PYC International Energy Conference 2025

Towards Visi Indonesia Emas 2045: *Aligning Energy Security, Economic Growth, and Environmental Sustainability*

Unlocking Investment Potential in Energy Transition Projects

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Board of Supervisory, Indonesia Investment Authority

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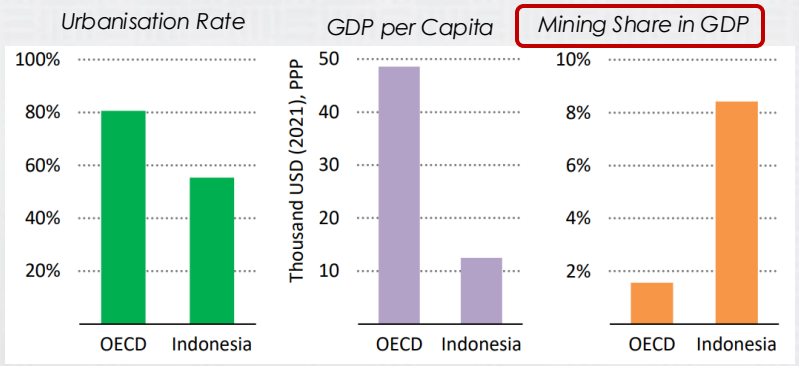
purnomoyusgiantorocenter.org

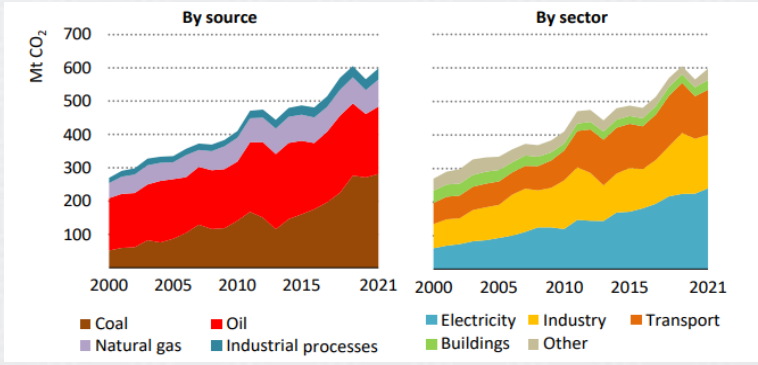
Green Energy Financing Plays Important Role in Achieving Net Zero Emissions (NZE)

1 **Main Indicator of Socio-Economics in Indonesia**



As Indonesia's GDP was heavily powered by **fossil fuels, energy transition is mandatory**

2 **Energy sector CO2 emissions in Indonesia**



In recent 11 years, **coal-fired electricity** has **increasing trend**

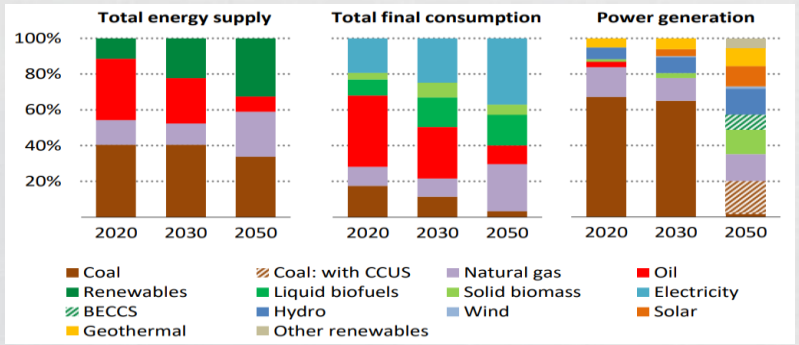
3

1. **Paris Agreement or COP 1**
2. **Nationally Determined Contribution**
3. **Net Zero Emissions 2060**
4. **UN 2030 sustainable development goals.**

Green Energy Financing

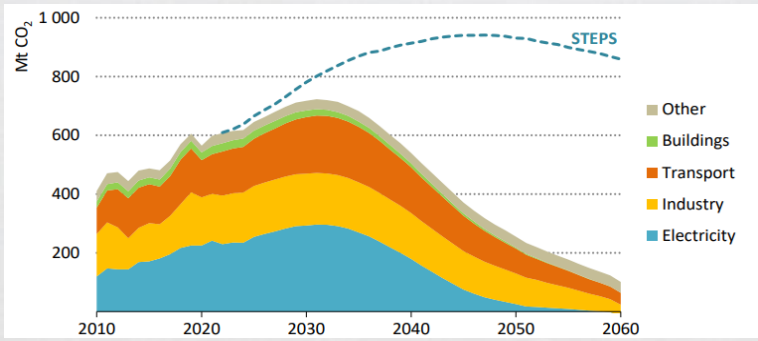
Source: International Energy Agency

4 **Long-Term Low Emissions Strategy**



Coal as the **largest** contributor of emissions is targeted to **decrease**

5 **Target Emissions in APS 2010 – 2060**



STEPS; Stated Policies Scenarios or BAU (Business As Usual)
APS: Announced Pledges Scenario

After 2030, the trend of emission **declines**

1. **Indonesia should enhance the green energy financing, such as renewable energy investment, to achieve Net Zero Emissions 2060 and comply with NDC**
2. **In investing in renewable energy, Indonesia would reduce the emissions, by lowering coal utilization in critical sectors, mainly in electricity usage, and others (transportation, and building)**

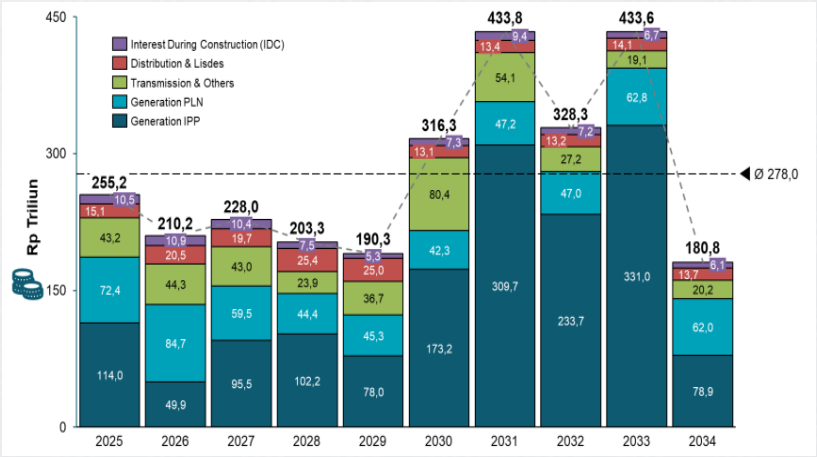
Green Energy Financing for Electricity Supply: (RUPTL) 2025–2034

Electricity Supply Business Plan 2025 - 2034

No.	Description	Unit	Indonesia	Sumatera	Java-Bali	Kalimantan	Sulawesi	MPN
1	Economic growth	%	5.2	4.5	5.7	3.1	5.5	5.2
2	Revenue growth	%	5.3	6.9	4.2	6.6	10.3	6.9
3	Additional power plant	MW	69,512	15,057	33,552	5,768	10,423	4,713
4	Additional Transmission	kms	47,758	11,155	13,889	9,812	9,019	3,883
5	Additional Main Substation	MVA	107,950	28,410	59,730	8,080	9,670	2,060
6	Additional Distribution Channel	kms	197,998	33,364	59,888	33,722	35,656	35,368
7	Additional Distribution Substation	MVA	18,407	4,895	7,004	2,396	2,482	1,629
8	Additional Customers	juta	16.4	2.9	6.6	1.4	3.4	2

