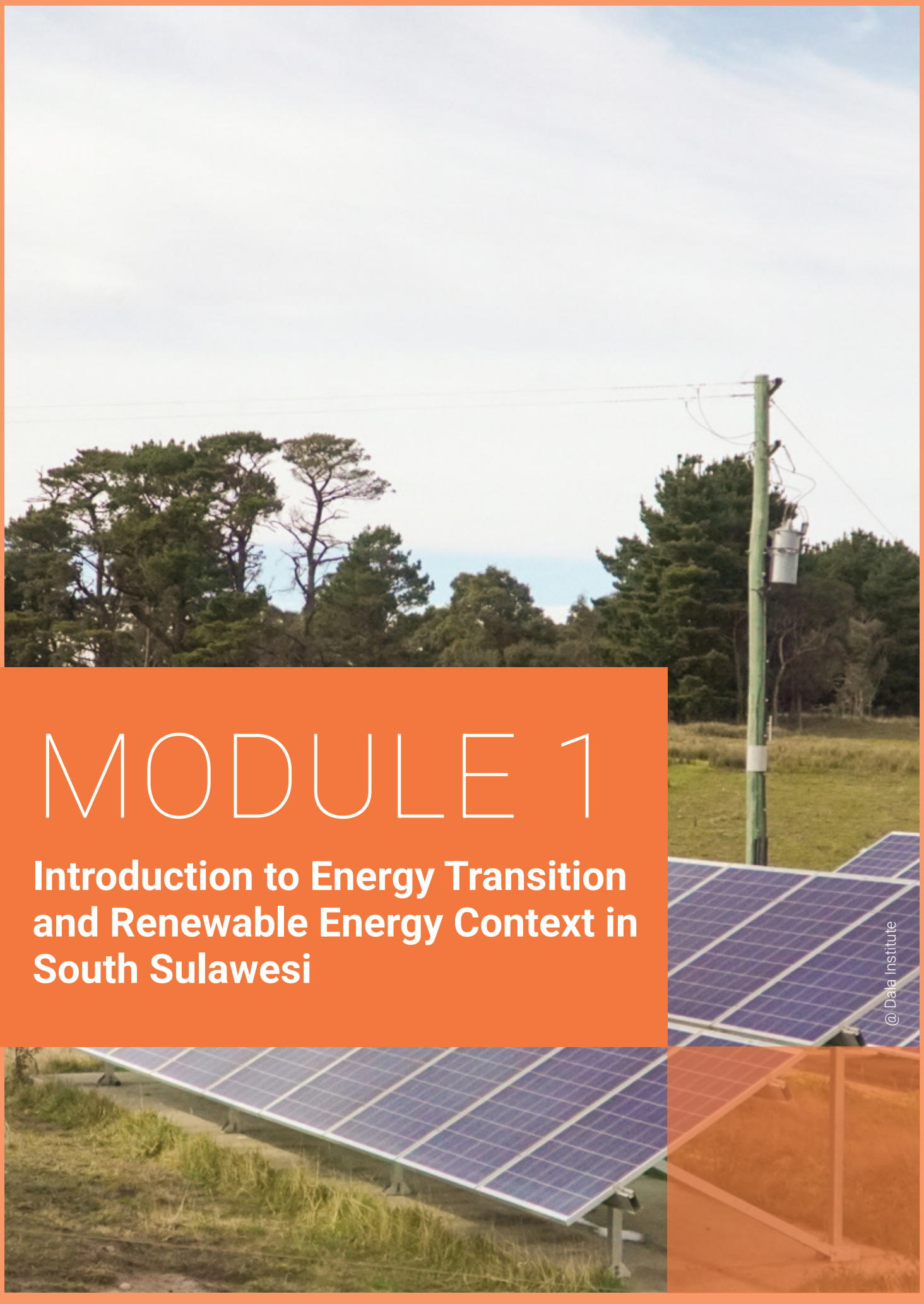

MODULE 1

Introduction to Energy Transition and Renewable Energy Context in South Sulawesi

1.1 National Commitments and Momentum

Indonesia is currently engaged in the pursuit of sustainable energy solutions to decrease its dependence on fossil fuels and reduce its carbon footprint. This commitment is demonstrated by Indonesia's new Enhanced Nationally Determined Contribution (E-NDC) emission reduction targets of 31.89% unconditionally (with its own efforts) and 43.20% conditionally (with international support) by 2030, with the energy sector aiming to achieve 12.5% and 15.5% (MOEF, 2022). The share of renewable energy is expected to be 17-19% in 2030, 36%-40% in 2040, and 70%-72% in 2060 with a focus on geothermal, nuclear, hydrogen, and ammonia as emerging energy sources, in line with the New and Renewable Energy Bill (RUU EBT) currently under deliberation, aimed at accelerating the energy transition and achieving Net Zero Emissions (NZE) by 2060.

Box 1.1
Understanding Renewable Energy

According to United Nations (n.d.), renewable energy (RE) is energy derived from natural sources (such as solar, wind, water, biomass and geothermal) that are replenished at a higher rate than they are consumed – constantly replaced and never run out. It produces lower emission than fossil fuels– transitioning from fossil fuels to renewable energy is key to addressing the climate crisis–and can support local economic activities and energy access.

Is renewable energy more expensive than fossil fuels?
The cost comparison between fossil energy and renewable energy is not always straightforward and depends on several factors:

- Upfront cost vs long-term cost
  - Renewable energy often has higher initial investment costs
  - However, operational costs are very low (no fuel cost), making it cheaper over time
- Fossil energy appears cheaper, however
  - Fossil fuels benefit from existing infrastructure and subsidies
  - Their costs do not fully reflect environmental and health impacts
- In many contexts, renewable energy is already cost-competitive, according to IEA (2024)
  - Globally, solar and wind are among the cheapest sources of electricity
  - In Indonesia, costs can vary depending on:
    - Location and grid access
    - Financing conditions
    - Technology availability


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Notably, since 2022, Indonesia's clean energy transition efforts have gained significant momentum, spurred particularly by the launch of the Just Energy Transition Partnership (JETP) (Inayah et al., 2023). This initiative serves as a crucial vehicle to finance the upgrading of Indonesia's energy infrastructure and accelerate its journey toward net-zero emissions in a just and 'affordable' manner (Fiscal Policy Agency, 2022). This momentum was further reinforced domestically by Presidential Regulation No. 112/2022 on the Acceleration of Renewable Energy for Electricity Supply, which outlines plans for the early retirement of coal-fired power plants with several exemptions.

