

INDONESIA'S TRANSITION TOWARD A GREENER ECONOMY—CARBON PRICING AND GREEN FINANCING¹

The adoption of carbon pricing and corporate green financing can help Indonesia transition to a greener economy. The authorities have taken steps on both fronts, but to ensure effectiveness, further measures to enhance market mechanisms in both energy and financial markets are critical.

A. Introduction

1. Indonesia, as one of the large greenhouse gas (GHG) emitters, continues to tackle climate change. Indonesia is ranked as the eighth emitter² in the world although per capita GHG is still at low levels. The government has incorporated climate change factors into its policy planning process such as its climate budget tagging system and the issuance of green sovereign sukuks;³ Bank Indonesia and the Financial Services Authority (OJK) are closely collaborating to foster Indonesia's green financial market infrastructure, drawing on international experience in developing green taxonomies and measurements of climate risks. Despite the pandemic, COP26 motivated Indonesia to accelerate its efforts toward a greener economy, notably introducing carbon pricing and enhancing green financing. This short note provides an overview of Indonesia's updated Nationally Determined Contribution (NDC) targets and climate change policies. The note also identifies the challenges facing Indonesia in implementing carbon pricing and green financing and offers relevant policy recommendations. Assuming the presidency of the G20 this year, Indonesia is well positioned to lead the discussions on climate change and help shape the G20's policy agenda.

B. Indonesia's Updated NDC and Recent Climate Policy Measures

2. Indonesia emphasized its strong commitment to tackling climate change at COP26. Among the policies discussed, officials pledged that the forestry sector will become a net carbon sink by 2030—absorbing more carbon dioxide from the atmosphere than it releases. In the energy sector, Indonesia intends to develop an electric car ecosystem, build the largest solar power plant in Southeast Asia, promote new renewable energy, and foster clean energy-based industries. To achieve these goals, the authorities announced plans to mobilize climate finance and innovative financing such as green bonds. Indonesia stressed that carbon markets and carbon pricing must be part of the efforts to address climate change and that a carbon economy ecosystem that is transparent, has integrity, and is inclusive and fair must be created. Indonesia signed the Glasgow Climate Pact, which included the acceleration of efforts towards the phasedown of unabated coal power and the phase-out of inefficient fossil fuel subsidies. They also signed the Glasgow Leader's Declaration on Forest

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² As of 2018, based on World Resources Institute, CAIT Climate Data Explorer.

³ See Harada (2021) paragraph 8 for more detail.

and Land Use, which included commitment to working collectively to halt and reverse forest loss and land degradation by 2030.

3. Indonesia announced that it will explore a plan to reach net-zero emissions in 2060 or sooner but left unchanged its NDC targets. Indonesia submitted its updated NDC to the United Nations Framework Convention on Climate Change (UNFCCC) in July 2021 but kept the GHG emissions targets the same as in the 2016 submission, which imply further increases in greenhouse gas emissions from current levels: the unconditional target for GHG reduction is 29 percent compared to a Business as Usual (BAU) scenario, while its conditional reduction target is 41 percent compared to BAU. The projected BAU and emission reduction from each sector's category are also unchanged. More than half of the reduction in GHG emissions will be contributed by forestry and other land uses, which are expected to see a significant reduction in levels by 2030 compared to 2010. In contrast, emissions from energy use in 2030 will be lower relative to BAU but substantially higher compared to 2010 levels.

Table 1. Indonesia: Updated Nationally Determined Contributions (NDCs)
(Projected BAU and emission reduction from each sector category)

Sector	GHG Emission Level 2010 1/	GHG Emission Level 2030 (Mton CO2e)			GHG Emission Reduction				Annual Average Growth BAU (2010- 2030)	Average Growth 2000-2012 1/
					(Mton Co2e)		Percent of total BaU			
	Mton CO2e	BaU	CM1 2/	CM2 2/	CM1 2/	CM2 2/	CM1 2/	CM2 2/		
Energy 1/	453	1,669	1,355	1,223	314	446	11%	15.5%	6.7%	4.50%
Waste	88	296	285	256	11	40	0.38%	1.4%	6.3%	4.00%
IPPU	36	70	67	66	3	3	0.10%	0.11%	3.4%	0.10%
Agriculture 3/	111	120	110	116	9	4	0.32%	0.13%	0.4%	1.30%
Forestry and Other Land Uses (FOLU) 4/	647	714	217	22	497	692	17.2%	24.1%	0.5%	2.70%
TOTAL	1,334	2,869	2,034	1,683	834	1,185	29%	41%	3.9%	3.20%

Source: Republic of Indonesia, 2021, *Updated Nationally Determined Contribution*.