There are the progressive target of power plant, transmission, main substation, distribution channel and distribution substation in 2025-2034

Estimation of Investment Needs for Electricity Projects



1. The generation IPP takes more portion for electricity projects.
2. Total fund of generation **IPP is Rp1,566 trillion** for 2025-2034 (**US$ 95B**), excluding generation PLN, interest during construction, distributions & transmission & others
3. Therefore, investment plays more important role to generate electricity

Source: Electricity Supply Business Plan 2025 - 2034

Installed Power Plants

Installed Power Plants 2024
101.000 MW

Renewable Energy Power Plants (15%)
15.100 MW

Fossil Power Plants (85%)
86.000 MW

Development Plan of Renewable Energy (MW)

No	Jenis	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	Jumlah
1	PLTA/M*	754	592	439	823	588	794	3.571	1.929	1.375	825	11.690
2	PLTP	133	125	275	346	71	564	1.265	573	1.805	-	5.157
3	PLTS**	777	988	1.618	1.468	1.058	1.651	2.284	2.099	3.870	1.247	17.062
4	PLTB	-	350	372	485	293	1.265	930	922	1.570	1.000	7.188
5	PLT EBT Lain	15	21	13	258	307	278	24	25	32	-	973
6	PLTN	-	-	-	-	-	-	-	250	250	-	500
Jumlah		1.679	2.077	2.717	3.380	2.317	4.552	8.074	5.798	8.903	3.072	42.569

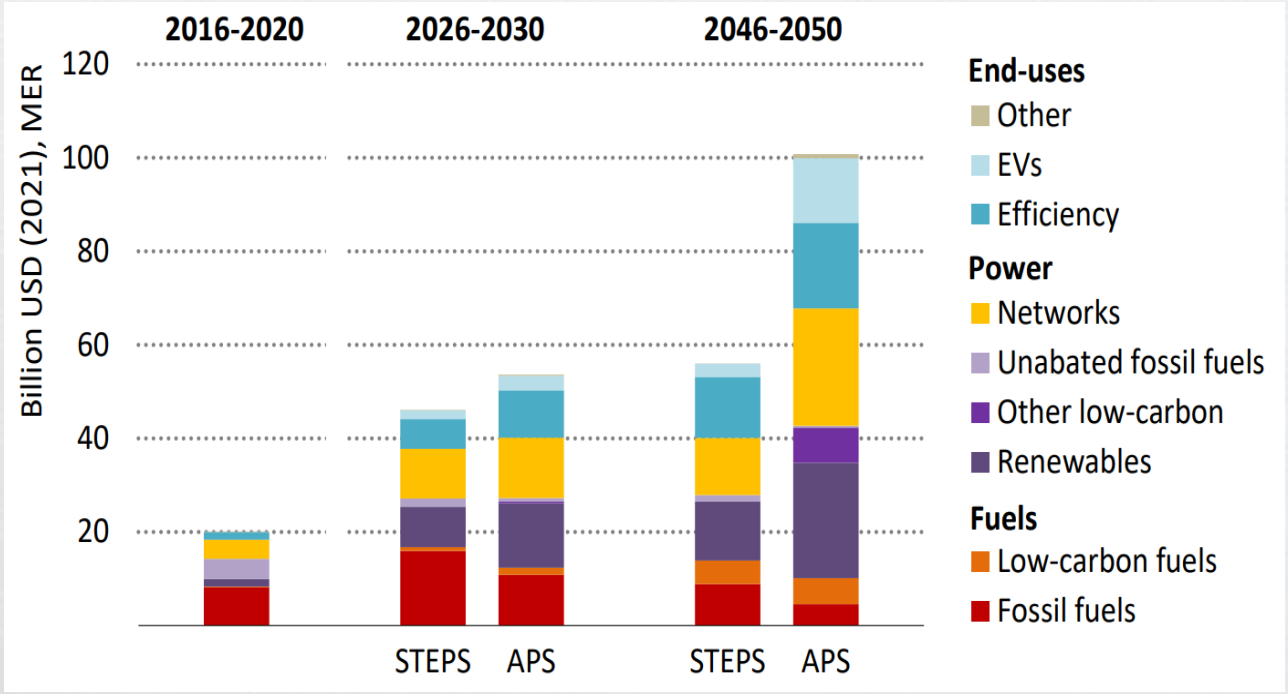
Solar power plant has a significant portion, followed by the other renewable energy power plants

Notes:
1. *Energy storage system for renewable energy power plan 2023-2034 10.256 MW*
2. *Fossil power plant 2025-2034 16.687 MW*

1. **Green energy financing plays important role in achieving Electricity Supply 10-year Business Plan 2025 – 2034.**
2. **Total installed renewable energy (**RE**) power plants in 2024 was 15.100 MW (**15% of the total**). For 2025-2034, the target of RE power plant is 42.569 MW power plant (**61% of the total**) so it would be 57,669 MW RE (33.8%) and 112,943 MW fossil power plants (66.2%).**
3. **Renewable energy power plant has increasing trend in average for 2025-2034, dominated by solar power plant.**
4. **Investment in building the power plant is important since the IPP takes more portion in electricity projects for 2025-2034.**

Potential Global Investors in Green Energy Financing

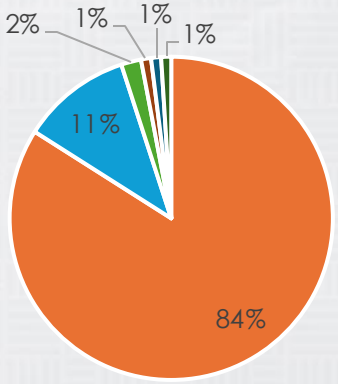
Energy Investment



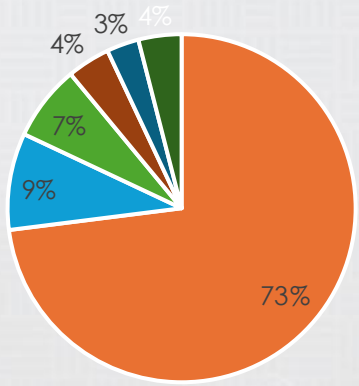
STEPS; Stated Policies Scenarios or BAU (Business As Usual) *APS: Announced Pledges Scenario*

Energy sector investment needs to increase by more than four- and-a-half-times by 2030 in the NZE, a pathway that is 70% more capital intensive than the APS pathway

Global Sustainable Investors



	Assets	
1	Europe	USD2,293 bn
2	United States	USD299 bn
3	Asia ex- Japan	USD67 bn
4	Australia / NZ	USD31 bn
5	Japan	USD23 bn
6	Canada	USD31 bn



