation will increase. In managing forest resources, the government has the power to pursue development inside or outside of forestry needs. Article 38 of the Forestry Law, which regulates the use of forest areas, is no longer valid and has been replaced by the Law of the Republic Indonesia No. 11 of 2020 Concerning Job Creation. Developments outside of forestry can be carried out in protected forest areas and productive forest areas but only selectively. This expression can be interpreted to mean that it should only be done for strategic purposes that cannot be avoided, such as the establishment of hydropower.

The of hydropower establishment in several locations has encountered many obstacles in the form of rejection from the community. This can be seen in PLTA Batang Toru, North Sumatra, which attracted controversy because it led to disturbance of the local flora and fauna and the opposition of the local community in the establishment of PLTA Batang Toru.[30]

Another rejection case regarding the establishment of a PLTA also took place in Central Sulawesi, where, according to plan, a PLTA is to be built on the shores of Lindu lake. There are three reasons underlying the opposition of the community: (1) the Lindu community itself was proposed to be resettled; (2) there was a failure to meet standards on certain environmental and social factors; and (3) the area is prone to earthquakes. The rejection of the resettlement was largely due to the results of a feasibility study that was done in collaboration with the French consulting agency Coyne et Bellier and PT Yodya Karya Indonesia. A national park is a part of conserved forest, so many activities are prohibited within them. This is explicitly stated in the Job Creation Law that the use of forest areas for development purposes outside of forestry can only be carried out within the area of production forests and protection forests.

The hydropower establishment on the Karama River in Mamuju was also being rejected because the community was not willing to be relocated to a new place.[31] The series of rejections regarding the hydropower

[30] Anugrah Andriyansyah, "Pembangunan PLTA Batang Toru, Siapa Yang Terkena Dampak Negatif Dan Dirugikan ?," https://www.voaindonesia.com/, 2019, https://www.voaindonesia.com/a/pembangunan-plta-batang-toru-siapa-yang-terkena-dampak-negatif-dan-dirugikan-/4902063.html.

[31] "Warga Mamuju Tolak Pembangunan PLTH," makassar.antaranews.com, 2009, https://makassar.antaranews.com/berita/5504/warga-mamuju-tolak-pembangunan-pltmh.

plans will only increase following the establishment of PLTA Karama, West Sulawesi, due to its destructive impact on Sipakko and Kamassi, which are considered significant historical sites. The oldest Austronesian-speaking dwellings that have ever found are there, as well as one of the oldest and the most exhaustive archaeological finds. [32] In addition, the hydropower plan for Lembang District, Pinrang Regency, South Sulawesi, also encountered massive rejection. If the work had gone according to plan, it is undeniable that: (1) four villages in the Mamasa Regency area will be drowned; (2) thousands of people, houses, and government buildings. as well as farms and rice fields, in two villages in the Pinrang Region, where the hydropower plant was planned to be built, will be greatly impacted[33].

It is necessary to reflect and consider what the most appropriate policies that the Indonesian government should be, taking into account the country's responsibility to mitigate climate change by establishing hydropower plants while facing massive local resistance. Controversy arose regarding a PLTA established in Norway around 50 years ago and that had finally succeeded in integrating hydropower establishment while maintaining the principles of sustainability.[34] It is obvious that sustainable development has environmental, social, and economic dimensions. To cover all aspects, Peter Holmgren recommends taking a landscape-based analytical approach,[35] suggesting that working with reference to the landscape will not defeat traditional energy sectors, but it will be a great help in combining all means for the achievement of better outcomes.

