▶ Modelling and comparing the employment impacts of COVID-19 crisis and recovery policies in Indonesia

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Contents

List of tables

List of figures

1. Introduction

Just as the rest of the world, Indonesia and its economy were drastically affected by the COVID-19 pandemic. Historically, Indonesia's economy had been performing well, with an average GDP yearly growth of 5.3% since the start of the millennium. The pandemic, however, brought the first recession the country has experienced in two decades, plummeting Indonesia's economic growth to -2.1% in 2020.

The economic impact was most heavily felt during the first half of 2020 as a result of the imposed restrictions to curb the virus' spread at a national level and of the weakening global economy due to the reduction in consumption, investment, and production. As these restrictions gradually eased on the second half of the 2020, so did economic activity slowly recover. The recovery was also aided by the massive recovery measures implemented by the Indonesian Government (made possible by the 3-year suspension on the 3% of GDP budget deficit limit) under the National Economic Recovery (PEN) program.

Overall, for the year of 2020, Indonesian consumption fell by the 2.1% and investment[1] by 4.9%, according to World Bank data. As it also did across many other countries across the world, poverty and unemployment rates increased in 2020 for Indonesia. The poverty rate increased from 9.4% in 2019 (the country's historical minimum) to 9.8%, while unemployment rose to 4.3% in 2020, from 3.6% in the previous year.

In 2021, the economy recovered beyond its level in 2019, growing 3.7% relative to the previous year, nonetheless consumption and investments did not recover fully to pre-pandemic levels, growing only 2.0% and 3.8%, respectively.

Inflationary pressure remained low in the two years after the start of the pandemic shock (1.68% and 1.87% in 2020 and 2021, respectively) relative to historical values due to weak domestic demand (the average yearly rate of the 10 years prior was 4.8%).

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1   Gross fixed capital formation.

▶ 2. Employment impacts

2.1 Introduction

The purpose of the modelling exercise in this country report is to estimate the net employment outcomes resulting from the economic fiscal interventions (detailed in Appendix A, Section A.1) that have been announced in Indonesia during 2020-21 and implemented during 2021-22.

The methodology consists of using the E3ME model, which takes into consideration the different economic realities and aspects at global level, as well as the recovery policies implemented. It is best placed tool to estimate the impact of these policies on employment. This modelling exercise utilised the archetype classification present at the Global Recovery Observatory (GRO) database[2]. The actual investment was gathered by CE from a series of fiscal policies sourced from various Indonesian government, ministries, and other official websites.

2.2 Modelling assumptions

Cambridge Econometrics' global E3ME model provides an economic framework with which to evaluate the effects of a wide range of policies. Behavioural relationships in the model are estimated using econometric time-series techniques applied to a database that covers the period from 1970 onwards, on an annual basis. A core feature of the model is its treatment of technology, which will be key to meeting many of the world's policy challenges. The Future Technology Transformation (FTT) models of technology diffusion[3] in E3ME

provide a representation of the adoption of new low-carbon technologies. E3ME extends its treatment of the economy to cover physical measures of energy, food, and material consumption. The main data sources for European countries are Eurostat and the International Energy Agency (IEA), supplemented by the OECD's STAN database and other sources where appropriate. For regions outside of Europe, additional sources for data include the UN, OECD, World Bank, IMF, ILO and national statistics. Gaps in the data are estimated using custom software algorithms.

The modelling results present the effect of the combined green and non-green recovery policies compared to a business-as-usual (BAU) case, which considers already adapted rescue measures and effects observed in 2020. Modelled policies include green (e.g. V - Green market creation) as well as other fiscal policies (e.g. Z - Healthcare investment (non-infrastructure), etc).

