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Green Jobs in the Green Transition as a Regulatory and Investment Strategy to Overcome Employment Disparities in the Conventional Economic Sector

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ABSTRACT
The green transition is considered Indonesia's development agenda in facing the environmental crisis, and at the same time, encouraging the performance of sustainable growth in the economy. Among the main tools of this transition is the creation of jobs that are expected to be able to provide decent work. Nonetheless, it can be seen that the creation of new jobs in Indonesia faces different structural barriers that limit this transition process. This study, by this thesis, seeks to interpret how new jobs perform during the transition to green. This research adopts a descriptive method that uses a qualitative approach using secondary data obtained from government documents, global organization reports, and scientific literature. This study will use the process of reduction, categorization, and interpretation of the data obtained. The findings of the study show that the potential for green jobs in the fields of renewable energy, waste management, and sustainable agriculture has not been fully utilized due to low skills in green jobs, fragmentation of labor regulations, and concentration of green investment in certain areas. The findings of this study confirm that without integrated policymaking, the green transition can exacerbate structural inequalities. The importance of this paper focuses on the role of the just transition approach in the formulation of green work policies in Indonesia.
Keywords: green transition; green jobs, green investment, employment policy, inclusive development

1. Introduction

Conventional economic development is generally measured through economic growth indicators such as Gross Domestic Product (GDP). GDP shows an increase obtained from all production units in a country and is often used to measure the speed of consumption growth, investment, and foreign trade. However, the use of GDP as a key indicator of development has limitations because it tends to ignore the environmental dimension and the quality of employment. Its aggregate and global nature causes GDP to not fully reflect the level of people's welfare, and fails to capture various negative externalities such as environmental degradation and social inequality (Puspita et al., 2025).

In the Indonesian context, a development model oriented towards industrialization and exploitation of natural resources has been a major driver of economic growth over the past few decades. However, this model also contributes to increased carbon emissions and environmental damage. In the long term, these conditions have the potential to threaten the sustainability of development and the quality of life of future generations.

In response to these challenges, the green economy paradigm is evolving by emphasizing the integration between economic growth, environmental protection, and social justice. One of the key elements in the green economy is green jobs. The International Labour Organization (ILO) defines green jobs as decent work that contributes directly to environmental conservation or restoration (ILO, 2007). Furthermore, the ILO emphasized that green jobs play a role in improving energy efficiency, reducing greenhouse gas emissions,

minimizing waste and pollution, protecting and restoring ecosystems, and helping adaptation efforts to climate change.

However, the employment structure in Indonesia is still dominated by conventional economic sectors, such as the fossil energy-based manufacturing industry and mining. The high dependence on the sector poses socio-economic risks as the transition to a green economy begins to change production patterns and labor needs. The implementation of green jobs requires the readiness of human resources who have green skills. Green skills are not only related to mastering environmentally friendly technology, but also include adaptability to change, cross-sector cooperation, and commitment to sustainable development practices (Kristiana et al., 2025). Indonesia's Green Workforce Development Roadmap published by Bappenas in 2025 identifies several key green capabilities that support career development in the green jobs sector, including Low Carbon Energy Management and Audit, Mastery of Renewable Energy Technology and Its Support Systems, Carbon Accounting and Management (Carbon Accounting, Ecosystem-Based Natural Resources Management, Sustainable and Regenerative Agriculture, Circular Economy and Integrated Waste Management, Digitalization and Smart Technologies for Sustainability, Green Environmental Risk Management and Work Safety, Sustainable Development Planning and Governance, Sustainability Literacy, Standards, and Green Certification (Bappenas, 2025).

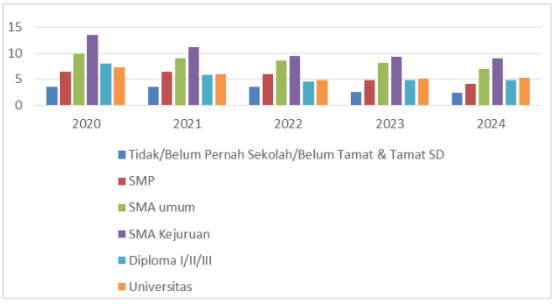

Figure 1. Indonesia's Employment Composition from 2020-2024
Source: BPS-Statistic of Indonesia

Employment data shows an imbalance between labor supply and demand, especially for secondary and higher education graduates. The conventional economic sector shows limitations in absorbing skilled labor, while the green sector has not developed optimally. The Deputy for Population and Manpower of the Ministry of National Development Planning/Bappenas stated that in 2045, it is projected that around 15.3 million jobs will be created that support the green economy in Indonesia (Maliki, 2023). In line with that, the research institute Celios reported that in 2023 there will be a potential of 19.4 million green job opportunities in several fields, including agriculture and fisheries, processing industries, trade, financial services, electricity procurement, construction, transportation, accommodation, and corporate services (Celios, 2023).

