ENERGY TRANSITION PARTNERSHIP

Powering Prosperity and Enabling Sustainability in South East Asia

INDONESIA TECHNICAL ASSISTANCE PROGRAM

MARCH 2023

UNOPS AFD Federal Ministry for Economic Affairs and Climate Action Department for Business, Energy & Industrial Strategy Environment and Climate Change Canada / Environnement et Changement climatique Canada CIFF CHILDREN'S INVESTMENT FUND FOUNDATION IKEA Foundation WINDWARD Fund SEQUOIA CLIMATE FOUNDATION

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Executive summary

1. **In the past twelve months, Indonesia has taken important steps toward accelerating its energy transition.** One of the most significant announcements was the Just Energy Transition Partnership (JETP) Declaration at the 2022 Bali G20 Summit. It is a landmark initiative that aims to mobilize an initial USD 20 billion from the International Partners' Group and private funds to assist in achieving power sector targets of 290 million tons of CO2e peak emissions and to increase the share of renewable energy to 34% by 2030. The JETP also aims at increasing social and economic benefits by creating jobs, reducing poverty, improving health, and enhancing economic resilience.

2. **The mobilization of USD 20 billion will be determined by a Comprehensive Investment Plan based on the Roadmap of Early Coal Fired Power Plant (CFPP) Retirement that is still being prepared by the government, with ETP engaged in preparing this document.** The current ETP assessment on the financial impact of early retirement will support the government's analysis of such a roadmap that further will be stipulated by regulation as mandated by the President Regulation (PR) No.112/2022. The PR 112/2022 decree will also accelerate the renewable energy (RE) deployment and integration into the national electricity system.

3. **Indonesia established the Indonesia Energy Transition Mechanism (ETM) Country Platform to enhance the financing accessibility of energy transition implementation.** It received commitment funding from the Climate Investment Funds of about USD 500 million of concessional funds that aim to leverage a further $4 billion of financing to accelerate the retirement of up to 2 GW of coal-fired power plants.

4. **Despite the current progress and commitment, Indonesia still faces multiple challenges with efforts to Decarbonize its Energy Sector.** These are well documented in documents that include the Ministry of Energy and Mineral Resources's 'Indonesia Net Zero Emission Target Roadmap' (2022), the World Bank's white paper 'Energy Transition in Indonesia' (2022), and International Energy Agency's (IEA) published work on energy sector roadmap to net-zero emissions launched at the G20 Energy Transition Ministerial Meeting in Bali. These challenges are loosely summarised as:

    a. **Undefined Scenarios:** There is no one pathway towards achieving net zero emissions, but many pathways, each with varying technical strategies and multiple stakeholders advocating for differing directions.

    b. **Fragmented Policy:** There are multiple non-aligned strategies across the Government of Indonesia, with fragmented sector regulation challenges. This raises issues in policy development, in the coordination of all actors, and in providing a coherent pathway to raise finance.

    c. **Coordination:** Both across government, and across supporting actors such as Development Partners and Private Sector, there is a need for a strengthening of coordination and an alignment of direction.

d. **Grid Infrastructure:** Both the distribution and the transmission networks are of low quality, have poor reliability, and are unprepared to handle an influx of variable renewable energy (VRE).

e. **Energy Efficiency (EE):** There is currently an oversupply of electricity in Indonesia and a low subsidized tariff. These are two main factors that keep energy efficiency measures at a minimum, despite the projected growth in energy demand. There remains a huge potential to simultaneously curb power demand and generate '*green growth'* that is currently unexploited

f. **Coal Subsidies:** Mobilisation of new and renewable technologies is hindered due to the applied subsidy provided to coal and fuel through the capping price of coal for PLN electricity generation as well as multiple other subsidies.

g. **Coal Phasedown Effects:** A phasedown of coal is likely to raise multiple socio-economic challenges, sector-wide, but with a prevalence in coal-dependent regions.

h. **Human Capacity:** There is a lack of awareness and knowledge to implement the energy transition in an effective and timely manner.

i. **Finance:** The energy transition, regardless of the scenario, will require significant amounts of financing for which international cooperation and support will be required.

5. **ETP engages closely with the stakeholders to help Indonesia in addressing those energy transition challenges when formulating its Technical Assistance Program**. By constantly engaging with and listening to the needs of the Government of Indonesia, mapping and engaging with the current work of development partners in this space, engaging lead consultants and experts in the field, seeking and analyzing the information products released, and considering all in the context of the political economy, ETP develops its strategy and resultant Technical Assistance program.

A. Country Targets

6. Indonesia established and stipulated targets related to the achievement of GHG emissions reduction in the energy and electricity sector as shown in Table 1.

Table 1: Indonesia's Climate Commitments

ETP's Impact	**ETP aims to assist Indonesia in achieving both the SDGs and Paris climate commitments by 2030, and net-zero emissions by 2050,** with a particular emphasis on aligning climate action plans with targets and commitments, reducing or avoiding GHG emissions, minimizing air pollution's impact on health, and creating green jobs in low-carbon industries.			
ETP's Strategic Goal (SO)	**SO1** Policy alignment with climate commitments **SO2** De-risking EE and RE investments **SO3** Sustainable and resilient infrastructure **SO4** Knowledge and awareness building			
	Indicator	**Target**	**Year**	**Commitment Document**
Country Target	RE share in Total Primary Energy Supply Energy consumption reduction	23% 17%	2025	National Energy Policy (KEN) 2014
	Carbon trading Performance based payment Carbon tax Other mechanism	Implemented		President Regulation No.98 on Carbon Economic Value 2021
	Additional RE power Reducing CFPP development	21 GW 13.8 GW	2030	PLN Electricity Business Investment Plan (RUPTL) 2021
	NZE from the energy (electricity) sector with international support	NZE	2060	Roadmap of Net Zero Emission 2060 2021 *
	NZE from the power sector Implementation of RE electricity PPA and the Roadmap of Early CFPP Retirement	NZE	2050	President Regulation No.112 on RE Power Development Acceleration 2022
	Increased GHG emissions reduction commitment	31.89% *unconditional* 43.02% *conditional*	2030	Enhanced Nationally Determined Contribution 2022
	Peak emission of CO2 RE share in the power sector	290 million tonnes 34%	2030	Just Energy Transition Partnership (JETP) Declarations 2022

*later in COP27 some numbers were revised

B. Steering Policy and Regulatory Framework

7. **Indonesia has strengthened its commitment to the international pledges of reducing greenhouse gas emissions and transitioning to clean energy and embracing the global impetus of energy transition implementation.** The country has undertaken significant actions to pursue these objectives, such as announcing plans to retire coal-fired power plants and enhance renewable energy deployment and energy efficiency measures. These actions are supported by a growing set of energy transition-related government plans and documents, such as the PLN Electricity Investment Business Plan (RUPTL) for 2021-2030, Presidential Decree No.98/2021 on Carbon Economic Value, and the Enhanced National Determined Contribution.

8. **One of Indonesia's significant milestones is the Just Energy Transition Partnership (JETP), a landmark initiative that aims to mobilize an initial USD 20 billion of public and private funds to enhance renewable energy and reduce coal dependence.** The JETP will help Indonesia achieve its target of 34 percent renewable energy share by 2030 and align with the global goal of limiting warming to 1.5°C. The JETP will also ensure social and economic benefits for the people by creating jobs, reducing poverty, improving health, and enhancing resilience.

9. **Another significant development is the adoption of Presidential Regulation (PR) No.112/2022, which sets out a framework for achieving net-zero emissions by 2050.** PR No.112/2022 provides interim targets for lowering greenhouse gas emissions from various sectors, including energy. It also outlines the policies and measures that will support the implementation of the roadmap, such as carbon pricing, green financing, innovation incentives, and stakeholder engagement.

10. **The National Energy Policy (KEN) 2014 is the highest-ranking regulation (approved by Government Regulation) guiding the energy sector planning and implementation is out of date, leading to uncertainty for policy and investment decision-making**. At the same time, various targets from different government agencies are misaligned with the KEN which adds to the lack of clear direction for energy stakeholders. While the revision of KEN is underway, the government introduced roadmaps of net zero emissions targets in 2021 and 2022 without a legal basis to support its implementation representing further contradiction.

11. **The Parliament and the government are drafting the New and Renewable Energy Law which will complement a set of energy-related laws including the 2001 Oil and Gas Law, 2007 Energy Law, 2009 Electricity Law, 2009 Mining and Coal Law, and 2014 Geothermal Law.** The new law, later, is expected to expedite the integration of various renewable energy for electricity generation and other energy uses. However, some organizations critique the drafted law, by stating that it would make it harder to reduce emissions from coal because it categorized coal derivatives like coal gasification,

coal liquefaction, and coal bed methane as well as carbon capture utilization and storage as a "new energy" that will be the focus of this drafted Law.

12. **The development of a regulatory framework regarding investment mobilization complemented by a transparent and comprehensive financing mechanism will be a key factor for ensuring the retirement of coal assets and RE power development.** Despite the Energy Transition Mechanism (ETM) Country Platform existence and the USD 20 billion commitment from the International Partners Group (IPG) to support JETP implementation, Indonesia is lacking in proven financing mechanisms for coal asset acquisition and does not yet have a taxonomy to back up the early retirement financial transaction. In addition, opaque practices on the power purchase agreement (PPA) for RE power have become a long issue between the project developers and PLN as the country's electricity signal discourages RE investment. At the same time, one of the potential energy transition financing sources from the carbon market designed by the President Regulation No.98/2021 has repeatedly been postponed and its full implementation and timeline are not clear.