To utilize the landscape approach, several things are necessary to be analyzed:

1. Forest resources

a. The Paris Agreement

The Paris Agreement, also known as the Paris Climate Agreement, was made under the United Nations Framework Convention on Climate Change (UNFCCC). Before the Paris Agreement, the Kyoto Protocol in 2005 had a fairly similar aim and foundation: to reduce GHG emissions globally. The journey of this international agreement continued in Bali from December 3 to 14, 2007, as Indonesia became the conference host for the members countries of UNFCCC. The states that attended this gathering made it clear that forests are among the most important agenda items, as they are able to absorb carbon produced by GHG emissions from developed countries. The rendezvous in Bali produced a document called *The Bali Roadmap*, containing several ways to reduce GHG emissions: transfer of clean technology provisions to developing countries, termination of forest destruction, and providing support and assistance for poor

[32] Hafis Hamdan, "Warga Kalumpang Tolak PLTA Sungai Karama Karena Dinilai Ancaman Situs Sejarah," accessed September 3, 2022, https://www.detik.com/sulsel/berita/d-6257887/warga-kalumpang-tolak-plta-sungai-karama-karena-dinilai-ancam-situs-sejarah.

[33] Samuel Mesakaraeng, "Rencana Pembangunan Bendungan PLTA Pokko, Wabub Mamasa Bilang Begini," https://makassar.tribunnews.com/, 2019, https://makassar.tribunnews.com/2019/10/17/rencana-pembangunan-bendungan-plta-pokko-wabup-mamasa-bulang-begini.

[34] Inger Auestad, Yngve Nilsen, and Knut Rydgren, "Environmental Restoration in Hydropower Development—Lessons from Norway," *Sustainability* 10, no. 9 (September 2018): 3358, https://doi.org/10.3390/su10093358.

[35] Peter Holmgren, "Landscapes for Sustainable Development," accesed September 5 2022, https://forestsnews.cifor.org/12517/landscapes-for-sustainable-development?fnl=en..

countries to deal with economic and environmental impacts of climate change.[36]

This agreement was adopted by the 21st Conference of Parties (COP) and is considered a success in global climate change diplomacy. The agreement is a breath of fresh air for multilateral climate change diplomacy following the failure of the 15th COP in Copenhagen, 2009, to form an agreement of the idea of global climate regime. The Paris Agreement, intended to limit the increase in global temperature below 2°C was signed by 195 countries, is considered a huge flame of hope. This agreement is a model for a new world social contract in overcoming global problems.[37]

In the Paris Agreement, different countries are acknowledged to have their own diverse technological capabilities and national needs. The agreement clearly states that the parties must acknowledge that adaptation steps must follow a local resource-based approach, be gender-responsive, be participatory and fully transparent, including consideration of vulnerable groups, communities, and ecosystems, as well as being based on and guided by the best available science. However, this agreement suggests that—if necessary—traditional knowledge, the knowledge of indigenous people, and the local knowledge systems can be integrated and adapted into the relevant socio-economic actions and environmental policies.[38]

The Paris Agreement adheres to a principle called *applicable to all Parties* that results in a considerable burden for developing countries. Developing countries, referred as non-Annex countries in the convention, must participate in global efforts to mitigate GHG emissions and must adapt to the impacts of climate change. For these reasons, these countries must urgently transform as quickly as possible with low-carbon developments while ensuring resilience to the impacts of climate change.

The greatest challenge lies in the funding support aspect for the response to climate change. Non-Annex countries, in particular those with emerging economic status, have to face this funding support-related challenge, taking into consideration that the priority for climate change funds will especially be allocated to the categories of the Least Developed Countries and Small Island Developing States.

b. Landscape Approach

In recent years, global commitments to conservation, landscape restoration, and emissions reductions have accelerated efforts to reach a safer, fairer, and more sustainable future. The main reason why a landscape approach is considered as important is that land-based sectors seeking cross-institutional solutions are in poor condition. [39] The Sustainable Development Goals, set in the United Nations, and the Bonn Challenge to restore 150 million hectares of degraded land help form the goals of many countries. The methods of achieving those aims include mobilizing action, providing adequate funding, and coordinating multilateral political will. The Global Landscape Forum, which took place in Bonn in 2018, has unified a wide range of diverse interests, ranging from policy makers and stakeholders to local and global representatives of the

[36] Wartiningsih, *Forestry Crime-Involvement and Accountability of Forestry Policy Operators*.