However, information from the Central Statistics Agency for the 2020-2024 period shows that the open unemployment rate is still relatively high in the group of graduates of vocational secondary education and college. This condition indicates the limited absorption capacity of the conventional economic sector for educated workers. On the other hand, the increase in green investment in recent years has not been fully followed by the equitable distribution of job creation. The high concentration of green investment on the island of Java reflects the spatial inequality in the distribution of economic benefits from the green transition.

The empirical findings confirm that without comprehensive and targeted policy interventions, the transition to a green economy has the potential to reproduce the structural inequalities that have long been inherent in the Indonesian economy. Therefore, this paper intends to examine how regulatory strategies and investment policies can be directed to encourage the creation of inclusive green jobs, so that the green transition in Indonesia can take place in a just and sustainable manner.

2. Literature Review

2.1 Green Jobs in the Green Transition

A green economy is an economic strategy that combines social, environmental, and economic factors, and emphasizes the sustainable development and use of resources. This idea emphasizes achieving fair and

sustainable economic growth, protecting and restoring ecosystems, and improving people's living standards (Priyatna & Suryadi, 2025). In its implementation, the green economy prioritizes the just transition approach (OECD, 2014), this concept developed as a normative framework to ensure that the transition to a green economy does not cause social impacts that harm certain groups of workers, through worker protection, social dialogue, and skills development.

The green transition serves as a motor for creating new jobs that are environmentally friendly. This transition will result in green jobs, which are jobs that support emission reduction, energy efficiency, and sustainable resource management (ILO, 2018). Green jobs cover a wide range of sectors, from renewable energy technicians to recycling experts, to organic farming. In fact, the implementation of the circular economy has the potential to empower women in the sustainable industrial sector, which shows an inclusive dimension (Purba et al., 2025). Globally, green jobs are expected to increase by nearly 24 million or 14% of total jobs by 2030 (World Economic Forum, 2023).

In Indonesia, the development of green jobs shows a positive trend as various parties pay increasing attention to the importance of Green Industry, Green Technology, and Green Infrastructure (Bappenas & GIZ, 2023). The results of the study by the Koaksi Indonesia project indicate that the energy transition will have the potential to create jobs in the sector of *Green Jobs*, which is expected to increase by 1.12 million by 2050 (Pristiandaru, 2024). Maliki as Deputy for Population and Manpower of the Ministry of National Planning and Development/National Development Planning Agency (Bappenas) said that the rapid development of the green economy has encouraged the opening of jobs in the green jobs sector to reach 19.4 million (Waluyo, 2024).

But in practice, this work needs to be supported by green skills, which are skills needed to contribute to minimizing the environmental impact of human activities (Sern et al., 2018), The form of green skills includes knowledge, attitudes, and values that support sustainable development in the economy (Fernandes et al., 2010).

2.2 Regulation and Green Investment

Regulations have a central role in directing green investment and determining the quality and distribution of jobs generated. Policies that focus too much on investment incentives without paying attention to the employment dimension risk ignoring the social justice aspect. One of the government's important tasks in this case is to provide a regulatory and institutional framework that supports the planning process. This includes the drafting of legal rules, fiscal and monetary policies, as well as institutional frameworks that ensure integration between sects and between regions (Susanto et al., 2024).

The current Government of Indonesia has initiated various policies to support the development of green jobs. Starting with the program *Green Jobs in Asia* by the Australian government through the ILO-Australia partnership in 2010, which aims to support the transition to low-carbon and sustainable development, while preparing the workforce for the transition period (Bincang Energi, 2021).

However, the Regional Study on the Readiness of Green Employment Policies in ASEAN, shows that policies that support the active green labor market in Indonesia are still limited, which means that there is a lack of alignment between microeconomics and sectoral labor market policies. Environmental policies are considered to have little influence on employment, but the impact is still relatively small and needs to be strengthened at the macro and micro levels (Pociovălișteanu et al., 2015).

