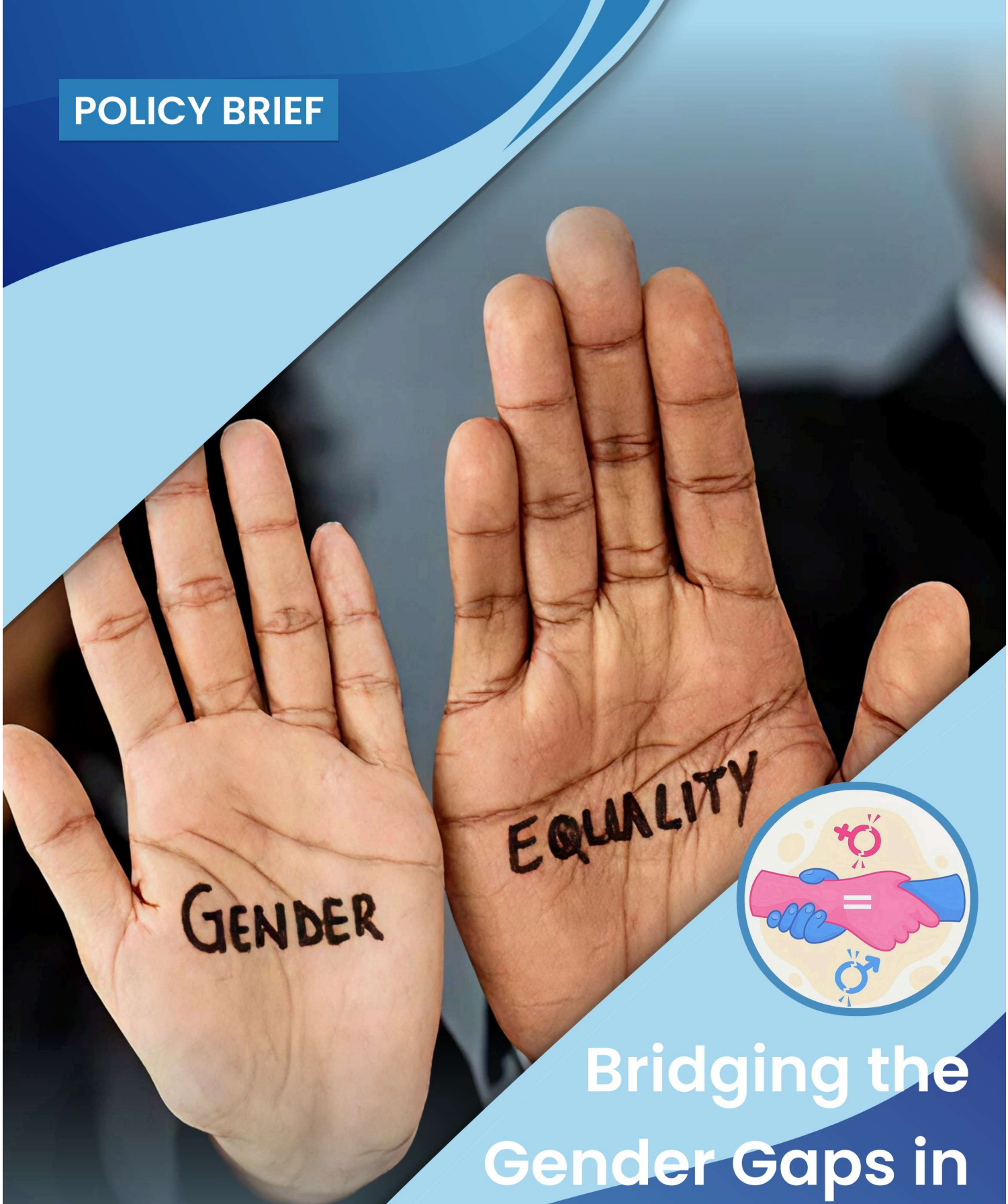
POLICY BRIEF



Bridging the Gender Gaps in Indonesia's Energy Transition[1]

KEY POINTS

Indonesia has made strong commitments to energy transition and gender equality, but they remain largely disconnected in policy and practice. While recent initiatives show progress, women's participation in emerging energy-transition related jobs are not systematically embedded in national energy strategies and programs.

Women continue to face structural barriers to entering and advancing in the energy sector, including low participation in science, technology, energineering and mathematics (STEM) education, limited technical training, and insufficient targeted support. Addressing these gaps require gender-responsive skills development support and stronger linkages between education and training providers and industly, as well as energy companies with policies and programs aimed at advancing women's participation as managers, employees and energy users.

At the community level, women play pivotal roles in managing household energy and maintaining distributed renewable energy systems, yet they are often excluded from decision-making. Empowering women through inclusive and accessible infrastructure, training, and leadership opportunities is key to a just and sustainable energy transition.

I. INTRODUCTION

This brief assesses the gender dimension of Indonesia's energy transition, providing insights and recommendations to ensure that the process not only advances Indonesia's climate and energy goals, but also actively integrates gender considerations in the transition. Inclusive energy transition can enhance labor force participation, address skills shortages in the clean energy sector, and improve productivity, while gender-responsive energy policies and initiatives can address structural inequalities. The focus of this brief is threefold. First, we provide an analysis of the policy and regulatory landscape concerning energy transition and gender equality, and where they intersect. We then examine women's involvement in energy transition, especially in education, employment, and leadership. Finally, we present a brief analysis of women's experiences managing household and community-level energy systems in rural Indonesia, and their capacity to participate in and benefit from renewable energy initiatives. The brief is informed by desk review, and in-person interviews, surveys, focus group discussions, and site visits conducted between 2023 and 2024.

