Taxing Coal to Hit the Goals:

A simple way for Indonesia to reduce carbon emissions

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Executive Summary

The Government of Indonesia has pledged to reduce absolute carbon emissions by between 29% and 41% by 2030 compared to "business as usual" (Republic of Indonesia, 2021). To help achieve this, the government is considering options for carbon pricing, including an emissions trading scheme (ETS), a carbon tax, or results-based payments. A pilot ETS is underway in the electricity generation sector, and a draft law has proposed a carbon tax of IDR 75,000 (USD 5.10)[1] per tonne of carbon dioxide (Jiao & Sihombing, 2021). Carbon pricing is an effective and economically efficient way to reduce emissions, but significant details will need to be resolved, including fuel and sectoral coverage, exemptions for vulnerable consumers, and timeframes for implementation. Negotiations to resolve these issues will take time.

As an interim and immediate measure, we recommend the government simply increase taxes on coal as a de facto form of carbon taxation. A coal tax is recommended for four reasons:

1. **Coal is highly polluting**, accounting for 40% of Indonesia's energy sector carbon emissions, and it is a major source of ambient air pollution (Sugardiman, 2018), which caused 95,155 premature deaths in Indonesia in 2018 (World Health Organization [WHO], 2021).
2. **Taxes are an effective way to reflect coal's negative impacts in its price**, allowing the government to compensate for some of the costs of pollution and increasing coal prices, which would encourage consumers and investors to shift to cleaner alternatives.
3. **A coal tax would be relatively easy to administer**, as it would apply to one fuel at one rate.
4. **A tax would generate significant revenue.** For example, a coal tax of IDR 78,700 (USD 5.50) per tonne, as implemented in India, would generate around IDR 49 trillion (USD 3.6 billion) per year. This tax rate is equivalent to a carbon tax of around IDR 32,000 (USD 2.20) per tonne of carbon dioxide (half the rate of the government's proposed carbon tax).[2] The revenue could be used to compensate vulnerable households and sectors for higher energy prices, encourage investment in clean energy, and assist coal workers and communities impacted by any production declines arising from the tax (e.g., due to lower export volumes).

India has demonstrated that such a tax is politically and economically feasible. The Government of India imposed a coal "cess" (special tax) in 2010, initially to raise funds for clean energy and environmental projects. The cess is now equivalent to USD 5.50 per tonne and raised USD 3.7 billion in 2019. Parry et al. (2017) found that increasing India's coal cess would deliver stronger carbon, health, and economic growth benefits for India than alternative policy measures, including a carbon tax or ETS. Like Indonesia, India has a large coal industry, substantial electricity subsidies, and rapidly growing electricity demand. These did not prevent India from imposing the coal tax. A special coal tax would likely be feasible for Indonesia, too, and would help deliver the central government's goals to reduce carbon emissions and toxic air pollution, promote renewable energy, and increase government revenue.

[1] Exchange rate conversions use average annual exchange rate for 2020 of USD 1 = IDR 14,582 from https://data.oecd.org/conversion/exchange-rates.htm

[2] See main text for details of calculations and assumptions.

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Abbreviations and Acronyms

ADB	Asian Development Bank
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
CDMI	Central Data Mediatama Indonesia
ETS	emission trading system
EU	European Union
FY	financial year
GHGs	greenhouse gases
GJ	gigajoule
GST	goods and services tax
GW	gigawatts
ICAP	International Carbon Action Partnership
IDR	Indonesian rupiah
IEA	International Energy Agency
INR	Indian rupee
MEMR	Ministry of Energy and Mineral Resources
MoF	Ministry of Finance
MW	megawatts
MWh	megawatt hour
NCEF	National Clean Environment Fund
NDC	nationally determined contribution
OECD	Organisation for Economic Co-operation and Development
PT	Perseroan Terbatas (Limited Company)
PLN	Perusahaan Listrik Negara
PMR	Partnership for Market Readiness
UNFCCC	United Nations Framework Convention on Climate Change
USD	US dollars
VAT	value-added tax
WHO	World Health Organization