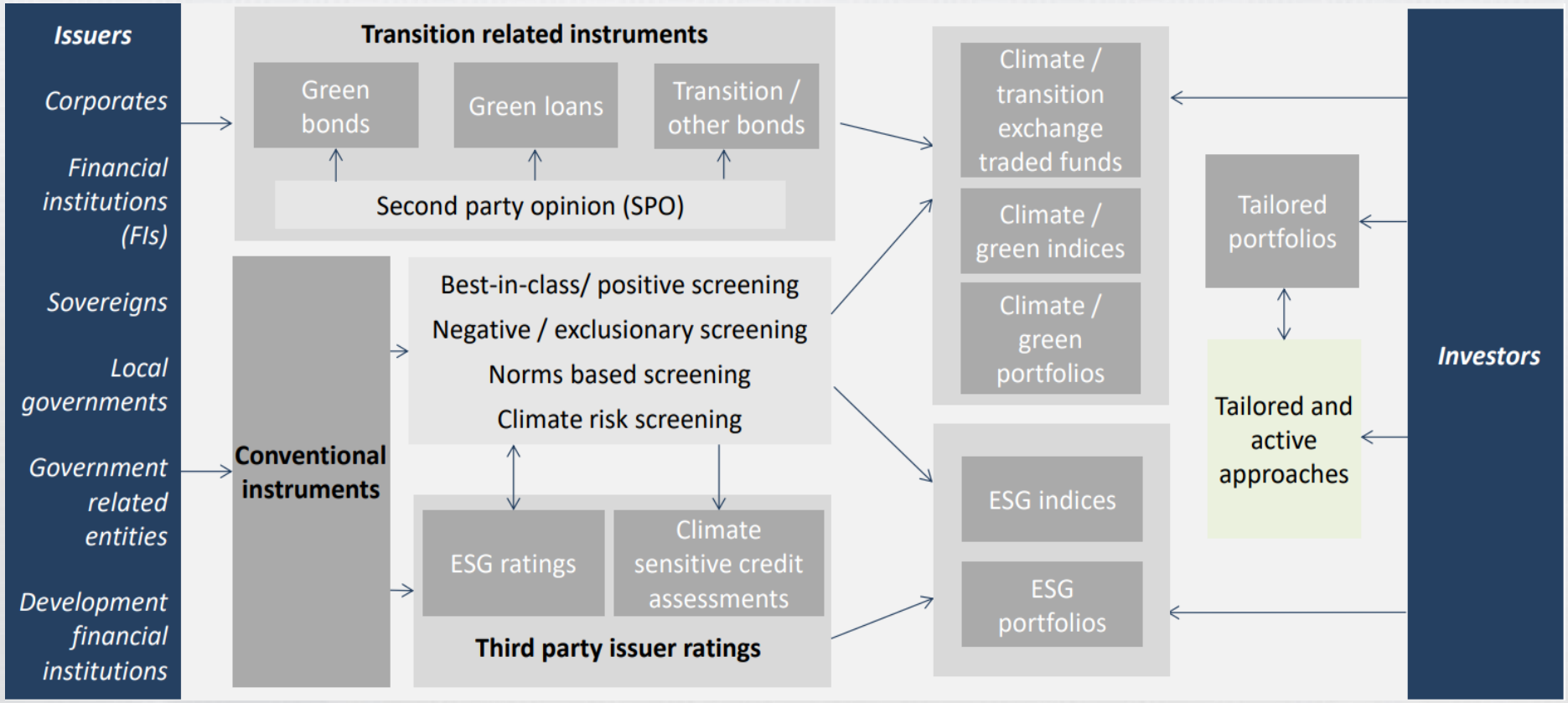
1	Europe	5,608 USD bn
2	United States	USD661 bn
3	Asia ex- Japan	USD539 bn
4	Australia / NZ	USD268 bn
5	Japan	USD236 bn
6	Canada	USD336 bn

Europe
United States
Asia ex- Japan
Australia / New Zealand
Japan
Canada

Source: International Energy Agency

1. **As an investment vehicle, SWF needs to strive to attract sustainable investors to fund energy transition projects.**
2. **Investors may invest in renewable energy, power networks, and end users efficiency to accelerate the decarbonization.**

Collaboration in Green Energy Financing: Risk-Return Appetite



1. **Financial sectors, SWFs, and private sectors would collaborate to finance green energy in order to achieve NDC and NZE 2060**
2. **To get more funding, the investee should enhance the aspects of environmental, social, and governance to elevate the higher ESG ratings**

Source: OECD

Success Story from Green Bonds by Sovereign Wealth Fund

PIF صندوق الاستثمارات العامة

Commitment to → **Green Finance Framework**

3rd	June 2024	USD5.2 billion	*USD1,75 bn*	*7 years*	**6 times over-subscribed** → **USD33 bn**
2nd	February 2023	USD5.5 billion	*USD2bn*	*12 years*	
1st	October 2022	USD1,3 billion	*USD1,75bn*	*30 years*	

First ever Green Bond of Sovereign Wealth Fund

1. As a SWF success story, PIF has successfully issued the green bonds to raise the funding
2. This benchmark prove that INA is very potential to use green bonds to do funding

SWF Mobilizing Fund to Energy Transition Projects

RUSSIAN DIRECT INVESTMENT FUND

fortum

Solar Power Plan 116 MW in Kalmykia in Southern Russia as the largest power solar plant in Russia (Equity Investment)

NATIONAL INVESTMENT & INFRASTRUCTURE FUND

CDC Group, UK Development Finance Institution and Impact Investor

Eversource

Ayana Renewable Power, a leading Indian renewable energy platform (Equity Investment)

Nigeria Sovereign Investment Authority

INTERNATIONAL SOLAR ALLIANCE

SUSTAINABLE ENERGY FOR ALL

AFRICA50

Innovative partnership for a US$500 million **distributed renewable energy (DRE) Nigeria Fund** to develop and finance DRE rojects in Nigeria (Equity Investment)

INA

MASDAR

~$500 million Anchor investor into the **IPO of Pertamina Geothermal Energy (Equity Investment)**

PERTAMINA GEOTHERMAL ENERGY

1. **SWF which has orientation for inward investment, such as in emerging countries (i.e. NIIF India, NSIA Nigeria) and developed countries (i.e. Russian Direct Investment Fund) have successfully attracted the fund to invest in their domestic projects**
2. **The projects should be commercial for the investors besides bringing developmental impacts**

Challenges and Opportunities in the Energy Transition Projects

Indonesia faces some opportunities to solve some challenges arisen from climate transition and decarbonization efforts

Challenges

Implementation of new technology is still expensive
- *Scaling climate technologies and building new capabilities can be high*
- *Opaque regulations makes the investor reluctant to invest, leads to expensive cost*

Needs improvement of domestic capabilities
Lack of skills and knowledge to process raw minerals

Lack of research and development
Some example is in agriculture sector

Need more accommodating policy
- *Unclear and opaque regulatory policies*
- *The implementation of current policy is already lagging*
- *The policy needs to address a whole stakeholders*

Operational challenges had arisen
- *Complex permitting and licensing procedures*
- *There is reluctancy for energy transition from corporate producing emissions*

Some risk of investment in technology
Mismatch of time horizons between investment return and the climate condition

Political instability and law enforcement
Investors need certainty for the projects

Opportunities

Enhancing technological partnership
- *Developing technologies suitable the Net Zero transition*
- *More advanced technology in Indonesia*