II. NATIONAL FRAMEWORK FOR ENERGY TRANSITION IN INDONESIA

As the largest energy consumer in Southeast Asia,[2] effective energy transition is critical for the country's energy security. According to the World Economic Forum's Energy Transitions Index (ETI) score in 2025, Indonesia is ranked 58 out of 118 countries.[3] Despite being significantly dependent on coal and imported oil products, Indonesia has recognized the urgent need to address climate change and promote sustainable development.

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[1] This report is based on the research conducted by the Center of Energy Studies, University of Gadjah Mada (UGM). The research is supported through Asian Development Bank (ADB), Technical Assistance TA10089: Integrating Gender and Social Inclusion Dimensions in Climate Change Interventions in Southeast Asia.

[2] Q. F. Erahman and W. W. Purwanto. 2021. Energy Security: A Case Study of Indonesia. In M. Asif, ed. Energy and Environmental Security in Developing Countries—Advanced Sciences and Technologies for Security Applications.

[3] World Economic Forum, 2025. Fostering Effective Energy Transition 2025

Indonesia has demonstrated a strong commitment to global climate action, notably through the Nationally Determined Contributions (NDCs) 2015, the enhanced NDCs in 2022,[4] which included the aim to reduce greenhouse gas (GHG) emissions by 31.9% through domestic efforts and 43.2% with international support,[5] a declaration of a net-zero emission (NZE) target by 2060 or sooner; as well as the development of a comprehensive Long-term Strategy on Low Carbon and Climate Resilience 2050. This commitment was further reinforced during Indonesia's G20 Presidency in 2022, when the Just Energy Transition Partnership (JETP), aimed at decarbonizing the power sector, promoting renewable energy, and enhancing energy efficiency, was formalized by Indonesia and the International Partners Group (IPG). Through JETP, Indonesia has committed to reducing its peak GHG emission to 290 million metric tons of carbon dioxide (Mt CO2) by 2030, accelerating the share of new and renewable energy mix out of its overall energy mix from xx% to 34% by 2030.[6] Additionally, the enactment of Presidential Regulation No. 112/2022 concerning the Acceleration of Renewable Energy Development for Electricity Supply marked a significant step toward promoting renewable energy development, highlighting Indonesia's holistic approach to achieving a sustainable and inclusive energy transition.[7] In October 2025, Indonesia submitted Second Nationally Determined Contributions (SNDC), which reflects updated commitments targeting emissions peaking after 2035 and net zero by 2060, supported by offsets from forestry and land use.[8]

III. GOVERNMENT COMMITMENT TO GENDER IN ENERGY TRANSITION

Indonesia's commitment to climate action reflects its policies and regulations related to gender equality and women's empowerment. In 1984, Indonesia ratified The Convention on the Elimination of All Forms of Discrimination against Women (CEDAW) (No.7/1984). In 2000, it promulgated Presidential Instruction No. 9/2000 regarding Gender Mainstreaming into National Development (No. 9/2020). In line with this policy, several of the formulated laws and programs related to energy transition incorporate gender mainstreaming efforts, including the Long-term Strategy on Low Carbon and Climate Resilience 2050[9]. In March 2024, the Ministry of Women's Empowerment and Child Protection (MOWECP) and the Ministry of Environment and Forestry (MOE) jointly launched the National Plan of Action on Gender and Climate Change (RAN-GPI) with the support from Asian Development Bank (ADB)[10]. It signals the commitment of Indonesian government to implement gender mainstreaming approaches in national and subnational programs related to climate change, especially in the efforts to increase women's access to equal,

full and meaningful participation in the climate action. The RAN-GPI covers seven sectors that are crucial in addressing both adaptation and mitigation measures: 1) food security, sustainable agriculture, water and irrigation, 2) forestry and land use, 3) renewable energy, energy efficiency, waste management and environmental health, 4) green industry and economy, science, technology and innovation, 5) disaster resilience and support for recovery, 6) social resilience, health, social protection and children's rights, and 7) marine, coastal and blue economy. The Ministry of Development Planning (BAPPENAS), MOE and MOWECP signed a joint agreement on the National Task Force for RAN GPI Implementation Acceleration in November 2025, and committed to taking leadership roles as National Secretariat to oversee implementation of RAN-GPI, while seven sectoral working groups (WGs) have been established to mainstream intersection of gender and climate change into their programs and projects.

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[4] Republic of Indonesia. Enhanced Nationally Determined Contribution (NDC), 2022. Jakarta: Ministry of Environment and Forestry, September 23, 2022. Accessible at: https://unfccc.int/sites/default/files/NDC/2022-09/23.09.2022_Enhanced%20NDC%20Indonesia.pdf

[5] Republic of Indonesia. 2022. Enhanced Nationally Determined Contribution.

[6] Y. Damuri et al. 2023. Risk and Challenges of the Just Energy Transition Partnership (JETP) Indonesia. Centre for
Strategic and International Studies.

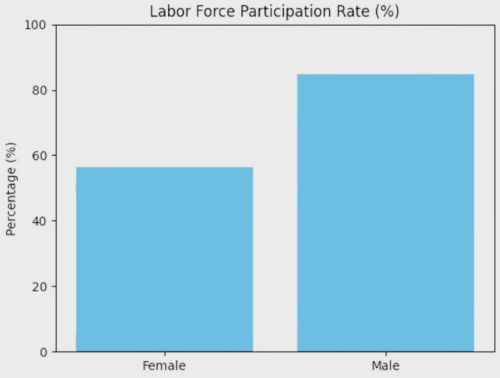
[7] The status of implementation is addressed through MEMR Regulation No. 10/2025 on the Roadmap for Energy Transition in the Electricity Sector, which provides concrete measures.