To implement strategic policies, it is important to strengthen the education and training system to meet the needs of the green jobs market. However, policies that support the development of green skills in Indonesia are still minimal. Until now, the integration of green skills in the Technical Vocational Education and Training (TVET) system in Indonesia is still limited. The Coordinating Ministry for Economic Affairs of the Republic of Indonesia, through the pre-employment card program, has a discourse in the form of procurement of green skills courses, such as sustainability, reporting, carbon accounting, motorcycle modification into electric motorcycles, environmentally friendly fertilizers, waste processing, and others (Media Indonesia, 2024)

As it develops, the government realizes that the development of green jobs in Indonesia requires initiatives from various parties and not only from the Central Government level. The issuance of Presidential Regulation No. 111 of 2022 concerning the Implementation of the Sustainable Development Goals (SDGs) emphasizes the importance of the involvement of local governments and non-state actors in supporting the green development agenda, including the creation of green jobs (Itsnani & Jatmiko, 2024)

In general, Indonesia has a variety of relatively adequate green economy policies (PAGE, 2023). As one of the first steps in contributing to addressing the impact of global climate change, Indonesia provides an international commitment through the ratification of the Paris Agreement (PPID KLHK, 2016). Furthermore, Indonesia issued Law Number 16 of 2016 concerning the Ratification of the Paris Agreement to the United Nations Framework Convention on Climate Change. Within the framework of the Paris Agreement, all countries are committed to paying attention to their mutual commitments and, in accordance with their respective capabilities, to formulate climate policies and actions to prevent global temperature increases from exceeding 20 ºC and to do their utmost not to exceed 1.5 ºC (WALHI, 2020).

In addition to making regulations, the development of green jobs is also greatly influenced by the direction and quality of green investment. The concept of green investment needs national and international attention. At the national level, Indonesia has begun to shift towards green investment due to environmental damage and the mandate of the 1945 Constitution of the Republic of Indonesia concerning national economic development (Pramana & Komalasari, 2023). In the international arena, Indonesia has established a national framework on Climate Change (United Nations Framework Convention on Climate Change) in Law Number 16 of 2016.

Green investment is defined as capital activities that are in line with the implementation of environmentally friendly business and natural resource conservation (James, 2022). Green investment is a derivative of the green economy that emerges from market turmoil, which is a combination of economic and social aspects, as described in the concept of "third flow", which places environmental impacts as triggers for new economic dynamics. Therefore, the relationship between environmental, social, and economic must be sustainable. (Correia, 2019).

However, in Indonesia, the increase in green investment tends to be slower compared to non-green investment. Among the factors that affect are Natural resources and large economies of scale, which make the extractive sector, especially mining and fossil energy, remain dominant in the national investment structure (Udemba & Philip, 2022). So that green investment cannot compete with non-green investment. In fact, non-green investments can damage ecosystems. Data shows that renewable energy investment in 2020 only earned USD 1.4 billion; if converted to Rienstra, only about 60 percent of the initial target investment of the Ministry of Energy and Mineral Resources, where the initial target is USD 2.3 billion, with the dependence of trees on geothermal. While in the renewable energy sector, energy substitution and conservation are slightly more challenging to reach the target, but investment in the bioenergy sector is quite low, reaching only 1% of the target to be achieved (Wahyunindyawati & Dyanasari, 2017). This condition shows that non-green investments are still more competitive despite having significant environmental impacts, such as 1) Lack of policies related to industrial control; 2) Unstructured industrial uplift; 3) Technology that has not been updated; 4) Small industries that do not pay attention to the environment; 5) Poor management of lime; 6) Leakage in the pipelines, and other factors (Wahyunindyawati & Dyanasari, 2017).

Green investment focuses on profit opportunities and companies towards the protection of natural resources, the improvement and research of new and renewable energy (NRE), the implementation of clean water and air supply, and environmentally friendly investment activities. Based on global practice, green investment in various countries refers to environmental, social, and governance, or ESG for short. The goal of ESG is to build a sustainable business without damaging the environment (Rahayu, 2020)

Normatively, green investment focuses on the protection of natural resources, the enhancement of new and renewable energy, the provision of clean water and air, and the application of low-carbon technologies. This practice generally refers to the principle of *Environmental, Social, and Governance* (ESG), which aims to build sustainable businesses without damaging the environment (Rahayu, 2020). In contrast to non-green investments that are purely profit-oriented, green investments are expected to be able to generate economic benefits as well as sustainable social and environmental impacts.