Increasing the investment from prominent global investors
Due to especially ow-carbon transitions in energy, transport, cities, manufacturing and food

Larges potential revenue of minerals for battery
Indonesia is rich for nickel and supporting minerals, such as copper and tin

Strengthening high-value-added economy.
- High GDP and good impact on environment
- *Circular economies that recycle waste*

More diversified prosperity
Green sectors diversifies the prosperity to more sustainable

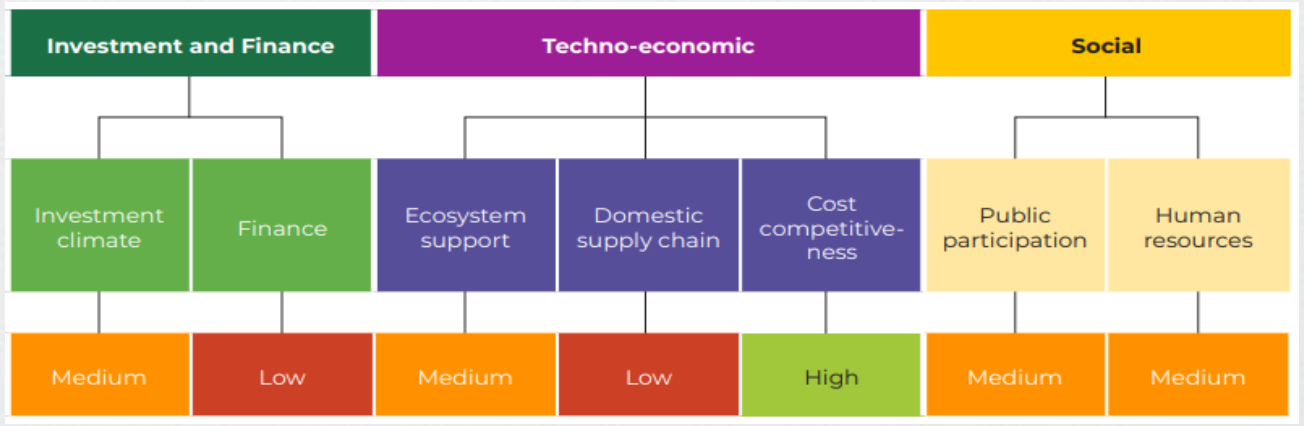
More affordable electricity
Sustainable energy resources lower the cost

Fostering energy efficiency
Higher construction standards or retrofitting existing buildings

Better infrastructure and facilities
- *Good water supply and sanitation services*
- *Transit-oriented development*

Improvement Area for Attracting Investors to Energy Transition Projects: Indonesia Context

Political commitment	High-level policy document on energy transition	Low
	Alignment of climate and energy policies with Paris Agreement	Low
	Implementation of energy transition targets/ plans	Low
Regulatory framework	Quality of existing regulatory support	Medium
	Alignment of sectoral roadmaps and regulation with decarbonization target	Low
	Supportive non-energy regulations	Low
Institutional and governance	Corruption level	Low
	Institutional capacity	Low
	Leadership	Medium
	Accountability	Low



Source: Indonesia Energy Transition Outlook 2025

1. **To attract more foreign and domestic investors to participate in transition energy projects and strengthen investments in the energy transition sector, government need to refine:**
   - **a. Alignment of sectoral roadmaps and regulation with decarbonization target**
   - **b. Supportive non-energy regulations**
   - **c. Quality of existing regulatory support**
2. **Besides that, government should improve the techno-economic and social aspects**
3. **The key factor that may enhance the score/rating to high is participation of SWF (i.e INA) since it reflects the proxy of the government, especially in the green energy investment**

Project Financing and Corporate Financing: Lenders View

	Project Financing	Corporate Financing
Purpose	Financing specific projects with isolated risk	Managing overall corporate financial needs
Assets	Assets of project	Entire companies
Vehicle	Use Special Purpose Vehicle (SPV)	The Company
Term	Usually long (more than 5 years)	Usually short (below 5 years)
Typical Usage	Infrastructure, energy, large projects	General corporate operations
Collateral	The project's (not the borrower's) assets and cash flows	The borrower's assets and cash flows
Credit valuation	1. Attractive Net Present Value (**NPV**) and Project Return 2. Quality of project owner 3. Key project contracts are completed	Strong balance sheet of the project owner
Risk Allocation	Limited recourse to sponsors	Full recourse to the company
Repayment	From project – generated cash flows	From company-wide revenue

1. **Financing the business (renewable energy), there are 2 types of financing: a) project financing and b) corporate financing**
2. **The suitability of the financing depends on some aspects, such as assets, vehicle, term, typical usage, collateral, credit valuation, risk allocation, and repayment capacity**

Green Energy: Project Financing and Corporate Financing

	Project Financing	Corporate Financing
Fund Usage	The funds can be made available step-by-step according to the project development and construction progress	The funds is usually drawn in the stages of project development until project completion
Valuation	Easier	More complex
Risk	Complex	More complex
Collateral	Project owner and the legal contract	Company's asset and cash flow
Lender Benefit	Focus to the project assets	Less focus to project assets
Greenhouse Gases Emission Reductions	Carbon intensity of the energy created by the project	Sum of all emission reductions for all underlying asset project companies
Job creations	Job creation associated with the single projects	Job creation associated with all projects in the company

Example

Project Financing

Deutsche Bank

€2.9bn project financing

Deutsche Bank, Rabobank

The construction of five UK solar PV projects

PGE, AUKERA

Corporate Financing

mandiri

PERTAMINA GEOTHERMAL ENERGY

1. **Green financing for renewable energy usually use project financing instead of corporate financing**
2. **The project financing for renewable would give more benefit for project owner and lender**

Source: 1) Personal database 2) Positive Energy Ltd

INA as SWF Attracting Global Investor to Green Investment

Investors should invest in renewable energy, power networks, and end users efficiency to accelerate the decarbonization

Profile

INDONESIA INVESTMENT AUTHORITY

- ***Sui generis*** which is directly responsible to **President**
- **Atttracting FDI** to finance National Project
- **Supervisory Board**: Minister of Finance, Minister of SOE, 3 *prominent professionals*
- ***Investment Grade*** *Rating* ***(BBB) Int'l (AAA) national*** *by Fitch Rating (sovereign)*
- ***Full Member of IFSWF***

Mandate

1. Contribute to Indonesia's sustainable economic development
2. Build wealth for future generations

Investment

1. USD25 bn Commitments from partners
2. > USD4 bn cumulative investment deployment

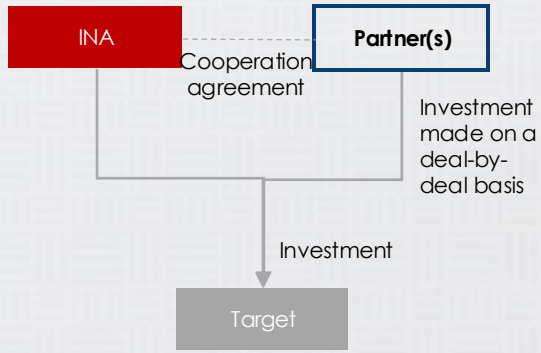
Unique Strength

- **Inspiring confidence as a co-investor**
- **Acting as a conduit for foreign co-investment**
- **Structuring of transactions**
- **Value creation & asset management**