[8] Government of Indonesia. 2025. Second Nationally Determined Contribution.

[9] Government of Indonesia. Indonesia Long-Term Strategy for Long Carbon and Climate Resilience 2050 (Indonesia LTS-LCCR 2050).

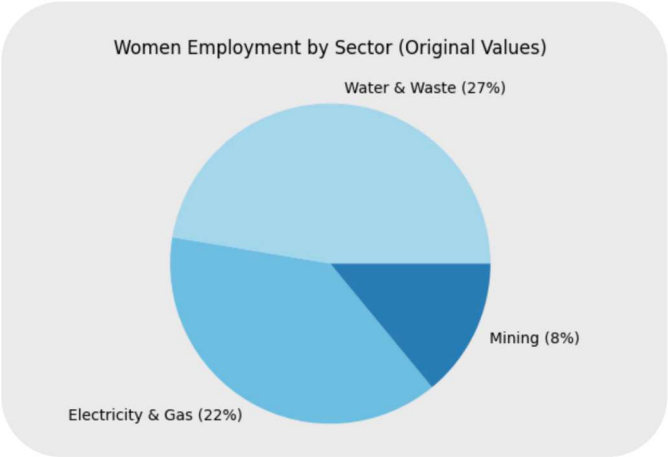
[10] Ministry of Women Empowerment and Child Projection and Ministry of Environment and Forestry. 2024. National Action Plan on Gender and Climate Change in Indonesia 2024-2030.

IV. GREEN JOBS11 FOR WOMEN AND GIRLS IN CLIMATE CHANGE AND ENERGY RELATED SECTORS



Women remain significantly underrepresented in sectors relevant to energy transition in Indonesia. Data from Badan Pusat Statistik (BPS) or the Central Statistics Agency shows that the overall female labor force participation rate in 2024 was only at 56.42%, far below the male participation of 84.66%, with women's formal employment share even much lower at 36.32%. In 2023, women accounted for 27% of employment in the Water Supply, Sewerage, Waste Management sectors; 22% in Electricity and Gas; and 8% in Mining and Quarrying.[12]

The shift toward cleaner energy requires technological and environmental transformation fueled by a diverse, skilled and innovative workforce. The rapid growth in renewable energy sector opens new opportunities for women and girls who currently are or will be in education to embrace a future career in energy related fields. In 2023, renewable energy employment reached around 16.2 million globally.[13] A survey found significant growth potential in the coming years to nearly 29 million jobs in 2050, with women's contributions (skills and knowledge) being considered invaluable to the industry.[14] It also found that the percentage of female workers in the renewable energy sector at 32% and in STEM jobs at 28%. A significant portion of these opportunities are arising in Asia, which accounts for almost two-thirds of all renewable energy jobs.[15]



In Indonesia, employment in renewable energy is expected to rise sharply: solar PV related jobs could exceed 742,000 jobs by 2050, while wind power energy related jobs could reach approximately 22,000 jobs by 2040, growing from a very small base of xx in 2020.[16] Growing renewable energy industries like solar, wind, bioenergy, and hydroelectric power each requires personnel with a specific set of skills and knowledge , such as energy analyst, environmental architect, green building specialist, and fuel cell engineer.[17]

[11] Green jobs are jobs that contribute to preserving or restoring the environment and promote decent work through one or more of the following mechanisms: having particular tasks, requiring special skills, implementing environmentally friendly processes, and/or producing environmentally friendly outputs (products/services) (Bappenas, 2022)

[12] BPS. 2024. Keadaan Angkatan Kerja di Indonesia Agustus 2024

[13] IRENA. 2024. Renewable energy and jobs: Annual review 2024.

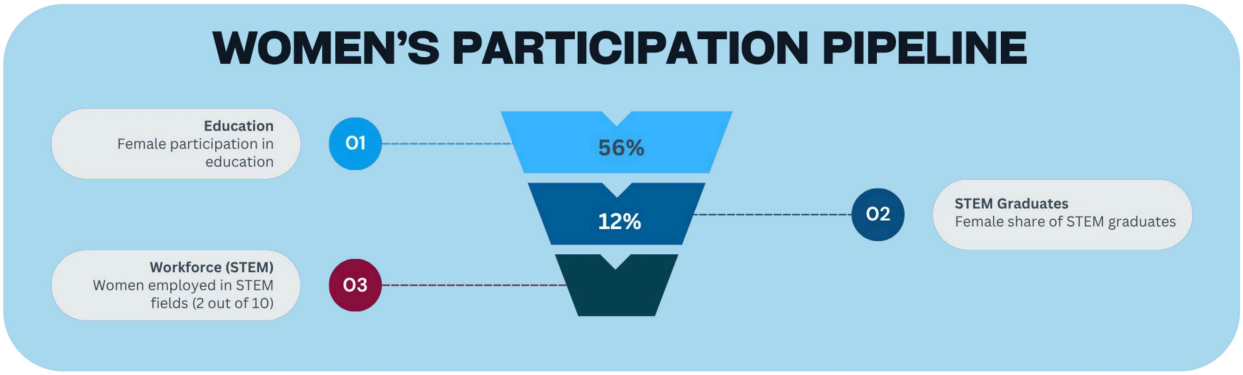
[14] IRENA. 2019. Renewable Energy: A Gender Perspective.

