



Powering Prosperity and Enabling Sustainability in South East Asia

PHASE 2 REPORT

STUDY ON THE FINANCIAL IMPLICATIONS OF THE EARLY RETIREMENT OF COAL-FIRED POWER PLANTS IN INDONESIA

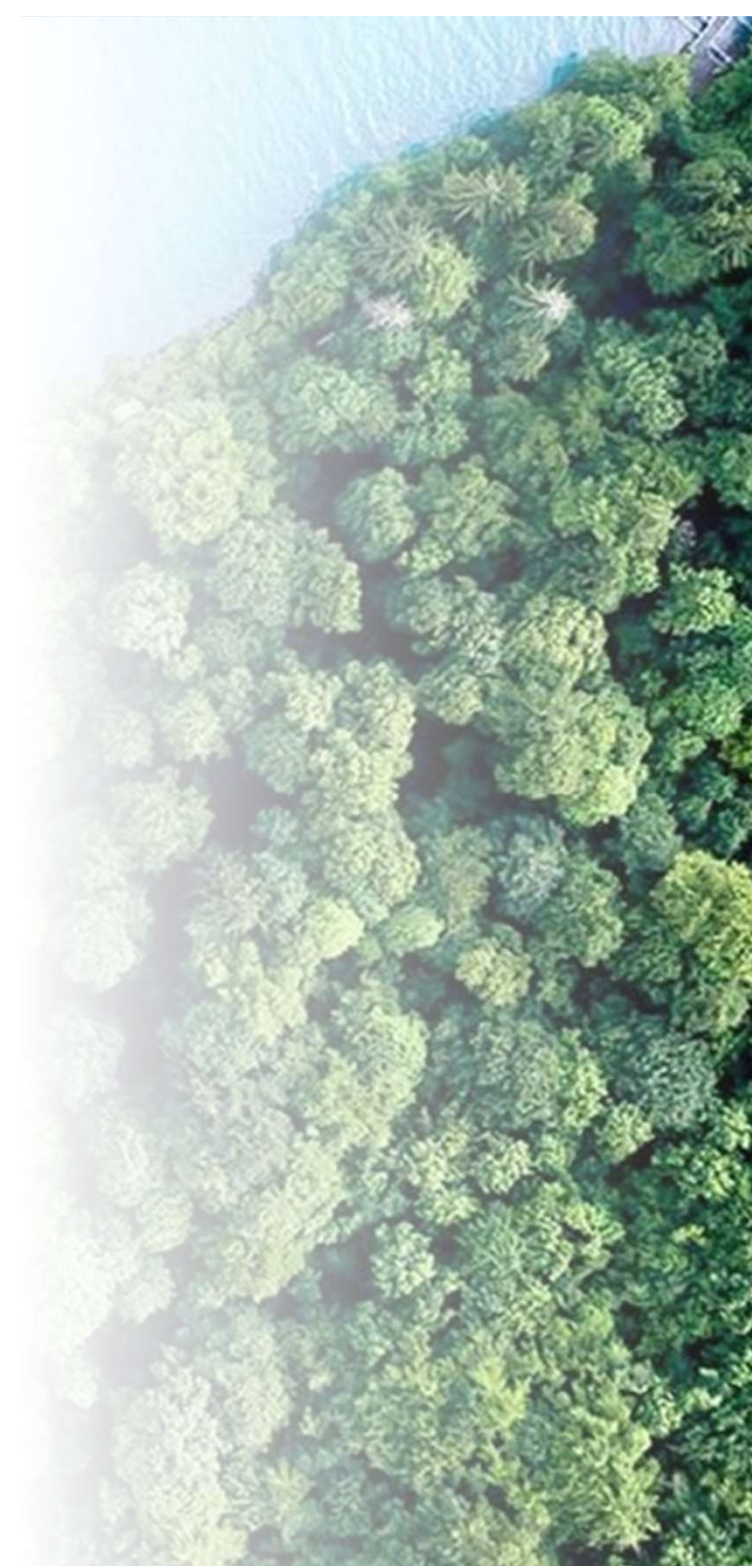
RFP/2022/41426

MARCH 2023



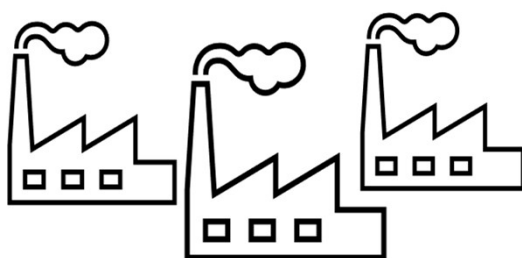
Private and confidential

This presentation is confidential and has been prepared by Hartree Consultants for discussion purposes only. Nothing contained in it will constitute or be considered as a representation, guarantee, agreement or endorsement of any nature. Furthermore, nothing contained in this presentation shall be considered an offer or obligate either party to enter into any specific transaction referred to or contemplated in the presentation. Any specific transaction will be subject to (i) the completion of due diligence by the parties, and (ii) the execution and delivery of definitive agreement(s) by the parties based on the facts and conditions present in that transaction.