The policies for Indonesia are sourced from CE's own data collection from several governmental, ministerial, and other official websites[4]. The country's policies were aggregated across the following eleven policy archetypes; each with a specific channel through which the employment is affected:

▶ S - Tourism and leisure industry incentives. Measures under the archetype are treated as boosts to the consumption of tourism and leisure industry goods, thereby simulating subsidized goods and services as well as exemptions granted by firms in the industry, which are

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2   Given that GRO databases' policies were limited to the year of 2020, the polices and the related investment could not be included in this modelling exercise.

3   Mercure, J-F (2012) 'FTT:Power : A global model of the power sector with induced technological change and natural resource depletion', *Energy Policy*, Volume 48, September 2012, pp 799-811.

4   Concerning the archetypes used in this modelling exercise, the policies have been categorised according to a framework of 24 distinct archetypes. These archetypes consider the interventions in different sectors of the economy and are classified according to the degree of being considered "green policies". This classification varies between green, partially green, and non-green, or adaption.

passed through to prices, inducing increased consumption.

▶ V - Green market creation. Investments in green market creation are modelled as electrification of industrial energy demand. The modelling decreases the use of fossil fuels by industrial sectors, while it increases their electricity use.

▶ W – Other incentive measures. Due to the highly uncertain measure of this archetype it is modelled as a general increase in consumption, therefore affecting every sector in the economy proportional to its natural size.

▶ Z - Healthcare investment (non-infrastructure). This type of investment corresponds to an increase in government current expenditure in healthcare.

▶ ω (omega) - Agriculture support spending. Modelled as increased investment by the agricultural sector.

▶ β (beta) - Communications infrastructure investment. This archetype's investments are modelled as exogenous increases in investment on the communications and computer services sectors. The increase in each sector is proportional to the yearly endogenous investment on each sector.

▶ θ (theta) - Local (project-based) infrastructure investment. Modelled as investment by the public sector.

▶ π (pi) - Other large-scale infrastructure investments. This type of investments is assumed to be an exogenous increase of public administration investment within the model.

▶ σ (sigma) - Armed forces investment. This type of investment corresponds to an increase in government current expenditure on defence.

It is assumed that Indonesia implements these policies and their associated investment from 2021 until 2023 according to the values and timeframe indicated in Table 2.1. Resulting in a total investment of USD 88.04 billion.

An important caveat is the fact that the model does not take into consideration the efficiency and productivity gains resulting from the construction and enhancing of infrastructure that came to be from the execution of the recovery policies. As such, one should consider that the efficiency and productivity gains in the modelled economy are underestimated.

▶ **Table 2.1: Additional recovery spending ($bn) by archetype and yearr**

Architype	2021	2022	2023
S	0.60	0.00	0.00
V	0.00	0.15	0.00
W	11.10	10.80	0.00
Z	12.40	8.20	0.00
ω (omega)	3.30	0.00	0.00
β (beta)	1.20	0.00	0.00
θ (theta)	1.90	9.89	0.00
π (Pi)	28.50	0.00	0.00
Grand Total	**59.00**	**29.04**	**0.00**

Source(s): Own data collection.

Financing assumptions

It is assumed that the financing of these policy interventions is done through an expansion of the national government's debt, for which Indonesia enters in a debt repayment phase after 2030 (thus not affecting the presented results). As it is discussed in the previous chapter, Indonesia has suspended its budget deficit limit in order to finance these measures. Furthermore, this modelling exercise also assumes that there is no revenue recycling and that there is no crowding out effect caused by these investments due to the assumption of non-limited money supply. While these policies are long-term in nature, the results in this report are presented up to 2030 only.

2.3 Employment outlook

Economy-wide outcomes

Modelling results indicate a positive temporary shock to the economy due to the measures in the recovery program. Employment gains are realised first as a result of targeted subsidies (e.g. agriculture and tourism), followed in the later years by gains due to higher investment levels.

Figure 2.1 shows overall, economy-wide employment impacts of the recovery policies compared to the baseline. Direct subsidies lead to demand increases, while sectoral investments lead to productivity gains and supply expansion. During the implementation phase of the policies (2021-22), employment impacts reach over 2% (about 3 million jobs) compared to the baseline.