[15] IRENA. (2022, Sept 22). Renewable Energy Jobs Hit 12.7 Million Globally [Press Release]. Retrieved from https://www.irena.org/News/pressreleases/2022/Sep/Renewable-Energy-Jobs-Hit-12-7-Million-Globally

[16] Koaksi. 2021. Green Jobs: Peluang Kekinian Demi Sekepal Asa Kemakmuran Masa Depan.

[17] Bappenas' Occupation Map for Green Jobs in the Renewable Energy sector provides more information on green jobs. See Bappenas. 2023. Peta Okupasi Nasional Green Jobs dalam Kerangka Kualifikasi Nasional Indonesia (KKNI).

Indonesia's ranking in the 2022 Programme for International Student Assessment (PISA) showed significant improvement from the past, ranking 69th out of 81 participating countries. Indonesia has achieved notable progress in gender equality in education, with 2023 data revealing that women's participation rates in education from junior high school to tertiary levels exceed those of men.[18] However, this progress does not uniformly extend into all areas of study, especially in STEM disciplines. In 2018, women constituted only 12% of all STEM graduates in Indonesia, a figure notably lower than in neighbouring countries like Malaysia, the Philippines, Thailand, and Viet Nam,[19] underscoring a significant gap relative to their majority share in overall tertiary enrolments.[20] Although the data specific to Indonesia is lacking, globally, women constitute only about 28% of those graduating in engineering disciplines, underscoring the persistent gender gap in technical fields.[21] Additional data from the Directorate General of Higher Education in 2020 highlights a significant gender disparity between general higher education enrollment and specific institutions focused on technology and energy fields in Indonesia. Across all fields of study, the number of new female students at 1,213,815 (56.10%) surpasses male students at 949,866 (43.90%).[22] However, women's representation falls sharply in technology-focused pathways. Based on data from the National Labour Force Survey in 2020, only about 2 out of 10 women were employed in STEM fields.[23] Female STEM graduates do not necessarily seek employment or remain in STEM industries due to structural barriers including social norms and work environment that is not conducive to women's participation and career progression.



As the energy sector shifts toward sustainability, equipping women and girls for future green jobs is key. Educational institutions are increasingly aligning their programs with the evolving needs of the renewable energy sector, focusing on equipping students with relevant skills and knowledge. In 2020, Ministry of Education, Culture, Research and Technology (MoECRT) introduced the updated curriculum, Kurikulum Merdeka as part of the Merdeka Belajar (freedom to learn) program, which integrates climate change content into higher education and vocational training to develop human resources. The Kampus Merdeka program, also introduced by the MoECRT in 2020, has further expanded opportunities for experimental learning related to the energy transition, and encouraging students to blend practical and theoretical knowledge. The Program has been implemented gradually across various educational levels in Indonesia, incorporating energy transition issues into the curriculum from elementary school through to higher education. It allows students to spend up to three semesters focusing on their interests and talents outside their primary courses. These activities include certified internships and independent studies, such as the Gerakan Inisiatif Listrik Tenaga Surya (GERILYA) program, a collaborative effort with the Ministry of Enegy and Mineral Resources (MEMR). The GERILYA program provides students hands-on learning experiences in renewable energy and energy conservation. While not specifically targeted to women, these programs are designed to blend practical and theoretical knowledge that can help prepare women for various roles in the renewable energy sector. In the GERILYA program, in 2023, women comprised 38% (24 out of 62) of Batch 4 of participants and, in 2024, 32% (29 out of 89) of Batch 6 of participants. Building on these efforts, one of the five main pillars of the MoECRT's 2024 policy is the enhancement of teaching and learning quality,which

[18] BPS. 2023. Statistik Pendidikan 2023.
[19] Kemenperin. 2022. Mematahkan Bias, BPSDMI dan Prospera Gelar Webinar Hari Perempuan.
[20] Marshan & Nikijuluw.2020. Will Indonesia's 4.0 revolution leave women behind?
[21] UNESCO. 2021. UNESCO Research Shows Women Career Scientists Still Face Gender Bias.
[22] Direktorat Jendral Pendidikan Tinggi. 2020. Statistik Pendidikan Tinggi 2020.
[23] Kementerian KPPA. KemenPPA Dorong Perempuan Tingkatkan Keterampilan di Bidang STEM.

includes strengthening curriculum content on climate change. [24]

Scholarships and mentorships are frequently a way to introduce girls to fields of study such as STEM. The Lembaga Pengelola Dana Pendidikan (LPDP) (Indonesia Endowment Fund for Education) offers targeted scholarships for underserved students. These initiatives can collectively empower students, including women, in the renewable energy sector and STEM fields more broadly. LPDP's 2024 annual report shows a cumulative 28,885 female recipients (53.3%) versus 25,264 male (46.7%). In 2025, Indonesia further aligned STEM education with its energy-transition goals by issuing Permendikdasmen No. 13/2025, which allows schools to offer Coding and Artificial Intelligence as elective subjects from upper primary through secondary, phased from the 2025/26 school year. The Ministry of Primary and Secondary Education Regulation also released a teacher's guide and an academic paper to support implementation, signaling a systemic push to equip learners for green-economy jobs.