13. **Energy efficiency remains an important piece of energy transition activities to complement a picture of GHG emissions reduction.** Some areas of energy efficiency best practices, among others, are the standard and labeling for the appliances, application of efficient machinery and technology, green building implementation, etc., that would reduce energy consumption and ultimately emissions. In Indonesia, those activities are explained in Government Regulation No.70/209 concerning Energy Conservation. To update with the current dynamics of the energy sector, the government started the revision of this regulation four years ago but it has never been completed, and no clear elaboration on the challenges that hinder its completion. Some concerns are related to the current electricity supply mainly in the Jawa-Madura-Bali (Jamali) system in which there is a current oversupply of power. This is one reason that may have slowed the promotion of energy efficiency measures across energy consumers such as in the industry, households, and buildings. The electricity tariff being kept artificially low through subsidy is another block in the journey to an effective energy efficiency sector. The transport sector will need to see a move towards electrification in vehicle technology conversion from the internal combustion engine to electric vehicles (EV). Another issue is the lack of financing support for energy efficiency projects and until such financing becomes available the sector remains locked.

C. Issues and Challenges

12. **High dependency on coal:** The electricity sector in Indonesia has a high dependency on coal-fired power plant facilities (CFPPs). Until 2020, CFPP shared 50% of the total installed capacity. In the PLN's RUPTL 2021-2030, PLN put a pipeline of additional CFPP for the next several years. Although PLN has adopted the government policy of no new coal, PLN still intends to extend the life of existing coal-fired power plants, and continue

with committed plants, including 8.5 GW of CFPP additions on Java as late as 2027.

13. **The Coal Domestic Market Obligation (DMO) policy creates an unfair playing field for Variable Renewable Energy (VRE), as it subsidizes coal and makes it cheaper than renewable energy sources.** The DMO requires coal mines to sell 25 percent of their production to the domestic market, mainly to coal-fired power plants, at a capped price of $70 per tonne, thus keeping the coal-generated electricity artificially low.

14. **The Local Content Requirement (LCR) policy restricts the growth of solar PV installation, as it limits access to imported equipment and technology that are often cheaper and more efficient than domestic ones.** The LCR also reduces the competitiveness and attractiveness of solar PV projects for investors and developers, as it increases the costs and risks associated with compliance.

15. **The subsidy policy for fossil fuels stalled the growth of renewable energy.** The Indonesian government has been spending trillions of rupiah every year to keep the prices of electricity, liquefied petroleum gas (LPG), and gasoline low and stable for consumers. This policy distorts the energy market, as it makes fossil fuels more competitive than renewable energy sources. The subsidy also reduces the fiscal space and incentives for investing in renewable energy projects, as it increases the costs and risks associated with them.

16. **Over capacity of the electricity supply drives the government and PLN to increase electricity consumption which challenges potential RE and EE deployment.** While energy transition activities are being implemented, the government and PLN are requesting international support to increase demand through the development of EV ecosystems, the battery industry, the use of electric stoves to increase household offtake, and the design of designated industrial parks to absorb the excess supply.

17. **Multiple scenarios from different government agencies and lack of coherency in scenario and financing planning for the energy transition.** A coherent energy transition scenario to support the low-carbon initiative would raise the international and local financing institutions' involvement in providing funds to accelerate sustainable and renewable energy generation investment in line with reducing the reliance on subsidized coal.

18. **Condition of the power grid which needs an upgrade and renewal.** The aging power control system with aging and fragmented power grids leads to the curtailment of variable renewable energy (such as wind and solar). This particular condition reduces the technical viability to integrate renewable energy into the grids.

19. **Ineffectiveness and lack of coordination among sector agencies in the electricity sector.** There is a lack of rigorous assessment of PLN's justified costs and revenue requirements, leading to the combination of inadequate revenues and poor investment efficiency. Prevailing investment planning and tariff-setting processes are opaque,

creating an environment susceptible to vested interests

20. **Knowledge gaps related to EE and RE, particularly in the modeling, innovative investment framework, system operations, and financing model, curb the energy transition**. In addition, the absence of nationwide awareness building of the benefit of the low carbon energy system and the economy becomes another barrier in nourishing the energy transition.

21. **Energy Efficiency challenges** include lack of access to finance, limited access to technologies, lack of awareness and knowledge for implementation of energy management, limited minimum standards and implementing and reporting requirements for industrial energy efficiency improvement, limited regulations for labeling, and lack of coordination among government agencies and stakeholders. These challenges, compound those gathered from the bilateral engagement between ETP and the government and non-government entities provided in the ETP's Diagnostic of Barriers to Energy Efficiency In Indonesia, the Philippines, and Vietnam, support the decision-making process when determining how and where to apply ETP interventions.

D. Background of ETP in Indonesia

22. **ETP brings significant technical and financial resources and coordination capacity to support Indonesia in reaching its energy transition goals and moving to a low-carbon energy system.** ETP provides an innovative platform that designs and coordinates interventions with four intertwined prongs that drive enhancement of the capacity of the Government, private sector, and civil society to promote the energy transition and contribute to attaining the Government's NDC targets. The goal of the ETP's involvement in Indonesia is to accelerate a transition to a cleaner energy system to address climate change challenges.

23. **ETP's strategy is identified under four outcome areas**, which are seen as essential in asserting compounding impact to achieve energy transition outcomes, the Sustainable Development Goals, and the Paris Climate Goals. Therefore, ETP's activities are planned and designed under the four strategic outcomes areas of:

    (i) policy alignment with climate commitments,
    (ii) de-risking energy transition investments,
    (iii) extending sustainable and resilience infrastructure - smart grids, and
    (iv) knowledge and awareness building.

24. **Between 2020 and 2022 ETP's activity in Indonesia has been focused on establishing itself as a trusted partner of the government and laying the necessary legal foundations, ETP has been able to build trust and confidence by delivering technical support.** To date, the ETP Indonesia program has hosted 7

stakeholder meetings, 5 workshops, 24 capacity-building sessions, and a multitude of bilateral meetings with government stakeholders and development partners. Additionally, ETP is currently conducting a study on the Financial Implications of the Early Retirement of Coal, is completing a flagship technical assistance for PLN by conducting the detailed engineering design and overseeing the delivery of PLN's largest control center (Jawa-Madura-Bali system), has launched two energy efficiency grantees, tendered two new technical assistance (TA) projects on wind power development and streamlining government's energy plans and conducted an energy efficiency diagnostics.

25. **ETP established a Memorandum of Understanding (MOU) with the Ministry of National Development Planning (Bappenas),** which enables ETP to work across the energy transition agencies of the government. Under the MOU, ETP, and Bappenas arrange regular stakeholder meetings that support the development of the central government's role in conjunction with the Ministry of Energy and Mineral Resources. Through this methodology, ETP aims to foster a champion for energy transition under a shared energy transition roadmap and donor coordination.

26. **ETP signed a partnership agreement with the state-owned electricity company (PLN)** to first deliver the detailed engineering design of the Jamali Main Control Center (MCC) Project. The upgrade will unlock the RE potential into the Jamali electricity system and remove this physical impediment to RE, positioning ETP close to PLN. ETP will extend its support to PLN in the pursuit of integrating VRE into the grid.

27. **The trust and relationship between the GoI and ETP have been reflected in the recent and ongoing energy transition expedition workshops and resultant requests for support.** ETP is positioned as being able to respond rapidly to government requests and in line with government needs and is presented as a politically neutral and highly responsive program aiming to deliver evidence-based solutions to the needs of the government. With this, ETP conducted energy transition workshops, aiming to unearth institutional gaps and challenges in delivering the energy transition. This has resulted in 70+ requests for interventions, of which ETP has both internally, and with the support of sectoral experts, filtered down to a streamlined program ensuring ETP adds ambition and operates in the area where ETP can best add value.

28. **Supplementing direct engagement with the Government stakeholders, ETP is also engaging and building its technical assistance across multiple interfaces.** The control center project, for example, is tied directly to Asian Development Bank's (ADB) Results Based Loans (RBL), with completion of the task unlocking around $30 MUSD in finance. ETP has engaged with Asosiasi Pabrikan Modul Surya Indonesia - the Indonesian Solar PV Manufacturing Association (APAMSI), to support supply chains, for which ETP looks to build on the work on the UK Mentari project. For wind, ETP has discussed with Denmark, Agence de Développement Française (AFD), Global Green Growth Institute (GGGI), and the Indonesia Independent Power Producer Association (APLSI) as well as with the national and global wind energy association and wind power

companies to identify gaps (data collection, permitting issues, financial mechanisms, etc.) and to determine programs which can be delivered through a common understanding and with complementarity.

29. **The procurement modality of ETP has been appreciated by our partners and counterparts and fosters ownership with the beneficiaries.** Technical assistance programs are tendered, offering solutions that combine the highest level of international expertise coupled with local experience. This approach allows ETP to respond to a multitude of requests, not limited to our in-house capacity. Additionally, involving the beneficiary at each stage of the project ensures buy-in and ownership of programs from the beginning, with the beneficiaries both supporting the design of the technical assistance, engaging with the consultant selection process, and being active partners throughout the whole program.

E. ETP and Coordination

30. **Indonesian Energy Transition will be led by the Government of Indonesia.** As such, a driver for determining ETPs technical assistance programs lay in the expressed needs of the various government stakeholders. This is reflected in the agreements with government agencies. The relationships are conducive and highly collaborative, with numerous activities planned for pursuing the acceleration of energy transition and coordination among the engaged parties. To enhance ETP coordination with relevant government agencies, Bappenas issued a Minister Decree for the establishment of a multi-ministerial committee to oversee ETP project implementation and address energy transition-wide issues. The energy sector background is provided in Annex 1.

31. **Effective collaboration among stakeholders will accelerate the energy transition toward Net Zero Emission (NZE).** The consensus among the various stakeholders with multiple perspectives and agendas is essential to avoid working in silos and to orchestrate a pathway for the energy transition. This further creates an opportunity to build on and leverage the work of other programs in similar fields. While ETP undertakes deep engagement with the development partner community and specifically the major donor organizations, namely the development banks and philanthropic organizations, in identifying and assessing donor involvement, stronger prerogatives in favor of coordination and alignment at the institutional levels are still required to truly capitalize on a coherent front of support.