1.0 Introduction

Coal-fired electricity generation is the world's single largest carbon emitter, accounting for 30% of all energy-related carbon dioxide (CO_2) emissions (International Energy Agency [IEA], 2019). Coal combustion also emits chemicals and particles that are toxic to human health. Together, these emissions make coal the most polluting fossil fuel. However, the price of coal around the world does not reflect this. The "polluter pays principle" indicates polluters should be charged with the cost of pollution prevention and control (Organisation for Economic Co-operation and Development [OECD], 1975). Similarly, Pigouvian taxation suggests a tax should be levied on any actor causing environmental damage as a way to incentivize a change in behaviour to avert or lessen such damage (OECD, n.d.). In contrast, the average effective carbon tax rate (including excise) on coal is close to zero across 44 countries, including Indonesia, analyzed by the OECD (OECD, 2019).

This brief makes the case for higher coal taxation in Indonesia in order to reflect its cost to society and increase government revenues to fund other development priorities. While an excise, sales, or export tax would be relatively simple and cost effective to administer, any increase in energy prices is politically challenging to implement (OECD, 2019). The revenues from the tax can be used to ease implementation through funding compensation for vulnerable groups, as well as economic stimulus to boost jobs and growth. Higher coal taxes would be a step toward carbon pricing for Indonesia. They would also put the country on a path toward meeting its climate commitments and help reduce the growing problem of air pollution.

2.0 Coal in Indonesia

Coal is a major contributor to Indonesia's energy supply and economy (Table 1). Indonesia is the world's 4th largest producer of coal and the largest exporter of thermal coal (Casey, 2021; IEA, 2020a).[3] Given its abundant supply, it is unsurprising that coal is the single largest contributor to Indonesia's primary energy supply (Figure 1). Around three quarters (73%) of domestic coal consumption is by electricity generation and the remainder by industry: cement, textiles, fertilizer, and metallurgy (Ministry of Energy and Mineral Resources [MEMR], 2020a).

Coal also generates revenue for the central government (Table 1). Key taxes and non-tax revenue streams are: royalties (3% to 7% of selling price), corporate income tax, value-added tax (VAT), dividends from equity in the state-owned coal company PT Bukit Assam Batubara, rent on mining land, land and building taxes, and import taxes (VAT or customs duties on imported equipment). There are currently no excise or export taxes on coal.

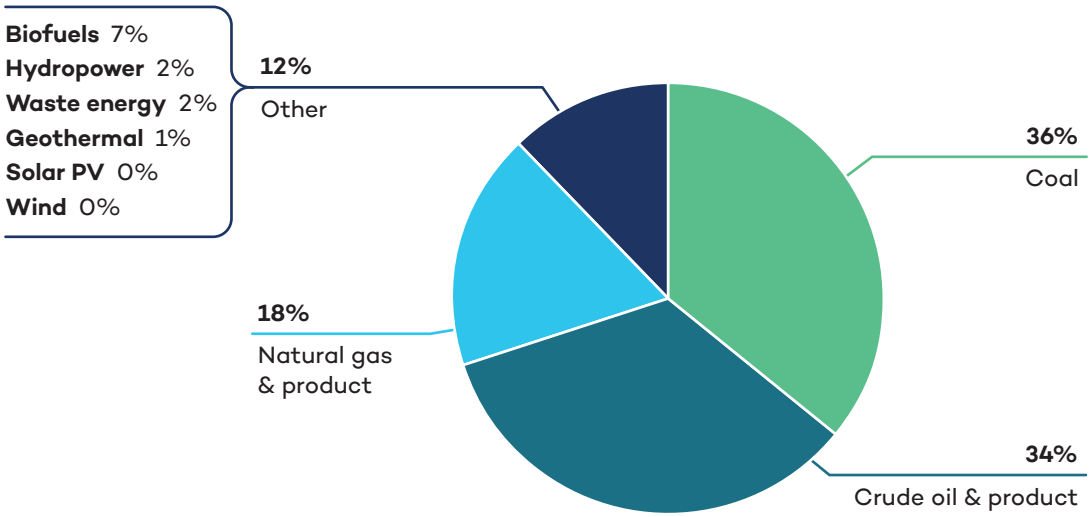
Table 1. Contribution of coal to Indonesia's economy and energy supply