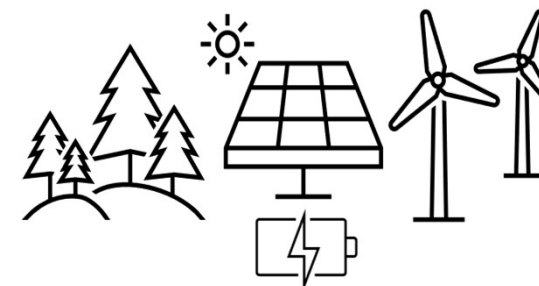


INDONESIA AIMS TO DECARBONIZE ITS ECONOMY BY EARLY RETIRING COAL-FIRED POWER PLANTS (CFPP) AND MUST CONSIDER ITS IMPLICATIONS TO EFFECTIVELY DO SO

Indonesia today



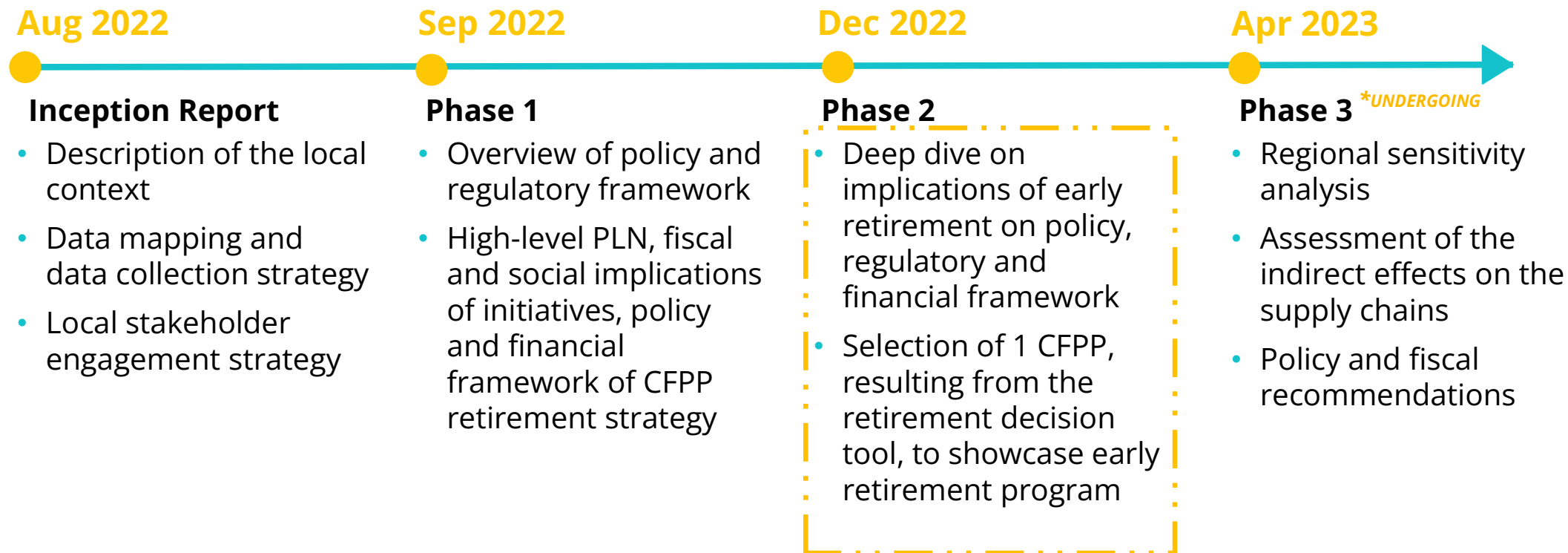
Indonesia in 2050



This study

Aims to analyze, evaluate, and provide suggestions on the retirement pathways for coal-fired power plants with respect to their financial implications

THE STUDY IS DELIVERED WITHIN A TEN-MONTH PERIOD, DIVIDED IN THREE CONTINUOUS PHASES



Outputs for Phase 2:

- ✓ Project level screening framework of CFPP retirement implications including financial risks and risk mitigation measures
- ✓ Fiscal analysis on early retirement of CFPPs, estimating impacts of subsidies and tariffs
- ✓ 1 CFPP project proposal to showcase the early retirement program and the funding mechanisms that could enable the early retirement

IN ADDITION TO THE EXECUTIVE SUMMARY, THE REPORT IS DIVIDED IN FOUR DOCUMENTS BY TOPICS



Study on the Financial Implications of the Early Retirement of Coal-fired Power Plants in Indonesia

Deliverable 3: Phase 2 Report A: Implications Of Early Retirement of Coal-fired Power Plants in Indonesia

Analyses the existing and projected coal-fired generation retirement initiatives and policies

By:
Hartree NEYEN.IO CBS

16 December 2022




Study on the Financial Implications of the Early Retirement of Coal-fired Power Plants in Indonesia

Deliverable 3: Phase 2 Report B on Regulatory Analysis and Financing Opportunities Of Early Retirement of Coal-fired Power Plants in Indonesia