Although the government has launched various programs to encourage green investment, such as the development of sectors: 1). energy, 2). sustainable landscapes, 3). special economic zones, and 4). *Green Climate Fund preparation* (Indonesian Growth Program, 2022). Investment realization still shows greater alignment in the non-green sector. This is reflected in the realization of the budget for economic recovery in April 2020, which was not centered on green investment, with around Rp 100 trillion through policies set in early 2020, around USD 6.49 billion allocated to promote the fossil fuel energy sector, and USD 237.17

allocated for renewable energy. This can be seen from the amount of fiscal support for fossil energy compared to renewable energy in the post-pandemic economic recovery period (IESR, 2021); (Indonesian Growth Program, 2022). This is a reflection that regulations related to green investment have not been fully integrated with employment policy. This indicates the need for a more comprehensive institutional framework to ensure that green investments contribute significantly to inclusive and sustainable economic development.

3. Method

This study uses a descriptive method with a qualitative approach to obtain a comprehensive understanding of the dynamics of green jobs development in the context of green transition in Indonesia.

The data sources used in this study are from official government publications, reports of international organizations, and relevant and up-to-date scientific journal articles.

Data analysis is carried out through reduction, categorization, and interpretation stages. In the first stage, the data is selected based on its relevance to the themes of regulation, green investment, and employment. Then, the data is categorized to identify relationship patterns, key challenges, and evolving policy practices. The last stage, namely the interpretation stage, is used to formulate policy implications and prepare an analytical framework that is the basis for discussion of the results of this study.

4. Result

4.1 Dynamics of Green Jobs in Indonesia

The results of the analysis show that economic activities in the renewable energy sector, waste management, and sustainable agriculture have great potential in creating *Green Jobs* in Indonesia. This potential is especially seen in the increase in labor needs in the fields of production, national clean energy development, waste treatment and recycling, and environmentally friendly agricultural practices (Nasri & Keindahan, 2024). However, the realization of these opportunities is still limited and uneven.

The main obstacles to the development of *Green Jobs* are the limitation of labor capacity, especially the low suitability of skills with the needs of the green sector. Most of the workforce still comes from conventional sectors with skills that are not yet fully relevant to the demands of green jobs. The limitations of the integration of green skills in the education and training system are slowing down the process of skill transfer (*reskilling* and *Upskilling*), as well as a lack of access to training in *Green Skills,* thus inhibiting the expansion of *Green Jobs* more broadly (Alfiah et al., 2024).

4.2 Regulation and Labor Protection in Green Transition

Analysis of the regulatory framework shows that labor protection in the context of the green transition in Indonesia is still partial and sectoral. Despite the existence of various environmental and green economic policies, there is no legal mechanism that explicitly regulates the protection, reallocation, and capacity building of workers affected by the shift from the conventional sector to the green sector. Studies show that existing policies tend to focus on environmental issues in general and are implemented through a top-down approach without covering the protection of the workforce as a whole (Nasri & Keindahan, 2024).

The absence of an integrated regulatory framework increases the risk of structural unemployment, especially for workers in the fossil energy-based sector and extractive industries due to cross-stakeholder policy gaps and a lack of focus on labor protection in the process of green economic transformation (Mariska, 2024). In addition, weak coordination between environmental, labor, and education policies has the potential to widen employment disparities if the green transition process is not managed comprehensively and fairly.

4.3 Investment Strategy and Regional Disparities

The results of the analysis show that the direction of green investment in Indonesia is not fully aligned with the goal of creating *Green Jobs* that are inclusive. Green investment tends to be concentrated in sectors and regions that already have relatively stronger infrastructure readiness, market capacity, and policy support because it is expected to provide higher output than targeted in rural areas, small towns, and sparsely populated cities (Vandeplas & Vanyolos, 2022). This condition leads to the creation of opportunities for *Green Jobs,* more developed in major economic zones, while areas with lower economic capacity have limited access to the benefits of green investment.

This inequality of green investment is not only a geographical problem, but also reflects the lack of optimal integration of investment policies with development strategies. Limited funding and access to technology in many regions is one of the main obstacles in the development of green economy projects at the regional level (Santika & Farizki, 2025). This weakens the capacity of the region to absorb *Green Jobs*, so that opportunities for fair and inclusive job creation are hampered.