Preparing female students for future energy jobs, particularly in the green sector, is critical for ensuring gender equality and maximizing the potential of the workforce in the rapidly evolving energy landscape. Examples of international best practices that could be adopted for Indonesian education include (i) early exposure of girls to STEM subjects which can significantly impact girls' interest and confidence in these areas; (ii) targeted STEM programs for women, including inclusive curriculum design that engage and inspire female students; (iii) scholarships and financial support targeting female students;(iv) partnerships between educational institutions and industry actors, inclusive of internships and job placements; and (iv) female role models and mentors in the energy sector. [25]

V. SURVEY RESULTS OF FEMALE STUDENTS' ATTITUDES AND KNOWLEDGE ABOUT GREEN JOBS

To better understand the perception and readiness of female students for future energy jobs, this study conducted an online survey in 2023 [26] with 349 female students currently in higher education and vocational institutions across educational levels,[27] disciplines,[28] and geographic locations.[29] The survey conducted reflects a substantial awareness of "green jobs" or jobs related to sustainability and the energy sector, with 70.89% of STEM respondents registering awareness, compared to 56.02% among non-STEM. Vocational school students show higher awareness than

[24] Detik. 2023. Kebijakan Kemendikbud 2024: Materi Perubahan Iklim hingga Program Indonesia Pintar.

[25] Asian Development Bank. 2025. STEM for all: Addressing Gender Disparities in Science, Technology, Engineering and Mathmatics.

[26] The survey was conducted by the Center of Energy Studies, University of Gadjah Mada (UGM). It was designed with both structured and open-ended questions to capture qualitative insights directly from the participants. Respondents' proficiency was measured on a scale of 1 to 5, with 1–2 for low, 3 for moderate, and 4–5 for high.

[27] 284 respondents (80.2%), are bachelor's students, followed by 34 (9.6%) vocational school students, 27 (7.6%) vocational high school students, and the remaining 8 students (2.29%) are pursuing master's degrees and one student a doctoral degree (0.29%).

[28] Students with STEM majors come from engineering fields and natural science fields such as agronomy, biology, chemistry, environmental science, food science and technology, health sciences, physics, computer science, statistics, mathematics. Students with non-STEM majors come from political science, law, economics, finance, sociology, psychology, education, business administration, international relations, and communications.

[29] 77.1% or 269 respondents are from Java, followed by 9.5% from Sumatra and 8% from Kalimantan. Additional responses were received from students in Sulawesi, Nusa Tenggara Barat, and Nusa Tenggara Timur.

university students in both STEM and non-STEM groups. This might be attributed to vocational education's focus on practical skills and direct job market applicability. Additionally, vocational institutions might have stronger linkages with industries, allowing students to gain firsthand insight into green jobs through internships and industry projects. The analysis also reveals a significant interest among students in pursuing careers in green jobs, with 70.89% of STEM students and 56.54% of non-STEM students rating their interest as high (levels 4 and 5). Further, 35.56% of vocational STEM students rate their interest at the highest level, slightly above the 30.09% of university STEM students.

The data suggest that the emphasis on practical and applied learning in STEM education may be effective in highlighting the relevance and importance of green jobs, thus fostering a greater sense of awareness, interest and job readiness among female students in these areas. This trend suggests that the hands-on, application-oriented approach of vocational education not only enhances awareness but also can boost interest in green careers. While university students also show considerable interest, the data points to a potential gap in applied learning experiences, identifying an opportunity for universities to incorporate more practical energy sector exposure into their curricula, building on the broader educational strategies that already contribute to cultivating student interest in sustainable careers.

The top three drivers of perception and readiness of students in pursuing green jobs were environmental concern (30.2%), desire to make a positive impact (29.4%), and personal passion or interest (13.6%). On the other hand, a lack of awareness of career opportunities in the energy sector (30.9%), educational qualifications (29.1%), and information (29.1%) emerged as primary reasons for deterred interest in pursuing a career in green jobs. This suggests a gap in understanding the relevance of individuals' skills relevant to the green sector. Exposure to career opportunities in the green sector can bridge this gap, revealing its broad potential and encouraging a more diverse pool of talent to explore opportunities in sustainable careers.

The survey participants identified limited access to scholarships or funding (19.9%), pervasive gender stereotypes that STEM majors are for men (19.6%), the scarcity of women in faculty or leadership positions (16.2%), and the absence of female role models in STEM (15.1%) as key obstacles that restrict women's academic and career development in renewable energy. Additionally, 9.8% of participants identified gender-based discrimination within educational institutions (for example, teachers claiming that women can't be engineers) as a significant impediment, undermining women's academic achievements.

In regard to career goals in the energy sector, 18.2% respondents show an interest in renewable energy, while 18.5% have expressed an interest in energy efficiency and conservation related careers. 18.8% of students are uncertain about their career paths in this sector. This highlights the need for better career advice and more information about the energy industry's various roles, especially for women.
Regarding technical knowledge and soft skills vital for future energy jobs, the majority of the students rated their technical skills in renewable energy, energy efficiency, and energy conservation as low (scores 1 and 2), with university students more likely to report lower proficiency levels than vocational students. On the other hand, a smaller portion of participants reported high proficiency (scores 4 and 5), with vocational students more frequently reporting higher levels of skill compared to their university counterparts.[30]

[30] Respondents' proficiency was measured on a scale of 1 to 5, with 1–2 for low, 3 for moderate, and 4–5 for high.

in key soft skills such as leadership, teamwork, problem-solving, critical thinking, and communication. Less Over half of the respondents, from both vocational and university backgrounds, self-rated as highly competent (scales 4 and 5) than 10% felt they had low competence in these areas.