1/ Including fugitive.

2/ CM1 = Counter Measure (unconditional mitigation scenario); CM2 = Counter Measure (conditional mitigation scenario).

3/ Only include rice cultivation and livestock.

4/ Including emission from estate crops plantation.

4. The updated NDC includes specific policies to reach the GHG emission reduction target. For example, in forestry, Indonesia set a 2030 target for peat land restoration of 2 million hectares and rehabilitation of degraded land of 12 million hectares. In the energy sector, Indonesia is developing green refineries, to produce green fuels from bio-resources and mixing them with existing fuels in order to increase biofuel content and reduce fossil fuel consumption.

5. The authorities have banned the new development of coal-fired power plants from 2022 and intend to phase out such plants by 2056 at the latest.⁴ To this end, the Indonesian authorities are devising a roadmap for shifting from coal-generated electricity to renewable energy sources, including by accelerating related infrastructure deployment. The strategy will be

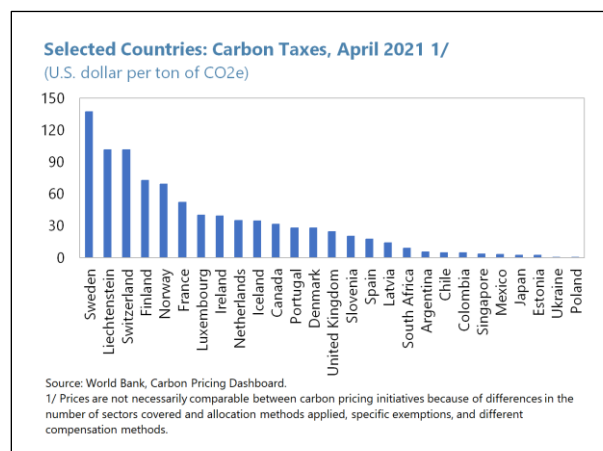
⁴ A moratorium on new plans for coal fired power plants does not apply to those already approved.

complemented by energy-efficiency measures,⁵ increased use of biofuels, and the development of an electric vehicle industry. However, existing contracts with coal-fired power plants operators could be a roadblock in the energy transition in the near to medium term. Indonesia's energy mix target by 2025 as stated in the National Energy Plan (RUEN)⁶ remains unchanged: oil (25 percent), gas (22 percent), coal (30 percent), and new and renewable energy (23 percent). The current RUEN has been mapped into a new Electricity Supply Business Plan (RUPTL) for 2021–2030⁷ by PLN, the state-owned electricity company.⁸

C. Carbon Pricing

6. The general purpose of carbon pricing is to reduce GHG emissions by making them costly. Depending on its design, a carbon tax could, for example, lead to higher fossil fuel prices, which, in turn, could discourage individuals from using fossil fuels to produce energy and incentivize for corporates to invest in greener facilities. Carbon tax and Emission Trading Systems (ETs) are the main forms of carbon pricing mechanisms. The former works directly through prices, while an ETS works through restrictions on the quantity of carbon emissions afforded to individual emitters, which, in turn, affects the cost of carbon through the price of emission rights. To maximize the effectiveness of carbon pricing, cost increases through carbon pricing systems must be passed on to end-users through market mechanisms. The path of carbon prices should be predictable and increasing, focusing on achieving GHG emissions targets by 2030. In this way, through behavioral change in end-users, GHG emissions will gradually decrease.

7. Indonesia is introducing carbon pricing mechanisms. A carbon tax will be introduced on April 2022, with a rate of IDR 30,000 per ton CO₂e, which is imposed on GHG emissions exceeding a certain threshold (a cap and tax system). At about US\$2 per ton of CO₂e, this carbon price will be one of the lowest tax rates among the countries where carbon taxes currently are in place. There are no plans for further increases. Despite these limitations,



⁵ The government regulation 70/2009 requires all companies with an annual energy consumption exceeding 6,000 tons of oil equivalent to appoint an energy manager, develop an energy conservation plan, perform an energy audit and report energy consumption to government (IEA, 2021).

⁶ The latest RUEN was established in 2017.

⁷ Approved by the Minister of Energy and Mineral Resources in October 2021.