Investment and government spending increases productivity of the investing sectors, even though productivity effects of the supplied goods and services were not considered. Between 2025-30 employment is on average 0.3% above the baseline, this translates to on average 500 thousand more jobs than without the recovery policies.

Sectoral employment

During the implementation phase (2021-22), employment impacts compared to the baseline are strong in the agricultural sector (about 2%, over

▶ **Figure 2.1: Employment impact (% from baseline) of recovery policies, 2021-30**

**2023
End of recovery
measures implementation**
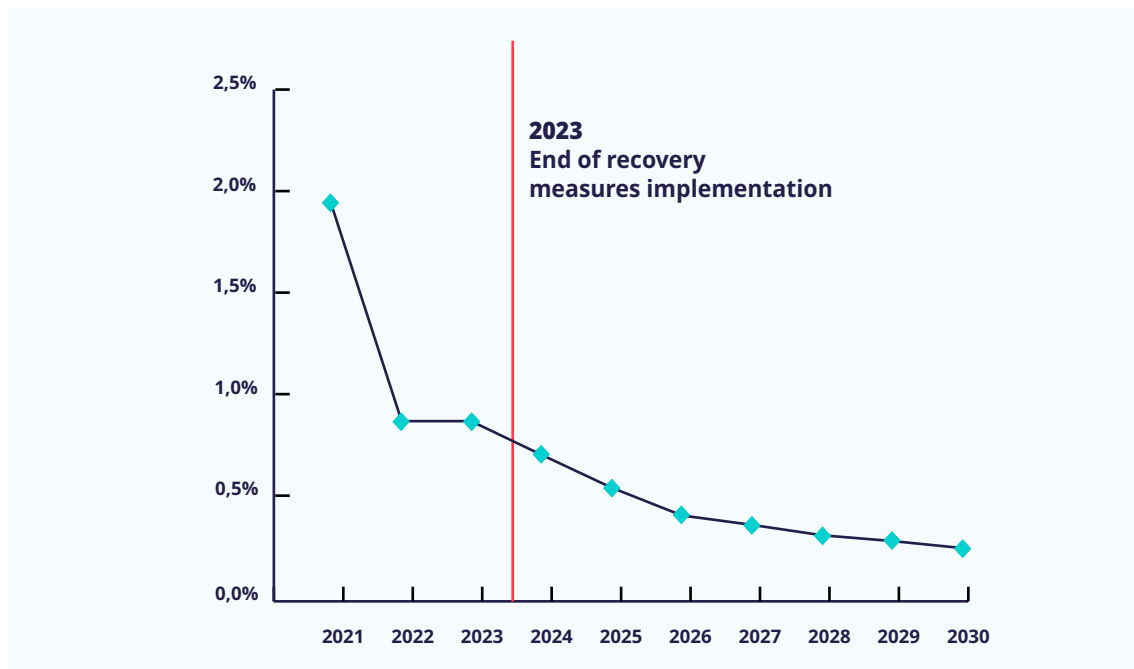
Source(s): Cambridge Econometrics' E3ME model.

700 thousand jobs), services including tourism (about 1.8%, 690 thousand jobs) and in the business services sector, which includes the communications sectors (about 740 thousand jobs in the full sector, about 290 thousand jobs in communications). Note that all these sectors directly received targeted investment and/or subsidies as part of the recovery policies. Sectors, which are connected through supply-chain effects are also boosted: construction (4.3%, 310 thousand) or manufacturing (3.3%, about 580 thousand).

Nevertheless, most of these effects are direct impacts and the magnitude of their effect might shrink once the implementation is completed and the policy is concluded. Therefore, much lower impacts can be observed in 2022. Although in agriculture and healthcare the impacts are still rather strong. This is mainly due to the investment type stimulus targeted towards these sectors.