VI. WOMEN'S REPRESENTATION AND EMPLOYMENT IN THE ENERGY SECTOR

Although women remain underrepresented overall, they represent 32% of the renewable energy workforce globally, compared to 22% of the workforce in traditional sectors like oil and gas.[31] An analysis of nearly 2,500 energy sector companies globally in 2021 revealed that women hold just under 14% of senior management positions. This percentage is highest at x in the utility sector but falls below 12% when utilities are excluded. Women occupy 15.5% of senior roles across 30,000 non-energy firms analyzed.[32] In Indonesia, according to BPS data, women make up only about 30% of the STEM workforce.

This study's findings from interviews with 20 women[33] engaged in the energy sector in Indonesia show that cultural and social norms often limit their educational and professional opportunities, making it challenging to enter or advance within the sector workforce. Persistent stereotypes and traditional beliefs, along with their care responsibilities and lack of care support, often dictate that women's primary responsibilities are in the home, which limits acceptance of women working in sectors like energy, particularly in technical or field-based roles that may require travel for long hours. Stereotypes that label engineering and technical work as "men's jobs" persist. They also contribute to biases or doubts about women's abilities in roles that require physical labor, technical skills, or leadership. Even among women already in the energy sector, biases around their leadership capabilities often hinder their advancement to decision-making or authority roles.

At the Ministry of Energy and Mineral Resources (MEMR), over the past 10 years,a proportion of female employees has increased from 23% to 28%. Furthermore, the Directorate General for New Renewable Energy and Energy Conservation has the highest proportion of female employees, approximately 35%.[34] The Ministry of State-Owned Enterprises (SOE) has committed to increasing the representation of women in leadership positions within SOEs to 25%.[35] Companies such as Perusahaan Listrik Nasional (PLN) or National Electricity Company, Pertamina, Medco Power Indonesia, and Institut Bisnis dan Ekonomi Kerakyatan (IBEKA) are creating opportunities and fostering environments that encourage women's participation and leadership. These companies employ policies aimed at ensuring equality in the workplace, especially in terms of career progression and promotion, creating respectful workplaces and eliminating sexual harassment.

PLN has implemented policies to ensure women have equal opportunities to occupy important positions in both management and operational roles. It has been proactive in setting tangible targets to increase the number of women in managerial and decision-making roles. In 2021, PLN established a program called Srikandi to enhance women's role within the company by developing and implementing company policies related to gender mainstreaming and a conducive work environment, free from violence and discrimination, such as Respectful Workplace Policy (RWP) and Employee Wellbeing Program (EWP).[36]

[31] IRENA. 2019. Renewable Energy: A Gender Perspective. International Renewable Energy Agency.
[32] N. Pilgrim and N. Johnstone. 2021. Women in Senior Management Roles at Energy Firms Remains Stubbornly Low, but Efforts to Improve Gender Diversity Are Moving Apace.
[33] Survey and interview respondents consisted of 20 women including 16 workers, 3 decision-makers, and 1 entrepreneur whose educational backgrounds ranged from high school to doctoral.
[34] EBTKE. 2022. Kementerian ESDM-USAID Dorong Peran Perempuan Dukung Transisi Energi.
[35] Erick Thohir: Women Must Hold 25% of Leadership Positions in SOEs - News En.tempo.co
[36] PLN's Srikandi, the Active Role of Women's Involvement in Company Performance Productivity

The Srikandi network has become essential to build a women's community within the company and beyond to promote women's advancement. Other than the RWP and EWP, PLN has established the Gender Mainstreaming Policy, detailed in the Statement of Corporate Intent No. 0056 of 2023, which sets out strategic initiatives to promote gender diversity. In 2024, PLN achieved 33.33% nominated female talent proportion through the talent pool, which showed increase from 32.25% in 2023, exceeding the 32% target, with these women expected to progress into Dorector roles within SOEs.[37] .[38] In 2025, PLN reached a significant milestone by receiving the Equity, Diversity, and Gender Equality (EDGE) Certification, making it the first SOE in the utilities sector in Indonesia to attain the certification.[39] Acquiring EDGE certification demonstrates PLN's institutional commitment to gender equality.

Similarly, in 2021, Pertamina, a state-owned energy company, developed Pertamina Women with Resilience and Integrity, Authority, and Innovative (PERTIWI). One of its initiatives is the Women Leadership Accelerator Program that provides training opportunities for prospective female leaders. Pertamina tracks data on the female workforce's talent to address the effectiveness of coaching and capacity development initiatives to ensure the program is benefitting female employees. The program led to the increase of the number of women in leadership positions from 14% in 2021 to 18.1% in 2022. [40] In 2024, the percentage of women in leadership reached 18.4%.[41] PERTIWI promotes sustainable lifestyle and holistic well-being of Pertamina workers.[42] Additionally, it formed a Respectful Workplace Policy in early 2021, which the Ministry of State-Owned Enterprises adopted for all SOEs.

In the global energy industry, only 11% of startup founders are women,[43] highlighting a significant gender imbalance and hindering innovation, as diverse leadership is crucial for developing new and effective energy solutions. While specific statistical data on women's energy entrepreneurship in Indonesia is limited, there are compelling examples of female entrepreneurs in the sector. A case in Alor Regency, East Nusa Tenggara, illustrates women excelling in creating and selling lamps for home lighting, effectively transforming energy into economically valuable products.[44] Another prominent figure is Tri Mumpuni, the founder of IBEKA, which focuses on community-based renewable energy projects, bringing electricity to remote villages across Indonesia. IBEKA has been supporting female entrepreneurship at the community level to build micro-hydro in villages that do not yet have electricity. Once the villages can independently manage electricity, they use it for productive and income-generating activities for village women, such as embroidery. Additionally, various start-ups in the energy sector led by women are flourishing, including the activities of The Bali Women Climate Entrepreneur Project supported by the ClimateWorks Foundation. Compared to the oil, gas, or mining sectors, the energy transition offers women more opportunities to actively participate in entrepreneurship.