Assesses gaps and limitations of the current policies and the regulatory state of play

By:
Hartree NEYEN.IO CBS

16 December 2022




Study on the Financial Implications of the Early Retirement of Coal-fired Power Plants in Indonesia

Deliverable 3: Phase 2 Report C on Case Study Of an Early Retirement: Ombilin Units 1 and 2

Presents the CFPP used to showcase the early retirement: Ombilin 1 & 2

By:
Hartree NEYEN.IO CBS

16 December 2022



Study on the Financial Implications of the Early Retirement of Coal-fired Power Plants in Indonesia

Deliverable 3: Phase 2 Report D on Recommendations for Early Retirement of Coal-fired Power Plants in Indonesia

This describes the recommendations provided to support early retirements

By:
Hartree NEYEN.IO CBS

16 December 2022

THE STUDY CONSIDERS THE EARLY RETIREMENT ROADMAP ENDORSED BY THE GOVERNMENT OF INDONESIA

The project follows the **early retirement roadmap** aligned with the Net-Zero Emissions Scenario developed by the IEA ^[1] and meets the decarbonization requirements set in the Just Energy Transition Partnership (JETP) ^[2]. The **ETP-NZE scenario** considers the following assumptions:

- Net Zero by 2050 – JETP
- Electricity and unabated coal reach Net Zero by 2040 – IEA NZE
- Electricity demand: 550TWh (2030), 1710 TWh (2050) – IEA NZE
- Coal Generation: 15% (2030), 7% (2050) – IEA NZE
- 34% generation from renewable energy by 2030 – JETP

Additionally, considers the CFPPs to be installed after 2021 as defined by the Presidential Regulation. The pipeline includes the installation of 11 GW from 2021 to 2025 and 3 GW from 2026 to 2030 ^[3]

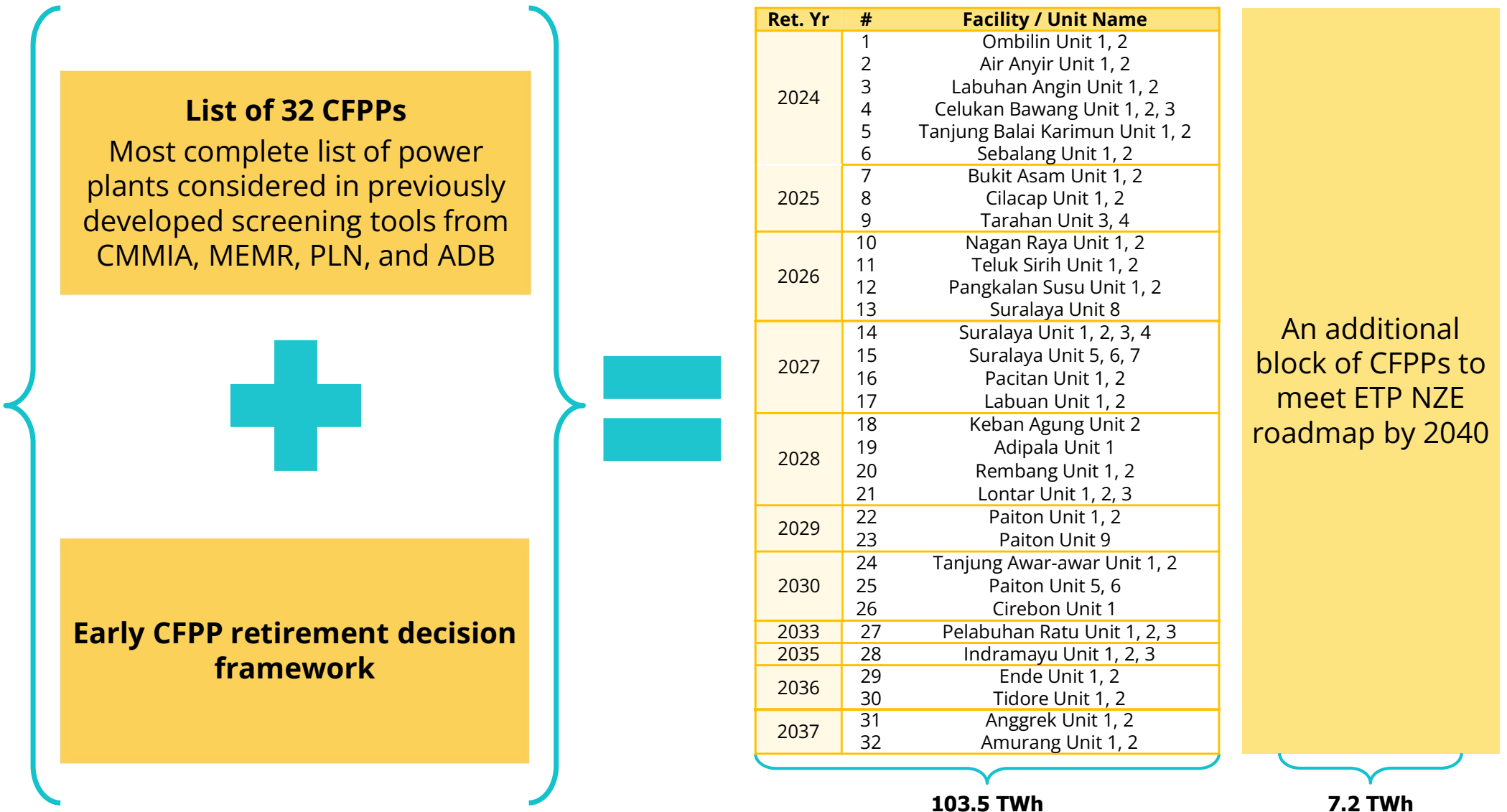
The early retirement roadmap would require replacement of the expected coal-fired power generation:

Period	CFPP Generation to be replaced (GWh)
2021 – 2030	83,430
2030 – 2035	4,570
2035 – 2040	22,740
Total:	110,740

LCDI Net-zero emission scenario is being compared and contrasted with our ETP-NZE to inform future roadmaps

Source:
 [1] IEA (2022), An Energy Sector Roadmap to Net Zero Emissions in Indonesia, IEA, Paris <https://www.iea.org/reports/an-energy-sector-roadmap-to-net-zero-emissions-in-indonesia> , License: CC BY 4.0
 [2] The European Commission. (2022, 15 November). Joint Statement by the Government of the Republic of Indonesia and International Partners Group members on the Indonesia Just Energy Transition Plan
 [3] PT Perusahaan Listrik Negara (PLN) (Persero) (2021) RUPTL 2021-2030.

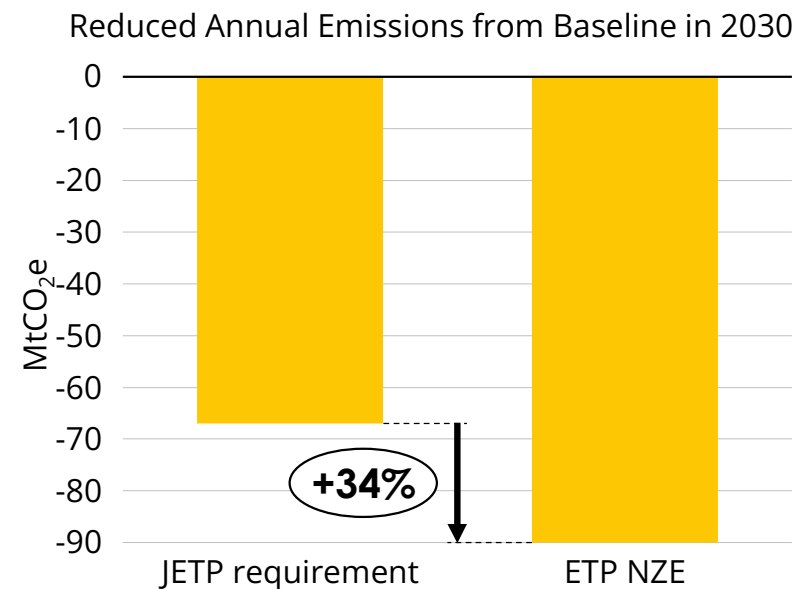
CFPPs DEFINED BY THE GOVERNMENT OF INDONESIA WERE PRIORITIZED USING THE DECISION FRAMEWORK TO KICK START THE EARLY RETIREMENT PROGRAM



EARLY RETIREMENT FOR CFPPS HAS A POTENTIAL TO REDUCE CUMULATIVE CO₂e EMISSIONS (2023-2040) BY 61% COMPARED TO THE BASELINE SCENARIO

GHG emission avoided

- JETP has aims to reduce emission from the power sector from 357 to 290 MtCO₂ in 2030
- ETP NZE would reduce an additional 34% of GHG emissions in 2030 compared to JETP reduction target
- 1,470 Mt of cumulative CO₂e are avoided in ETP NZE vs the Baseline (-61%)
- The reduction form ETP NZE scenario by 2030 would have a cost of ~ US \$252/tCO₂e