[37] Institute for Esential Service Refom, "Indonesia and the Ratification of the Paris Agreement, Where Is Indonesia??," accesed Ausugt 5 2022, https://iesr.or.id/indonesia-dan-ratifikasi-paris-agreement-di-manakah-kita.

[38] "Art 7 (5) Paris Agreement," n.d.

private sector, eager to find solutions at the landscape level and accelerate measurable actions on the ground for negotiating conflicting land use demands that are undeniably essential for the nature.[40]

Robert Nasi recommends defining different landscapes based on the differing problems at hand, conducting research that takes these landscapes in their entirety, taking into account social, economic, cultural, and environmental aspects to better target action. Furthermore Nasi, in relation to forest landscape restoration, concluded that forest landscape restoration requires an informed understanding of the entire forest landscape and all of its stakeholders—from the trees in the ground to the clean air and water they produce, the people and animals that depend on forest products, the cultural values attached to the place, and the resources needed by government and industry for social and economic development.[41]

In the Indonesian context, the provisions in the Article 33 paragraph (4) of the 1945 Constitution of the Republic of Indonesia, established in the Fourth Amendment in 2002, show the importance of the principles of sustainable and environmental-friendly development for the country. Regarding these two principles, Chief Justice Jimly stated that the Indonesian people could not allow development practices that would damage the natural environment or that are not environmentally secure. [42] The implementation of forest protection seeks to protect the forests, its products, and its areas and their environment, to uphold the forest's functions of protecting, conserving, and producing can be optimally and sustainably achieved. Government Regulation No. 44 of 2004, concerning the adjustment of the production forests consisting of ordinary production forests, limited production forests, and convertible production forests (HPK). HPK in particular is a designation of a territory reserved and prepared for development purposes outside of forestry (non-forestry) uses, such as plantations, transmigration, agriculture, and so on, [43] including PLTAs. With respect to the development outside of forestry activities, Law Number 11 of 2020 concerning Job Creation stipulates that the use of forest areas for development purposes outside of forestry can only be done within production and the protection forest areas while the limits of the area and the time period of the activities are taken account of in terms of how they affect environmental sustainability.

Looking back, most hydropower plants were to be built in forest areas, and even the Lindu hydropower plant in Donggala Regency was located in the Lore Lindu National Park (TNLL), setting aside the fact that this national park is a conservational forest. Moreover, there was opposition from the community, so a holistic approach was needed. Here, the approach which is likely to be used is the landscape approach, recommended by Robert Nasi. According to him, landscapes are understood in relation to the problem at hand, and research should be

[40] GLF 2018, "Global Landscape Forum: Together, Healthy World Landscapes," n.d.

[41] Deana Ramsay and Catriona Croft-Cusworth, Addressing the World's Greatest Challenges through a Landscape Approach," 2018, accesed August 2022, https://forestsnews.cifor.org/54643/taking-landscape-approach-worlds-biggest-challenges?fnl=en.

[42] Jimly Asshiddqie, *Green Constitutuion : Nuansa Hijau Undang-Undang Dasar Negara Republik Indonesia Tahun 1945* (Jakarta: Rajawali press, 2009), 129.

[43] Pramono Dwi Susetyo, "Quo Vadis Perlindungan Hutan," accesed August 18 2022, https://www.forestdigest.com/detail/1009/regulasi-kehutanan.

conducted that considers these landscapes in their entirety, taking into account social, economic, cultural, and environmental aspects, to better inform targeted action. Furthermore, forest landscape restoration requires an informed understanding of the entire forest landscape and all of its stakeholders—from the trees in the ground to the clean air and water they produce, the people and animals that depend on forest products, the cultural values attached to the place, and the resources needed by government and industry for social and economic development.[44]

The implementation of the landscape approach has, been prepared by the government. Indonesia's National Working Groups on Landscape Restoration provide guidelines for landscape restoration in Indonesia by formulating nine principles; the main two points are as follows:

1. Ensuring the interests of all the parties, especially the local community of the landscape.
2. A platform for all involved parties, including government, private sector, and civil society representatives, which was clearly needed in negotiation and decision-making at the landscape scale.