The healthcare sector (included in public services) maintains employment levels of 5.3% higher than the baseline (on average, about 300 thousand jobs) between 2022-30. Business services also benefits from the investment-type measures: employment is on average 0.8% above the baseline (about 97 thousand jobs) between 2022-30. As

well as agriculture, with, on average, 0.6% higher than baseline employment (2022-30) or about 178 thousand jobs. While by 2030 most of the direct impacts disappear, the overall effect of the recovery is a stronger economy, which yields higher than baseline consumption, which, in turn, induces higher employment in consumer sectors (services, distribution). For example, in the retail sector by 2030 employment is about 220 thousand (0.6%) higher, while in business services the increase is about 1% (106 thousand).

2.4 Comparison – 'green' vs 'conventional' policies and their impact on jobs and emissions

While the modelling presented so far has focused on the overall impact of the presented recovery policy package to better understand the contribution and impact of individual policies a 'marginal impact' modelling exercise has been undertaken. This means that the E3ME model has been run for the eight archetypes separately to separate out their individual effects, these effects were then compared to the baseline in terms of employment

▶ **Table 2.2: Employment by sector (difference in '000 from baseline)**

Broad sectors	2021	2022	2025	2030
Agriculture & forestry	727	386	244	5
Extractive industries	14	0	-1	0
Manufacturing	579	47	43	-17
Energy & utilities	0	0	0	0
Construction	311	59	35	8
Distribution, retail, hotels and catering	693	-8	65	221
Transport and storage	5	10	44	41
Business services	738	165	68	106
Public services	-11	669	305	-35
Total	**3,056**	**1328**	**803**	**328**

Source(s): Cambridge Econometrics' E3ME model.

and in terms of emissions. National average carbon intensity of employment in Indonesia for 2018 has also been computed in order to see how emission intensity of job opportunities created by different recovery archetypes compare to this average.

Figure2.2 and Figure 2.3 shows these cumulated emission and employment impacts for the short-term and long-term respectively. The average carbon intensity of employment for the national economy in Indonesia in 2018 is further shown with a red line. 'Conventional' policies are shown with blue, while policies named 'green' by the GRO are shown with green. Finally, the size of the bubble on the figures shows the magnitude (in monetary terms) of the archetype.

As it can be observed, there is no archetype that creates emission reductions in the short-term. It needs to be noted though that in the case of Indonesia there is only one archetype that is labelled as green: the V archetype, 'green market creation'. However, this archetype accounts for a small part of the overall recovery package (monetary terms) and in the short-term even this archetype creates additional emissions (due to initial investment phase). Therefore, while most archetypes create jobs with carbon intensity below the national average (especially healthcare and agricultural investment) even these archetypes still lead to increased emissions in the short-term.

On the long-term major observed impacts are similar. Investment and subsidies to agriculture

and healthcare still have better than 2018 average emission intensities, i.e. in relative terms they create more jobs and less emissions. The 'green' potential of the sole green archetype (V archetype) also shows emission reduction on the long-term. As it was noted, Z and archetypes have better emission-to-employment ratios than what is the average, however, other than the V archetype, each of the archetypes create additional emissions.

Overall, this result shows that given the industrial structure of Indonesia, conventional policies, even if they are not directly environmentally harmful, can create additional emissions. However, employment-to-emission ratios might be better for several archetypes than what is the national average ratio otherwise. This especially applies to policies focusing on services: such as investment into healthcare, where emissions are generally lower than in industry.

Such comparison between 'green' and 'conventional' policies allows policy makers to analyse employment and emissions impacts simultaneously. Running alternative policy scenarios ex-ante, would allow to optimise fiscal, recovery and other archetype of economic development policies. They could then be designed in such way so as to maximise employment creation while minimizing emission. And, they may then be accompanied by just transition policies ex ante, such as skills training, social protection and industrial policies, to induce a structural change towards green and low carbon growth.