Coal contribution to:	**Data** (2019 unless stated)	**Source**
Primary energy supply	36%	MEMR, 2020a
Electricity generation	78%	MEMR, 2020a
GDP (coal mining)	1.83% in 2020, decreased by 0.5% from 2019[a]	Central Bureau Statistics Indonesia, n.d.a
Gross national income	2.2%[b]	MEMR, 2020b; MoF, 2020b, 2021
Employment (coal mining only)	1.96 million[c]	Central Data Mediatama Indonesia (CDMI), n.d.; Central Bureau Statistics Indonesia, n.d.b
Exports	USD 19 billion[d]	Export value: Central Bureau Statistics Indonesia, n.d.a; Export quantity: MEMR, 2020a[e]
Revenue[f]	IDR 26 trillion (USD 2 billion) per year (tax and non-tax revenue) (2014 to 2017)	Braithwaite & Gerasimchuk, 2019

Notes: [a] Includes coal and lignite mining. [b] IDR 44.9 trillion (USD 2.9 billion) in 2019. [c] Assumes 70% of total mining sector employment (2.8 million employees in 2019) people (CDMI, n.d.). [d] 14% of the total export value in 2019 (454 million Tons in 2019, 74% of coal production) (MoF, 2019). [e] Statistics on coal exports differ between the MEMR and Bureau Central of Statistics Indonesia. [f] Disaggregated data on coal revenue is not available. These data were taken from Braithwaite & Gerasimchuk (2019), who assumed that coal comprises 40% of total mining tax and non-tax revenue in addition to IDR 1 trillion in VAT revenue.

[3] Most (90%) of Indonesian coal resources is sub-bituminous (i.e., medium quality) and lignite (Nusadaily.com, 2021).

Figure 1. Primary energy supply in Indonesia (excluding traditional biomass)



Source: MEMR, 2020a.

Indonesia plans to increase coal production. Indonesia's 2015 energy plan pledged to build 35 gigawatts (GW) of new power capacity, of which 20 GW was from coal (Enerdata, 2015).[4] To fuel the growing capacity, as well as to increase export earnings and create jobs, the Government of Indonesia set a target to increase coal production from 400 million tonnes in 2019 to 628 million tonnes in 2024 (Patriella, 2020; Presidential Regulation No. 22, 2017). In May 2021, the state-owned power company PT Perusahaan Listrik Negara (PLN) promised to meet Indonesia's electricity needs only from renewable energy, but only after the 35 GW target is met (Rahman, 2021). This is at odds with the central government's target of achieving 23% of the energy mix from new and renewable energy in 2025 (Bridle et al., 2018) and the Ministry of Energy and Mineral Resources objective to achieve net zero in the power generation sector by around 2050[5] (MEMR, 2021b).

While coal has been central to development, **it has also caused significant problems for Indonesia: toxic air pollution, climate change, and degradation of land and water.** Burning coal releases toxic compounds (such as particulate matter, nitrous oxides, sulphur oxides and heavy metals) that can cause heart and lung disease (WHO, n.d.). Coal accounts for 14% of Indonesia's particulate matter (Istiqomah & Marleni, 2020) and 25% of lead in ambient air pollution (Santoso et al., 2011). In 2018, ambient air pollution caused an estimated 95,155 deaths in Indonesia (WHO, 2021). Indonesia's coal-fired power stations have been estimated to cause 7,480 premature deaths per year from air pollution-related diseases alone. As well as being a personal tragedy, disease and premature deaths result in

[4] The remaining 15 GW is broken down as follows: gas-fired projects 13 GW and renewable energy sources 3.7 GW, split into 2.4 GW of hydropower, 1.2 GW of geothermal energy, and 120 MW of wind electricity capacity.