Monetization of potential emissions reduced

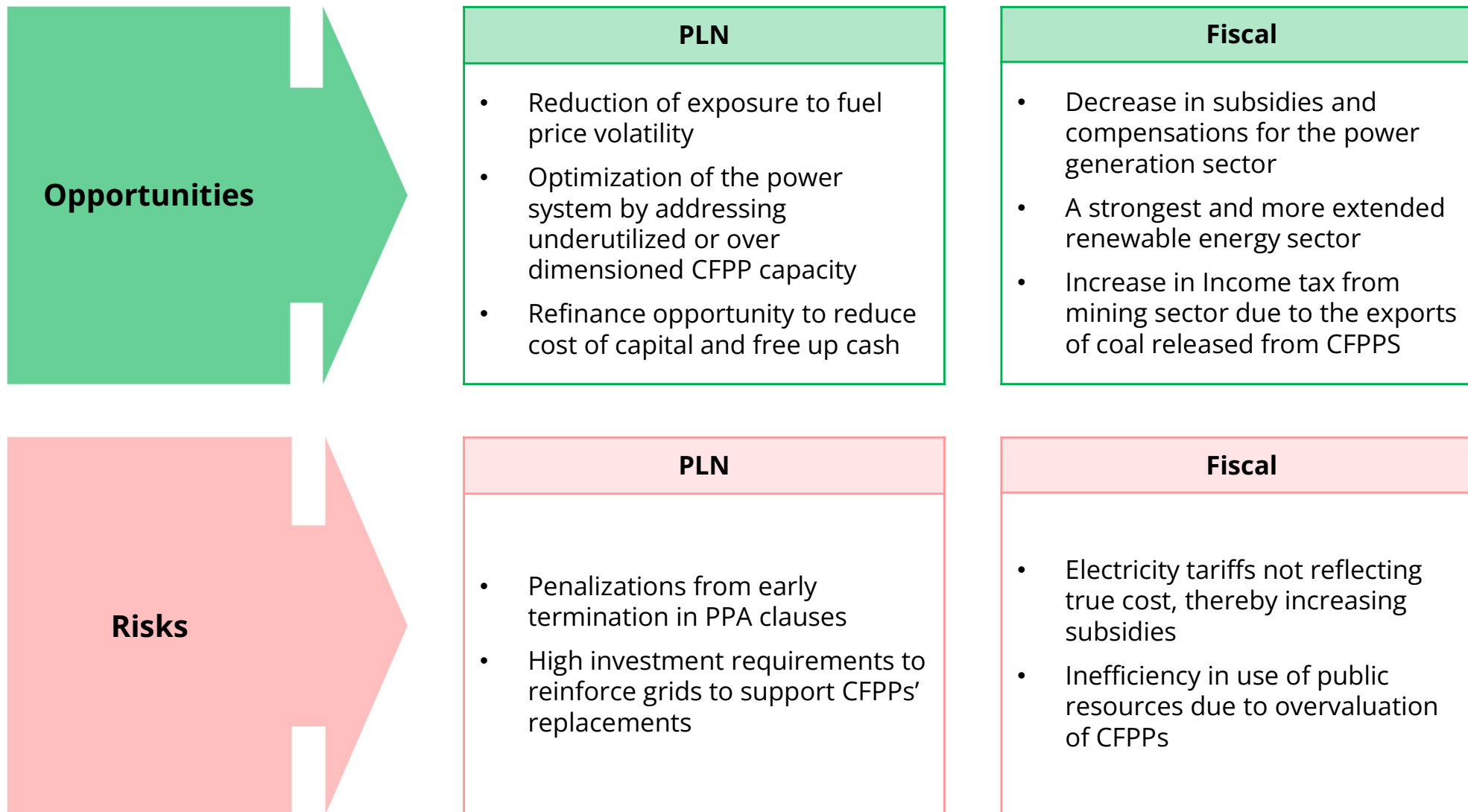
Carbon Tax (CT)

- A carbon tax in a baseline scenario would collect US\$3.6 - 4.5bn between 2023 and 2040. The tax would incentivize cleaner generation sources. If generation were to follow the ETP NZE scenario, the tax revenue would be reduced to US\$1.6 - 1.7bn, still relevant to finance early retirement programs

Revenues from carbon offsets

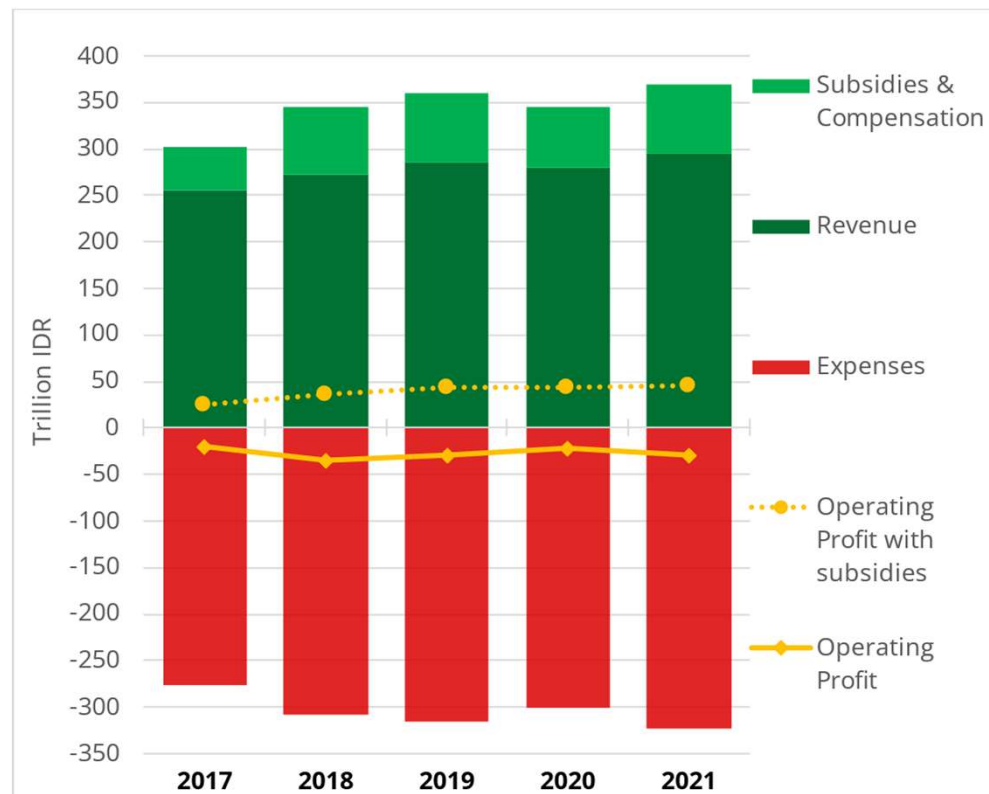
- International standards will not consider early CFPP retirement eligible to produce carbon offsets provided its questionable permanent emission reduction

THE CFPP EARLY RETIREMENT PROGRAM OFFERS OPPORTUNITIES AND RISKS FOR PLN AND THE FISCAL CONDITIONS OF THE GOVERNMENT OF INDONESIA



PLN HAS BEEN EFFICIENT WHEN PROVIDING A PUBLIC SERVICE BUT INEFFICIENT TO RECOVER ITS COSTS

PLN's historical operating revenues, operating expenses, and profit



Revenue

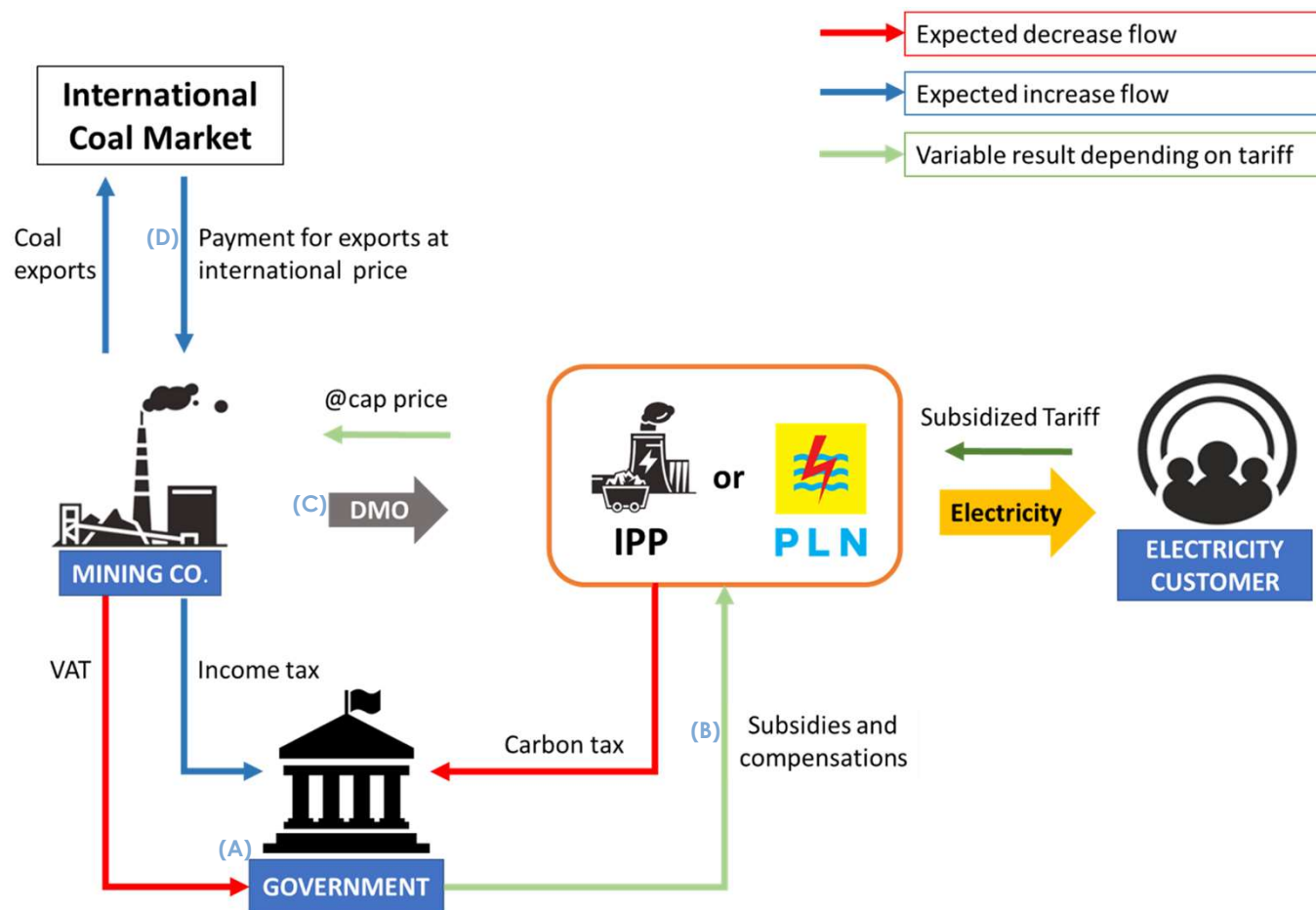
- PLN's 2021 total income considering operating revenue has increased 7% from 2020
- In 2021, electricity sales composed 98% of PLN's annual revenue and increased 5% from 2020
- Electricity sales could increase around 118% by 2040, if tariffs change following historical trends
- If tariffs remained constant since 2021, electricity sales could increase 185% by 2040, from to 2021

Expenses

- In 2021, PLN's total expenses represented Rp 323,119 billion, which was an increase of 7% compared to 2020.
- PLN's expenses are mainly composed of fuel and lubricants (37%) and purchased electricity (32%)
- Both fuel and lubricants and purchased electricity increased from 2020, 12% and 8% respectively

EARLY CFPP RETIREMENT WILL IMPACT INCOME AND VAT REVENUE AND SUBSIDY DISBURSEMENT BY THE GOVERNMENT OF INDONESIA

Fiscal flow model:



- Increase in income tax and decrease in VAT flows as a consequence of increased coal exports and declining domestic transactions, from coal not consumed domestically
- Electricity subsidies and compensations are highly sensitive to electricity tariff mechanism decided by the government

Key assumptions:

- (A) Every legal regulation related to taxes for mining sector and energy sector will be maintained for the entire period of analysis
- (B) Indonesian Government will maintain subsidies for customers and compensations for PLN
- (C) Cap price set out as part of the Domestic Market Obligation covering production costs of mining companies
- (D) Coal released from CFPPs would be able to sell for international market and is diverted towards medium grade international coal markets

THE EARLY RETIREMENT PROGRAM ALSO PRODUCES SOCIAL WELFARE OPPORTUNITIES AND RISKS

Opportunities

- **Better public health**
+45,000 premature deaths can be avoided
- **Revitalization of jobs and the economy**
An average of 1,580 jobs per solar installation and 2,265 jobs per onshore wind installation
- **Access to external funding**
Programs such as the Just Energy Transition Partnership (JETP) with Indonesia launched in November 2022 can help provide the financing needed

Risks

- **Increase in social tensions**
With Indonesia's history of social tensions and demonstrations due to government actions, the government should be mindful of the socio-economic impacts of its future policies and efforts
- **Decreased funding for public services and infrastructure**
Local public services may be affected due to a decrease in local government revenue coming from the coal mines supplying the CFPPs
- **Decreased regional revenue**
After the retirement, the value chain may end up relocating to find opportunities in nearby locations
- **Gender issues**
With such low representation in the coal and power sector, women may be likely to miss out on opportunities presented by the coal transition.