▶ **Figure 2.2: Short-term employment and emission impact of archetypes, 2021-2022 cumulated effect**
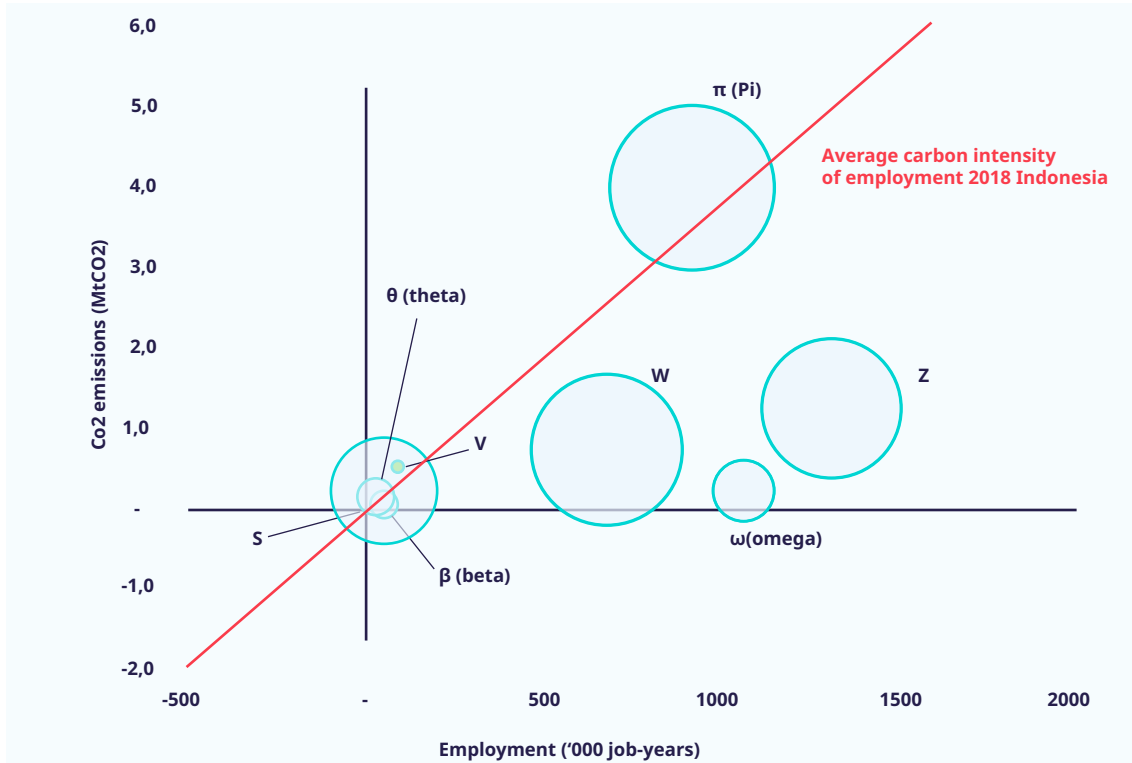
Source(s): Cambridge Econometrics' E3ME model.