[5] The strategy includes three scenarios to achieve net zero by 2045, 2050, or 2060. At the time of writing, none of the three possible policy pathways had been selected for implementation.

significant costs for Indonesian households and governments in health care costs and lost productivity (Sanchez & Luan, 2018).[6]

Mining and processing of coal have also been demonstrated to have negative impacts on land and air quality and groundwater levels. Issues include removal of vegetation and overburden (soil and rock), lowering aquifers, groundwater pollution, and release of toxic gases (Dudka & Adriano, 1997; Ives, 2015; Zhao et al., 2017). Abandoned coal mines can be dangerous for local communities, requiring expensive remediation (Ives, 2015).

Carbon emissions from coal represent about 15% of Indonesia's total emissions. The energy sector accounted for 37% of Indonesia's total greenhouse gas (GHG) emissions in 2016, with coal comprising 40% of that (Sugardiman, 2018). Indonesia's emissions (excluding land use change)[7] increased by 140% between 1990 and 2017, with the highest increase being in the energy sector (Climate Transparency, 2020). In 2017, total emissions (excluding land use) were 889 million tonnes of carbon dioxide equivalent ($mtCO_2e$) and are expected to continue increasing to 2030 based on existing policies (Climate Transparency, 2020). PLN published an annual sustainability report in which it mentions the emissions produced by each power plant type. According to the 2020 Sustainability Report, 83% of total emissions were produced by coal-fired power plants (124.4 $mtCO_2e$) (PLN, 2021). In contrast, Indonesia would need to reduce its non-land use emissions by 30% (to 622 $mtCO_2e$) by 2030 to be consistent with 1.5 °C global warming (Climate Transparency, 2020).

[6] For further details on the health cost of coal in Indonesia, see https://www.iisd.org/system/files/publications/health-cost-coal-indonesia.pdf

[7] Land-use change—including deforestation, forest fires, and peat fires—is the single largest source of GHG emissions in Indonesia, and varies widely from year to year (Sugardiman, 2018).

3.0 Indonesia's Actions to Address Coal-Based Emissions

Indonesia has several strategies to reduce GHG emissions and toxic air pollution from coal. To monitor and reduce toxic air pollution from coal-fired power stations, the Government of Indonesia has required installation of electrostatic precipitators and continuous emission monitoring systems (PLN, n.d.).[8] To reduce GHG emissions, the government has enacted several regulations since ratification of the Kyoto Protocol in 2004 (Partnership for Market Readiness [PMR] Indonesia, 2018; United Nations Framework Convention on Climate Change [UNFCCC], 2021).[9] Indonesia's nationally determined contribution (NDC) under the 2015 Paris Agreement on Climate Change targets a 29%–41% reduction in GHG emissions by 2030 compared to "business as usual" (Republic of Indonesia, 2021). The Government of Indonesia has trialled several voluntary mechanisms to control carbon emissions that have had limited impact on overall emissions (PMR Indonesia, 2018).

In 2017, Indonesia passed the "Government Regulation on Environmental Economic Instruments" that sets a mandate for an emissions trading system (ETS) to be implemented by 2024 (International Carbon Action Partnership [ICAP], 2021). Under this directive, monitoring, reporting and verifying guidelines for the power sector were released in 2018 with an online reporting system on GHG emissions from the power sector ("APPLE-Gatrik") (MEMR, 2021a). In March 2021, a pilot carbon cap and trade project was initiated for 80 coal power plants, with the goal of reducing emissions by 314–398 mtCO_2e by 2030 (MEMR, 2021c). The voluntary program allows coal power plants to buy or sell emissions to meet their regulated caps, depending on their installed capacity (Mulyana, 2021) (see Table 2). The pilot is intended to familiarize stakeholders in advance of a potential national ETS, compliance procedures, and offset mechanisms (ICAP, 2021).

Table 2. Carbon emission cap in Indonesia

Type of power plant	**Installed capacity** (MW)	**Cap threshold** (tonne CO_2E/MWh)
Coal power plant (X)	X > 400	0.918
	100 ≤ X ≤ 400	1.013
Coal mine power plant (X)	100 ≤ X ≤ 400	1.094

Source: Mulyana, 2021.

