AUGUST 2023

Indonesia SDG Push

Consolidated Report

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Acknowledgments

The team would like to thank Joydeep Gosh and Ismael Fofana for their technical support. The team also benefited from the precious contributions of Juliaty Sopacua and Sanjoyo Kirlan from BAPPENAS The team is grateful to Dr Vivi and Prof. Arief Yusuf for their insightful comments.

Acronyms and Abbreviations

CGE	Computable General Equilibrium
SAM	Social Accounting Matrix
INFF	Integrated National Financing Framework
GDP	Gross Domestic Product
SDG	Sustainable Development Goals

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Executive Summary

The SDG Push framework provides a comprehensive and country-specific UNDP tool to plan and implement SDG breakthroughs in various development contexts, for both pro-cyclical and anti-cyclical response moments – elevating fiscal, financial, digital/data and governance enablers of sustainable development.

It is envisaged as an all-terrain tool, meant to catalyze breakthroughs from real-world constraints, rather than adding mechanical benchmarks or targets.

Indonesia is well advanced in mainstreaming SDGs and leading sustainable finance innovation. This is also reflected the country's VNRs. Despite robust economic growth in Indonesia in recent years, which resulted in the emergence of a millennial middle class, it has also created development challenges, such as environmental and social impacts. In addition, the rise of this middle class has created the need for sustainable cities and communities in the future.

The objective in piloting the SDG Push was to explore SDG gaps and use systems methods that help identify the policy interventions that move the needle on persistent challenges. The government lead partner, BAPPENAS, identified SDG Push as an approach that can significantly contribute to the 'Roadmap of the SDGs Indonesia: Towards 2030' revisions planned in 2023 by proposing portfolios of development interventions with the most impact on Indonesia's SDG ambition.

The SDG Push, is an evidence-based approach is crucial to identify key areas of intervention that can drive SDG progress in the country. It follows a structured approach to identifying accelerators by utilising various integrated elements:

- **Scoping** examines specific contexts and trends with data visualisation via SDG Push Diagnostic, establishes a rapid landscape of trends, current priorities, futures and interlinkages.
- **Acceleration dialogues** leverage sensemaking protocols to explore scoping outcomes, interrogate previous policies and chart accelerators.
- **Modelling** engages new forms of participatory and economic modelling to assess the impact of potential accelerators.
- **Sustainable finance** estimates financing and the feasibility of potential accelerators. It uses SDG finance tools, including the Integration National Financing Framework (INFF).
- **Acceleration pathways** integrate insights developed through this approach with data visualisations and recommendations to advance policy interventions.

In the scoping phase, national data on SDG trends was enhanced and visualised in the SDG Push Diagnostic. This integrated evidence base of progress and 'last mile' challenges provided a common foundation to assess gaps and challenges ahead in multistakeholder acceleration dialogues led by the Ministry of National Development Planning/National Development Planning Agency (PPN/Bappenas) with UNDP support.

The SDG Push dialogue considered critical challenges and opportunities, and zeroed into priority areas based on progress and trends over the last seven years, identified the challenges, bottlenecks and, interlinkages, and potential accelerators considering future country trajectory. Utilizing a tailored facilitation approach drawing from sensemaking methodologies, generative dialogue and futures methods, the dialogues supported a structured exploration of current and future interventions with the interlinkages that had the most potential to advance multiple SDGs in the country.

The main drivers of progress with demonstrated impact across sectors included free primary and secondary education, the doubling of energy efficiency, universal health coverage, and the increase of renewable energy. These drivers contribute to the end goals of eliminating hunger and malnutrition, and achieving more inclusive economic growth. Other crucial interventions include ensuring universal access to urban housing and basic services, providing safe drinking water, reducing poverty, eradicating epidemic diseases, improving access to energy, and increasing the income of the poor.