32. **ETP builds on complementary efforts by a wide range of stakeholders and manages coordination through its process when developing concept notes for its projects**. It also includes the opportunity to build alliances to strengthen project implementation. ETP conducts a careful investigation of the related interventions. This includes consulting with AFD, ADB, and other multilateral development banks (MDBs) on their Results Based Loan, engaging with Energy Transition Council (ETC)/Friends of Renewable Energy (FIRE) in their stakeholder holder meetings, taking guidance and learning lessons from other development partners and ETP-aligned programs such as

the UK Mentari Program, International Energy Agency (IEA), USAID, Clean, Affordable, and Secure Energy (CASE), among others. In addition, ETP is also seeking opportunities to realize a tangible investment in EE and RE such as with the Southeast Asia Clean Energy Facility (SEACEF), private sector, and industry associations. Lastly, the guidance from the government ministries and the State Owned Enterprises (SOEs) such as PLN and PTSMI as well as the ETP engagement in the Country Platform and JETP Secretariat, has leveraged confidence to implement the energy transition projects in Indonesia.

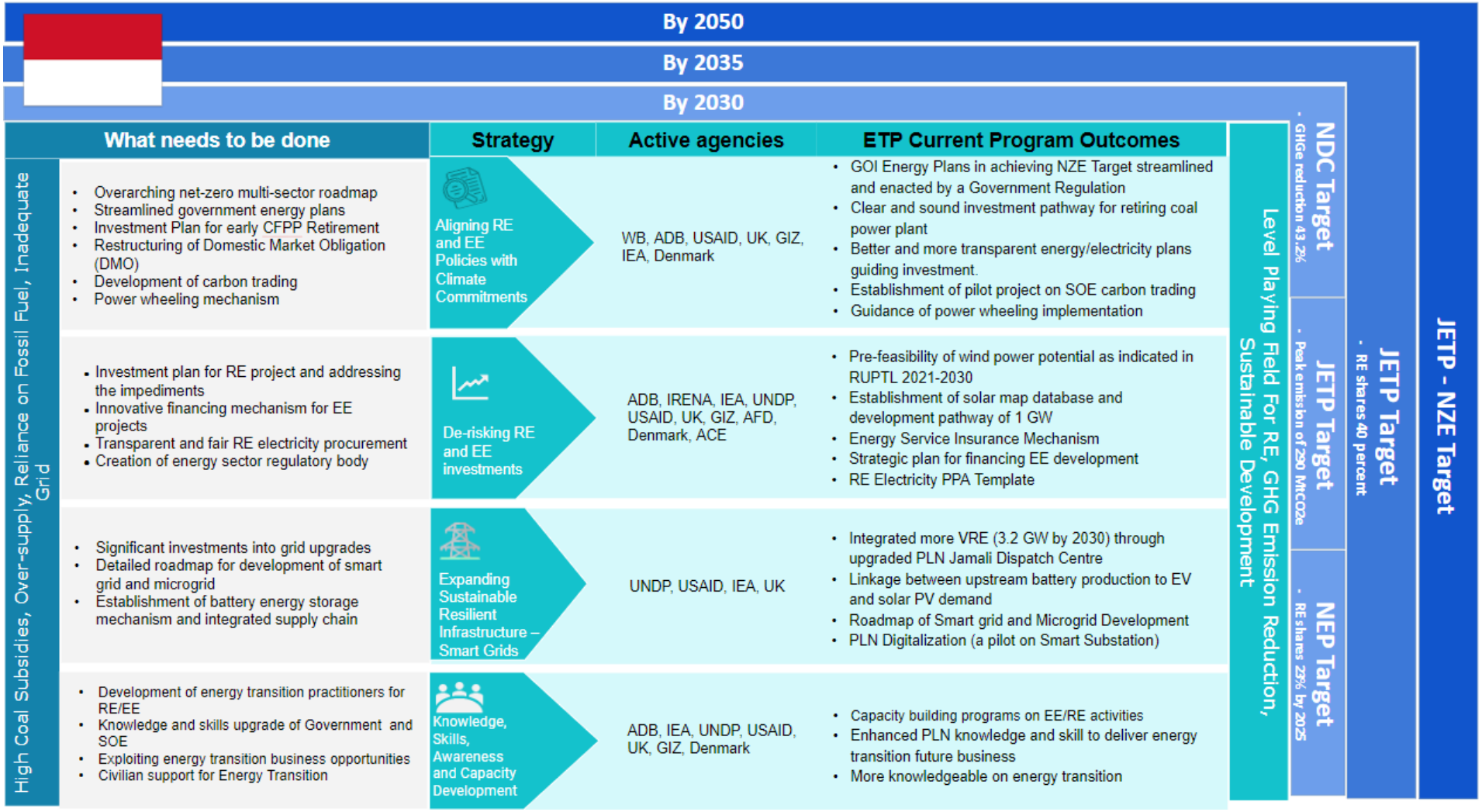
33. **Strengthening coordination and leveraging partnerships, ETP capitalizes on its Aligned Programs.** Alignment is an important feature in ETP's operating model as it connects programs' funded by ETP's funders but not implemented through its trust fund by purpose (what we do and why we do it), their strategy (how we plan to fulfill our purpose), and implementation (how we execute our strategy). ETP is currently an Aligned Partner with Southeast Asia Clean Energy Facility (SEACEF) and the Clean, Affordable, and Secure Energy (CASE) project.

F. ETP High Level Technical Assistance Program in Indonesia

34. **ETP's High-Level Program is driven by the four strategic outcome areas of the partnership.** The High-Level TA program is the ETP strategic planning that addresses the challenges to build an enabling environment leading to the achievement of the targeted outcomes. While proceeding with the forthcoming projects, ETP will remain flexible and adaptable to account for the changes and progress made or requested by the Government (as the main beneficiaries) and the energy transition stakeholders in Indonesia.

35. **ETP Secretariat is developing pioneering interventions and programs with the Government agencies engaged in Energy Transition and the involved Donors and Stakeholders.** These interventions are foreseen to support ETP's overall Results-based Monitoring Framework and key performance indicators, including GHG reductions, alignment of policies with the Government's climate commitments, increase in investment in energy efficiency and renewable energy projects, an extension of smart grids to facilitate deployment of variable renewable energy and enhancement in knowledge and awareness of energy transition objectives, commitments and the Paris and Sustainable Development Goals.

Table 2: Summary of ETP's Energy Transition Analysis and Programming in Indonesia



Strategic Outcome Area 1: Policy Alignment with Climate Commitments

36. ETP aims to strengthen the ambition and foster consensus regarding energy transition among key national institutions by supporting the consolidation and alignment of internal concepts, models, targets, plans, and policies that currently display incongruencies. ETP develops assistance programs to support the establishment of robust governance for a participatory long-term energy transition scenario. Such measures include policy and regulatory alignment with the energy transition, stakeholder coordination, stocktaking of energy transition scenarios, financial and investment needs, impact studies for early retirement from coal-fired energy production, assets management under the transition to expedite energy transition in the electricity sector, and related public campaigns.

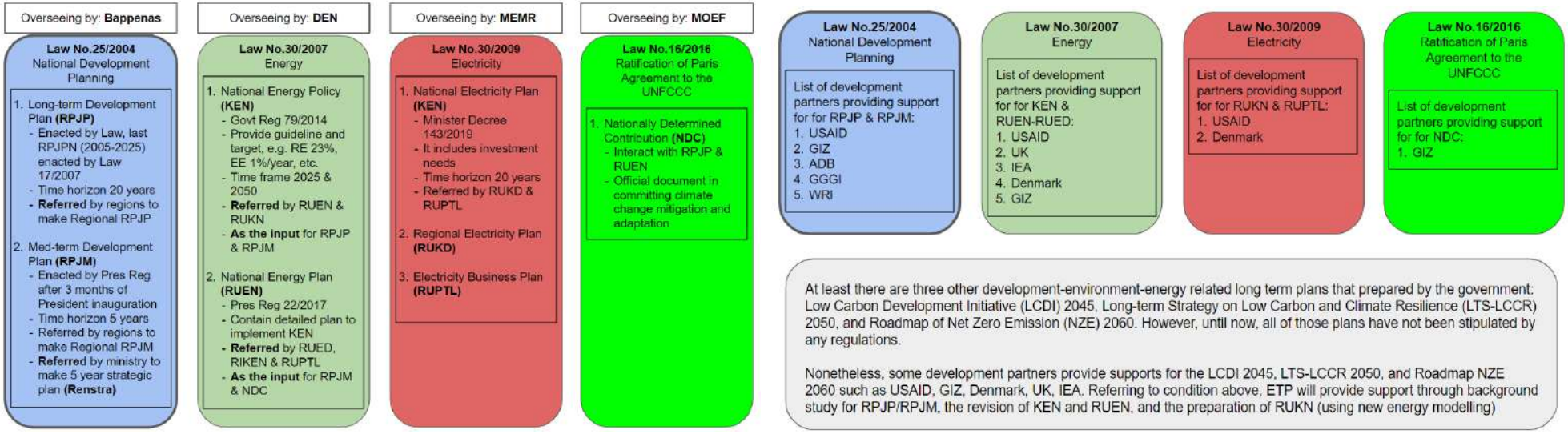
37. The current overarching policy mix, and the implemented policies, demonstrates a fragmented arena with divergent direction and various government entities claiming responsibility for the energy transition.

38. At the highest level, there are four laws that relate to providing the pathway for energy transition, each law having its subsequent regulations and interactions with each other.
    - Law No.25/2004 concerning National Development Planning (the legal basis for RPJP and RPJM[1])
    - Law No.30/2007 concerning Energy (the legal basis for KEN and RUEN[2])
    - Law No.30/2009 concerning Electricity (the legal basis for RUKN and RUPTL[3])
    - Law No.16/2016 concerning the Ratification of Paris Agreement to the UNFCCC (the legal basis for NDC)

39. Figure 2 shows how these regulations provide various pathways using different assumptions and scenarios. Creating cohesion and alignment between these laws is required in order to ensure a ubiquitous pathway for the energy transition, one in which confidence can be brought to government policymakers, financiers, project developers, and the development partner community in ascertaining a clear pathway forward with the energy transition.