To achieve the emission reduction goal of 29% by 2030, a presidential regulation to provide a national framework for carbon pricing instruments is being drafted (ICAP, 2021). The "Presidential Regulation on Carbon Economic Value Instruments" sets out three different

[8] The RUPTL 2021-2029 is still in draft form (Page II-43)

[9] Indonesia's key climate change policies prior to 2015 are summarized in its intended NDC (Republic of Indonesia, 2015).

mechanisms for carbon pricing in Indonesia: ETS, results-based payments, and a carbon tax (Draft of Presidential Regulation, 2020).

A draft law was presented to parliament on June 28, 2021 that proposes a carbon tax of IDR 75,000 (USD 5.20) per tonne CO_2 (Jiao & Sihombing, 2021). The bill was not released publicly, but Jiao & Sihombing (2021) reported analysis by the Ministry of Finance that projected:

- A tax of IDR 75,000 (USD 5.10) applied to energy sector emissions would raise IDR 32 trillion (USD 2.2 billion) per year.[10]
- Increasing the tax to USD 12 from 2024 would reduce GHG emissions by 16.6% in 2030 (compared to no tax) but also reduce GDP growth by 0.58%, employment by 0.15%, and consumption by 1.97%.

The assumptions behind the simulations were not available. Reallocation of tax revenues as targeted cash transfers to consumers and economic stimulus could significantly reduce the social and economic impacts of taxes and potentially lead to net gains. Modelling of Indonesia's 2015 fossil fuel subsidy reforms found that reallocation of government spending from consumer fuel subsidies to investments in productive capacity (infrastructure and social assistance) resulted in higher GDP growth and employment than an alternative scenario where prices remained subsidized (Pradiptyo et al., 2016).

Assessing Carbon Pricing Options for Indonesia

Governments have several options to price externalities of using coal and other fossil fuels. Externalities include air pollution and GHG emissions, aligned with sustainability targets of many countries, including Indonesia (see the previous section). This section focuses on common carbon pricing mechanisms.

A review of carbon taxes and ETSs found they have similarities in terms of emission reductions, abatement costs, possibilities for raising revenue, costs to regulated firms when revenue-raising instruments are employed, distributional impacts, and effects on competitiveness (Stavins, 2019). However, there are also significant differences. An ETS will only generate revenue when there is auctioning or other sale of emission allowances, which are typically phased in over many years, e.g., the EU ETS (European Commission, 2016). Sambijantoro (2021)[11] estimated that the Government of Indonesia could raise IDR 26–57 trillion (USD 1.8–3.9 million) revenue from a carbon tax of USD 5–10/tonne CO_2-e) in the first year. However, carbon taxes also tend to be phased in, reducing revenue in the early years, e.g., South Africa's carbon tax (Republic of South Africa, 2019). Taxes are widely understood to be among the most efficient ways to internalize the negative impact of fossil fuels on human health and the environment, including carbon and specific toxic air pollutants (OECD, 2019). An ETS allows for international trading of emissions permits among compatible and jointly

[10] Based on total emissions of 425.5 million tonnes per year from electricity generation, industry, and air, land, and sea transport (Ministry of Finance analysis as reported by Jiao & Sihombing, 2021).

[11] Sambijantoro is an economist at PT Bahana Sekuritas, a large Indonesian investment bank, 99% owned by PT Bahana Pembinaan Usaha Indonesia ("BPUI"), a state-owned enterprise (Bahana Sekuritas, n.d.).

recognized trading schemes (EU Commission, n.d.). Carbon taxes and ETSs can be used in conjunction to harness the benefits of each approach.

Approximately 40 countries and more than 20 sub-national jurisdictions use carbon pricing mechanisms, with more scheduled to implement them over time (World Bank, 2020). These mechanisms have proven effective. Countries with a carbon price have a 2% lower annual growth rate in CO_2 emissions from fuel combustion than countries without (Best et al., 2020). Nordic countries, which implemented carbon and pollution taxes in the 1990s as well as participating in the EU ETS, have experienced dramatic reductions in carbon emissions and air pollutants while maintaining strong GDP growth (Laan et al., 2021).