⁸ The new RUPTL was devised based on the assumption that electricity demand growth is 4.4 percent annually, which is significantly lower compared to 6.5 percent in the previous RUPTL 2019–2028 plan, and subsequently additional power capacity is around 40 percent lower. The reduction of additional power capacity is mainly from fossil fuel power plant capacity and thus the renewable energy share has increased. 26.3 GW of the total 40.6 GW of planned additional capacity is allocated to Independent Power Producers (IPPs) and thus investment of private sector on renewable energy is expected. The total power investment needs are estimated at around US\$9.14 billion per year over 2021–30 and, of this total, PLN is expected to contribute to US\$5.14 billion per year (OECD CEFIM, 2021).

the tax is an important first step given that only a limited number of developing countries have introduced a carbon tax. The authorities will start an ETS by 2024, the design of which is still under preparation. The pilot of the ETS has been completed with the participation of 32 coal-fired power plants with 14 buyers and 18 sellers.

8. Achieving Indonesia's mitigation objectives will require structural reforms to strengthen the market element in energy pricing. To support the transition to renewable energy and greater energy efficiency, the relative effective costs of energy for end-users need to favor green energy. However, energy subsidies apply to fuels and electricity, and domestic market prices are fixed in practice, with very infrequent adjustments to changes in world market prices.⁹ This is at odds with the aims of carbon pricing, which are to internalize the costs of GHG externalities and thereby fix the market failure that led to high GHG emissions. Introducing carbon pricing without policy reforms may lead to harmful outcomes because electric companies cannot recover their costs by passing them on to customers. The electric company is a monopoly that is state-owned, and the rigid price mechanism would lead to fiscal risks. Carbon pricing mechanisms will thus only be effective with complementary broader energy pricing reforms.

9. Removing energy subsidies will be essential. The Indonesian government proposed its reform plan to parliament in 2020.¹⁰ The plan recognizes that current energy subsidies are not well-targeted and do not meet their objective of providing support to poorer people through low energy prices (for example, LPG can be purchased at a fixed price regardless of income level). To improve targeting, the energy subsidy reform will transform some of the energy subsidies into direct social assistance. The reform is expected to be implemented this year, but its implementation will be dependent on the pace of economic recovery from the pandemic. However, there are no plans to reform the energy pricing mechanism.

10. While energy price adjustment is a prerequisite for carbon pricing, a gradual adjustment would be warranted. The transition from fixed to flexible pricing should be gradual and clearly communicated to minimize distributional effects across income groups and address concerns about potential inflation stemming from energy price hikes. Enhancing accountability and transparency of the government and energy companies would be necessary to increase energy prices.¹¹ However, although the current energy pricing system is designed to regularly adjust to changes in energy prices, this has not occurred in practice. Thus, if energy prices are not adjusted despite the introduction of carbon pricing, the additional costs to energy companies would be covered by subsidies, cancelling out the effects of carbon pricing.

11. Going forward, the design of carbon pricing should be further developed. Achieving net zero emissions by 2060 would require a substantial rise in the carbon price. The cap and tax design

⁹ See Harada (2021) Box 1 for more detail.

¹⁰ See Harada (2021) paragraph 14 for more detail.

¹¹ In this regard, introducing an electricity fee system to reflect customer preferences on energy sources might be worth considering as a means to demonstrate end-user support for renewable energy sources and secure political backing for green energy.

does not provide incentives for below-the-cap companies to reduce GHG emissions further since they will not be able to profit from selling their allowance of GHG emissions. In this sense, the cap-and-tax type of a carbon tax system would be weaker than ETS in terms of GHG reduction mechanisms. Moreover, the current carbon tax applies only on a limited basis to coal-fired power plants, leaving the industry and transportation sector, which account for about 29 and 26 percent of the GHG emissions by the energy sector,¹² respectively. Thus, a redesign of the carbon tax system to include further carbon tax rate hikes and an expansion of applicable sectors, should be considered. The upcoming ETS should incorporate major emitter sectors. To reduce GHG emissions, it is desirable for the ETS to involve as many sectors as possible. The ETS also requires a market adjustment mechanism for energy prices.

12. A comprehensive mitigation strategy and its roadmap by 2030 would be needed to accelerate GHG emission reduction.¹³ Carbon pricing can achieve mitigation goals with the lowest economic cost, but given the difficulty of implementing effective carbon pricing, complementary mitigation measures such as feebates and regulations should also be considered. Carbon pricing revenues could also be used to compensate people for the loss of income from higher energy prices. In the case of Indonesia, a carbon price of US\$25 would not only reduce GHG emissions by 16 percent but also generate revenues of 0.7 percent of GDP.¹⁴ Close communication with stakeholders and the public about reform packages would facilitate consensus building, leading to the implementation of effective mitigation measures.