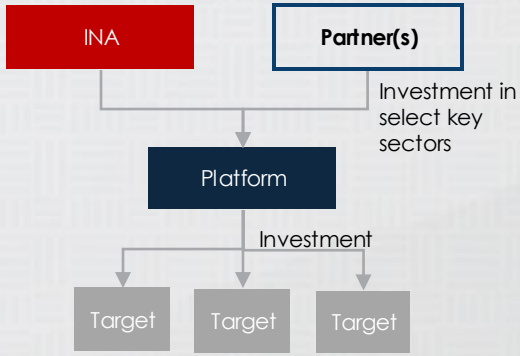
Total AUM INA & Co-investor (Rp trillion)

Scheme

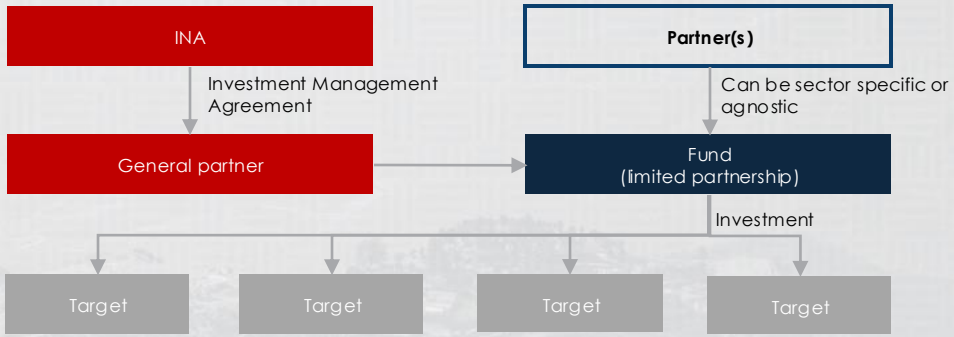
Direct co-investment



Platform Model



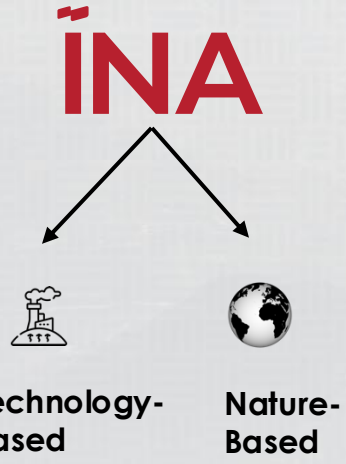
GP/LP Structure



INA Enhances Green Energy Investment: Technology Based and Nature-Based Framework

In achieving:

1. **Paris Agreement or COP 1**
2. **Nationally Determined Contribution**
3. **Net Zero Emissions 2060**
4. **UN 2030 sustainable development goals.**



	Technology-Based	Nature-Based
Framework	Use **technology t**o produce renewable energy to reduce the emissions	Preserve and enhance the **value of nature** to reduce the emissions
Benefits for Environment and Social	1. **Reduce carbon emissions** 2. Increase quality life of people from sustainable energy 3. Enhance socio-economic growth	1. **Absorb carbon emissions** 2. Bolster biodiversity 3. Nurture socio-economic growth.
Benefits for Economy	1. Support Indonesia in meeting its national targets (NZE and NDC) 2. Attract global investors 3. Enhance national productivity from sustainable electricity	1. Assist Indonesia in meeting its national targets (NZE and NDC) 2. Attract global investment 3. Generate additional export opportunities where applicable, 4. Bring about positive outcomes for Indonesia's natural environments and its people.
Scheme	Geothermal company	1. Conservation 2. Improved land management 3. Restoration activities to increase carbon storage

Green Energy Investment of INA in Renewable Energy

Investment	Indonesia Distribution	Mandate for National Development and Commercial Return

Green Energy & Blue Economy

INA · MASDAR · PERTAMINA GEOTHERMAL ENERGY

~$500 million (2023)
Anchor investor into the IPO of Pertamina Geothermal Energy

Green Energy

Geothermal energy

400 GWh
electricity generated per month

0.34 mtCO$_2$eq
CO_2 offset per month

Support **energy transition**

Monetize **natural capital** and unlock the potential of the **blue economy**

Expand and capitalize on **clean tech adoption**

1. **INA has implemented green financing by investing in the IPO of Pertamina Geothermal Energy**
2. **This investment is to support energy transition**

INA in Green Energy Investment and EV Battery Ecosystem

Geothermal Investment

- **INA together with Masdar Renewable Energy co-invest in Pertamina Geothermal Energy, taking PGE IPO process in 2023**
- **Total investment for INA and Masdar in PGE IPO reached US$480 Mn** where both INA and Masdar also have strong minority protection rights with option rights for future opportunities in renewable energy.

EV Battery Ecosystem

1. The production from the first phase and the planned expansion of the **Lithium Iron Phosphate** (**LFP**) cathode material production facility by PT LBM Energi Baru Indonesia
2. Located in Kendal Industrial Park (**KIP**)—one of Indonesia's largest industrial complexes with Special Economic Zone (**SEZ**) status—is poised to become the largest producer of LFP cathode globally outside of China.

Performance

1. PGEO successfully maintained its power generation levels in 2024,
2. PGEO plans to pursue organic growth initiatives to increase its capacity.
3. PGEO continued to maintain a strong and healthy EBITDA margin
4. PGEO has successfully integrated Environmental, Social, and Governance (ESG) principles across all of its operations,

Benefits

1. By 2030, Indonesia is anticipated to serve a market valued at nearly USD 10 billion in LFP cathode active materials, contributing meaning fully to the global transition toward clean energy.
2. Help position Indonesia as a key player in the global battery ecosystem.
3. Support Indonesia for long-term commitment to fostering economic resilience and advancing clean energy solutions
4. The creation of over 2,000 jobs, 92% of which are filled by local workers,

1. **INA has attracted Masdar to invest in the IPO of Pertamina Geothermal Energy. INA has enhanced the performance of Pertamina Geothermal Energy, such as operation, financials, and ESG.**
2. **INA has a planned strategic investment partnership with Changzhou Liyuan New Energy Technology Co., Ltd. to make (LFP) cathode material production facility to support Indonesia as a key player in the global battery ecosystem.**

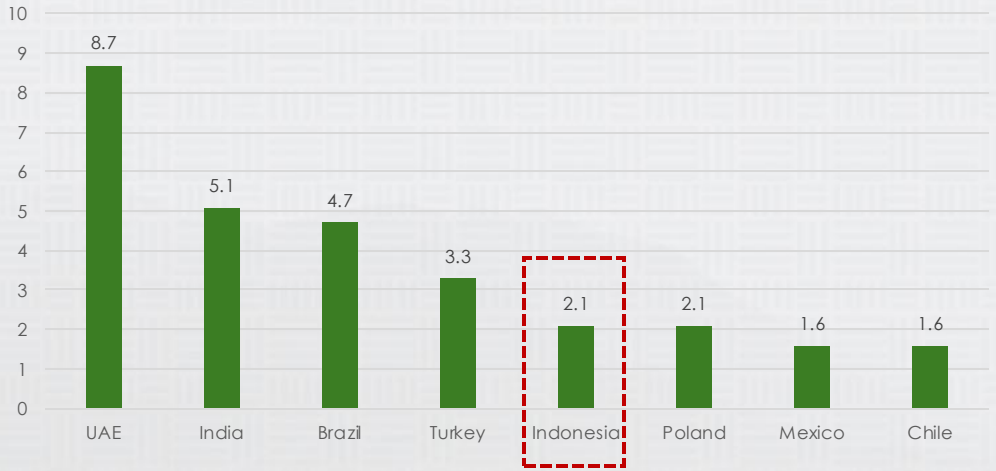
INA's role in Attracting Investors for Green Energy Investment