[1] RPJP: Rencana Pembangunan Jangka Panjang (Long-term Development Plan), RPJM: Rencana Pembangunan Jangka Menengah (Medium-term Development Plan)
[2] KEN: Kebijakan Energi Nasional (National Energy Policy); RUEN: Rencana Umum Energi Nasional (National Energy Plan)
[3] RUKN: Rencana Umum Ketenagalistrikan Nasional (National Electricity Plan), RUPTL: Rencana Usaha Penyediaan Tenaga Listrik (Electricity Business Plan)

Figure 1: Diagram outlining the overarching laws guiding the energy sector with agencies supporting these areas.



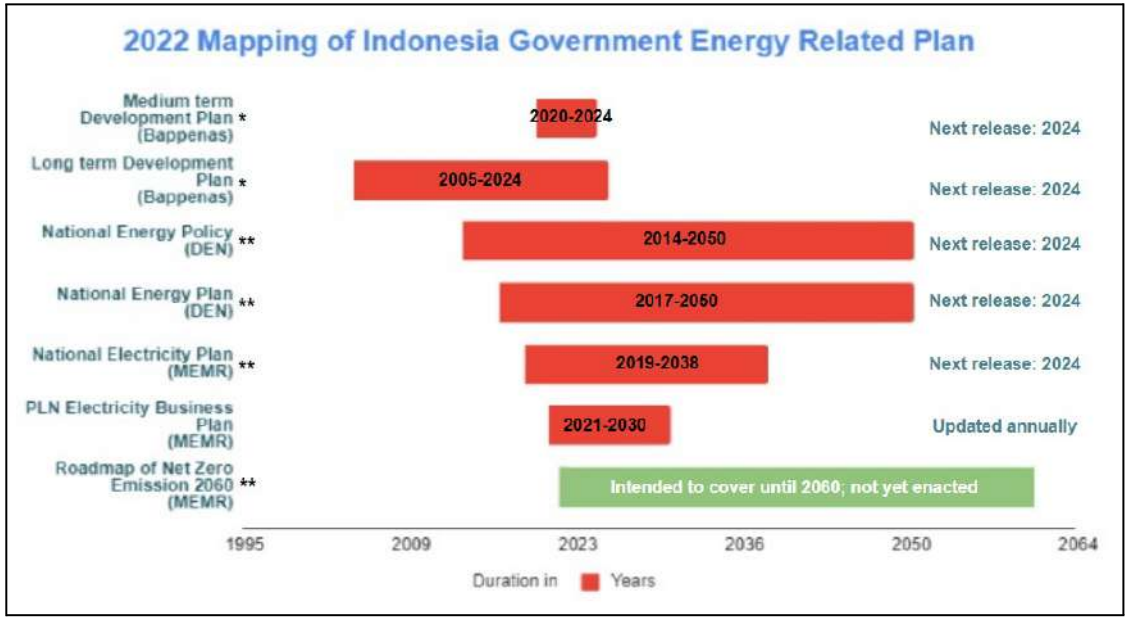
40. The Government of Indonesia has requested ETP assistance in the planning and development of key framework documents in which due to the time horizon of each plan and the challenges in reaching the Paris Agreement target, the GOI needs to review and prepare updated plans within the next two years to coincide with the incumbent government of 2024/2025. Figure 2 shows that action in such an area will affect the future planning related to the implementation of the energy transition. By providing support to Bappenas through a background study as the input for the next RPJM (Medium-term Development Plan) and RPJP (Long-term Development Plan), which will be adopted by the new government by 2024/2025, ETP can play its role to ensure that the energy transition will be further mainstreamed in the government planning and program implementation.

41. ETP's current support to the National Energy Council-NEC (DEN) to review and revise KEN (National Energy Policy) and RUEN (National Energy Plan) shows the strategic position of DEN as the sole coordination platform for cross-sectoral energy issues (including the current energy transition landscape) as well as its membership that include eight prominent ministries, eight stakeholder representatives, and led by the President with Minister of Energy and Mineral Resources as the daily chairman.[4]

[4] https://www.oecd-ilibrary.org/sites/0007dd9d-en/index.html?itemId=/content/publication/0007dd9d-en

42. To enhance ETP's role in Indonesia, support the development of a new electricity planning model integrated with a geospatial tool for making the new RUKN (National Electricity Plan) and RUPTL (Electricity Business Plan) will leverage ETP to involve in a real example of program/project that leads to making the differences in Indonesia.

Figure 2: Timeline of energy transition-related plans



*supporting development partners: the United States Agency for International Development (USAID), the Clean Affordable Secure Energy (CASE), Global Green Growth Institute (GGGI), World Resources Institute (WRI)
**supporting development partners: USAID, CASE, IEA, Denmark

43. Align with the work of the government and other development partners for delivering JETP commitments, ETP was requested by Ministry of Energy and Mineral Resources (MEMR) to draft the early CFPP retirement roadmap based on the electricity model determined by MEMR to find the CFPP capacity to be retired and additional RE power to meet JETP targets by 2030. It means that the

ETP's current study on the financial implications of early CFPP retirement will be timely in addressing the concern of what will be the impact of such policy on the state budget concerning the subsidy, electricity price, and revenue as well as the impact on the PLN financial performance in implementing the energy transition measures. Further, it will help the government to prepare an extensive investment plan within the 6-months time frame stated in the JETP declarations.

44. The study above also found one issue regarding the implementation of coal Domestic Market Obligation (DMO) as an indirect subsidy from the government to PLN creates an unfair playing field for RE to supply more power to the grid. ETP will investigate such a policy and work with relevant beneficiaries to offer an alternative solution through DMO restructuring that can enhance Indonesia's commitment to providing cleaner electricity for the economy.

45. The carbon market mechanism is believed as one of the enabler factors to accelerate the energy transition in developing markets that heavily rely on fossil fuels. Despite the carbon economic value decree having been in place for two years, only slow progress happened, with the power sector just recently launching such a mechanism. According to the MEMR[5], the first stage of the carbon trading mechanism will cover 99 power plants with a total installed capacity of 33.6 GW that are connected to PLN grids. The potential carbon reduction is calculated at around 36 million tonnes CO2 target by 2030 while the market price mechanism is ranging from USD 2 to USD 18/ tonne. In line with the power sector mechanisms, ETP was requested by the Coordinating Ministry of Economic Affairs (CMEA) to support the establishment of a carbon market mechanism for targeted state-owned enterprises as a pilot to expect an increased awareness and contribution to emissions reduction.

46. Another opportunity to embrace the electricity transmission and distribution business has been indicated by the government through the stipulation of Minister Regulation No.1/2015 on the power wheeling mechanism. Nevertheless, up to now, there is no movement on power wheeling due to PLN's reluctance to open its grid for such business, and the government is lacking experience in managing this business area. ETP will seek guidance from the government on how ETP could support the reformation of the electricity market and at the same time, convince PLN to readily embarking a beyond meter business as reflected by the latest PLN business restructuring that assigned one of PLN subsidiaries to cover the new business.

[5] https://www.esdm.go.id/en/media-center/news-archives/menteri-esdm-luncurkan-perdagangan-karbon-subsektor-pembangkit-listrik-

Outcome Area 1: Policy Alignment with Climate Commitments

Title of Program and Beneficiary	Current Situation	Objective	Outcome	Collaboration Opportunities
Ongoing: Study of the Financial Implications from early Coal-fired Power plant Retirement program Beneficiary: Bappenas, MEMR, PLN, Ministry of Finance (MOF)	While early coal retirement is given in the Government's plans as a strategy to achieve NZE system and energy transition and climate goals, an actual strategy has not been developed, which would investigate steps and time-bound measures to accomplish the program.	Impact study on coal phasing out to PLN financial condition, including on the state fiscal related to subsidies and tariff considerations as well as the accessible financing mechanism options and socio-economic impact of the coal relied upon regions.	Roadmap and investment plan to execute the early retirement of coal-fired power plants and increased RE deployment	ADB provides support through the Energy Transition Mechanism (ETM) with progress shared regularly in the Coal Phase Out Working Group under FIRE Dialogue. Similarly, ETP will use the FIRE platform to deliver updates once approved by GoI. The ToR requires that ETP consultants engage both with ADB and the Coal Phase Out TWG stakeholders.
Ongoing: Streamlining of Government of Indonesia Energy Plans as a Pathway to Achieve NZE Target Beneficiary: DEN, Bappenas, MEMR, MOEF	Current energy transition plans are hosted by various Government agencies involved in energy sector planning, under several models, forecasts, and assumptions. These incorporate a series of interrelated agendas and sectors. Based on the Energy Law 2007, Dewan Energi Nasional (DEN) or National Energy Council (NEC) has the authority to establish the cross-sectoral coordination as the members of DEN from the prominent ministries and the	A coherent, whole-of-government energy transition pathway, a consolidated roadmap to the NZE in 2060 and map the required regulatory and policy measures for accelerating energy transitions with financing needs, providing for impact analysis for coal retirement programs to foster commitment and steps for NZE and concrete plans for energy	A coherent energy transition roadmap; multi-stakeholder consensus; consolidated energy and early coal retirement strategy stipulated by a sound regulatory framework.	Denmark previously provided capacity building and TA for energy modeling for DEN; USAID provides support for monitoring the establishment of the regional energy plan (RUED). ETP will take further, these supports under DEN guidance in reviewing and revising KEN and RUEN, updating to meet the

	representatives of the stakeholders which further align the efforts and at the same time provide the necessary regulatory framework.	transition measures and actions.		current dynamic energy sector and RE commitments.
Background study on the medium-term national development planning (RPJM 2025-2029) and long-term national development planning (RPJP 2025-2045). Beneficiary: Bappenas	Every 5 years the government sets up the RPJM to ensure that all the government agencies will implement their work referring to this document. The cycle of the RPJM is concurrent with the 5 years presidential election in which the RPJM document will be used by the elected president to run the government and become the opportunity that the energy transition will be further mainstreamed in the government planning and program implementation. To emphasize the effort, the RPJM needs to be included in the RPJP.	A consistent and comprehensive energy transition planning and implementation strategy is important to ensure the achievement of the government's climate commitment.	RPJM and RPJP are aligned with the overarching energy transition targets, provide clear guidance, and a defined strategy, and are transparent.	WRI provides background studies for the environmental issue; GIZ for background studies on infrastructure. ETP support will aim to align the energy transition across national development planning.
Integrated power system planning and geospatial tool to support National Electricity Plan (RUKN) and Electricity	The current supply and demand scenarios of the RUKN, as well as the PLN RUPTL, is driven by the economic and population growth. The inputs however do not sufficiently consider future energy scenarios that will be impacted by the energy transition. Additionally, the increased use of RE is not linked to the transmission and	This approach will help the government and PLN to have a better understanding in determining the business and investment decision based on the electricity infrastructure least cost plan.	Planning and investment roadmaps are aligned with the future energy transition scenarios.	Under the Indonesia Clean Energy Development (ICED) II program (2015-2020), USAID provided support to produce geospatial maps of RE sources in some provinces, becoming the input for the energy model. Later,