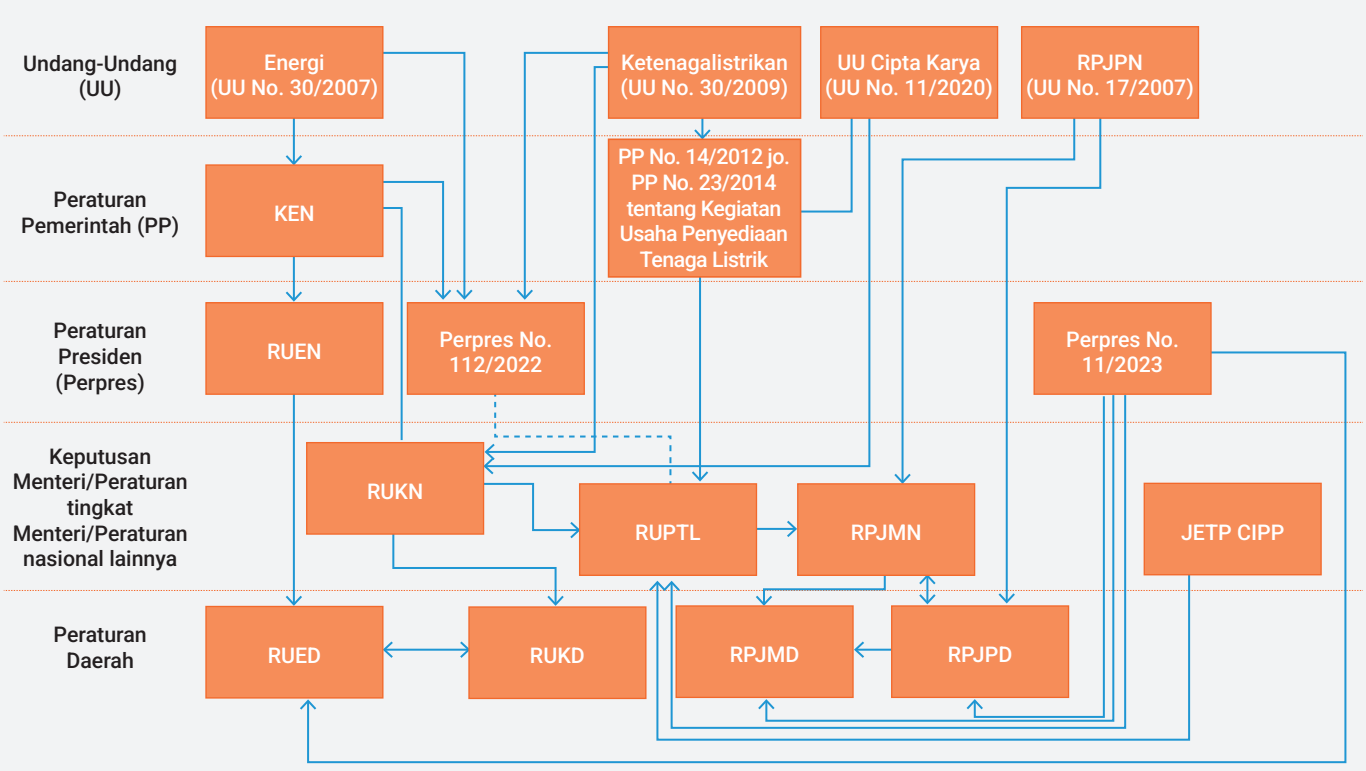
Indonesia has also made important strides in institutionalizing energy planning under the responsibility of the National Energy Council (DEN) - through the National Energy Plans (RUEN) and mandating Regional Energy Plans (RUEDs) at the sub-national or provincial level. However, the vertical linkages across governance levels, i.e., the national and sub-national levels for renewable energy planning and implementation, continue to remain weak.

1.2 The Subnational Gap

Achieving Indonesia's just energy transition requires strong coordination across national and subnational governments, considering the country's diverse local contexts across provinces and districts. While Indonesia already has national and regional energy planning frameworks (see Figure 1.1) — including National Energy Policy/KEN, National Energy Plan/RUEN, Electricity Supply Business Plan/RUPTL, Regional Energy Plan/RUED, Regional Medium-Term Development Plan/RPJMD, and Regional Electricity Plan/RUKD — implementation at the subnational level remains uneven.

One key challenge is the integration of energy transition targets into broader regional development planning and budgeting processes. In many cases, renewable energy planning is still treated separately from sectoral development priorities and annual budget allocation processes.

Figure 1.1
National and subnational energy-development planning frameworks



Source: The SISET team

1.2.1 Expanding Authority, Navigating Limited Resources

Presidential Regulation No. 11/2023 expanded provincial authority in managing renewable energy resources such as solar, wind, biomass, biogas, and hydropower. This creates opportunities for provinces to play a more active role in advancing renewable energy initiatives, particularly at small and medium scales.