Partnership	Scheme	Objective
INA Indonesia Investment Authority & Norfund	Investment Framework Agreement (IFA) to explore joint investment opportunities in Indonesia	1. Renewable energy 2. Green infrastructure sectors 3. Sustainable development 4. Financial inclusion
INA Indonesia Investment Authority & Pollination	Memorandum of Understanding (MoU) harnessing the power of nature-based solutions (NBS)	1. **Absorb carbon emissions** 2. Bolster biodiversity 3. Nurture socio-economic growth
INA Indonesia Investment Authority & British International Investment	Investment Framework Agreement (IFA)	1. Renewable energy 2. Green infrastructure 3. Climate resilience 4. Adaptation and related sectors.

1. **INA has successfully attracted the prominent global investors, such as Norfund, Pollination, and British International Investment to invest in green energy investment.**
2. **INA has effectively implemented the mandate to enhance sustainable development, such as accelerating NZE**

Indonesia: Top 10 Green Bond Issuing Countries in the World and the Largest in Southeast Asia

Value of Green Bonds (USD Bn)



Rank 1

Tiongkok

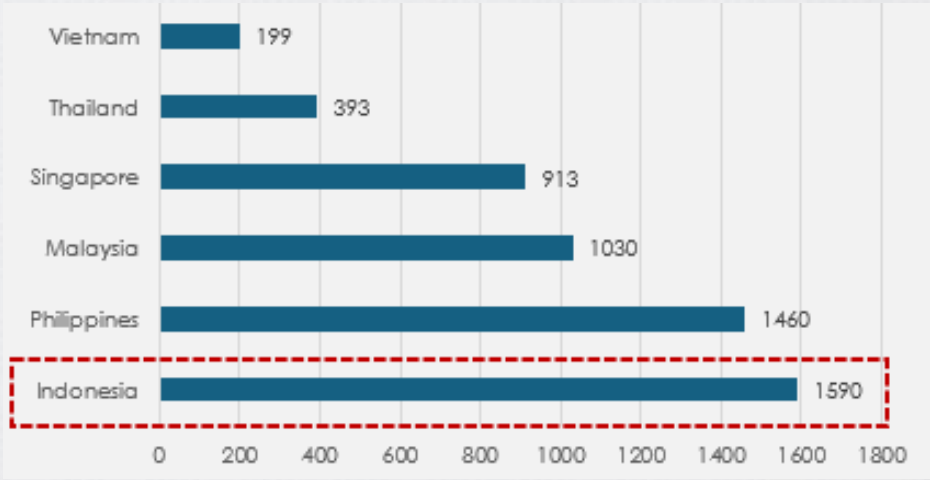
$89,1 bn

Rank 7

Indonesia

$1,7 bn

Green Bonds in South East Asia (USD million)

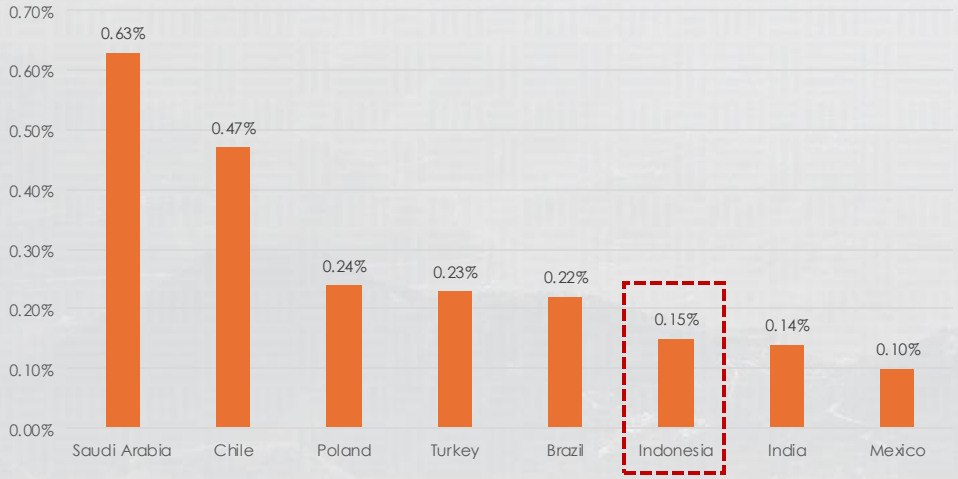


Rank 1

Indonesia

Rp1,59 bn

Portion of Green Bonds to GDP



Rank 1

UAE

1,71%

Rank 7

Indonesia

0,15%

1. **Indonesia was placed on the 7th rank of Top 10 Emerging Market Green Bond Issuing Countries in the World in the aspects of issuing green bonds, portion of green bonds to GDP.**
2. **INA as SWF may potentially raise the green financing**

Potential Green Financing for INA

Potential Activities for Green Bonds

- Renewable Energy
- Energy Efficiency
- Mitigation and Controlling Pollution
- Sustainable natural resources management and land utilization
- Conservation of biological diversity of land and water
- Environmentally Friendly Transportation
- Sustainable water and waste management
- Adaptation of Climate Change
- Product with less resources utilization and producing less polution
- Environmentally friendly building fulfilling standard and certification which is recognized nationally, regionally, and internationally
- The other activities which is categorized as environmental friend with the relevant taxonomy

Source: POJK No. 18 Tahun 2023

INA Investees

PERTAMINA GEOTHERMAL ENERGY

Potential Green Financing

- **Green Bonds**
- Equity Investment

1. **INA has potential to raise the fund through green financing**
2. **Furthermore, the fund may be deployed to the green energy investment, such as renewable energy**

Conclusion and Recommendation

1. **Indonesia should enhance the green energy financing to achieve Net Zero Emissions 2060 and comply with NDC. Total installed renewable energy (RE) power plants in 2024 was 15.100 MW (15% of the total). For 2025-2034, the target of RE power plant is 42.569 MW power plant (61% of the total) so it would be 57,669 MW RE (33.8%) and 112,943 MW fossil power plants (66.2%).**
2. **Green energy financing plays important role in achieving Electricity Supply Business Plan (RUPTL) 2025 – 2034 for 42.569 MW (33.2% of the total) renewable energy power plant and 10.256 MW energy storage system with around Rp1.1901 trillion from IPP generation**
3. **Green financing for renewable energy usually use project financing instead of corporate financing**
4. **SWF would play significant roles to attract sustainable investors (strategic & financial) for funding energy transition projects, because it reduces risks with the same returns so as to bankable for lenders**
5. **Financial sector, SWF, and private sectors collaborate to do green energy financing in order to achieve NDC and NZE 2060**