Business Plan (RUPTL) Beneficiary: MEMR, PLN	distribution planning and will lead to the issue of curtailment and weakened investment. Hence, there is a need for the electricity planner to understand how the geospatial tool will help more transparent and integrated power system planning to meet the potential supply and demand change behavior.			the UK through the Mentari Program provided a geospatial least-cost electricity plan guidance. Referring to these works, ETP will work with Directorate General of Electricity (DGE) and PLN to develop an integrated electricity plan with a geospatial map that is expected to become the new energy/electricity model for RUKN and RUPTL.
Study of DMO Restructuring Beneficiary: Coordinating Ministry for Maritime and Investment Affairs (CMMIA), MEMR, Bappenas. MOF	Coal DMO is regulated by Ministerial Decree No.267/2022 which mandated 25% of coal production to supply local power generation with a price cap of USD 70/metric tonne Free on Board (FOB) Vessel price of coal with 6,322 kcal/kg GAR. The current market price of coal is around USD 130/metric tonne. Impacts arise include the potential lost tax revenue from exporting coal, higher emissions from coal generation, and discouraged RE investment.	Assessing DMO restructuring to get a better picture of its potential and impact to drive economic value while lowering pressure on RE price development which further can reduce the emissions from the power sector.	Recommendations and policy dialogue for the restructure of DMO policy to create a fair playing field for RE generation and thus enhance RE uptake.	There were past studies from several development partners such as USAID, UK, and ADB, but not directly on the DMO policy but rather on the energy system. ETP could seek priority partners from its funders member.
Carbon trading mechanism options for the	The government has stipulated the President Regulation No.98 2021 on Carbon Pricing as the legal	To provide the indicator and guidelines in preparing the carbon trading mechanism it's	A transparent and measurable carbon trading mechanism for the SOEs.	The World Bank provides support on the carbon market white

energy transition financing mechanism (a pilot State-owned Enterprises (SOEs) business) Beneficiary: Coordinating Ministry for Economic Affairs (CMEA), Ministry of State Owned Enterprises (MOSOE)	basis for the carbon trading mechanism. Yet, the regulation is proposing that detailed mechanisms will be explained by sectoral ministries through their regulation. Thus, this is an unclear space that can be perceived as the learning room for the stakeholders to establish a sound mechanism/platform including for the SOEs that has a big potential to drive the energy transition in the country with an example and appropriate financing capability.	important for Indonesia in gaining the momentum to accelerate the energy transition in the niche area of the selected SOEs.		paper; United Nations Development Programme (UNDP) provides the Partnership for Market Readiness (PMR) and Partnership for Market Implementation (PMI), and The Organisation for Economic Co-operation and Development (OECD) and IEA assist DGE to set up the electricity Emission Trading Scheme (ETS). ETP is being asked to establish a pilot platform for SOE businesses using carbon trading as a tool to accelerate the use of RE and EE projects.
Carbon Market Mechanism for Targeted SOE Beneficiary: CMEA, MOSOE	State-owned enterprises (SOE) are the government's representatives to cover important economic areas including energy transition. Most SOEs have a strong financed structure to drive the government's economic objectives. Concerning one of the energy transition pathways through the carbon market mechanism, the government indicated that SOEs should also play a role to assist in	To provide knowledge of various carbon market mechanisms and activities to reduce emissions. It is also expected that this technical assistance will help to establish a carbon market mechanism for targeted SOEs.	Implemented Carbon Market mechanism for SOEs encouraging RE proliferation and early CFPP retirement.	UNDP, World Bank, ADB, USAID, UK, and GIZ, among others, are the active actors providing support for the government on carbon market issues. However, working directly with the SOEs for establishing the carbon market

	reaching the climate objectives. However, despite its being well-financed, SOEs lack an understanding of the implementation and thus require government guidance to apply such a mechanism.			mechanisms is rarely covered.
Power Wheeling Mechanism Enhancement Beneficiary: MEMR, PLN, Bappenas	In the last five years, the request for cleaner/green electricity has become more pertinent, especially from multinational companies considering their objective of a sustainable supply chain. PLN as the electricity single buyer and main provider sees the opportunity to provide the renewable energy certificate (REC) to meet these requests. Nonetheless, the consumers doubt the credibility of the REC due to unclear verification of its electricity sources. Further, the government is being encouraged to revisit and improve the power wheeling regulation that was enacted in 2015 without any implementation actions.	Opening the electricity transmission and distribution business through a transparent power-wheeling mechanism will become an opportunity for PLN and the government to pave the electricity market restructuring that would establish a "controlled competition market" to create the best price and service for new electricity businesses. PLN should have the agility to see this as a new business opportunity.	A transparent power wheeling mechanism leads to the international standard of renewable energy certificate resulting from more RE generation in the system.	The US National Renewable Energy Laboratory (NREL), World Resources Institute (WRI), and Allotrope Partners are actively supporting MEMR and PLN in understanding the REC business through the Clean Energy Investment Accelerator program. While USAID-SINAR provides TA to establish a distribution code that would assist the power wheeling mechanism.
Diagnostic of Competitive Arrangements for Energy Transition (DCAT)	Energy transition calls for significant investments into RE. These investments, in turn, require policy adjustments in the national frameworks to ensure a level playing field exists for the region to capitalize the globally tested	To diagnose the legal, economic, financial and political conditions to integrate competitive and transparent market mechanisms in place of the conventional and stagnant power purchasing systems, and	An in-depth assessment of the use of market mechanisms and market conditions in RE integration, and with a prudent agenda of actions for market mechanisms will provide	ETP is combining resources in partnership with CASE, SEACEF and GREENMAP to conduct in-country consultations and establish a donor-forum with

Beneficiary: MEMR, PLN, Bappenas	market mechanisms for RE integration. However, the region has not fully capitalized on these global concepts yet which could help to address the region's static nature of the conditions created by the long term Power Purchase Agreements (PPA) and the consequent lack of flexibility of consumers to price developments through current lack of competition.	develop action agendas to facilitate interest and adoption of market mechanisms to integrate RE. It is also expected to develop PPA templates for application and expediting RE procurement process.	the pathways and encourage the integration of competitive and market-based mechanisms to increase RE in energy supply mix.	stakeholders and donors.

Strategic Outcome Area 2: De-risking of Energy Efficiency and Renewable Energy Investments

47. ETP addresses technical and capacity constraints to de-risk investments in EE and RE to unlock a large-scale energy transition uptake. This is achieved by providing interventions that are necessary for projects to reach techno-commercial viability and by decreasing energy intensity by formulating energy efficiency projects. ETP will support upstream feasibility challenges of renewable investments (wind and solar), exposing stakeholders to successful models and reviewing impediments to bankability, and identifying examples for overcoming these. This support will address technical, financial, and economic viability, the financing environment and identify regulatory issues to develop the enabling conditions for investors. The analysis will include a road map and legal inputs for establishing an attractive IPP framework for wind (or solar) in Indonesia to fully realize their potential.

48. ETP has made significant strides in the development of its Energy Efficiency program and continues to strengthen in this area. The Energy Efficiency Diagnostic Report provides insights into the opportunities and challenges, at a granular level, in Indonesia. The work has resulted in multiple dialogues and provides a compass for forthcoming TAs. The Energy Efficiency Innovation Window has allowed ETP to provide tangible support to the development of the EE space in Indonesia, with the Director-General of New and Renewable Energy and Energy Conservation (DG Dadan Kusdiana) requesting close collaboration throughout and wishing to put the ERIE winners on a platform.

49. There is a need/potential for the collaboration, development, and proliferation of renewable energy programs in Indonesia with multiple impediments to overcome. ETPs donor mapping, in conjunction with messaging from the Government of Indonesia, highlights the need for coordination, support, and mobilization of assistance for the development of both wind and solar. Impediments include addressing the local content requirement (LCR), creating an environment for a pipeline of bankable projects, and essentially increasing the ambition of PLN to accept and prepare for the absorption of an increase in VRE. ETP has conducted wind workshops and is currently in the process of formalizing this into a Technical Working Group, whilst simultaneously preparing TAs to provide roadmaps to the wind and solar sectors.

50. In addition to the RE development acceleration, President Regulation No.112/2022 provides detailed electricity purchasing and price arrangement by technology type. It also mandated the Minister of Energy to stipulate a power purchase agreement regulation as technical and detailed guidance for the project developers and PLN to agree on RE power projects. ETP has been approached by the Energy Transition Council/Rapid Response Facility based on the request from MEMR to provide TA in drafting the PPA template as the annexes to the mentioned PPA regulation with the suggestion to use individual legal experts covering this work. Other development partners are preparing similar support on the PPA template that should be addressed with coordinated guidance from MEME.

51. De-Risking Energy Transition investment is one of the focuses of many development partners to provide support for the government to unlock the great potential of RE and EE which further will assist Indonesia in achieving the Paris Agreement and SGDs target. Some of the development partners such as the World Bank, ADB, AFD, USAID, GIZ, UK, etc, have a long history of engaging with the government and related stakeholders in the energy sector, including the current program on energy transition. The World Bank and ADB are focusing on improving the quality of electricity infrastructures that will ensure reliability and electricity access for consumers. While bilateral cooperation is mainly providing support on study and policy recommendations, technical assistance, and capacity-building programs, based on the discussion with the government.