[37] PLN. 2024. ESG Performance Report 2024.

[38] https://eppid.pln.co.id/wp-content/uploads/2024/07/Laporan%20TJSL%202023.pdf

[39] PT PLN (Persero) attains EDGE Assess Certification - EDGE Certified Foundation. Launched at the World Economic Forum in 2011, EDGE is an independently audited global certification for workplace diversity, equality, and inclusion . It assesses how well an organization ensures equitable opportunities and outcomes for all employees across 3 dimensions - gender balance in the workforce, policies and practices and staff perceptions of equality within the company. PLN has been awarded the Assess Level of EDGE Certification and has adopted a two-year action plan to further advance gender equality. The action plan includes commitments to systematically use gender-inclusive language and visuals in job advertisements, promotional and recruitment videos, provide training to tackle bias in the recruitment and promotion processes, and explore the feasibility of providing childcare facilities for employees.

[40] Kusumo. (2023). Lewat PERTIWI, Pertamina Dorong Inklusivitas Lingkungan Kerja.

[41] Pertamina. 2024. Sustainability Report 2024.

[42] Pertamina. 2024. Komunitas PERTIWI Pertamina Dorong Gaya Hidup Berkelanjutan dan Kesejahteraan Holistik Pekerja Pertamina.

[43] Fatya. 2023. 10 Perempuan Pemimpin Startup Bergabung Dalam Bali Women Climate Entrepreneur Project oleh New Energy Nexus Indonesia.

[44] Theresya. 2023. Memastikan Transisi Energi Berkeadilan di Indonesia (Studi kasus Provinsi Nusa Tenggara Timur): Peluang dan Tantangan Keterlibatan Perempuan dalam Pengembangan Energi Terbarukan (EBT).

VII. WOMEN AS ENERGY USERS AT DISTRICT AND VILLAGE LEVEL

In rural areas where modern energy infrastructure is limited, women bear main responsibilities for using and managing energy for daily household duties, collecting energy resources, daily domestic tasks using energy sources, and managing their household energy expenditures.[45] To observe and analyze rural women's participation in the energy transition, data was collected through field observations, interviews, and/or focus group discussions (FGDs) in 12 Indonesian villages[46] that use renewable energy, based on capacity, sufficient scale of usage by local residents, and continuity of operation. Out of 12, six villages[47] are featured in this report, in addition to two desa ramah perempuan dan peduli anak (DRPPA: women-friendly and child-caring villages),[48] for a total of eight villages. The DRPPA villages have an established program of MOWECP in the Sleman Regency, Yogyakarta.

The majority of the six villages, including Gawerejo, Dungus, and Sruni, rely on biogas from cow manure since farming and raising livestock are the most common economic activities. Out of four villages that have biogas as their main renewable energy, only Sambak does not depend on cow manure as it relies on industrial tofu production waste. The other two villages, Pantai Baru and Kedungrong, have other forms of energy production. Pantai Baru utilizes a mixture of solar and wind energy, and Kedungrong takes advantage of water current from the irrigation system to produce electricity.

Field work revealed that village women play a crucial role in the renewable energy transition, particularly in managing and consuming household energy. Despite gender norms that position women's roles as secondary to men's, they often make the most important household decisions. Women actively participate in operating and maintaining renewable energy sources like biogas, demonstrating their technical capabilities despite prevailing stereotypes. As household managers, they influence how energy is utilized and controlled, ensuring efficiency and sustainability.

However, women are still largely excluded from decision-making processes that may lead to inadequate energy provisions that fail to support their needs and economic activities. For example, high-tech infrastructure such as the micro hydropower plant in Kedungrong and the hybrid power plant in Pantai Baru proved to limit the involvement of women in the daily maintenance and usage of renewable energy, while they have more control over renewable energy facilities that are inclusive, easily accessible, and seamlessly integrated into their daily lives, such as in Sruni, Mundu, Dungus, and Sambak. Renewable energy infrastructure should be able to be easily maintained and should not disrupt the daily activities of its users to ensure good maintenance and sustainability. When women feel the benefits of the presence of renewable energy infrastructure, they can increase the added value of their local natural resources. The motivation to maintain the technology becomes high in order to process and utilize electricity and turn it into something of a higher value that will benefit individual households and the village economy.

[45] United Nations Development Program Indonesia. 2025. Powering Equality: Bridging Gaps for a Just and Inclusive Energy Future in Indonesia

[46] Villages include: Pantai Baru, Kedungrong, Gawerejo, Sambak, Dungus, Sruni, Srimulyo, JSN Cengkir Gading Group, Demangan, Krendowahono, Balong Wetan and Banjarharjo

[47] Pantai Baru, Kedungrong, Gawerejo, Sambak, Dungus, and Sruni

[48] DRPPA program was initiated by KemenPPPA in collaboration with the Ministry of Villages, Development of Disadvantaged Regions, and Transmigration in 2021. It aims to integrate gender perspectives and children's rights into village governance and includes indicators such as the existence of women and children's organizations, separate demographic data, village regulations supporting DRPPA, financial support for women empowerment and child protection, representation of women in village structures, and initiatives to prevent violence, child labor, and underage marriages. DRPPA villages featured in this study include Pandowoharjo and Wedomartani.