D. Green Financing

13. The authorities are seeking to promote green finance to meet the significant investment needed to achieve climate change and development goals. The authorities estimated that the financing needed to achieve its NDC targets amount to 2.8 percent of GDP annually. Also, its infrastructure needs are estimated as 6.0 percent of GDP annually. The extent of climate and infrastructure financing needs suggests that mobilizing private investment is essential. In this regard, OJK updated its sustainable financing roadmap to identify several key priorities: developing a green taxonomy; implementing Environmental, Social, and Governance (ESG) aspects into risk management, through reporting on ESG aspects and developing key performance indicators; sharing success stories of innovative green scheme development; developing innovative schemes of sustainable project financing; and building an understanding of the importance of the activities that consider ESG aspects.

¹² As of 2018, based on World Resources Institute, *CAIT Climate Data Explorer*. GHG emissions of the industry sector come from manufacturing/construction, other fuel combustion, and fugitive emissions. GHG emissions of the electricity/heat sector account for 41 percent of the total GHG emissions of the energy sector.

¹³ See Black and others (2021) Box 2 for more detail.

¹⁴ Black and others (2021).

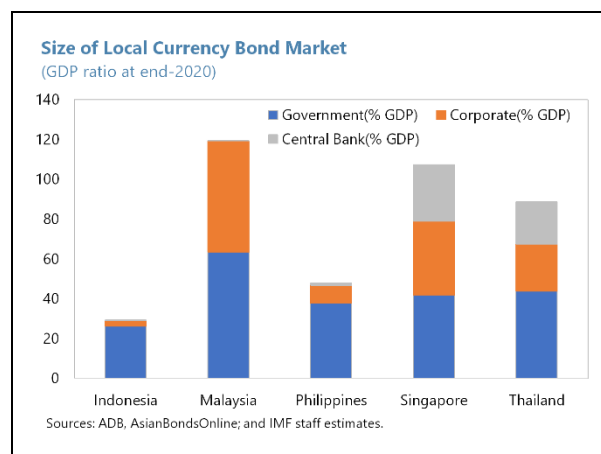
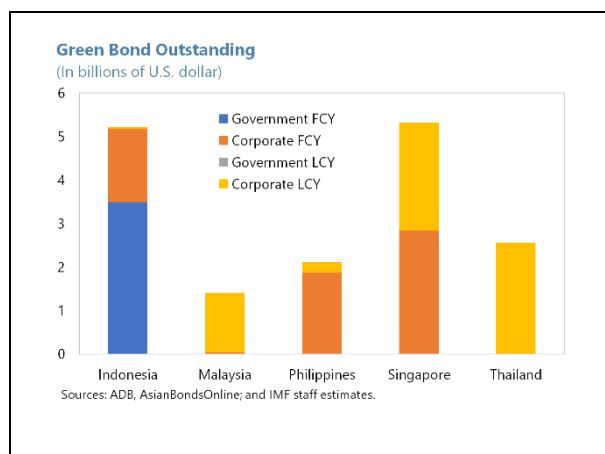
Table 2. Indonesia: Estimated Financial Needs

<i>The authorities' estimation to meet the unconditional target in 2030</i>		
Sector	Financial Needs (In trillions of rupiah)	Financial Needs (In billions of U.S. dollar)
Forest and land use	309	22
Energy & transportation	3,500	246
Agriculture	7	1
IPPU	1	0
Waste	185	13
Total	4,002	281
Annual average 1/	301	21
Annual average (GDP ratio)	2.8	--
<i>ADB's estimation of Infrastructure Needs (Climate-adjusted estimates 2016-2030)</i>		
Investment Needs (In billions of U.S. dollar)	Annual Average (In billions of U.S. dollar)	Investment Needs (In percent of GDP)
1,229	82	6.0

Source: Asian Development Bank, 2021 *Biennial Update Report*; and IMF staff calculations.

1/ The timeframe is 2011-2030 for agriculture, 2013-2030 for forestry and land use, and 2018-2030 for the others.

14. Indonesia has issued several sovereign green sukuk internationally, but domestic green financing is yet to be developed. Indonesia's green bond market is the second largest among its Southeast Asia peers behind Singapore in nominal terms (see left chart), although it is still small in relative terms to GDP (US\$5 billion, accounting for around 0.5 percent of GDP). The market is dominated by government bonds partly reflecting the government's green development initiatives, and almost all bonds are denominated in foreign currency (FCY). In some peer countries, local currency (LCY) corporate green bonds account for a substantial share of the market. However, the size of Indonesia's local currency bond market is the smallest among its peers in terms of GDP ratio, implying only a limited size in the domestic market for green bonds. The mobilization of private green investment will require the development of the domestic financial market.