Outcome Area 2: De-Risking Energy Efficiency and Renewable Energy Investments

Title of Program and Beneficiary	Current Situation	Objective	Results	Collaboration Opportunities
Ongoing: Wind Energy Development In Indonesia: Investment Plan Beneficiary: MEMR, Bappenas, PLN	PLN has committed to building only 600 MW of wind projects by 2030 in their electricity business plan, therefore not exploiting the wind potential available. With the advanced technology development in the industry, particularly in turbine capacity efficiencies and offshore wind, the wind has significant techno-economic potential. Increased ambition is, therefore, possible the government also needs evidence to give clear guidance on how the wind potential can become the potential source of VRE in the (near) future.	Detailed road map of wind power and investments pathway to further encourage the commercial and bankable projects; ii) identification of potential social-environmental issues and community acceptances on the large wind farms, and iii) facilitation of project preparation facilities to attract investors for project delivery	A roadmap, recommendations, and investment pathway for wind power projects, de-risking 600 MW of wind power projects and aiming to kickstart a wider wind energy sector.	Denmark provides experts to PLN to cover the PPA issue on the wind power project; GGGI provides support on the HSE (Health, Safety, and Environment). This effort works in silos as some other areas need to be addressed, e.g. land permits, data collection, financing, etc. ETP comes with the idea to establish a working group and put all of those issues in a wind power investment roadmap under the government's guidance.
Solar Irradiance Mapping and Development Plan	Solar PV is earmarked to play an important role in the accomplishment of Indonesia's	To open a pathway for the development of a floating solar	The derisking and early stage development of 1 GW of solar photovoltaic	Reflecting the huge potential and proven technology, solar PV is a

Beneficiary: MEMR, Bappenas, PLN	reaching its goal of 31% RE by 2050. A large share can be achieved through floating solar (including from the open mining lakes), current reservoirs, and sheltered seas at the utility-scale level.	PV sector and ultimately unlock finance in this area.	projects. An analysis of resource, technical, economic, and market potentials reporting on theoretical physical potential and energy content of resources. Mapping of supporting and required infrastructure for solar energy across Indonesia. Creation of a roadmap and prioritization strategy to support future floating PV pilot projects.	low-hanging fruit receiving support from many development partners such as USAID, UK Mentari, GIZ, UNDP, etc. MEMR and PLN have requested ETP to add to work in this area to expedite a bankable pipeline of projects.
Study of LCR Restructuring Policy Beneficiary: CMMIA, MEMR, MOI, Bappenas, CMEA	LCR is a major impediment to the development of renewable energy, mainly solar PV projects in Indonesia. The Indonesian government seeks to strengthen its solar PV manufacturing capabilities to create jobs and wealth and ensure an equitable transition.	Supporting the work of UK Mentari, ETP plans to both support the Indonesian government in developing and realizing plans to strengthen the solar PV manufacturing sector, whilst simultaneously seeking to provide evidence-based decision-making to the application (or modification) of the LCR.	A strengthened Solar PV manufacturing sector, a lightening of the LCR, and a pipeline of solar projects were initiated to justify the expansion of such a manufacturing sector.	The UK Mentari program (and most recently the IEA Special Report on Solar PV Global Supply Chains) is producing significant work in addressing solar PV supply chains and simultaneously tackling the LCR regulations. ETP will build and support this program.
Energy Efficiency Program Beneficiary: MEMR, Bappenas	While Regulation 70/2009 provides energy efficiency measures, industrial energy efficiency policy for all major consumers, and MEMR has introduced a national EE award and municipal Decree No.38/2012 in Jakarta foster green building	Stock takes study on the energy saving insurance (ESI) mechanism that is available and applicable considering the Indonesia EE business needs.	A pilot project of EE investment/project that can be supported by the ESI scheme	There is interest from UK LCEP and AFD to provide innovative financing mechanisms for the government. ETP wishes to take bold action, offering the government to identify available ESI

	implementation, EE programs are weak without an energy-saving company model as the service provision. However, these are subject to initial capital costs, and without considering downstream savings, among many other uncertainties, the market has been very constrained.			mechanisms and set up measurements to apply the ESI that suits Indonesia's EE needs.
		Provide a TA to establish a capacity-building program and an innovative funding mechanism to support the public street lighting program in targeted cities.	An innovative funding mechanism including the identification of potential investors for the public street lighting program	Currently, UNDP and The United Nations Environment Programme (UNEP) supported by the fund from GEF (Global Environment Facility) work with MEMR to run the 3 years program called ADLIGHT (Advancing Indonesia's Lighting Market to High Efficient Technologies). However, there is a gap in that the government seeks ETP support in providing potential grants (as a first loss guarantee mechanism) for the street lighting project in targeted/selected cities.

Strategic Outcome Area 3: Extending Smart Grids

52. ETP addresses impediments to integrating renewable energy into the transmission and distribution networks to enable access to smart technologies, including battery energy storage and ancillary services and extending smart grids. The barriers to energy transition in Indonesia include the capacity of the transmission and distribution grid network, dispatching technology, control technology for optimizing and integrating renewable energy, and the necessary human resources to operate such technologies

53. The PLN Jamali MCC is a critical component for a successful energy transition in Indonesia. With the current Jamali MCC technology, it is difficult for PLN to allow more VRE to enter the Jamali electricity system. The ETP intervention to upgrade the control center is now in its final stages, with the Supervisory Control and Data Acquisition (SCADA) system under procurement by PLN and the buildings under final detailed design and due to start procurement in Q2 2023. The control center is one of the world's largest control centers serving electricity for 160 million population though at present, due to dated technology, impedes the efforts to achieve the RE utilization target. ETP saw this as a niche opportunity to address a major impediment whilst simultaneously building strong relations with PLN, a major actor in the present and future energy transition. With the assistance of ADB in making early introductions, the ETP engagement with PLN is now growing and acknowledged by the PLN Board of Directors as well as government officers that appreciate ETP's support to the PLN Jamali MCC. This was reflected in the showcase of the work on PLN Jamali MCC at the G20 Meeting.

54. ETP will use the PLN Jamali MCC upgrade project as the anchor to further contribute to the expansion of smart, sustainable, and resilient electricity infrastructure. Smart grids in Indonesia are still in the early stages of development with few development partners providing intensive support in this area. According to the IEA Digitalisation and Energy study report (2017), digitalization is reshaping the energy sector and further encouraging Indonesia to remodel its energy supply and demand projection. In meetings with the PLN CEO at the G20 Energy Transitions Working Group (ETWG) Labuan Bajo, ETP was requested to provide more support on the digitalization of the electricity system in PLN. This aligns with prior dialogues with the General Manager of PLN Jamali Control Center, where the need was highlighted for pilots of smart electricity substations in the Jamali system for assessment and ultimately expansion. In addition, DGE also emphasized the need for more support on smart grid development (embedded with the capacity building program) since it could establish a transparent and accessible electricity system.

55. Other development partners such as USAID, UK, and IEA have provided support to increase the awareness and best practices and references of the implementation of smart grids. USAID facilitated DGE of MEMR and PLN staff to visit the California Independent

System Operator (CAISO), demonstrating management of the dispatch center including the VRE inflow. Currently, USAID provides support to develop the distribution code (a pilot project in Jakarta) that has the objective to measure the small VRE (mostly solar rooftop PV) effect on the distribution system. IEA provides a study on the challenges and options for Indonesia to meet its renewable targets for the year 2025 and beyond, with a focus on how to enhance system flexibility. For ETP, building with the IEA and USAID, the upgrade project of PLN Jamali MCC can be the anchor to positioning ETPs' role in the smart grid development that may accelerate the energy transition.

56. The Government of Indonesia is putting electricity reliability throughout the country as the key performance indicator of the state-owned electricity company, PLN. It is challenging due to the geographical aspect, especially in the eastern part of Indonesia where RE potential is mostly located with intermittency issues to be addressed to build its reliability through the utilization of battery storage as a common practice in electricity generation. At the same time, the advancement of electric vehicles creates more opportunities for battery development. Even though battery technology is evolving, the government has not set up a mechanism yet a standard for battery storage utilization to cater to the best performance output forming electricity reliability for RE generation and electric vehicles. Thus, ETP is keen to bring this expertise in setting up the battery energy storage system and mechanism to optimize electricity reliability.

Outcome Area 3: Expanding Sustainable and Resilience Infrastructure - Smart Grids

Title of Program and Beneficiary	Current Situation	Objective	Results	Collaboration Opportunities
Ongoing: Detailed Engineering Design (DED) of the Java-Bali Control Centre Upgrade Beneficiary: PLN, MEMR, Bappenas	A grid network modernization is a prerequisite for feeding VRE to consumption. The current Jamali control system is not capable of integrating large VRE and is therefore an impediment to increasing RE share from 12% to 23% by 2025. The new grid code in 2020 also denotes the required replacement together with a need to modernize the energy management system electrical system.	Development of the basic and detailed engineering for the Main Control Center (MCC) and the Disaster Recovery Center (DRC) buildings; and Development of the basic engineering and technical specifications of the SCADAEnergy Management System for the MCC and DRC capable of integrating VRE without need for curtailment. Upgrading the main Java-Bali Control Center requirements to unleash smart grid upgrade projects and develop competencies in forecasting, modeling, and optimizing supply with demand and	A modernized control center that allows for the management of variable renewable energy and the extending of smart grids. Reduction in VRE curtailment opening the grid up for increased RE deployment.	This is a niche activity that ETP found through ADB information that PLN needs support to conduct the DED to upgrade the Jamali Main Control Center. ADB is providing RBL for this project. Other development partners have provided capacity building on the grid such as USAID and Denmark.