With quantitative data from the scoping phase and qualitative insights from the acceleration dialogues, new policy scenario were created using Computable General Equilibrium (CGE) model (SDG Push), to interrogate the potential impact of different policy choices through 2030. Six articulated scenarios were identified, and the modelling exercise evaluated the impact on selected SDG indicators that are directly and indirectly affected.

Six scenarios have been progressively studied in addition to the baseline scenarios. The scenarios reflect a different combination of public spending on education, health, transport infrastructure, renewable electricity and housing:

- Under the baseline scenario (business as usual, or BAU), the country is expected only to achieve SDG 4.1.2 related to the primary and lower secondary completion rate, while under full implementation of SDG Push scenarios, the country could achieve the SDG 4.1.2 target but would also make significant progress on the upper secondary completion rate (SDG 4.2).

- SDG Push scenarios would help the country achieve an annual GDP growth rate of 7.12 per cent, higher than the SDG 8.1.1 target (7 per cent). In addition, if the country benefits from a stimulus from foreign funds, the growth rate could reach 7.72 per cent, and the country would experience lower inequality (SDG 10. 1.1).

- Further, increased public spending as part of the SDG Push could contribute to half of the country's roads being in good condition (SDG 9.1.1) while using renewable electricity (SDG 7.2.1) and adequate housing in urban areas would increase.

- Finally, an additional 2.4 million people would be lifted out of poverty if all scenarios were implemented and financed at the domestic level (compared to the baseline scenario); if the country receives foreign financing (stimulus), more than 3.7 million additional people would be lifted out of poverty by 2030, and the poverty rate would fall to 4.3 per cent.

Introduction

The SDG Push framework is a set of comprehensive and country-specific tools developed by the United Nations Development Programme (UNDP) to accelerate progress towards achieving the Sustainable Development Goals (SDGs). The framework aims to reimagine and recalibrate how development interventions are planned and implemented to create meaningful progress in sustainable development. The framework is designed to adapt to the unique challenges and opportunities each country faces. It considers individual countries' specific contexts, priorities, and development trajectories. It allows for addressing various constraints and issues countries face to achieve the SDGs.

The framework combines the power of data, state of the art modelling, and finance to enhance the effectiveness of development interventions. By leveraging data and evidence-based approaches, fostering innovation, and mobilising financial resources, the SDG Push framework seeks to make interventions more impactful. The SDG Push framework recognises the importance of a participatory approach, i.e., collaboration and partnerships, in achieving the SDGs. It aims to bring together various stakeholders, including governments, civil society organisations, private sector entities, and international agencies, to work collectively towards common goals.

The ultimate goal of the SDG Push framework is to expedite the progress toward achieving the SDGs by providing countries with a comprehensive toolkit and support. It aims to accelerate positive outcomes and make a tangible difference in sustainable development.

This report synthesises the main findings of different stages of the SDG Push Framework in Indonesia. Doing so provides information and analysis of the country's context and development priorities. It summarises the outcomes of the multistakeholder dialogues which interrogate acceleration options that inform the modelling phase, which in turn provide inputs into the financing aspect of the exercise. Together these parts contribute to the final component called Acceleration Pathways.

Overview of socio-economic and environmental challenges in Indonesia

Indonesia is the World's tenth-largest economy in terms of purchasing power parity (World Bank, 2022). After going through the Asian financial crisis of the late 1990s, the country has had significant economic growth (World Bank, 2022). Between 2015 and 2019, robust economic development, with an average annual growth rate of 5%, was supported by strong macroeconomic fundamentals. Every year, the economy added roughly 2 million jobs, which resulted in low unemployment and a substantial drop in the poverty rate to under 10% (World Bank, 2020). At that time, Indonesia was on the path to achieving even more gains in poverty reduction and moving away from the 'middle income trap' into a 'middle-class society' (World Bank, 2020). Unfortunately, in 2020, similar to other places, Indonesia experienced a severe economic downturn due to the COVID-19 pandemic (IMF, 2022). However, owing to strong initial conditions, substantial space for policy actions, and a bold policy response package, the recession in Indonesia was less severe than in other countries (IMF, 2022). The pandemic has partially undone the progress in reducing poverty (from a record-low of 9.2 per cent in September 2019 to 10.14 per cent in 2021), while inequality has probably worsened (IMF, 2022). The pandemic has asymmetrically impacted different sectors of Indonesia's economy and regions (IMF, 2022).