STRATEGIES AND ACTIONS NEED TO BE IMPLEMENTED TO MITIGATE VARIOUS RISKS TO ENSURE FUNDING FROM BENEFACTORS

Risk mitigation measures

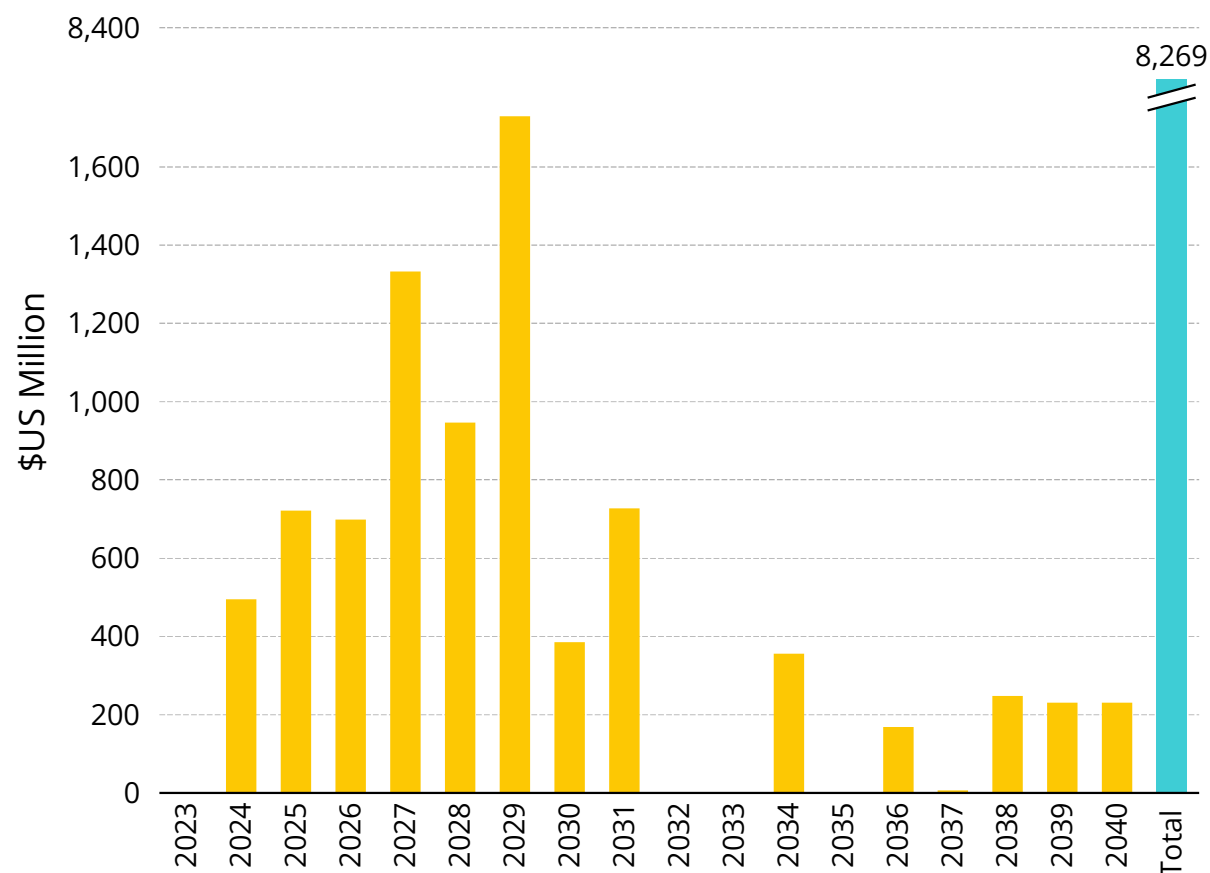
Risk Description	Strategies and Actions
Retirement of CFPP is not permanent	Ensure there is a clearly planned decommissioning stage and the retirement has a starting date in which it to will be executed
The retirement has negative environmental impacts	Strategy to remove hazardous material following local environmental regulation and ensuring there is a plan for environmental damage remediation
Retirement decreases energy security in Indonesia	Work with the system operator to understand the impact of the retirement to the grid and the effect of the replacement project's connection to the grid
Project costs overruns causing not efficient use of funds	Ensure there is an experienced and dedicated team of experts to evaluate feasibility of costs considering the local context and the project's specific characteristics
Social rejection to the retirement and economic impacts	Develop and execute a stakeholders' engagement plan that includes the local community groups. The plan should go hand in hand with a communication plan to report the project's advances

FINANCING MECHANISMS ARE REQUIRED TO CATALYZE FINANCE FOR THE EARLY RETIREMENT PROGRAM IN INDONESIA

Required investment for CFPP retirement

- The ETP NZE scenario requires highly accelerated efforts for electrification and coal phase-out rates
- To comply with JETP requirements and NZE from IEA, 111 TWh must be retired in the next 17 years
- There is an urgency to start with the retirement as soon as possible

Expected payments to compensate retirement of assets by year



POLICY AND TECHNICAL RECOMMENDATIONS ARE PROPOSED TO SUPPORT THE ESTABLISHMENT OF EARLY CFPP RETIREMENT STRATEGY IN INDONESIA

Recommendations	Enablers	Barriers
Finance and refinancing mechanisms for early retirement and repurposing of CFPPs	<ul style="list-style-type: none"> ✓ ETM Country Platform ✓ JETP will allocate US \$20 bn ✓ Indonesian Financial Service Authority has issued the Green Taxonomy 1.0 	<ul style="list-style-type: none"> ⊗ ETM will be funded through blended finance, which may result in delays ⊗ Green Taxonomy does not cover broader activities in the energy transition context
Implement fiscal incentives to favor the investment of renewable energy	<ul style="list-style-type: none"> ✓ Regulation includes carbon trading, carbon levies or results-base payments ✓ General rules of carbon tax implementation have been defined ✓ Carbon tax must be implemented by 2025 ✓ ETS pilot project has been exercised 	<ul style="list-style-type: none"> ⊗ Implementation of carbon tax could affect electricity tariffs ⊗ The implementation of carbon tax has been postponed a few times and there is no clarity on the new date
Develop a clear and unified transition roadmap	<ul style="list-style-type: none"> ✓ The Presidential Regulation 112/2022 already mandates the development of a roadmap for the early retirement of CFPPs ✓ JETP has set transition targets that will accelerate the definition of a clear roadmap 	<ul style="list-style-type: none"> ⊗ Many transition roadmaps that have been defined but have different scopes and focus on different aspects
Reduce environmental and public health impacts from electricity generation	<ul style="list-style-type: none"> ✓ The National Mid-Term Plan (RPJMN) 2020-2024 includes stipulations regarding air quality 	<ul style="list-style-type: none"> ⊗ Financing the installation of needed technology upgrades may be difficult to obtain
Assess job opportunities and challenges from the energy transition	<ul style="list-style-type: none"> ✓ Employment opportunities will come with the deployment of new RE that will replace coal generation 	<ul style="list-style-type: none"> ⊗ Renewable assets are usually more efficient than CFPPs, including the workforce per MW they use

Project Manager: Andres Fernandez

Work number: +41 22 560 70 30
andres.fernandez@hartreepartners.com

THANK YOU!