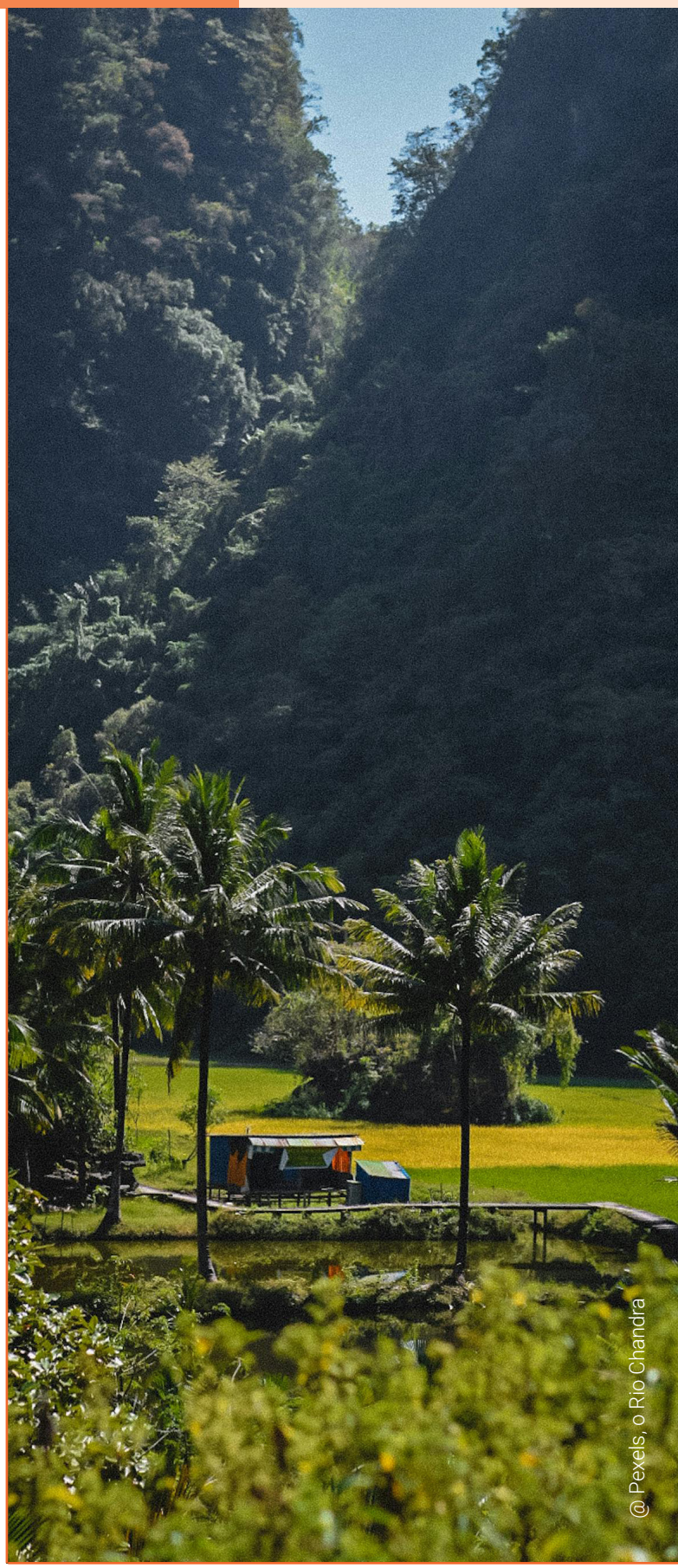
However, implementation remains influenced by several factors, including institutional coordination, technical capacity, and funding availability. At the same time, large-scale electricity planning and grid management remain under the authority of State-Owned Electricity Company (Perusahaan Listrik Negara/ PLN) and the central government. As a result, provincial governments often focus on facilitation roles, including coordination, planning alignment, and support for local implementation initiatives.

Despite these limitations, several provinces have started to develop innovative approaches and partnerships to advance renewable energy development, including through small-scale and community-based initiatives (further discussed in Module 5).

1.2.2 The Energy Planning Paradox

Provincial governments (through Energy Agency/Dinas ESDM) are mandated to develop Regional Energy Plans (RUED) aligned with national energy targets. RUED serves as an important instrument to guide renewable energy development and support broader energy transition goals at the regional level. However, in practice, the integration between RUED and regional development planning documents (such as RPJMD, RKPD, Renstra, and Renja)[1] is still evolving. Differences in institutional authority, planning processes, and budget mechanisms can affect implementation and coordination across sectors.