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THANK YOU

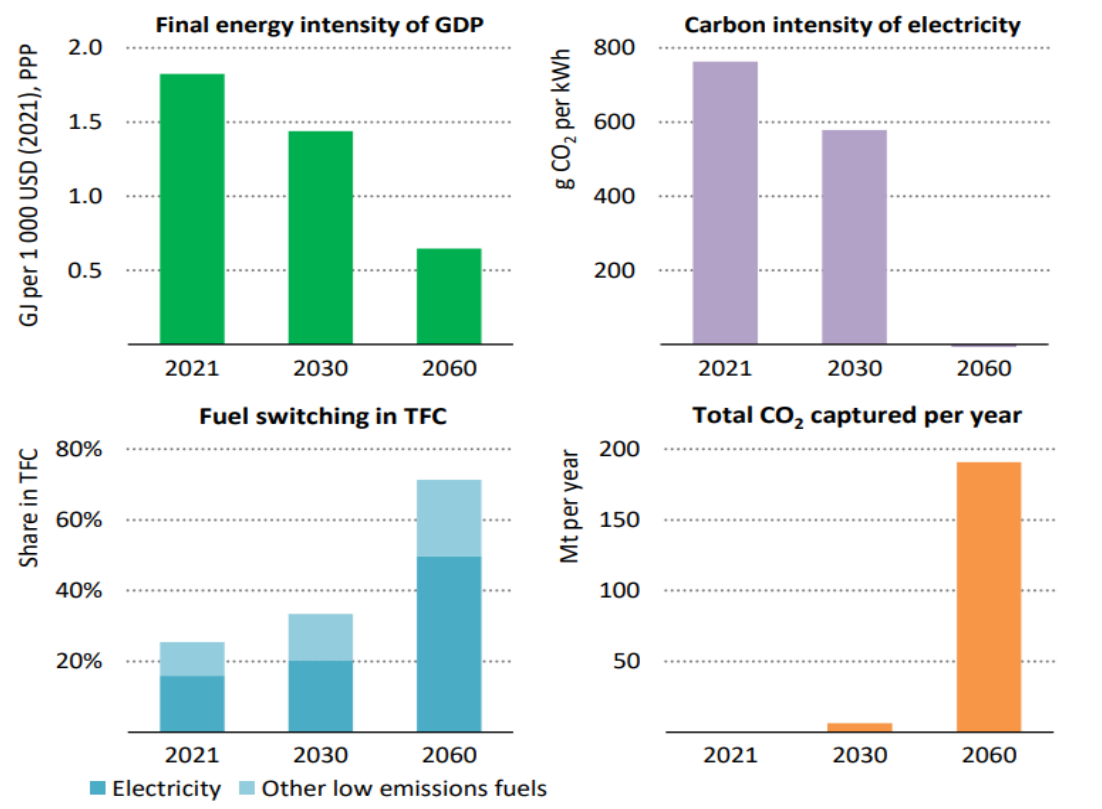
PYC International Energy Conference 2025

Towards Visi Indonesia Emas 2045: *Aligning Energy Security, Economic Growth, and Environmental Sustainability*

Investing in All Sustainable Projects as NZE Acceleration

Indonesia should enhance ESG investing, such as renewable energy and urban development, to achieve Net Zero Emissions 2060 and comply with NDC

Key Pillars of the Energy Transition to NZE



Fostering **low-carbon electricity, fuel switching, and carbon capture** is mandatory to reach **NZE**

Mitigation to Reduce Emission

1. Wind and Solar
2. Transport Electrification
3. Building Efficiency
4. CCUS Power
5. Nuclear

Renewable energy from **wind and solar** play **important** role in **reducing emissions**

Energy Investment

1. Renewables
2. Power Networks
3. End User Product Efficiency
4. Electric Vehicles
5. Low Carbon Fuels

Investing in renewable energy is **crucial** to lower the emissions and achieve NZE

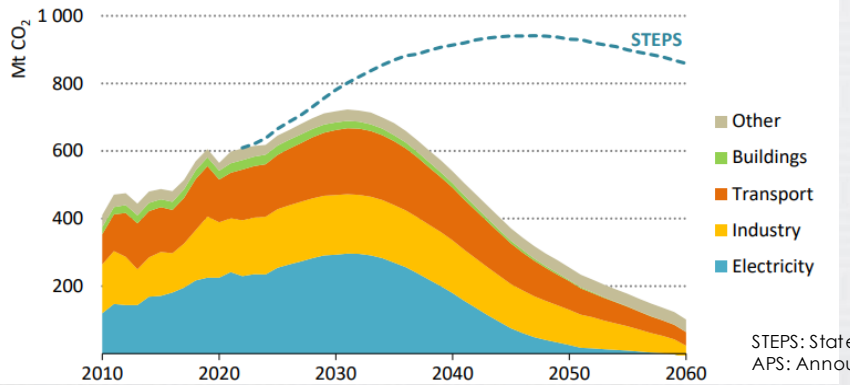
Source: International Energy Agency

To accelerate NZE 2060, Indonesia should attract the global investment in renewable energy and the other low carbon efforts (Power Networks, End User Product Efficiency, and Electric Vehicles)

Key Sectors in Indonesia as Primed for Decarbonization

Sectors of energy, industry, transportation, and building play important role in boosting decarbonization

Target Emissions in APS 2010 – 2060



CO2 emissions peak around 2030 in the APS (10% lower than in the STEPS in the same year; by 2040 emissions are 10% lower than today

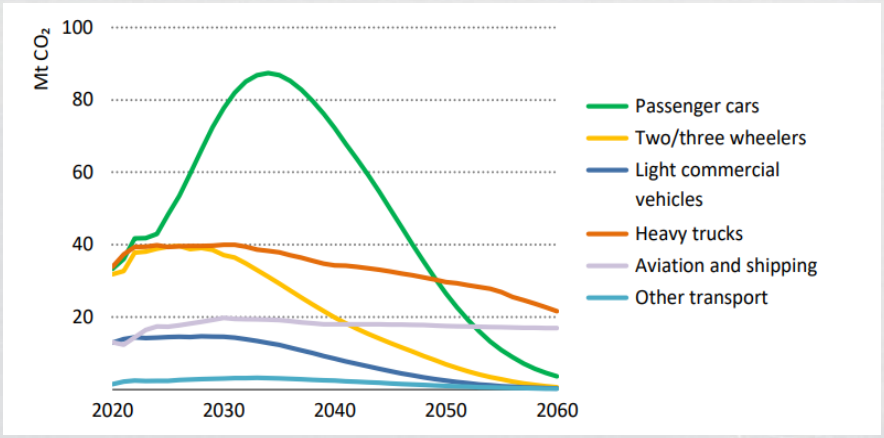
STEPS: Stated Polices Scenario or **Business As Usual**
APS: Announced Policies Scenario or **Target**