These findings suggest that green investments in Indonesia are still operating within conventional economic frameworks that place location and short-term profits as key considerations. There is no affirmative policy that links green investment with job creation, *green skills* development, and labor protection at the regional level. The green transition risks reproducing existing structural inequalities. Thus, green investment has not fully functioned as an instrument of inclusive development in supporting a just green transition.

5. Conclusion

The green transition can be a strategic opportunity for Indonesia through the creation of green jobs to encourage sustainable and inclusive economic development. However, the results of this study show that this potential has not been optimally utilized because there is still limited integration between environmental policies, employment, and green investment. Green jobs still face structural obstacles in their development in the form of limited green skills, partial regulatory protection, and uneven distribution of green investment regionally.

Green investment strategies tend to be concentrated in areas with higher economic readiness. This causes the benefits of creating green jobs not be fully felt by regions with more limited economic capacity. In terms of regulations, the absence of a policy framework that explicitly regulates the protection and reallocation of labor in the green transition process has the potential to increase the risk of structural unemployment, especially for workers in the conventional sector.

Therefore, the results of this study explain the importance of strengthening more integrated policies to ensure that the green transition takes place in a just manner. This includes the preparation of regulations based on the principle of *just transition*, attention to regional equity in green investment strategies, and the integration of green skills development into the national education and job training system. Through this approach, the green economy transition has a more cynical function, not only as an environmental agenda, but as an instrument of inclusive and sustainable economic development.

References

Alfiah, N. A., Sagala, S., Kristiana, J., & Kartika, L. (2024). Analisis Faktor Pengembangan Green Skills dan Green Jobs bagi Gen Z melalui Pendekatan Force Field Analysis (FFA). *Jurnal Cendekia Ilmiah*, *4*(1), 313–320.

Bappenas*: Pembangunan rendah karbon ciptakan 15,3 juta pekerjaan baru*. (2023). Antara.

Bappenas. (2025). *Peta jalan pengembangan tenaga kerja hijau indonesia*.

Bappenas, & GIZ. (2023). *The development of green jobs in Indonesia*. International Labour Organization.

Bappenas. (2021). *Implementasi Ekonomi Hijau Melalui Pembangunan Rendah Karbon (Indonesia Green Growth Program, 2022)*. Bappenas.

Bincang Energi. (2021). *Green jobs: Jembatan pelestarian lingkungan masa depan*. Bincang Energi.

Celios. (2023). *Dampak transisi ekonomi hijau terhadap perekonomian, pemerataan, dan kesejahteraan Indonesia*. Greenpeace Indonesia.

Correia, M. S. (2019). *Sustainability: An Overview of the Triple Bottom Line and Sustainability Implementation*. *2*(1). https://doi.org/10.4018/IJOSE.2019010103

Fernandes, C. M., Hinojosa, C., & Miranda, G. (2010). *OECD Local Economic and Employment Development (LEED)*. OECD Publishing. https://doi.org/https://dx.doi.org/10.1787/5kmbjgl8sd0r-en

IESR. (2021). *Strategic Partnership Green & Inclusive Energy*. IESR.

ILO. (2018). *WORLD EMPLOYMENT SOCIAL OUTLOOK 2018 Greening with jobs*. International Labour Organization.

International Labour Organization (2007). *What is a green job?*. International Labour Organization.

Itsnani, F. M., & Jatmiko, P. B. (2024). *Bappenas Targetkan 15,3 Juta Green Jobs Tercipta Pada 2045*. Kompas.Com.

James, C. (2022). *Guide to Green Investing*. Investopedia.

Kristiana, J., Adinda, N., Sagala, S., & Kartika, L. (2025). *Membangun Minat Green Jobs pada Gen Z melalui Pengembangan Green Skills*. *4*(2), 2029–2041. https://doi.org/https://doi.org/10.56799/jceki.v4i2.7047

Mariska. (2024). Optimalisasi Peluang Green Jobs Melalui Penyiapan Tenaga Kerja Hijau. *Direktorat Ketenagakerjaan, Kementerian PPN/Bappenas*, *VII*(3), 227–242.

Media Indonesia. (2024). *Pelatihan green skills perlu untuk penuhi kebutuhan green job.* Media Indonesia.