Strengthening the linkage between RUED, sectoral planning, and regional budgeting processes can help improve the implementation of renewable energy initiatives at the subnational level[2]. This also requires stronger coordination, improved capacity, and collaboration across government agencies and stakeholders.



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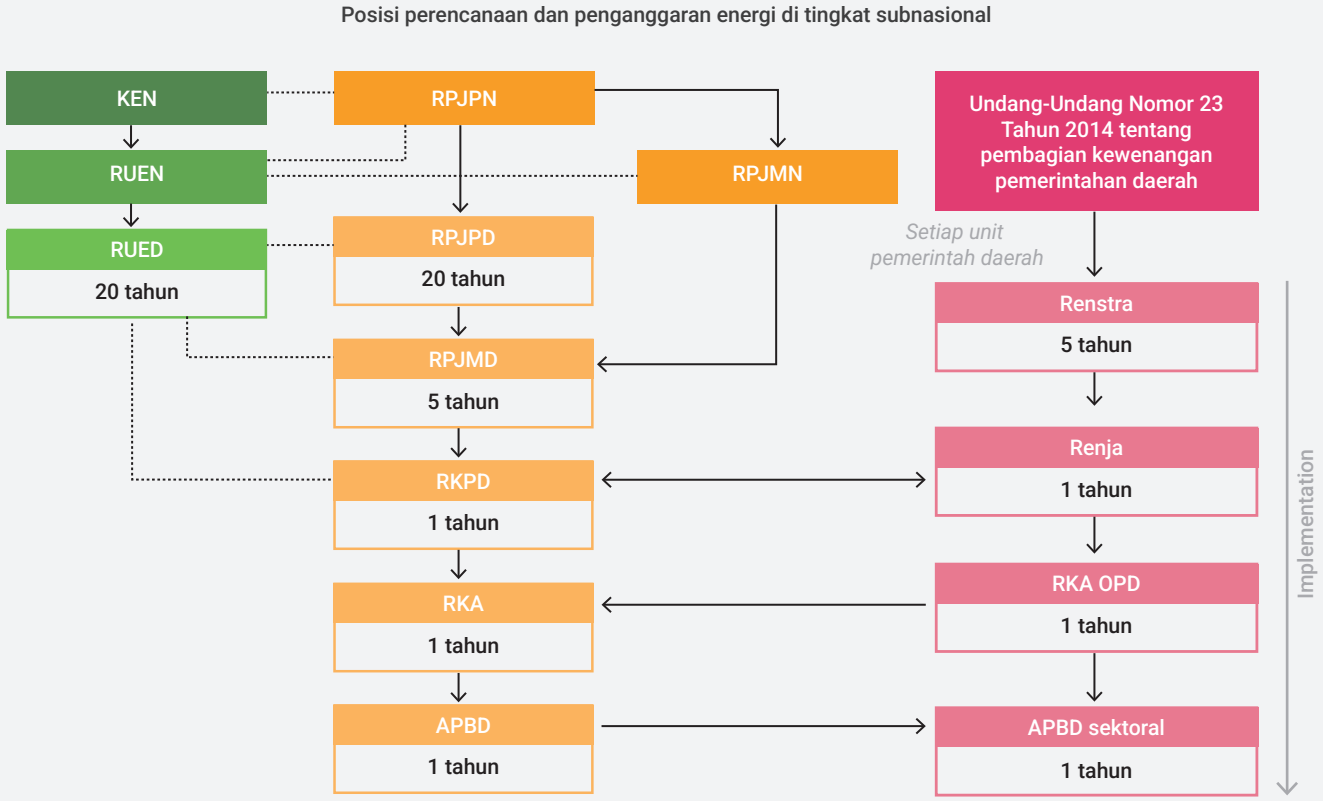
1 Development planning frameworks include Regional Medium-Term Development Plans (RPJMD) (5-year), Annual Regional Work Plans (RKPD) (1-year), Sectoral Strategic Plans (Renstra) (5-year), and Sectoral Annual Work Plans (Renja) (1-year).