Carbon pricing mechanisms take time to develop and implement. Details need to be negotiated with stakeholders (including the extent of application to different sectors, exemptions or compensation for sensitive sectors, timeframes for phasing in the tax) and legislation would need to be passed by parliament. South Africa's carbon tax, for example, took almost a decade to come into effect.[12]

A coal tax, such as an excise, would be easier to administer than a carbon tax, pollution tax, or ETS. For example, carbon taxes are not applied equally to all fuels and sectors. The Swedish carbon tax, which has been in place for three decades, still covers only 40% of carbon emissions (Jonsson et al., 2020), although the carbon tax in combination with the EU ETS covers 95% (MoF Sweden, 2021). In contrast, a coal tax would apply to one fuel and at one rate. The rate could be phased in to ease the transition.

[12] A Carbon Tax Discussion Paper was released in 2010 (South African Government, 2010), and the legislation was enacted in 2019 (Republic of South Africa, 2019).

4.0 A New Coal Tax to Reflect Externalities and Raise Revenue

As an interim measure, the Government of Indonesia could consider implementing a special tax on coal to help ensure its price reflects negative costs to society and raise revenue. Coal accounts for 40% of Indonesia's energy sector carbon emissions (Sugardiman, 2018) and 14% to 24% of ambient air pollutants.[13] Coady et al. (2019) estimated that coal was currently under-priced in Indonesia by a factor of five: efficient pricing that takes into account coal's impacts on air pollution and climate change would increase the coal price from around USD 3 per gigajoule (GJ) (~USD 66 per tonne) to approximately USD 15 per GJ (~USD 330 per tonne).[14] Raising the price of coal for end users would reduce both carbon emissions and toxic air pollution by encouraging energy efficiency and switching investment to alternative energy sources (Borozan, 2019; He et al., 2019; Lin & Li, 2011).

The tax could be an excise and equivalent export tax, or a special tax applied to all coal production. Ideally, a similar tax should be placed on other polluting fuels, such as natural gas.[15] Otherwise, taxing coal could encourage a shift to other high-carbon sources of energy rather than clean energy such as solar photovoltaic and wind.

India's Experience With Coal Taxation

India has demonstrated that a tax on coal can be an effective means of raising revenue and incorporating externalities into coal prices. In addition to royalties, GST and customs duty, India imposes a special "cess" on coal. In India, a cess is a levy or tax imposed to raise funds for a specific purpose. The coal cess was originally imposed in 2010 as the "Clean Energy Cess" or "Clean Environment Cess," with 30% of revenues allocated to the National Clean Environment Fund (NCEF) (Gerasimchuk, 2018). It is levied on domestic and imported coal. India's 2015 NDC cites the cess as the primary source of funding for the NCEF, dedicated to financing clean energy technologies and related projects, and as a form of carbon pricing (Government of India, 2015). From the inception of the cess to FY 2017–2018, cess revenue totalled USD 12 billion, of which USD 5.6 billion was allocated to 55 clean energy and environmental projects (Government of India, 2015).

Following the introduction of the GST in 2017, the Clean Energy Cess was replaced by the GST Compensation Cess but was levied on coal at the same rate. The revenues are used to compensate India's states for income losses arising from the tax reform. The current cess is imposed on domestically produced and imported coal at a rate of INR 400 (USD 5.7 per tonne) (Garg et al., 2020). This is equivalent to a carbon tax rate of approximately USD 2 per

[13] 14% of particulate matter (Istiqomah & Marleni, 2020), 25% for lead (Santoso et al., 2011).

[14] Conversion to tonnes based on an average energy content for sub-bituminous coal of 22 GJ/tonne, using the IEA's definition of sub-bituminous as 20–24 megajoules (MJ)/kg (IEA, 2020b).

[15] Concessional rates of taxation for natural gas are not recommended, given large emissions from the production, transport, and use phases. Gas is not needed for the energy transition, as renewable-based alternatives for most of its uses are either already cheaper or are expected to be within a few years (Muttitt et al., 2021).

tonne CO_2 (Sanchez et al., 2021). The cess remains a significant source of revenue, with USD 3.7 billion collected in 2019 (Garg et al., 2020).