In line with the principles related to efforts for achieving energy sustainability through the establishment of hydropower plants in several locations in Indonesia that have has been mentioned previously, Pietrosemoli and Monroy warned that such development must be able to improve the quality of life of the local community and to support poverty alleviation and sustainable development.[45] Duff *et al*. added that an integrative approach should be used to avoid the stakeholders' incompetence that has already been marginalized.[46]

Sustainable development insists that the environment cannot be addressed without simultaneously addressing the social conditions that require growth or establishment to improve livelihoods. Joshua Pearce claimed that sustainable development is applied in economic policy and has also been recognized as the dominant definition of sustainability for the government and the private sector. This idea has been extended as the basic theoretical framework for many international development initiatives, focusing on the integration of social, environmental, and economic dimensions to achieve the aims of development itself. For example, the World Bank has used this definition since 2001. Since that time, many sustainability models have been developed. One of the best-known models of sustainable development is the one which relies on the principles called *the triple bottom line*, i.e., social, economic (financial), and environmental (ecological).[47]

Renewable energy, especially the energy generated by large hydroelectric plants that supply most of the renewable energy consumed by the developing countries,

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[44] GLF 2018, "Global Landscape Forum: Together, Healthy World Landscapes."

[45] Licia Pietrosemoli and Carlos Rodríguez Monroy, "The Impact of Sustainable Construction and Knowledge Management on Sustainability Goals. A Review of the Venezuelan Renewable Energy Sector," *Renewable and Sustainable Energy Reviews* 27 (2013): 683–91.

[46] Olivia E. Freeman, Lalisa A. Duguma, and Peter A. Minang, "Operationalizing the Integrated Landscape Approach in Practice," *Ecology and Society* 20, no. 1 (2015): art24, https://doi.org/10.5751/ES-07175-200124.

[47] Pietrosemoli and Monroy, "The Impact of Sustainable Construction and Knowledge Management on Sustainability Goals. A Review of the Venezuelan Renewable Energy Sector."

requires technical, legal, financial, and social arrangements due to its complex processes, supported by innovation and valuable knowledge. In addition to these efforts, renewable energy requires a solid infrastructure for generating and distributing the energy resources needed to meet the basic needs of the people.[48] To overcome people's refusal to allow the construction of hydropower plants in several parts of Indonesia, it is preferable to take some advice from Peter H and adopt a landscape approach, as such an approach does not mean to go against traditional sectors but integrates them with modern science to achieve better and more comprehensive results.[49]

IV. Conclusion and Suggestions

The supply of electricity sourced from coal, oil and natural gas will gradually run out, so hydropower will be useful as an energy buffer in the future. The government plans to build 18 dams throughout Indonesia. However, some of these plants have been opposed by local communities. The lack of community participation in development, such as planning activities, starting with information about the place/location for the construction of the dam and AMDAL, are among the reasons for this rejection. Development will be more effective if it involves the community, so that they feel that the existing program is a joint program. Law Number 30 of 2007 mandates that energy resource management policies be based on the principles of expediency, rationality, fair efficiency, increased added value, sustainability, community welfare, preservation of environmental functions, national resilience, and integration by prioritizing national capabilities. In reality, these principles have not been implemented, as seen through the large number of community rejections, given with various reasons, the most critical of which is that hydropower plants are built in protected forest areas. Development outside the forestry sector is not allowed by the Forestry Law, but with the issuance of the Employment Creation Act, it allows development outside the forestry sector, so long as it is carried out selectively and hydropower development is interpreted as a development with strategic objectives.

It has been observed that the development of hydropower plants has a strategic objective but should be carried out selectively in site selection by submitting the results of the National Working Group on Landscape Restoration in Indonesia. It is important that the development be able to improve the quality of life of the community and to support poverty alleviation and sustainable development. Therefore, an integrative approach is needed to avoid the powerlessness of marginalized stakeholders.

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[48] Freeman, Duguma, and Minang, "Operationalizing the Integrated Landscape Approach in Practice."

[49] Peter Holgren, "Landscapes – Part 1: Why Landscapes Matter?," n.d.

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