▶ **Figure 2.3: Long-term employment and emission impact of archetypes, 2021-2030 cumulated**
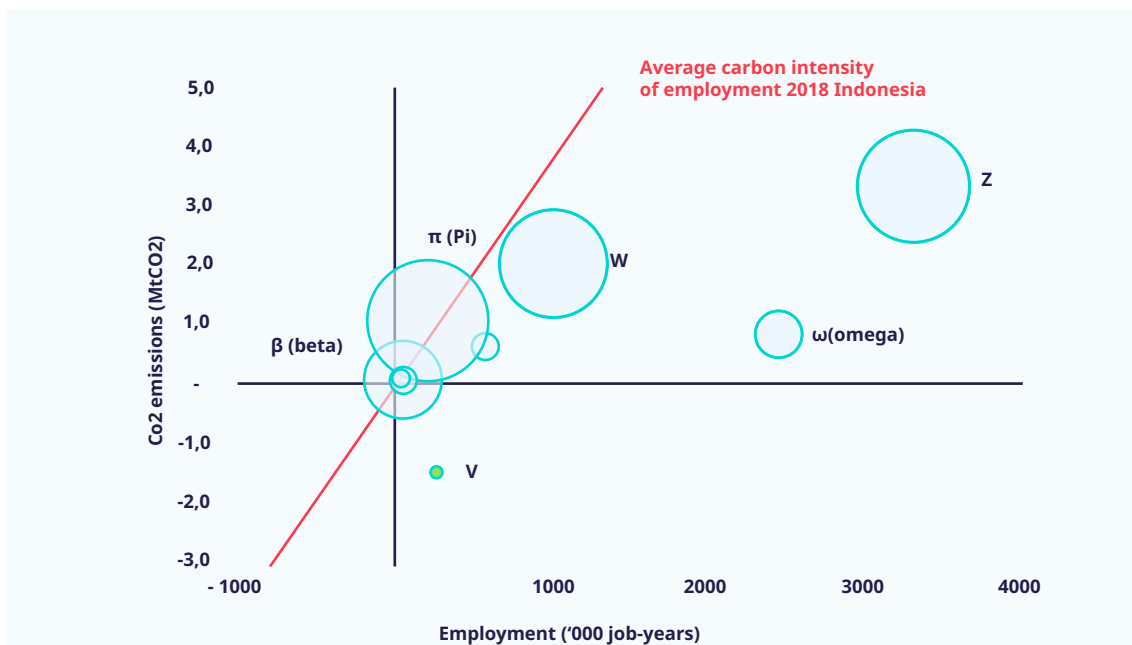
Source(s): Cambridge Econometrics' E3ME model.

▶ Appendix A: Annex

A.1 Review of recovery policies adopted in Indonesia

With the aim of enhancing the economic recovery of the nation, the Indonesian government has announced and implemented several programs to inject money into the economy at the onset of the COVID-19 pandemic and its subsequent economic fallout. In terms of funds involved, these are the 4 largest economic recovery programmes implemented by the Government of the Republic of Indonesia that have been included in the E3ME modelling:

National Economic Recovery (PEN) program 2021

The National Economic Recovery (*Pemulihan Ekonomi Nasional* – PEN) program is a massive recovery program started in 2020 with the objective of increasing domestic consumption and business activity, while maintaining economic stability and monetary expansion.

In continuation of the 2020's National Economic Recovery program, the 2021 edition of the recovery policy saw its budget increased to IDR 699.43 trillion (a value equivalent to USD 49.3 billion). The program's funding will be mainly used in eight areas to strengthen Indonesia's economic recovery: health, social protection, labour intensive projects, food security, ICT investments, tourism, business incentives, and support for MSMEs and corporate financing.

Healthcare has been allotted with IDR 176.3 trillion, which is equivalent to USD 12.4 billion, from the total 2021's budget of the National Economic Recovery program. These funds will be allocated to the vaccination program, diagnostics, therapeutics, health tax incentives, and other treatments. Also in continuation of last year's policy, 2021's National Economic Recovery program allocates IDR 157.4 trillion (USD 11.1 billion) to social benefits for vulnerable households. Through these benefits the Government of Indonesia intends to stimulate domestic consumption and increase the national population's purchasing powers as well as alleviate the increased poverty incidence that has affected the country alongside the pandemic.

Complementing a parallel infrastructure projects investment policy (more information below), the National Economic Recovery program also commits IDR 27.33 trillion (USD 1.9 billion) to labour intensive projects across the country, as well as IDR 47.1 trillion (USD 3.3 billion) to strengthen food security, IDR 11.33 and 16.55 trillion (USD 0.8 and 1.2 billion) to industrial and ICT investments, respectively, and IDR 8.66 trillion (USD 0.6 billion) in tourism.