The coal cess was found to be highly effective compared to alternative policy options in the Indian context. Using economic modelling, Parry et al. (2017) projected that increasing India's coal cess was the strongest fiscal policy option for delivering CO_2, health, and fiscal benefits in India. Increasing the cess annually by INR 150 (USD 2.25) per tonne of coal from 2017 to 2030[16] was projected to avoid over 270,000 air pollution deaths, raise the equivalent of 1% of GDP in revenue in 2030, reduce CO_2 emissions by 12%, and generate net economic benefits of approximately 1% of GDP. The policy would be mildly progressive and would impose a modest cost burden on industries (at least initially). In contrast, a broader carbon tax (that also taxes petroleum products) was projected to deliver 40% more revenue than the coal tax but achieved more modest net economic benefits (Parry et al., 2017). Other options considered—an ETS, feebate, electricity or road fuel taxes, and incentives for renewables and energy efficiency—were found to have smaller benefits.

Table 3. Similarities and differences between India and Indonesia, as relevant to coal pricing reform

	Indonesia	India
Country circumstances		
Poverty at USD 1.90 per day (2020)	4.3%	10.7%
GDP per capita (2020)	USD 4,135	USD 2,099
Coal and electricity sectors		
Producer subsidies for coal	Yes	Yes
Fossil fuel revenue as % GDP[a] (2014–2017)	1.8%	3.7%
Fossil fuel revenue as a % total government revenues (2014–2017)	13.6%	17.8%
Coal trade	Net exporter	Net importer
State-controlled coal pricing	Yes	Yes
Controlled electricity prices for certain consumers	Yes	Yes
Growing electricity demand	Yes	Yes

Notes: [a] Central governments only. For both countries, most of the revenue is from oil and gas. Disaggregated revenue data is available for India—see Prayas (Energy Group) (2021)—but not Indonesia, therefore fossil fuel revenues are cited here.

Sources: Poverty – ADB, 2021; GDP per capita – World Bank, 2021; Oil trade – IEA, 2019; Fossil fuel revenues – Braithwaite & Gerasimchuk, 2019; Garg & Geddes, 2019; Indonesia coal pricing – MEMR, n.d. If not specified, information is summarized from this report.

[16] This increase would bring the cess to INR 2,500 (USD 37.50) per tonne of coal in 2030, equivalent to a carbon tax of USD 16 per tonne CO_2 (Parry et al., 2017).

Importantly, **India has demonstrated that a coal tax is politically achievable.** India and Indonesia share important similarities in relation to coal (Table 3), which may indicate that if India successfully imposed a coal tax, Indonesia might too. Importantly, both countries are highly dependent on coal and are increasing production to fuel rapidly growing electricity production. Both countries provide subsidized electricity to consumers (Asian Development Bank [ADB], 2015; Garg et al., 2020), making it difficult for coal-fired power generators to pass on the costs of a higher tax. Important differences also exist. India is a net importer of (mostly Indonesian) coal; therefore, its balance of trade would benefit from reduced consumption of imported coal, while Indonesia is a net exporter with a desire to boost export income from this sector. These issues are addressed in the following section.

Opportunities and Challenges for a New Coal Tax in Indonesia

Opportunity 1: Revenues immediately flow to the government.

A coal tax rate like India's coal cess of INR 400 (IDR 78,700; USD 5.50) per tonne of all coal produced would generate around IDR 49 trillion (USD 3.6 billion) per year in Indonesia.[17] This is equivalent to a carbon tax rate of around IDR 32,000 (USD 2.20) per tonne of coal.[18] These revenues are essential for easing the implementation of the tax, such as assisting vulnerable consumers (households or industries), as discussed below.

Opportunity 2: A coal tax would help the government achieve several major sustainability and development goals.

These include the commitment to reach 23% renewables in the energy mix (Bridle et al., 2018) and net-zero emissions in the electricity sector (MEMR, 2021b). Higher coal prices would send a price signal to consumers to reduce emissions and for investors to switch to cleaner sources of energy. A coal tax would also help achieve the government's objectives to boost revenues eroded by the COVID-19 pandemic (Reuters, 2021c) and reduce air pollution.

Challenge 1: Increasing coal taxes would raise operating costs of coal-fired power generators.