15. The demand for green sukuk in the secondary market is mixed.

The government green sukuk issued in 2018 appears to carry a greenium (green bond premium) since 2020, aligned with a surge in global ESG investment demand. However, the other government green sukuk do not appear to show a similar premium, probably because they lack liquidity and have long maturity. In the chart, the green sukuk 1 has the largest amount of issuance and the shortest remaining maturity among the four green sukuk and shows higher prices than conventional bonds. While the green market is still at an early stage of development, it would be important to closely monitor developments in both the primary and secondary markets to identify areas for improvement in the green market infrastructure as well as in the issuance strategy. The government's green sukuk could be used as a benchmark for the design and pricing of the corporate green market in Indonesia.

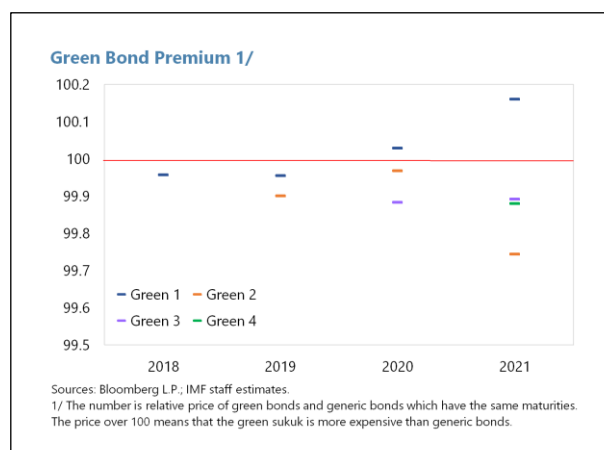


Table 3. Indonesia: Government Green Sukuk

	Government Green Sukuk 1	Government Green Sukuk 2	Government Green Sukuk 3	Government Green Sukuk 4
Amount	US\$1,250 million	US\$750 million	US\$750 million	US\$750 million
Issue Date	3/1/2018	2/20/2019	6/23/2020	6/9/2021
Maturity Date	3/1/2023	8/20/2024	6/23/2025	6/9/2051
Coupon	3.75	3.9	2.3	3.55

16. Transparency is key to enhancing the functioning of a green financing market. It is crucial to diminish the issue of information asymmetry as much as possible. The disclosure standards of listed companies should be internationally aligned to ensure comparability and consistency, and sufficient for investors to assess the risk profiles of green projects. As OJK recognizes in its sustainable financing roadmap, the Indonesia Green Taxonomy is also essential for comparing information about green financial instruments for investment decisions.

17. To promote green financing, Indonesia needs to overcome the limitation of a shallow financial market and maintain sound macroeconomic fundamentals. This is a longstanding challenge and will require efforts towards promoting financial deepening more broadly. In this regard, it would be important to implement the 2017 FSAP recommendation regarding enhancing

bond yield curve by consolidating debt issuance and improving secondary markets.¹⁵ In addition, maintaining strong macroeconomic policies will be crucial to attract foreign direct investment and foreign financing for green investment, and enabling the private sector to obtain more favorable financing terms for green investment.

E. Conclusion

18. Promoting green financing combined with effective carbon pricing is key to reconciling the reduction of GHG emissions while fulfilling Indonesia's development needs.

Green financing in tandem with carbon pricing could strengthen and accelerate the transition toward a greener and inclusive economy. To this end, further policy efforts are needed within a comprehensive mitigation strategy. The strategy would outline a roadmap by 2030, that could include the energy subsidy and pricing reforms as well as a carbon pricing revenue recycling plan. The authorities should also consider redesigning the carbon pricing mechanisms, including expanding the number of participants in the ETS and increasing carbon tax rates in a clear and predictable manner. Furthermore, it would be important to establish institutional frameworks to manage all carbon pricing mechanisms in a consistent and effective manner, while ensuring that the burden of carbon pricing does not fall disproportionately on lower income groups. Finally, enhancing transparency, including the implementation of the green taxonomy, deepening financial markets, and maintaining sound macroeconomic policies would help foster a green financing market. These measures would facilitate the development of green financing market mechanisms, which could help Indonesia meet its financing needs for climate change.

¹⁵ The 2017 FSAP raised as priorities: (i) improving the efficiency of the yield curve by consolidating the number of instruments issued and prioritizing the issuance (and reissuance) of benchmark maturities for T-bonds and increasing the issuance of T-bills; (ii) removing legal obstacles to the development of structured non-recourse products, critical for infrastructure financing; (iii) reforming the taxation of financial products (including by replacing the tax applied to the gross value of transactions with one more closely linked with firms' performance), (iv) strengthen insolvency procedures and creditor rights to improve expected recovery rates; and (v) promoting the development of derivative instruments to enable risk hedging.

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