2 To enhance the impact of RUED on subnational energy transition, it is important to strengthen its role as the basis for the energy agency's annual work plan (RKA DESDM), integrate energy transition initiatives aligned with subnational authorities and sectoral agencies into RUED, and develop an energy-specific budget plan with diverse funding sources (IESR, 2025).

Figure 1.2
Position of energy planning and budgeting at the subnational



Source: IESR Energy Transition Outlook 2025 (IESR 2024)

1.3 Case Study: South Sulawesi

1.3.1 South Sulawesi and the Energy Transition Context

South Sulawesi demonstrates both the opportunities and challenges of integrating renewable energy into regional development. The province has made significant progress in renewable energy deployment through hydropower, biomass co-firing, and large-scale projects such as the Sidrap and Jeneponto wind farms. However, renewable energy is still not fully integrated into broader sectoral and development planning processes.

This is important because South Sulawesi's economy is strongly driven by sectors such as agriculture, fisheries, animal husbandry, Micro, Small, and Medium Enterprises (MSMEs), and resource-based industries, which are closely linked to the province's blue and green economy priorities. These sectors are highly energy-dependent and offer strong opportunities for decentralized and productive-use renewable energy solutions.

South Sulawesi also has abundant renewable energy potential, including solar, wind, biomass, and marine-based resources, alongside growing energy demand from industrial development and the nickel supply chain. If managed inclusively, renewable energy development can support economic growth, green jobs, local value chains, and more equitable development outcomes.

Current Energy Landscape and Projections

According to the 2024 ESDM Handbook, South Sulawesi's installed electricity capacity is approximately 1,622 MW, with hydropower contributing around 756 MW (MEMR, 2024). Under RUED and PLN's Electricity Supply Business Plan (RUPTL), the province targets a 35% renewable energy share by 2030, while electricity demand is projected to continue increasing, particularly from industrial and smelter activities.

While utility-scale renewable energy projects dominate current development, decentralized renewable energy remains underutilized as a tool for local economic development. Many productive sectors still rely heavily on diesel for irrigation, cold storage, processing, and transport, resulting in high operational costs and vulnerability to fuel price fluctuations.

Decentralized Renewable Energy and Socio-Economic Opportunities

Experiences from initiatives such as solar-powered irrigation systems in Gowa demonstrate how small-scale renewable energy can help reduce operational costs, improve productivity, and strengthen local livelihoods. Similar approaches can support fisheries, MSMEs, remote islands, and coastal communities through more reliable and affordable energy access.

These examples show that renewable energy should not only be viewed as an infrastructure or electricity issue, but also as an enabler of broader development priorities, including local economic development, workforce development, and inclusive livelihoods.

Integrating Energy Transition into Sectoral Development (Horizontal Linkages)

To maximize these benefits, renewable energy needs to be integrated into regional planning and sectoral development strategies. Achieving renewable energy targets is not solely the responsibility of the energy sector, but also requires contributions from sectors such as agriculture, fisheries, industry, education, women's empowerment, and workforce development (See Module 2 for further explanation on the cross-sectoral integration/synergy).

Subnational governments are pivotal in translating the energy transition into tangible co-benefits: job creation, skills development, economic growth, local value chain development, research and development capacity, and equitable energy access. Strategic governance at the provincial and regency levels will determine whether South Sulawesi's energy transition amplifies opportunity or deepens existing disparities.

Therefore, it is important for all OPDs to understand the policy direction and renewable energy development targets that have been established at both the national and provincial levels. Achieving these indicators does not rely solely on the energy sector but also requires contributions from various development sectors such as agriculture, fisheries, industry, education, women's empowerment, and others.

As an initial overview, Table 1.1 presents several key indicators for renewable energy development along with relevant targets for the provincial government and related sectors. This information is expected to help OPDs understand the contributions they can make in collectively supporting the achievement of energy transition targets.