Mitigation to Reduce Emission

1. Wind and Solar
2. Transport Electrification
3. Building Efficiency
4. CCUS Power
5. Nuclear

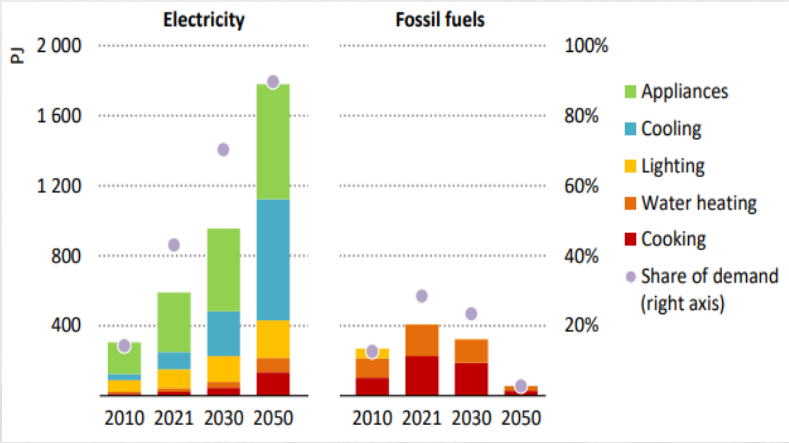
A wide range of emissions reduction measures are required to reach net zero, with low-carbon electricity and efficiency significantly contributing in the near term

Emissions from transportation in Indonesia



Emissions from all transportations peak by the mid-2030s and decline sharply to 2060, emissions from aviation and shipping are relatively consistent

Buildings sector electricity



Electricity rises from a 43% share of energy demand in 2021 to 90% in 2050 as the traditional use of biomass fades and appliances and equipment are added

Source: International Energy Agency

Investing in renewable energy is a main driver of decarbonization is crucial to achieve NZE

Benchmarking of Global Startups in Electric Transportation

The best startups in the world develops electric transportation and the supporting, such as their components (like batteries) and ecosystem (like charging stations)

1. **Tesla**
   Accelerates the transition to electric mobility with a full range of increasingly affordable electric cars
   $20.2bn

2. **Rivian**
   Develops products and services to advance the shift to sustainable mobility.
   $14.3bn

3. **Lucid Motor**
   A Silicon Valley company that designs, develops, and builds electric vehicles.
   $11.3bn

4. **Nio**
   Designs and develops electric autonomous vehicles.
   $9.6bn

5. **Xiaopeng**
   An electric vehicle and technology company that designs and manufactures smart cars.
   $6.4bn

6. **WM Motor**
   Develops electric vehicle that isn't a bus, isn't slow, but IS a well-designed, 100% electric vehicle aimed at the mainstream market.
   $5.3bn

7. **Faraday Future**
   A design and technology company, develops global solutions that re-imagine transportation, content, and ownership.
   $4.1bn

8. **Vinfast**
   The first Vietnamese car brand to expand into global markets and produce EVs
   $4bn

9. **Nikola Motors**
   Develops an architecture that could satisfy the power output needs and durability requirements of heavy-duty applications
   $3.4bn

10. **Zenobe Energy**
    The largest independent owner and operator of battery storage in the UK.
    $2.9bn

Source: Energy Startups

Benchmarking of Global Startups in Building in Electric Transportation

Top global energy-efficient building startups are dedicated to developing innovative technologies and solutions for sustainable building design, construction, and operation

1 **Redaptive**
An energy-as-a-Service provider that funds and installs energy-saving and energy-generating equipment and manages energy use in buildings.
$916.5mn

2 **Stem**
artificial intelligence with energy storage to help organizations automate energy cost savings and protect against changing rates.
$582.6mn

3 **Bloc Power**
Offers smart, all electric heating, cooling, and hot water systems to building owners for no money down..
$266.6mn

4 **Urban Volt**
energy-saving LED lighting firm. They retrofit commercial premises with LED lighting for no upfront cost.
€184mn

5 **Atom Power**
Built the world's first and only true solid-state circuit breaker.
174.5mn

6 **Ice Energy**
Develops Ice Bear - thermal energy storage for air conditioning, that is lowering electric bills for businesses and homeowners, and reducing CO2 emissions.
$132mn

7 **Aeroseal**
Design both air ducts and building envelopes so you waste less energy and reduce your bill
$119mn

8 **Solatube International**
Developed the system that revolutionized the way daylight was brought into a building.
$119mn

9 **Broad Group**
Produces clean air-conditioning systems and other sustainability-oriented products to enhance building efficiency
$119mn

10 **Ecoworks**
Uses industrial prefabrication, digital processes, and energy systems to modernise multi-family houses with up to four floors within a few weeks.
$119mn

Source: Energy Startups

Benchmarking of Green Bonds in Indonesian Market

Indikator	Green Bonds I Bank BRI Phase II Year 2023 B Series	Obligasi Berwawasan Lingkungan Berkelanjutan I Bank BRI Tahap I Tahun 2022	Obligasi Berwawasan Lingkungan Berkelanjutan I Bank Mandiri Tahap I Tahun 2023	Obligasi Berwawasan Lingkungan Berkelanjutan I Oki Pulp & Paper Mills Tahap II Tahun 2023
Rating	idAAA (Triple A)	idAAA (Triple A)	idAAA (Triple A)	idA+
Tenor dan Indikasi Kupon	Seri A (1 Tahun): 5.80% - 6.40% Seri B (2 Tahun): 6.00% - 6.50% Seri C (3 Tahun): 6.10% - 6.60%	Seri A (1 Tahun): 3,70% - 4,50% Seri B (3 Tahun): 5,75% - 6,50% Seri C (5 Tahun): 6,45% - 7,25%	Seri A (1 Tahun): 5,50% - 6,00% Seri B (3 Tahun): 5,75% - 6,50% Seri C (5 Tahun): 5,95% - 6,95%	Seri A (1 Tahun): 6.50% – 7.00% Seri B (3 Tahun): 10.25% - 10.50% Seri C (5 Tahun): 10.75% - 11.00%
Nominal Target Penerbitan	Max Rp5 triliun	Max Rp5 triliun	Max Rp5 triliun	Max Rp500 miliar
Bidang Usaha	Finance	Finance	Finance	Pulp and Paper
Pembayaran Kupon	Setiap 3 bulan dengan metode 30/360 day basis	Setiap 3 bulan dengan metode 30/360 day basis	Setiap 3 bulan dengan metode 30/360 day basis	Setiap 3 bulan dengan metode 30/360 day basis
Jaminan	Seluruh harta kekayaan Perseroan	Seluruh harta kekayaan Perseroan	Seluruh harta kekayaan Perseroan	Clean Basis
Rencana Penggunaan Dana	KUBL dan Modal Kerja	KUBL dan Modal Kerja	Min 70% KUBL	Energi dari biomassa dan produk limbah.
Minimum Pemesanan	Rp5 Juta dan kelipatan Rp5 Juta	Rp50 juta dan kelipatan Rp50 juta	Rp50 Juta dan kelipatan Rp50 Juta	Rp5 Juta dan kelipatan Rp5 Juta
Biaya Pemesanan	1%	1%	1%	1%
Pajak	10%	10%	10%	10%

- **Coupon with range 3,7% - 7% (1 year), 5,75% - 10.25% (2 years), 5,95% - 11% (3 years) with the payment every 3 months, through method of 30/360 day basis which is competitive rate**
- **Business line of the company is finance with pulp and paper in which the fund utilization , working capital, and renewable energy**
- **Target of issuance with range of Rp500 billion – Rp5 trillion**
- **Subscription fee is 1%**

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Towards Indonesia Emas 2045: *Aligning Energy Security, Economic Growth, and Environmental Sustainability*