The *Pemulihan Ekonomi Nasional* will also allocate funds in 2021 towards supporting companies, especially micro, small, and medium enterprises to which subsidised interest rates will be made available with the objective of facilitating access to working capital. Program's total budget of IDR 186.8 trillion (USD 13.2 billion) will be allocated to this end. The National Economic Recovery program budget also contemplates the use of IDR 53.9 trillion (USD 3.8 billion) for business and tax incentives. These incentives continue the previous year's tax breaks, in which, among other policies, corporate tax was reduced to 22% (from 25%), workers earning under the threshold of USD 13.00 were exempted from paying income tax conditionally on their industry of work, and VAT refunds were relaxed.

National Economic Recovery (PEN) program 2022

The 2022 edition of the National Economic Recovery program aims to continue and accelerate the economic recovery of the country after the disruption caused by the COVID-19 pandemic in 2020 and 2021. The total budget of IDR 455.62 trillion or USD 31.7 billon will be, most notably, allocated to healthcare, social benefits, and other economic recovery measures.

The intervention in the area of healthcare has been budgeted at IDR 117.9 trillion (around USD 8.2 billion) is focused on vaccine supplies procurement and treatment of COVID-19 patients, all the while the budget for social benefits accounts for IDR 154.8 trillion around USD 10.8 billion). The social benefits comprise of, among others, family, basic food, and unemployment benefits.

The other economic recovery measures, which include stimulus for industrial, infrastructure and connectivity development, food resilience, tourism and creative economy industries, as well as tax incentives and support to firms and MSMEs (through small-holder business credit and other types of funding, e.g.), will account for IDR 141.4 trillion a value approximately equivalent to USD 9.89 billion.
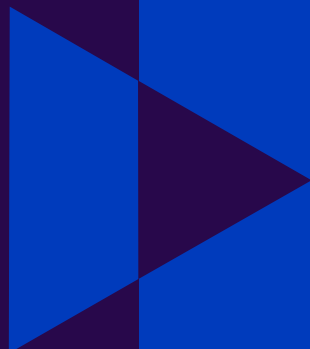
Infrastructure projects

With of budget of USD 28.5 billion or IDR 417.8 trillion, this publicly funded infrastructure project for the year of 2021 seeks to finance a series of sustainable and labour-intensive infrastructure developments as a way to provide economic stimulus after the COVID-19 pandemic. These projects aim to strengthen the digital infrastructure of the country as well as provide support infrastructure to industry, tourism, water supply, sanitation, housing, and healthcare. For the energy sector, projects include the construction of a natural gas network for household use (120,776 household projected connections), as well as support for the construction of rooftop solar units. Sanitation access is to be expanded to 1,643,844 households and 3,900 km of irrigation network are to be rehabilitated alongside the construction of additional 700 km. To increase connectivity, 965.4 km of roads are to be built, alongside 26.9km of bridges, 446.56 km of railway lines, and 10 units/locations of airports. The strategic target for this policy also includes the construction of 10,706 flat and special housing units, as well as concluding works on 53 dams and the construction of base transceiver stations on 5,053 locations across Indonesia.

ADB Loan to Support Green Recovery

Financed by the Asian Development Bank, Indonesia will be receiving an IDR 10.4 trillion (USD 150 million) loan in 2022 to support its "Sustainable Development Goals Indonesia One–Green Finance Facility" (SIO-GFF). This facility's objectives are to accelerate the country's economic recovery after the pandemic shock and to direct private and public financing towards green infrastructure projects. The facility will also aim to manage credit risk throughout the timespan of the projects, especially in the early phases when cashflow tends to be negative. To achieve these goals, SIO-GFF will offer loans, equity, convertible debt, and guaranties in order to mitigate credit risk and thus attract commercial lenders.

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