Renewable energy has significantly reduced women's domestic workload, freeing time for productive and income-generating activities, although largely within the informal sector due to limited infrastructure, reinforcing gender gaps, particularly in rural areas of Indonesia. Access to time-saving appliances has transformed their lives, enabling increased workforce participation and financial independence. Although renewable energy is affordable and reliable, challenges such as access to capital, business networks, education, and training remain obstacles to women's full participation in entrepreneurship.

Community involvement plays a critical role in women's representation and opportunities. In most of the villages with renewable energy infrastructures, there are many models of women-only activities and/or organizations, such as the pemberdayaan kesejahteraan keluarga (family welfare movement), posyandu (integrated health service posts), kelompok wanita tani (women farmer's group), and the Dasawisma. The Dasawisma, for example, is a group consisting of around 10 households that have a regular gathering every month. There are three Dasawisma in Kedungrong, in which all representatives from each Dasawisma attend the Muskal (village meeting) or the musrenbangdes (rural development planning meeting). Many of these women's organizations are formed through women's role as care providers for the households, yet they are integrated as part of the common social order in communities as a certain form of a body to support village development.

VIII. RECOMMENDATIONS

The study findings highlighted both challenges and opportunities for women in Indonesia to take on more active roles in the energy transition, whether as employees, entrepreneurs, and community leaders. The following recommendations are intended to support the enhancement of these changes and directed towards key stakeholders, including government ministries such as MOWECP and MoECRT, educational and training institutions, and state-owned enterprises and private companies in the renewable energy industries.

A. CREATE AN ENABLING ENVIRONMENT FOR INCREASING PARTICIPATION OF GIRLS AND WOMEN IN STEM

I. Include sex-disaggregated targets and indicators across national and sub-national education and skills strategies related to STEM and the energy transition, including outcomes such as female graduate employment, percentage of female vocational and higher-education graduates employed and female students' participation in experimental learning.

II. Integrate energy-transition content in curriculum — renewables, energy grids and storage, climate resilience, and digital skills—into curricula from secondary to higher education.

III. Provide targeted incentives for girls through scholarships, mentoring, career guidance, and reserved participation opportunities in STEM and clean-energy education/ career programs

IV. Raise awareness of green-career pathways via school and campus career services, parent–teacher outreach, and industry exposure activities.

V. Strengthen industry–education linkages through internships, industry projects, site visits, and lecturer-from-industry schemes, with incentives for companies to mentor female students and build future pipelines.

VI. Address gender stereotypes and discrimination in education settings by updating STEM materials, training teachers on gender-responsive pedagogy, and embedding equality messaging in national learning platforms and co-curricular programs.

B. IMPROVE THE WORKING ENVIRONMENT AND OPPORTUNITIES FOR WOMEN IN THE ENERGY SECTOR

I. Collect and publish sex-disaggregated workforce data across the energy value chain to inform planning, policy design, and accountability.

II. Adopt and enforce inclusive workplace policies, including fair recruitment and promotion, equal pay for work of equal value, flexible work, parental leave, respectful workplaces, and robust grievance mechanisms including prevention of sexual exploitation, abuse, and harassment.

III. Set time-bound targets for women's representation in leadership and technical roles across utilities, regulators, developers, and suppliers, and require annual public reporting.

IV. Identify and share good practices by encouraging companies to publish gender-equality reports and join peer-learning networks; showcase programs such as PLN's Srikandi and Pertamina's women leadership initiatives.

C. EMPOWER WOMEN IN THE ENERGY TRANSITION AT THE COMMUNITY AND VILLAGE LEVEL

I. Guarantee women's participation in local decision-making on renewable-energy projects by embedding gender criteria in village facilitation guidelines and in Musrenbangdes and other planning forums including private sector led projects

II. Deliver targeted technical training for women on installation, operation, and maintenance of renewable-energy systems (solar PV, biogas, micro-hydro), with modules adapted to appropriate literacy levels and local languages.

III. (iii) Leverage existing women's networks to mobilize participation, provide peer mentoring, and co-design solutions that fit local contexts.

IV. Design renewable-energy projects with direct economic benefits for women, such as reducing production costs, enabling product diversification, improving market access, or lowering unpaid care burdens through time-saving technologies.

VIII. CONCLUSIONS

Policies concerning both energy transition and gender equality have been developed in Indonesia, yet significant implementation challenges persist. A central issue is that women's representation in the energy sector both in formal employment and entrepreneurship remains low, largely due to persistent gender norms, limited access to relevant skills development opportunities, and workplace environment that does not consistently enable even career entry and progression for women. At the same time, women, especially in rural areas, play an indispensable role not only as primary consumers of energy but also as daily maintainers of renewable energy infrastructure and as key players within the local economy and community organizations. Yet, their knowledge and practical roles are not translated into meaningful participation in the decision-making processes of xxx.

Bridging these gaps require a well-designed and deliberate, gender-responsive approach to Indonesia's energy transition. This includes strengthening the pipeline of women and girls into green jobs through increased opportunities in STEM and industry-linked training, improving gender-responsive workplace policies and leadership support, and ensuring women's participation at community level through inclusive planning processes. Aligning energy-transition policies and programs with these actions and strengthening implementation and monitoring will support a more just transition that provides quality employment and enterprise opportunities for women in clean energy, promotes the development of new and greener industries, fosters inclusive, innovative and sustainable business models and entrepreneurship, and drives clean energy innovation across the nation.

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