Tabel 1.1
Renewable Energy in the South Sulawesi Regional Medium-Term Development Plan (RPJMD) 2025-2029

Mission	Target	Outcome	Indicator	Program
4. Continuing equitable infrastructure development, resilient to disasters and climate change, to support the acceleration of economic growth	17. Improved environmental quality and resilience in disaster adaptation and mitigation as well as climate change	Increased amount of energy generated from New and Renewable Energy (NRE)	Target indicators: IS.6.2.1. Disaster Risk Index IS.6.2.2. Environmental Quality Index (IKLH) Outcome indicator: Amount of energy generated from new and renewable energy (NRE) infrastructure	New and Renewable Energy Management Program

1.4 Energy Transition as a Socio-Economic Opportunity

The SISET framework demonstrates how renewable energy development can generate broad socio-economic benefits when deliberately integrated into planning and policy. Rather than treating the energy transition as purely technical infrastructure or as only for the sake of reducing GHG emissions, this approach identifies four interconnected pillars that transform renewable energy into a driver of inclusive economic development.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Tabel 1.2
Four interconnected pillars of SISET framework

Productive Use and Economic Development	Beyond resilience, renewable energy technologies can directly strengthen key productive sectors like agriculture, fisheries, tourism, and small industries through locally appropriate solutions. Solar irrigation pumps, dryers, milling machines, cooling systems, and captive power with storage for small industries can boost productivity and incomes while reducing GHG emissions. The spillover effects are substantial: enhanced agricultural yields, reliable solar irrigation, reduced food loss through improved cold chains, and new employment opportunities linked to RE technologies, among others. By aligning RE with sectoral objectives, the energy transition becomes a vehicle for provincial economic development.
Local skills and workforce development	Addressing the skills gap between renewable energy sector needs and available workforce capacity is critical. Provincial governments must lead workforce planning through industry-based training programs that connect educational institutions, technical-vocational education and training (*TVET-technical-vocational education and training*) centers, and renewable energy companies. Without deliberate investment in local capacity building, the region risks importing expertise while local communities remain excluded from the economic opportunities the transition creates.
Mainstreaming gender inclusion and representation of vulnerable groups	An equitable energy transition requires applying a GEDSI (Gender, Equity, Disability, and Social Inclusion) lens throughout planning and implementation. Women, people with disabilities, indigenous communities, and the poor remain largely excluded from the energy sector in technical roles, economic participation, and decision-making. This exclusion stems from unequal access to skills training, limited information, and insufficient inclusive policies. Provincial governments must ensure that energy projects deliver tangible benefits to these groups, not just technical infrastructure. Inclusion is not ancillary; it determines whether the transition reduces or reinforces existing inequalities.
Strengthening local value chains	Deepening local industrial participation in renewable energy development can strengthen domestic value chains, enable self-sufficiency, and drive regional development. This means enabling MSMEs, local companies, and other local entities to supply components and installation services, along with operation and maintenance services. Current barriers include limited local industrial capacity, import dependence, and inadequate support for MSMEs accessing RE business opportunities. Provincial governments are uniquely positioned to address these challenges through local content policies, favorable regulatory conditions, and targeted incentives for MSMEs and such local service providers.

1.5 The Path Forward

Despite its potential, green technology adoption faces persistent obstacles: limited technology access, high upfront costs, and insufficient community training in operation and maintenance. Sub-national /provincial governments can overcome these barriers through adoption incentives, financing schemes for small businesses, and comprehensive community training programs that build local ownership and self-sufficiency.

The SISET approach fundamentally reframes renewable energy development—from a narrow focus on technical capacity and decarbonization targets to a comprehensive development strategy. In South Sulawesi's context, this means tracking not only GHG reductions and renewable energy percentages but also income growth, poverty reduction, and productivity gains. By investing in workforce skills, ensuring inclusive participation, building local industrial capacity, and optimizing green technology for community productive needs, the energy transition becomes a catalyst for equitable and sustainable economic development—not merely an infrastructure upgrade or only an energy access point of view.

Some of the key actions that sub-national authorities can take include:

- Align RUED with RPJMD and sectoral plans
- Integrate energy priorities into regional budgets
- Establish joint planning forums across agencies
- Mainstream gender and youth in energy-linked programs
- Promote participatory approaches and local ownership

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