Although the economic recovery in 2021 was slower than expected due to a more disruptive effect on demands from contamination measures, it has accelerated since late-2021. The local demand, accommodative fiscal policy, and favourable global commodity prices are expected to assist the economic recovery in 2022–2023, with a projected 5.1 growth in 2022 (IMF, 2022; World Bank, 2022).

Apart from socioeconomic challenges, Indonesia is one of the nations most vulnerable to natural disasters brought on by climate change, which brings a risk of additional economic disruption, financial strains, strained assets and deforestation, to mention a few (IMF, 2022). Climate change is projected to influence Indonesia's capacity to access water, health and nutrition, disaster risk reduction, and urban growth, especially in coastal areas, with consequences for inequality and poverty (World Bank, 2022).

Two main targets have been identified for climate change mitigation:

- a conditional reduction target of up to 41 per cent and
- an unconditional greenhouse gas (GHG) reduction target of 29 per cent

The country has taken significant steps to support these objectives, including creating a green financing pipeline through Green Sukuk in 2018, implementing a carbon pricing scheme in 2021, and introducing the Indonesia Green Taxonomy version 1.0 in the same year. Moreover, Indonesia has plans to establish an emission trading system (ETS) by 2024.

Scoping Phase

The scoping note marked the initial stride towards developing Indonesia' s SDG Push framework. The revision of Indonesia's SDG Roadmap in 2023 stands as the primary avenue for the SDG Push initiative. The insights garnered from this analysis will guide Indonesia in amending and enhancing its roadmap, drawing from the latest available data at the time of assessment.

To provide the Indonesian Government with a high-level overview of the development landscape and the existing challenges, an overview of existing strategic policy and planning documents was a first step towards developing Indonesia's SDG Push framework. An in-depth overview of national development plans and strategies was essential to understand countries' socioeconomic, institutional and environmental landscape, map out SDG gaps, evaluate SDG progress and identify potential interventions that could accelerate the achievement of SDG 2030 Agenda. In addition, the initial phase of SDG Push framework has identified data availability, disaggregation and consistency in their monitoring over time. This is important as data availability, reliability and accuracy are needed to correctly identify SDG gaps and development pathways that can accelerate the SDGs.

The Indonesian Government has set ambitious goals for the country's economic and social development by 2025. The Government designed the three interconnected and interdependent development plans to help attain these goals, which are heavily aligned with SDG 2030 Agenda. Presidential Decree No. 59/2017 outlines the formulation and integration of SDG targets into the country's development planning documents. For Indonesia, therefore, implementing the SDGs is the same as implementing the national development plan (VNR, 2019; 2021). SDG targets have been mainstreamed into the current national medium-term development plans, 2020-2024 RPJMN, with 124 targets. Consequently, the targets are also included in the sub-national medium-term development plan (Rencana Pembangunan Jangka Menengah Daerah/RPJMD).

Indonesia has integrated the Sustainable Development Goals (SDGs) into its National Mid-term Plan (2020-2024) and has formulated its National Action Plan along with the 'Roadmap of the SDGs Indonesia: Towards 2030'.

An integral aspect of the scoping process is the utilization of the SDG Push Diagnostic Simulator, which leverages sophisticated machine learning techniques to detect disparities in SDG advancement on a national scale. Moreover, it undertakes a preliminary, in-depth examination of accessible national data and knowledge reservoirs to pinpoint areas of paramount importance for national development.

Based on the diagnostic simulator it was possible to assess the progress Indonesia made in attaining distinct SDG targets, systematically organized in accordance with the five Ps of sustainable development: People (comprising 47 targets), