



MODULE 6

Capacity Gaps, Technical Assistance Needs and Actions for Renewable Energy Integration



The capacity gap in a socially inclusive RE transition represents the discrepancy between a local government's justice goals or mandates (specifically distributional, procedural, and recognition justice) and its practical ability to execute them. This gap stems from institutional, technical, financial, and socio-political shortfalls that hinder the integration of equity into energy governance and the effective operationalization of inclusive principles.

In the context of Indonesia's provincial and district levels, capacity gaps are multidimensional. They undermine equity and inclusion unless explicitly identified and addressed. This module classifies capacity gaps within four categories, namely (i) institutional and governance capacity gaps, (ii) human and

technical capacity gaps, (iii) financial and economic capacity gaps, and (iv) participation and social inclusion capacity gaps.

6.1 A. Institutional and Governance Capacity Gaps

Institutional and governance capacity gaps refer to weaknesses in systems, structures, and functions of governing bodies that are needed to coordinate RE and energy transition planning and implementation.

Table 6.1

Institutional and governance capacity gaps and actionable activities

Gaps	Actionable activities to close the gaps
A.1. Connecting development priorities and energy planning	
- While national energy frameworks (KEN, RUEN, RUPTL) provide a strategic foundation, their integration remains fragmented across governance levels. Weak linkages exist between national development goals and energy policy, as well as in their vertical translation into sub-national instruments (RUED, RPJMD, RUKD, Renstra). This misalignment is three-fold: a disconnect between national development and energy objectives; inconsistent translation from national to local levels; and horizontal gaps between local development plans (RPJMD) and energy plans (RUED). Consequently, energy targets are often detached from local development priorities and the budget allocations to operationalize them. - The energy plans frequently operate independently of broader development planning, leading to a lack of sectoral integration. The province's RUED insufficiently captures energy demand across key productive sectors (i.e., agriculture, fishery, transport), while the RPJMD treats energy mainly as a standalone sector rather than a driver of economic transformation. Although many energy-intensive sectors are well-suited for decentralized renewable solutions, provincial plans underutilize their potential to enhance value addition, productivity, and inclusive employment, and continue to rely heavily on fossil fuel (diesel). - RE has not yet been fully integrated into the Provincial Spatial Planning (RTRW). Potential RE sites are not clearly designated in spatial plans, leading to overlaps with agricultural land, forest areas, and coastal livelihoods. As a result, developers frequently encounter land-use conflicts and regulatory uncertainty.	- Technical assistance for Integrating energy into local development planning and budgeting through the temporary assignment of a dedicated staff, with a designated workspace, to work directly with provincial agencies and support coordination and implementation. - Establish a standardized policy translation framework (national–subnational energy planning alignment guidelines), providing methodologies for aligning energy targets with regional development priorities, sectoral strategies, and fiscal planning / sectoral budget. - Develop sector specific RE integration guidelines; - Include RE actions in sectoral Renstra and Renja planning cycles. - Introduce energy-linked development indicators in planning frameworks. - Develop an integrated monitoring and policy alignment platform - Capacity building - Resource support

Table 6.1 Continuation ►

Table 6.1 Continuation

Gaps	Actionable activities to close the gaps
A.1. Connecting development priorities and energy planning	
- Despite Indonesia holding the world's largest nickel reserves, these critical minerals remain poorly integrated into sub-national frameworks like the RUED and RPJMD. While Indonesia's "downstreaming" (<i>hilirisasi</i>) policy has driven a captive coal capacity for processing, the lack of sub-national planning alignment misses vital opportunities for local value-added employment and multidimensional poverty reduction. Consequently, the global energy transition's reliance on Indonesian nickel is not yet translating into localized socio-economic benefits or specific budget allocations for regional development. - There is also a persistent gap in linking RE targets with climate commitments, social equity objectives, co-benefits, and (international) financing mechanisms. RE planning remains largely disconnected from climate mitigation strategies and local development priorities. Despite clear opportunities to align RE initiatives with the SDGs, the Green Development Index, and net-zero emission targets, this fragmentation prevents the "mainstreaming" of energy as a cross-cutting solution, treating it instead as a narrow infrastructure concern rather than a vehicle for holistic sustainable and equitable development.	- Knowledge exchange, sharing best practices activities, and peer to peer learning - Development of knowledge repository - Conduct RUED–RPJMD alignment workshops; - Mentoring, and coaching on Renewable Energy, Conservation, and Energy Efficiency (National action plan on gender and climate change, 2024) - Formalize / institutionalize collaboration (forum) between ministries, CSOs, private sector, and international organizations to create both top-down and bottom-up momentum - Map RE potential zones and formally integrate them into spatial plans and conduct participatory land-use planning involving affected communities.
A.2. Jurisdiction and authority	
- Although provincial governments have been formally granted expanded authority to manage renewable energy resources, this shift has not translated into meaningful operational power.¹ Strategic decision-making over grid-scale electricity, rooftop solar quotas, and utility-scale renewable energy projects remains highly centralized. In practice, subnational governments are largely confined to facilitative and coordinative roles, with substantive authority limited to specific renewable energy types, primarily biomass and biofuel, off-grid renewables (such as solar PV and micro-hydro), and biogas or waste-to-energy initiatives. This constrained mandate narrows their ability to influence broader energy transition pathways within their jurisdictions. - Subnational governments (e.g., Dinas ESDM) are mandated to develop RUED aligned with RUEN and ensure it also serves as a reference for regional development planning documents. However, while provinces are required to align and implement these plans, they often lack clear operational guidance on how to integrate RUED into development planning processes. This challenge is compounded by limited authority, capacity constraints, and insufficient institutional support.	<i>Similar to proposed actions under A.1.</i>

Table 6.1 Continuation ►

¹ Under Presidential Regulation No. 11/2023

Table 6.1 Continuation

Gaps	Actionable activities to close the gaps
A.3. Coordination Mechanism	
› Coordination among government agencies is challenging due to the absence of clear mandates and operating procedures for multi-agency coordination on renewable energy-linked development programs. Furthermore, there are insufficient platforms for sustained coordination among government agencies, CSOs, private sectors, and other stakeholders. At the sub-national level, responsibilities for energy, sectoral development, financing, and community empowerment are distributed across multiple OPDs, yet coordination mechanisms remain ad hoc and personally-driven rather than institutionalized. Most actors tend to operate independently, with limited platforms for joint planning, co-design, or shared monitoring. This results in fragmented initiatives, duplication of efforts, and missed opportunities to align technical support, financing, and capacity building. › Significant coordination gaps between provincial, regency/district, and village administrations continue to hinder the integration of RE into mainstream development planning. Village governments and local entities (such as BUMDes, farmers' cooperatives, and fisheries organizations) have the local presence needed to manage small-scale RE systems, yet they are often sidelined from higher-level planning processes. They frequently lack clear guidance and confidence in areas such as budgeting and post-installation management, while higher-level agencies may not fully account for local governance realities and capacity constraints. The absence of a structured mechanism and adequate facilitation capacity to sustain both vertical and horizontal coordination ultimately prevents alignment between grassroots management capabilities and provincial or regency/district technical and budgetary frameworks, leaving decentralized RE potential underutilized. › Structural barriers to gender integration remain significant, with persistent gaps in institutional coordination posing a key obstacle to effective gender mainstreaming in RE and development planning. The absence of structured engagement with formal mechanisms, such as the Gender Mainstreaming Working Group (Pokja PUG), undermines policy coherence and weakens compliance with national gender integration mandates. Without formal coordination channels and clearly defined roles, gender considerations are treated as ad hoc additions rather than embedded components of planning, budgeting, and implementation processes.	At the provincial level: › Establish a provincial multi-stakeholder coordination platform / working group for RE led by Bappeda, preferably formally through a formal decree or regulation; › Institutionalize collaboration with the Gender Mainstreaming Working Group (Pokja PUG) in RE-related planning processes. › Conduct regular coordination meetings involving energy agencies, planning agencies, environment offices, CSOs, private sector actors, and development partners › Develop gender-responsive coordination guidelines for RE and development programs. › Ensure representation of women's groups and gender experts in coordination platforms. › Conduct gender analysis and gender-responsive budgeting workshops for government agencies and partners At the village or community level: › Institutionalize Vertical Coordination Mechanisms (Province–District–Village) › Introduce coordination focal points in each administrative level to ensure continuous communication. › Organize annual multi-level planning forums where village representatives, BUMDes, and local cooperatives participate in RE planning discussions › Develop village-level RE management guidelines and RE integration into village development plans and budgets guidelines › Create a provincial facilitation team consisting of technical experts, community engagement specialists, and policy advisors. › Pilot community-owned RE models managed through BUMDes/farmers or fisheries organisation/cooperatives, document the experience as lessons learned, and facilitate knowledge sharing among villages and community level organizations. › Training for trainers (ToT) programs at the community, and make sure to include women is part of the group.

Table 6.1 Continuation

Gaps	Actionable activities to close the gaps
A.4. Institutional Memory	
Frequent staff rotation and relatively rapid role shifts within government institutions act as a significant barrier to institutional memory, creating a “reset button” effect that halts momentum. In the absence of a standardized handover mechanism or comprehensive transition notes, incoming officials are often thrust into complex RE portfolios with little to no context regarding previous multi-stakeholder negotiations or technical feasibility studies. This information vacuum disrupts the continuity of long-term projects, as new personnel may inadvertently backtrack on established agreements or fail to uphold the specific social safeguards required for inclusive development. Consequently, the lack of a structured knowledge transfer process does not just delay administrative timelines, it actively erodes the trust of local communities and private investors, undermining the sustainability of energy transitions that require stable, consistent, and socially sensitive governance over many years.	› Introduce a standardized handover protocol with written transition notes when officials rotate between positions. › For projects that are being identified as strategic, introduce a handover template summarizing key information, such as project overview, project status, key decisions taken, stakeholder agreements, technical studies conducted, pending actions and risks. › Ensure that the document is formally recorded, maintained, and archived. › Develop a short onboarding package or rapid orientation modules for incoming officials › Set up a minimum overlap period (when possible) between outgoing and incoming staff.



6.2 B. Human and Technical Capacity Gaps

Human and technical capacity gaps involve awareness, skills, expertise, training, and technical knowledge necessary for renewable planning and implementation.

Table 6.2

Human and technical capacity gaps and actionable activities

Gaps	Actionable activities to close the gaps
B.1. Awareness and Understanding Gaps	
› The awareness gaps related to RE are not primarily about lack of knowledge of technologies, but about a limited understanding of RE as a cross-sectoral development enabler and insufficient energy justice literacy among planners and policymakers, leading to limited integration of just and inclusive principles into regional planning. Many non-energy agencies do not yet recognize how RE can directly contribute to their sectoral performance indicators (IKU/IKK), resulting in missed synergies and siloed planning. RE is therefore often perceived as a technical mandate of Dinas ESDM rather than as an instrument to support productive sectors (i.e., agriculture, fisheries, MSMEs, industry, transport) or workforce development targets. › At the community level, awareness of RE tends to emerge through practical, demonstration-based experience, rather than through abstract information campaigns. Evidence from small-scale projects shows that communities develop trust in and understanding of RE only after they observe tangible benefits, such as reduced energy costs, improved productivity, or new income-generating activities. Where RE is introduced without clear links to livelihoods or productive use, community understanding and long-term engagement remain weak, limiting sustainability and ownership. › A fundamental lack of conceptual clarity regarding the pillars of social inclusion in the renewable energy sector has resulted in the systemic exclusion of gender and youth considerations from formal energy planning. Despite the critical role these demographics play in building a resilient future workforce and driving local economic empowerment, they are rarely integrated into strategic frameworks. This oversight creates a missed opportunity to align energy transitions with broader human capital development goals, ultimately hindering the long-term sustainability and social license of RE projects.	› Capacity building on climate-energy-social inclusion intersection for OPD's program planners › Introduction to "Integrated Energy Planning," where every megawatt of clean energy is explicitly mapped to its carbon reduction potential, its contribution to social equity, and its ability to attract green climate finance.

Table 6.2 Continuation ►

Table 6.2 Continuation

Gaps	Actionable activities to close the gaps
B.2. Technical and planning gaps	
› A key technical constraint is the limited capacity of sectoral OPDs to translate RUED targets into sector-specific programs, activities, and sub-activities within Renstra and Renja documents. While the formal planning process is generally understood, challenges arise in identifying appropriate entry points, including suitable programs, activities, indicators, and output definitions through which RE can be meaningfully embedded in sectoral planning frameworks. Persistent challenge is identified in harmonising indicators, timelines, and budgets across RUED, RPJMD, Renstra, and Renja. This challenge is not procedural, but analytical and strategic. Many agencies lack experience in articulating how RE interventions contribute to sectoral outcomes such as productivity gains, income increases, or service delivery improvements. As a result, RE priorities often fail to pass internal screening processes or are excluded from budget allocations. › At the community level, technical capacity gaps manifest in limited skills for operation, maintenance, as well as weak understanding of lifecycle costs and long-term sustainability. Where local operators are not trained or where technical support systems are not embedded, RE installations face higher risks of underperformance or abandonment despite initial acceptance. Furthermore, underutilization of women and youth as potential technical workforce reduces the available labour pool and increases dependency on external contractors. Absence of mentorship and retention mechanisms limits diversity in technical roles, affecting long-term workforce sustainability. › Monitoring and evaluation of RE projects largely overlook social dimensions, focusing primarily on technical indicators such as installed capacity (MW) rather than broader impacts. Metrics rarely capture outcomes related to local employment, gender inclusion, or community benefit-sharing, leaving the social benefits of projects under-assessed. As a result, the success of the energy transition is measured mainly by infrastructure growth, rather than by how equitably and inclusively it improves livelihoods and strengthens community participation. › Institutional Dependency on External Consultant. A critical bottleneck in the regional energy transition is the limited internal technical capacity RE resource assessment within Dinas ESDM. The agency often faces significant constraints in independently evaluating resource maps, verifying generation forecasts, and conducting robust feasibility reviews. This gap creates an over-reliance on external consultants, which often leads to a “knowledge silo” where critical project data and analytical expertise remain outside the government’s institutional memory. Without the internal ability to scrutinize technical data, the ESDM agency risks approving projects based on inaccurate assessments. Furthermore, the inability to internalize these technical skills hinders the province’s power to negotiate effectively with private developers and prevents the development of a long-term, data-driven regional energy roadmap.	› Provide training for government agencies on gender-responsive and socially inclusive monitoring. › Facilitate community-based monitoring mechanisms to capture local feedback and benefit-sharing outcomes. › Develop standard reporting templates for renewable energy projects that include social impact indicators › Increase capacity for tracking progress with robust indicators and high-quality gender-disaggregated data, including finance flows, leadership positions, and income. › Training on renewable energy resource assessment basics › Join technical training with polytechnic › Collaboration on shared renewable energy data platform with PLN

◀ Table 6.2 Continuation

Gaps	Actionable activities to close the gaps
B.3. Operation and Maintenance Gap	
There is a limited understanding of small-scale RE maintenance requirements among policymakers. While significant attention is given to project approval and the rollout of RE programs, far less emphasis is placed on overseeing long-term operational performance, maintenance planning, and the development of local technical workforce capacity. This gap in knowledge and oversight weakens system sustainability.	› Workshops on renewable O&M lifecycle › Development of local workforce planning strategies to maintain the small scale RE
B.4. Negotiating Local Benefits	
Local governments often face weak negotiation capacity for securing CSR contributions and local benefit-sharing from large-scale RE projects. While opportunities exist to access CSR programs, community development funds, and profit-sharing arrangements, particularly from large-scale wind or solar projects, local officials frequently lack the technical skills, experience, and strategic knowledge needed to effectively engage with private developers. This limits the communities' ability to capture financial and social benefits, reducing the overall local impact of RE investments.	› Build capacity on public-private negotiation and benefit-sharing frameworks › Capacity building on developing CSR planning with companies & Blueprint of Development and Community Empowerment (PPM) › Facilitate dialogues between developers, local governments, and communities. › Training on negotiation strategies, contract management, and stakeholder engagement, as well as offering technical advisory support for structuring CSR agreements, profit-sharing schemes, and community development funds.
B.5. Workforce preparation vs. educational institutions	
Aligning renewable energy initiatives with vocational schools, TVET centers, workforce agencies, and other educational institutions helps build a local pool of skilled technicians and operators. Currently, educational institutions are not fully connected with government agencies, private companies, or industry associations, limiting their ability to design programs and curricula that reflect market needs and future workforce demands. Collaboration with training centers (BLK) and relevant government departments is essential to plan specialized renewable energy programs, ensuring that workforce development is practical, demand-driven, and capable of supporting the sector's growth.	› Curriculum Alignment: Collaborate with vocational schools, TVET centers, and universities to integrate renewable energy modules into existing programs, reflecting both technical skills and emerging market needs. › Industry–Academia Partnerships: Establish formal partnerships between educational institutions, private companies, and government agencies to co-develop training programs, internships, and apprenticeships in renewable energy. › Capacity Building for Educators: Provide specialized training for teachers and trainers to enhance their technical knowledge, hands-on skills, and awareness of evolving renewable energy technologies. › Specialized Training Programs with BLK: Coordinate with training centers (BLK) to design short-term, targeted courses on solar, wind, and other renewable technologies, tailored for local workforce demands. › Forecast-Driven Workforce Planning: Conduct regular labor market assessments and skills gap analyses to inform educational program design, ensuring alignment with projected renewable energy sector growth. › Incentivize Private Sector Engagement: Encourage companies to contribute to training programs via funding, equipment donations, or mentoring, creating real-world exposure for students. › Monitoring and Evaluation: Track graduate placement, skill acquisition, and employer satisfaction to continuously refine curricula and training approaches.
Examples of existing programs, platforms, and learning resources related to renewable energy education and workforce development can be found in Annex B.	

6.3 C. Financial and Economic Capacity Gaps

Financial and economic capacity gaps are barriers related to funding, investment readiness, and economic incentives for the social inclusion of renewable energy deployment.

Table 6.3

Financial and economic capacity gaps and actionable activities

Gaps	Actionable activities to close the gaps
C.1. The Fiscal-Planning Gap: Integrating Energy with Sectoral Budgets	
A persistent budgetary disconnect exists between regional energy roadmaps and sectoral programming. Although RE initiatives are formally identified within the RUED, they are not systematically translated into actionable provincial or sectoral budget allocations (APBD). This implementation gap is particularly evident in sectors such as agriculture, fisheries, and workforce development; while these sectors acknowledge the potential of RE at a conceptual level, this recognition rarely manifests in dedicated funding streams or integrated cross-sector programs. Consequently, without a synchronized fiscal mechanism to “lock in” budgetary commitments, strategic energy targets remain un-operationalized.	› Develop RE investment plans linked to sector development priorities. › Introduce climate and energy budget tagging through the Ministry of Home Affairs, similar to the existing gender mainstreaming budget tagging system. › Support Bappeda in integrating RE into sector investment planning.
C.2. Financing gender responsive community-based RE project	
› Access to affordable credit remains a major barrier for community solar projects. Local cooperatives and MSMEs often face high collateral requirements, while financial institutions frequently lack familiarity with RE business models, limiting their willingness to provide financing. This combination of financial and knowledge constraints restricts the development and scaling of community-led renewable energy initiatives. › There is a lack of integration between gender-responsive budgeting frameworks and climate or energy finance instruments reduces the distributive impact of public expenditure. Women-led MSMEs and cooperatives may face disproportionate barriers in accessing credit for renewable energy investments. Absence of inclusion-sensitive eligibility criteria in financing schemes may unintentionally reinforce existing inequalities. Gender-responsive financing increases the efficiency and impact of climate finance and energy policies and these mechanisms are critical enablers of just transitions.	› Workshops for banks and microfinance institutions on community-based RE projects to raise financial institutions’ understanding on climate change and RE and help provide customized financial solutions (e.g., microcredits, exploring the possibility of ‘Koperasi Merah Putih’ in financing energy projects). › Facilitate exchange sessions with successful community based RE projects to demonstrate viable models › Technical assistance, business development services, and training for women’s groups, cooperatives, and women-led MSMEs on financial management, project management, and proposal development of bankable RE projects to strengthen their ability to access climate and energy finance › Workshop for for SMEs to adopt electric technology with RE sources to improve efficiency › Revise financing scheme eligibility criteria to include gender- and inclusion-sensitive requirements that support women-led MSMEs and cooperatives.

◀ Table 6.3 Continuation

Gaps	Actionable activities to close the gaps
	› Develop monitoring systems with gender-disaggregated indicators › Introduce gender- and climate-responsive budget tagging systems › Use finance as an enabler through innovative financing models and gender-responsive budgeting of projects
C.3. Capital Focus over Asset Longevity (maintenance cost)	
› A critical barrier to the sustainability of RE systems is the persistent underfunding of operation and maintenance). Sub-national budget planning remains heavily skewed toward capital expenditure (<i>Belanja Modal</i>), prioritizing the initial procurement and construction of infrastructure, while allocating insufficient resources for ongoing operational and maintenance needs. This “build-and-neglect” cycle accelerates asset degradation, causing high-value installations, such as community-based solar PV systems or micro-hydro plants, to become non-functional well before their intended technical lifespan. › The challenge is further compounded at the community level. Local users and management groups often lack dedicated budgets for routine maintenance and repairs, and their limited technical knowledge, financial literacy, and asset management capacity constrain long-term planning for operation and maintenance costs. Without adequate financial planning, skills transfer, and institutional support, communities struggle to anticipate lifecycle expenses, mobilize maintenance funds, or manage revenue streams effectively, ultimately undermining the durability and impact of RE investments.	› Develop guidelines for life-cycle budgeting of RE infrastructure › Support local governments in allocating operation and maintenance budgets/or collaborate with village governments or PLN on maintenance. › Build capacity on asset management and maintenance planning.

6.4 D. Participation and Social Inclusion Capacity Gaps

Participation and social inclusion capacity gaps refer to the inability of governance systems to ensure meaningful stakeholder engagement, especially for vulnerable groups (e.g., indigenous peoples, women, rural and local community). Socially inclusive energy transition emphasizes participatory planning, highlighting local demand for capacity building in participatory governance. Participation gaps in ensuring social inclusion in renewable energy development may take one of these forms:

- › **Representation gaps:** Under-representation of local or marginalized voices in formal decision-making; inclusion requires representation in decision-making bodies, not only attendance in consultations.
- › **Consultation quality gaps:** Superficial or tokenistic engagement processes. Otherwise, consultation processes often occur late in project cycles, limiting meaningful influence.
- › **Feedback and accountability gaps:** Weak mechanisms for communities to provide input into project monitoring and adjustments. Absence of structured feedback and grievance mechanisms reduces trust and increases contestation risk.

Table 6.4
Participation and social capacity gaps and actionable activities

Gaps	Actionable activities to close the gaps
D.1. The engagement gap: transitioning from consultation to collaboration	
› There is a significant lack of structured and institutionalized mechanisms to ensure meaningful stakeholder engagement in energy planning. RE planning processes are often conducted in a top-down manner, with limited transparency and few formal channels for participation. As a result, local communities, Indigenous peoples, women’s groups, and MSME associations are not consistently involved in decision-making processes. This exclusion weakens social legitimacy, reduces the relevance of interventions to local needs and capacities, and increases the risk of implementation challenges due to limited community ownership and support. › Public consultation for large-scale RE projects is often limited to formal hearings that fulfill procedural requirements rather than fostering meaningful participation. In many cases, community engagement takes place only after key decisions have already been made, leaving little room for genuine influence over project design or implementation. These meetings tend to focus on one-way information dissemination instead of participatory dialogue or co-design processes. As a result, consultation can become largely tokenistic that is more about ticking regulatory boxes than gathering substantive input, feedback, and perspectives from local communities and marginalized groups, resulting in weakening trust, inclusivity, and long-term project sustainability.	› Capacity building of provincial and district government through targeted training on implementing Free, Prior, and Informed Consent (FPIC) mechanisms, emphasizing practical application of FPIC principles, particularly in land acquisition and livelihood restoration for RE projects, and ensuring consultations are participatory, inclusive, and rights-based. › Training to enhance women’s leadership in decision-making within households and social settings to support the transformation process into RE (National action plan gender and climate change, 2024). › Establish participatory planning forum during RE project development

References

Ministry of Women's Empowerment and Child Protection. (2024). *National action plan on gender and climate change 2024–2030*. <https://www.kemenpppa.go.id/buku/rencana-aksi-nasional-gender-dan-perubahan-iklim-2024-2030>

President of the Republic of Indonesia. (2023). *Presidential Regulation No. 11 of 2023 concerning additional concurrent government affairs in the energy and mineral resources sector in the new and renewable energy subsector*. <https://peraturan.bpk.go.id/Details/241778/perpres-no-11-tahun-2023>

ANNEX B

The table below (Table B.1) presents selected programs, platforms, and resources related to education, training, and capacity development in renewable energy. While not intended to be exhaustive, it serves as an illustrative reference for provincial governments, educational institutions, and training centers to identify learning opportunities, foster collaboration, and build locally relevant capacity development programs. By leveraging existing resources and initiatives, stakeholders can strengthen local readiness for renewable energy development while supporting the development of a skilled local workforce.

Table B.1.

Existing education and training programs / platforms in Indonesia

Program/Project/ Resource/Platform	Implementer	Accessible Region	Brief description	Source
Renewable Energy Skills Development (RESD) project (component 1)	Ministry of Energy and Mineral Resources (MEMR); Ministry of Education, Culture, Research, and Technology; and State Secretariat for Economic Affairs (SECO)	Makassar, South Sulawesi	Development of a one-year D4 Specialization Program (Semesters 7 & 8) in Renewable Energy in the fields of Solar, Hydro, and Hybrid at five state polytechnics under the collaboration between SECO, MEMR and the Ministry of Education, Culture, Research, and Technology. One example of program implementation is in collaboration with the Ujung Pandang Polytechnic, Makassar.	Renewable Energy Indonesia, 2023, project campaign
Kampung Hijau Energi	Yayasan Hadji Kalla	Several regencies, South Sulawesi	Green knowledge-based community development integration program, including training for resilient village cadres for biogas and bioslurry.	https://www.yayasanhadjikalla.or.id/humanityandenvironmentcare/kampung-hijau-energi/
Renewable Energy Skills Development (RESD) project (component 2)	PPSDM KEBTKE (MEMR); Ministry of Workforce; TVETs under Ministry of Workforce, & SECO	National	Competency-based job training for Solar Power Plant Technicians (PLTS), Micro Hydro Power Plant Technicians (PLTMH), and Hybrid Power Plant Technicians at five training centers (provinces) under the Ministry of Energy and Mineral Resources and the Ministry of Manpower.	Renewable Energy Indonesia, 2023, project campaign
Sumba Iconic Island initiative	Hivos	Sumba, NTT	Training programs to over 40 local renewable energy entrepreneurs and designated village technicians Sumba Iconic Island Initiative. This training focused on procurement, installation, and Operation and Maintenance (O&M) of solar panels.	Sumba Iconic Island Progress Report 2019

Table B.1 Continuation

Program/Project/ Resource/Platform	Implementer	Accessible Region	Brief description	Source
Renewable Energy Indonesia (REI)	Government of Indonesia, led by the MEMR, in collaboration with the Ministry of Education, Culture, Research and Technology, the Ministry of Workforce, the Ministry of National Development Planning (BAPPENAS), and the National Professional Certification Agency (BNSP).	National	The Renewable Energy Indonesia platform provides a range of information on renewable energy development in Indonesia, including resources related to education, training, workforce development, and industry trends.	https://renewableenergy.id
Energy Academy Indonesia (ECADIN)	Energy Academy Indonesia (ECADIN)	National	Convening platform for RE through dialogue, workshop, and webinars.	https://www.ecadin.org/
Society of Renewable Energy (SRE)	Society of Renewable Energy (SRE)	National	A capacity building platform through webinar, seminar, and trainings.	https://www.sre.co.id
Akademi Transisi Energi	IESR	National	An online platform to support skills development in RE.	https://akademi.transisienergi.id/
Solar Power Plants Training & Competency Certification	Warung Energi	National	PLTS competency training based preparing for BNSP-licensed LSP-ET certification in centralized off-grid and on-grid schemes.	https://www.warungenergi.com/
Training and competency certification programs	PPSDM KEBTKE (MEMR)	National	Training and competency tests for individuals seeking to acquire expertise in these fields. Examples include training in geothermal energy, solar power, and bioenergy.	https://ppsdmkebtke.esdm.go.id/

◀ Table B.1 Continuation

Program/Project/ Resource/Platform	Implementer	Accessible Region	Brief description	Source
An educational digital platform	Enerka	National	Educational digital platform, including: › Enerklaz: A web-based online course focusing on various energy topic › Enerka Live Training on Energy (EnerLite), provided for students and/or professionals with topics discussed in a total of 8-12 learning hours, held in two or three days. › Enershow: Free webinars open to the public in collaboration with student organizations, discussing various energy topics. › Enerclub: A club that facilitates collaborations between practitioners and students, to conduct research that results in publication › RE Geomonday: FREE Webinars on renewable energy topics held bi-weekly, in collaboration with PT SMI.	https://enerklaz.com/
ZE Academy	ZonaEBT	National	Platform on upskilling for the renewable energy and carbon sectors. ZE Academy topics include Carbon Solar Panels, Hydropower, Nuclear, Biofuel, Biomass, Wind, Geothermal, Energy Efficiency, Climate Change, Green Jobs, Electric Vehicles, Green Buildings, Waste & Biogas.	https://zonaebt.com/ze-academy/
V-LAB EBT Kompresi UNS	Universitas Sebelas Maret (UNS)	National	V-LAB EBT Kompresi UNS is an interactive learning platform developed at Universitas Sebelas Maret (UNS), Solo, Central Java in Indonesia focused on Renewable Energy. It provides virtual laboratories, digital simulations, and educational materials to help students easily understand and explore concepts like solar panels, wind turbines, and water turbines.	https://kompresi-web.vercel.app/