Nasri, M. A., & Keindahan, B. K. A. (2024). Tinjauan Regulasi dan Kebijakan dalam Pengembangan Green jobs di Indonesia. *Jurnal Ilmu Kesejahteraan Sosial*, *25*(2). https://doi.org/https://doi.org/10.7454/jurnalkessos.v25i2.1054

OECD/Cedefop. (2014). *Greener Skills and Jobs* (OECD Green). OECD Publishing.

PAGE. (2023). *Green Jobs and Just Transition Policy Readiness Assessment in the Energy Sector in Indonesia*.

Pociovălișteanu, D. M., Novo-Corti, I., Aceleanu, M. I., Șerban, A. C., & Grecu, E. (2015). Employment Policies for a Green Economy at the European Union Level. *Sustainability*, 9231–9250. https://doi.org/10.3390/su7079231

PPID KLHK. (2016). *Siaran pers: Indonesia menandatangani perjanjian paris tentang perubahan iklim*. Pejabat Pengelola Informasi Dan Dokumentasi Kementerian Lingkungan Hidup Dan Kehutanan.

Pramana, M. A., & Komalasari, Y. (2023). *Perkembangan Kebijakan Green Investment Dalam Peraturan Perundang- Undangan di Indonesia meratifikasi Konvensi Kerangka Kerja Nasional tentang Perubahan Iklim (United National Framework Convention on Climate Change / UNFCC) ke dalam Undang-Undang Nomor 16*. *XXX*(1), 2–6. https://doi.org/10.28946/sc.v30i1.2833

Pristiandaru, D. L. (2024). *Berapa Potensi "Green Jobs" dari Transisi Energi di Indonesia?*

Priyatna, H. N., & Suryadi, I. (2025). *Facing Global Inflation : Economic Strategies to Strengthen People ' s Purchasing Power*. *3*(1), 73–81. https://doi.org/https://doi.org/10.61942/msj.v3i1.312

Purba, B., Simamora, P. I. M., Simarmata, Y. V., & Sinaga, F. A. (2025). *Kontribusi Ekonomi Hijau terhadap Keberlanjutan Pengelolaan Sumber Daya Alam di Indonesia*. *4*(2), 8404–8409. https://doi.org/https://doi.org/10.31004/jerkin.v4i2.3044

Puspita, I., Istiqomah, A., & Syariah, E. (2025). *The Effect of Inflation Rates on Economic Growth in the City of Bandar Lampung*. 9867–9881.

Rahayu, A. B. (2020). Eksistensi Investasi Hijau dalam Poros Pembangungan Ekonomi sebagai Bentuk Manifestasi Perlindungan atas Lingkungan Hidup. *Padjadjaran Law Review*, *8*(1).

Santika, R., & Farizki, R. (2025). Exploration of Green Economy Potential in Regional Development in Indonesia: A Qualitative Study. *Journal of Regional Economic Studies*, *1*(1 2025), 44–52.

Sern, L. C., Zaime, A. F., & Foong, L. M. (2018). Green Skills for Green Industry : A Review of Literature Green Skills for Green Industry : A Review of Literature. *Journal of Physics: Conference Series*. https://doi.org/1019 012030

Susanto, H. A., Zaini, M., Irmanelly, Azizs, A., & Sinaga, S. (2024). *Pengantar Ekonomi Pembangunan*. PENERBIT NAGA PUSTAKA.

Udemba, E. N., & Philip, L. D. (2022). Policy insight from renewable energy , foreign direct investment (FDI), and urbanization towards climate goal : insight from Indonesia. *Environmental Science and Pollution Research*, 54492–54506. https://doi.org/10.1007/s11356-022-19599-9

Vandeplas, A., & Vanyolos, I. (2022). *The Possible Implications of the Green Transition for the EU Labour Market* (Vol. 8022, Issue December). https://doi.org/10.2765/583043

Wahyunindyawati, & Dyanasari. (2017). *Ekonomi Sumberdaya Alam dan Lingkungan*. Deepublish.

WALHI. (2020). *Lima Tahun Perjanjian Paris: Kebijakan Iklim Indonesia Tidak Serius dan Ambisius*. WALHI.

Waluyo, D. (2024). *Ekonomi hijau buka 15,3 juta lapangan kerja baru*.

Word Economics Forum. (2023). *The future of work in the green economy*. World Economic Forum.