	At the same time, the modernization of the control centers needs to be supported by a transparent dispatching system that can be accessed by the government as the regulator to ensure the quality of the electricity supply is well managed.	integration of variable renewable energy.		
		Improving transparency and accountability of the dispatching system by opening the possible access for regulator	A transparent mechanism for the dispatching system allowing remote real-time access.	There are no other development partners that have provided support for this activity.
Roadmap of Smart Grids and Microgrid Development and PLN Digitalization Beneficiary: PLN, MEMR, Bappenas	Based on the flagship project of upgrading PLN Jamali MCC project, the development of smart grid and microgrid is more possible and needs to be described by a comprehensive and integrated roadmap to establish a reliable and greener electricity supply in the future. At the same, this roadmap should be	Facilitating the smart grid and microgrid road map and its regulation framework	A roadmap on the smart grid and microgrid Indonesia with support on the required policy and regulation development.	IEA, USAID, and UK are active players providing support for the government and PLN in this area.
Energy Transition Supply Chain: Battery Industry for Supporting EV and Solar PV Development Beneficiary: CMMIA, MEMR, Bappenas, MOI, Indonesia Battery Corporation	The EV program launched by the government a couple of years ago is currently gaining momentum through the minerals industry adding value prioritizing battery production. A new target of two million electric cars and thirteen million electric two-wheelers by 2030 shows optimism of the government including a newly	Study on integrated battery industry supply chain and measurement for its deployment for the EV and solar PV	Analysis and policy recommendations to support the battery industry production and the resultant propagation of EV and solar PV.	IEA and UNDP provide support on EV ecosystem mapping. ETP is being asked that the EV roadmap is needed to be integrated with the supply chain of the battery industry since it is needed by the government to multiplier the economic added value. This roadmap also will

	introduced policy of EV price subsidy. While the solar PV market remains an opportunity for the battery industry toward hybrid power plants. However, there is no clear roadmap on how this potential battery production can be linked to meet the potential EV and solar PV market causing uncertainty for battery industry investment.			describe the RE charging facility.
Battery Energy Storage System (BESS) Mechanism Beneficiary: MEMR, DEN, Bappenas	The government has not set up a mechanism nor a standard for battery storage utilization to cater to the best performance output forming electricity reliability for RE generation and electric vehicles.	A mechanism and standard for battery energy storage utilization for hybrid RE power generation, industrial use, and EV utilization.	Comprehensive regulation development to allow for battery energy storage and hybrid RE power plants to operate within the Indonesian energy system.	UK, UNDP, and IEA are the active players providing support for the government in this particular area.
ASEAN Power Grid Program (APGP): Output 2 - ASEAN Power Grid (APG) Roadmap Beneficiary: ASEAN Center for Energy, MEMR	The implementation of APG has been challenged by the limited coordination and stop-and-go-progress despite its significant potential to generate demand for and supply of renewable energy through a multilateral power trading mechanism.	Development of a staged roadmap to implement APG multilateral power trading by identifying the pending diagnostic and analytics to develop arrangements for APG, the current ASEAN interconnection status and existing interphases for expansion and integration into APG, and ASEAN decision making steps for an unobstructed progressing of APGP among other work to move the APG from the current study stage to implementation.	A roadmap with a financing framework to implement the APG initiative. The roadmap will include the diagnostic and pathways to implement the Brunei-Indonesia-Malaysia-Philippine Power Integration Project (BIMP-PIP) in	Combining resources with CASE and ESCAP to collaborate with ACE under APGP. ACE will provide the necessary coordination and linkages for APGP to political decision-making level in ASEAN, CASE will fund a program management unit that will enhance the coordination

			the context of integration into a wider APG multilateral power trading.	capacity of ACE, and ESCAP will support the APGP coordination with broader stakeholder groups beyond Southeast Asia.

Strategic Outcome Area 4: Knowledge and Awareness Building

57. ETP supports capacity and knowledge development across all areas of the energy transition to equip stakeholders with the skills required to plan and implement an energy transition. The knowledge infrastructure is essential for providing the skills and technical capacities required for expediting the energy transition. Knowledge gaps are significant, including due to a fast-paced technological and conceptual development among government personnel, project developers, technical experts, local business advisors, and financiers in delivering renewable and energy efficiency investments. In the finance sector ETP targets the unlocking of upstream financing for bankable energy transition investments in renewable energy sources and energy efficiency projects; and diagnostic and capacity development to resolve technical and economic viability bottlenecks to enable investment flow to the energy transition projects. In terms of technical and engineering capabilities, Indonesia is at the beginning of developing a sufficient workforce, particularly among the youth, and thus significant focus is assigned to the development of such capacities.

58. ETP integrates capacity building into each project. When developing program concept notes, ETP ensures that the project deliverables encompass sufficient capacity building to ensure that knowledge products are sufficiently disseminated, and received by an audience willing and able to take action on the outcomes, and are equipped to implement further the requirements falling on the beneficiary. Supplementing this, reflecting the request from the government and related stakeholders, ETP will develop the knowledge and capacity development program through three clusters: the technical aspect, non-technical aspects, and the certification program as shown in the matrix of outcome area 4.

59. ETP through the Energy Transition Roundtable, a regional program (facilitated by the Australian National University) has provided capacity building to a total participant from Indonesia around 295 people. With the remaining time of this program, it is expected to double the number of participants from Indonesia joining the training session aiming to develop the leaders to implement the energy transition in the near term and the future.

60. ETP seeks collaboration with other development partners to improve the quality of delivery of the training program, increase efficiency, strengthen partnerships, and reduce overlaps. One such example is the collaboration with OECD and CASE under the guidance from MEMR and the Indonesia Financial Service Authority (OJK), to deliver the Clean Energy Finance Training week centered around financing clean energy and energy efficiency projects and it has been conducted successfully in the 1st week of November 2022 leading to the continuation request from MEMR and OJK for the year 2023 - 2025. The training was attended by around 63 participants from the

government, project developers, and financial institutions which increased awareness and opened discussion among the participants to improve clean energy finance in Indonesia.

Outcome Area 4: Knowledge and Awareness Building

Title of Program and Beneficiary	Current Situation	Objective	Results	Collaboration Opportunities
Knowledge and Capacity Building: Development of leadership in energy transition	Knowledge gaps in the areas of assessing project viability, de-risking, project finance, and energy sector access to capital markets, combining the government's relevant leadership, financial institutions, investors, their boards, and management. In addition, the government would also require more certified energy auditors, energy managers, and measurement and verification to generate the capability in promoting energy efficiency in the country.	To provide the technical capacity building program, e.g. smart grid management, energy (electricity) modeling, RE installation, etc. To provide the non-technical capacity building program, e.g. energy transition financing, communication, etc. To provide the certification capacities building programs such as the energy auditor, energy manager, and measurement and verification of the Investment Grade Audit (IGA) result.	Financial institutions capacity building. Building of knowledge and awareness on energy transition ⇒ demand for energy transition ⇒ Policy Alignment with Climate Commitments ⇒ De-risking Energy Transition Investments ⇒ Green Job Creation	Almost all DPs provide capacity-building programs. Nonetheless, there are some areas in which ETP can collaborate and complement others' work such as energy transition financing, energy transition public awareness for regions, as well as delivery capacity into each program.
Energy Transition Business Centre of Excellence	Energy transition opens opportunities for new business ideas and will generate investment in the specific area of the energy sector. At the moment, as a leading institution that is expected to implement the energy transition, PLN is still preparing its human resources capacity to learn and adapt to the new stream of electricity business. Further, PLN requests any support in improving its capacity development.	To establish the PLN Energy Transition Business Centre of Excellence to provide knowledge and enhance the skill to create innovative business activities on energy transition.	Analysis and exploitation of change management practices. PLN decision makers are exposed and empowered to utilize business models to strengthen PLNs business models for energy transition and as such build a PLN a strategy that both embraces and accelerates the energy transition.	In the past, PLN received capacity-building support from various DPs such as USAID, GIZ, Denmark, etc, but more in the technical aspects of the electricity sector. Currently, there are no DPs

				providing programs on the electricity business side.
Just Coal Transition Forum	A forum mechanism is needed to generate coordination among the many transition programs that will support the communities standing to be affected by energy transition, particularly those that are negatively affected by coal phase down and early retirement of coal-fired power plants.	A convening Forum bringing together community and donor representatives together to create learning and enhance capacities, provide coordination service for transition programs and access to finance, and build institutional governance and implementation capacities through facilitation of dialogue among stakeholders in Southeast Asia. ETP will host the first three years of the Forum and a sustainability plan will be formulated that will identify its long term future and its hosting arrangements among other criterias.	An independent coordinating and convening Forum that will support just transition programs to participate in the activities of the Forum and fund the ensuing activities.	The Forum is implemented jointly between ETP and the World Bank. International development partners such as the Powering Past Coal Alliance and Climate Investment Funds among others will lead the Forum's thematic committee on different subject matters in the economic and social angles of just transition.

Annex I: Indonesia Context and Energy Sector Background

A. Indonesia Energy Sector Overview

61. While Indonesia has abundant renewable energy (RE) resources, RE makes up only about 14.2% of the Total Primary Energy Supply (TPES) in 2022[6]. Under the National Energy Policy (KEN), the government targets the RE share of 23% in the TPES by 2025 and expects to increase it to 31% by 2050. In COP27, the Indonesian Government submitted the enhanced Nationally Determined Contributions (NDC) to reduce 31.89% greenhouse gas (GHG) emissions and 43.02% with international support, compared with the business-as-usual (BAU) scenario by 2030. Further, referring to KEN and NDC, Indonesia aims to shift to a low carbon economy and a more climate-resilient path, including through key initiatives such as renewable energy (RE) and energy efficiency (EE) development, in addition to forest conservation and reforestation, waste management, land intensification in the Medium-Term National Development Plan (RPJMN) 2020-2024.

62. The electricity sector is governed by Electricity Law No.30/2009. Under this landscape, the electricity market in Indonesia has been deregulated to allow private participation, but does not provide for wholesale or retail competition. According to the Law, electricity supply business comprises generation, transmission, distribution, and retail. Perusahaan Listrik Negara (PLN) as the state electricity company, is obliged to provide integrated electricity services for generation, transmission, distribution, and retail. In 2020, PLN had a generating capacity of 43,187MW in total. In addition to this, PLN purchases from Independent Power Producers (IPPs) an additional 20,463 MW and from Private Power Utilities (PPU), private sector under licences, and others a total of 9,102 MW[7].