However, the current pricing structure in Indonesia provides limited opportunity to pass on input costs to consumers. Indonesia subsidizes electricity by setting retail prices below the cost of supply, with taxpayers making up the difference (Burke & Kurniawati, 2018). The cost is substantial: the state budget allocated IDR 54 trillion (USD 3.6 billion) for electricity subsidies in 2021 (MoF, 2020a). To bring down the cost of coal-fired power, the government

[17] Based on the 2021 coal production target of 625 million tonnes (Reuters, 2021a) and assuming zero elasticity.

[18] Based on the energy and carbon content of sub-bituminous coal of 27.8 MJ per kg and 90.3 g CO_2 per MJ, respectively (Freund et al., 2005).

also sets a domestic market obligation that requires coal producers to supply a percentage of their production for local electricity production at a below-market price. As a result of decades of under-pricing of electricity, PLN, the national electricity distributor, is in poor financial condition (Brown, 2020). To cope with higher input costs from a coal tax, PLN would need larger subsidy payments or to pass on the tax to its customers.

SOLUTION

Passing on the coal tax to consumers is challenging but preferable to increasing subsidies if some of the coal tax revenues are used to compensate vulnerable consumers for higher energy prices. There is limited value in raising a coal tax with one hand and then spending the revenues on electricity subsidies with the other (especially if that electricity is largely generated from coal). At a rate of IDR 32,000 (USD 2.20) per tonne CO_2, electricity prices are likely to rise by around 3%.[19] Wealthier consumers could afford to absorb this increase, but poor and vulnerable consumers should be compensated for the higher cost of living through increased welfare payments funded by the coal tax. This approach has the advantage of decoupling income support from on fossil fuel use.

Challenge 2: Applying a tax or taxes to all coal production would affect the export competitiveness of Indonesian coal and reduce export volumes.

SOLUTION

The government would gain greater revenue from exports thanks to the coal tax. A proportion of the tax revenue raised could be used to incentivize manufacturing in emerging sectors (such as clean energy or electric vehicles) and promote export diversification. This would better position Indonesia's economy as the world begins to wean itself off coal and provide long-term sustainable jobs and exports. Such investments will be increasingly necessary as importing countries reduce coal consumption as part of their energy transition and to meet NDCs.

[19] Based on analysis by the International Monetary Fund/OECD (2021) that found a USD 50/tonne carbon tax would increase electricity prices in Indonesia by 75%. Extrapolating from this, a USD 2.20 carbon tax would increase prices by ~3%.

5.0 Conclusion

The Government of Indonesia is considering carbon pricing options as part of a transition to net zero emissions over the coming decades. A combination of a broad-based carbon tax and ETS would be a highly effective way to reduce emissions. But such measures can take years, if not decades, in development, consultation, and implementation. A coal tax could immediately cover 40% of Indonesia's energy-related emissions and, even at a modest rate of IDR 78,700 per tonne (similar to India's coal cess), would deliver revenue of around IDR 49 trillion (USD 3.6 billion) per year. This coal tax rate is equivalent to a carbon tax of IDR 32,000 (USD 2.20) per tonne of coal, half the government's proposed carbon tax rate of IDR 75,000 (USD 5.10) per tonne CO_2.

A coal tax would be a step toward more efficient pricing that reflects coal's negative impacts on human health and the environment. Positive flow-on effects would include reduced air pollution-related illnesses and deaths (with lower costs to health budgets and productivity) and increased investment in renewable energy (creating new jobs and potential export industries).

The tax would present challenges, but these can be overcome using some of the tax revenues. Given the precarious finances of PLN, the cost of the tax would need to be passed on to electricity consumers through higher tariffs. Welfare payments could compensate lower-income households for higher energy prices. Revenues could also be used to mitigate any negative effects on coal jobs and to fund economic stimulus through clean energy. Increased funding in these areas would better position Indonesia in a future of increased competition from renewables and mounting need for climate action. A tax would ensure that coal—which has been a foundation of Indonesia's development but also a significant source of pollution—contributes to the cost of the energy transition. Now, while coal is still prevalent, is the time to put in place a tax so that it can raise the revenues needed to support a just transition to clean energy.

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