63. PLN plays a substantial role in implementing market conditions and energy transition processes as the sole buyer for the IPPs. The uptake of RE has stood still at around 14% for almost a decade of the electricity generation mix[8]. Several factors affect the transition progress, including (i) cost savings for adopting new technologies; (ii) competitive conditions and technical characteristics that affect profitability; (iii) characteristics that influence the expected profitability of the innovation or firms; and (iv) the potential impacts to the PLN and state financial conditions. Nonetheless, Indonesia maintains its commitment to deliver an energy transition, a commitment which is reflected in the addition of this issue as one of the 2022 G20 Meeting pillars, which further brings more attention and support from the international community. Further, these efforts still need to be orchestrated to gain more benefits that will assist

[6]Press Conference from MEMR on 2022 Performance Achievements and 2023 Programs in the Electricity and Renewable energy and Energy Conservation of Sub-Sector accessed through https://www.youtube.com/watch?v=zHcFTyinPMM (minutes 19)
[7] https://gatrik.esdm.go.id/assets/uploads/download_index/files/8f7e7-20211110-statistik-2020-rev03.pdf (page 10)
[8] https://gatrik.esdm.go.id/assets/uploads/download_index/files/8f7e7-20211110-statistik-2020-rev03.pdf (page 9)

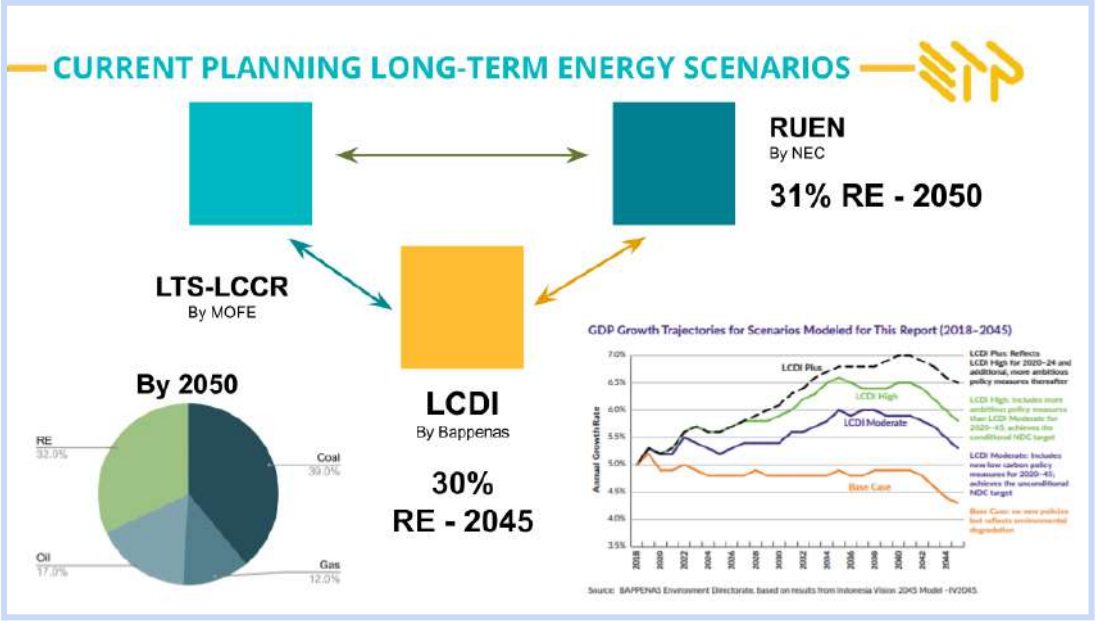
Indonesia in achieving the climate change targets and Sustainable Development Goals (SDG) objectives.

64. An emerging agenda to retire coal-fired power plant (CFPP) capacity has been discussed at the inter-ministerial level, with the recent update, President Regulation No.112 Year 2022 mandated MEMR to establish a Roadmap for Early CFPP Retirement with the last retirement in 2050.[9]. The various donor agencies and countries have discussed the early retirement of CFPP as one of the paths on energy transition to abate the GHG emissions from the electricity sector. A sharp reduction in the cost of solar and wind power and the improved awareness of the climate change policies appears to increase appetite for accelerating CFPP retirement.

65. Coal retirement as an issue requires a comprehensive assessment and massive planning to ensure that the state utility company can cope with retiring coal, abatement scenarios that are technically and financially feasible, and just transition programs, including financial solvency and stakeholder support programs. The possible implications of the coal phase out require a comprehensive assessment, including issues ranging from subsidy reform, fiscal implications and employment implications.

66. Multiple planning agendas need to be coordinated to a coherent strategy to accelerate energy transition in Indonesia. Bappenas' Low Carbon Development Initiatives (LCDI) outlines policies for a low carbon future. LCDI provides plans for the five sectors (energy, industrial waste, marine and coastal sector) and assesses impacts on economic growth, green jobs and creating jobs, and the intensity of the GHG emissions. LDCI sets RE and EE targets for the respective year until 2045. Addressing global climate challenges, Indonesia issued a Long Term Strategy (LTS) for Low Carbon and Climate Resilience 2050 (LCCR) which was submitted with the updated NDC prior to the COP26 meeting. In addition, the Ministry of Energy and Mineral Resources (MEMR) is preparing the Roadmap of NZE 2060 and the National Energy Council (NEC/DEN) is planning to revise the KEN and RUEN.

[9] https://jakartaglobe.id/business/jokowi-bans-new-coalfired-power-plants-with-few-exceptions



B. Overview of NDC Target

67. The Indonesian NDC targets a 29% reduction of GHG by 2030 and 41% reduction with international support was enhanced to become 31.89% and 43.02% respectively. Meanwhile, to achieve KEN targets to utilize 23% of RE in the TPES by 2025 and 31% by 2050 it needs to build 115 GW and 430 GW power plant capacity by 2025 and 2050. In addition, to meet the current electricity demand, Indonesia is also planning to increase the coal-fired power generation by 13.8 GW until 2027, which will reach a share of 45% of total installed capacity, according to the RUPTL 2021-2030. The Ministry of Finance (MOF), MEMR, and PLN have requested the international community for resources to facilitate these objectives in the context of the COP26 FIRE High-Level consultations.

68. In May 2021, Indonesia's power utility, PLN, declared a carbon neutrality goal for its energy sector and suggested that it would start shutting down coal-fired power plants and phasing them all out by 2056, amounting to 50 GW of capacity, with a view to net-zero carbon emissions by 2060. It is noted, however, that the declaration has been made in advance of a coherent early retirement strategy of coal plants and more than 40 plants are still planned to be built under the current power capacity expansion plans. Nevertheless, the government and PLN opened the possibility to not continue with the build of all CFPPs stated in the RUPTL 2021-2030, with the most likely to be omitted being those plants that have not reached financial closure.

C. Management and structure of the Energy Sector

69. The Law No 30 of 2009, stipulates that the government appoints PLN to represent the state as the main actor for the electricity business. Constituted from the law, PLN has the first right of refusal in public electricity provision. As the sole institution that holds the right to provide electricity services, PLN in effect formulates the long-term investment planning of the electricity sector, including the possible private sector's investment.

70. Under this specific circumstance, the government restricts parties other than PLN to serve the distribution and retail of electricity. Following the Law, once the business area has been assigned for PLN, only PLN owns the rights to organise the power distribution and sales in the specific area. If PLN service provision in a particular area is disturbed, other entities (either private entities or cooperatives) might be involved in the electricity provider. Therefore, although the regulation allows for the involvement of the private sector, participation is limited.

71. On the generation side, the government started opening opportunities stipulated by the Government Regulation No.14 Year 2012 concerning Electricity Business Activity for the engagement of the private sector by providing opportunities as independent power producers (IPPs). PLN also invests and operates its portfolios of power generation facilities. Hence PLN becomes the single buyer of electricity produced by IPPs besides operating and developing its generation facilities. The utility company has a buyer's monopoly, controls the market and holds the ability to drive wholesale prices of electricity down. From the energy economy's perspective, this electricity market model has substantial implications for any transaction between IPPs or developers with PLN as the only buyer in the electricity market.

72. The electricity sector is governed by several institutions. The Ministry of Energy and Mineral Resources (MEMR) manages the power sector policy, energy planning and proposing electricity tariff and regulates PLN as the designated state utility company. In this setting, MEMR verifies and approves PLN's capacity expansion plan and the performance of electricity services. The Ministry of State-Owned Enterprises (MSOE), as the sole shareholder of PLN, represents the government as the owner and is responsible for setting out and regulating PLN's performance in managing their company for delivering electricity services. In the context of national planning, Bappenas/PPN (National Planning Agency) is responsible for formulating the long-term (RPJPN) and medium-term (RPJMN) national development plans. Lastly, the Ministry of Finance (MOF) is responsible for providing electricity subsidies, giving the approval for government guarantees for PLN's obligations in loans and power purchase agreements (PPAs) as well as formulating and approving the fiscal incentives for renewable energy and energy efficiency projects. These multiple 'principals' of PLN provide possible conflicted agendas to PLN in managing the electricity services, which affects the condition of the electricity market in Indonesia, affecting the pace of energy transition in this country.

73. Energy Law No. 30 of 2007 recognizes energy security as a critical national issue. It requires a priority on new and RE development and provides support for doing so by giving incentives for developers to participate in providing cleaner and more

sustainable energy. However, the RUPTL 2021-2030 proposes that coal power generation is planned to increase by 13.8 GW in 2027 (reaching a share of 45% of total installed capacity).

74. PLN will struggle to achieve 23% renewable energy in 2025. This situation reveals that Indonesia faces substantial challenges in achieving the transition to clean and sustainable energy. High dependence on the coal economy triggers a major hurdle to this country in paving the energy transition.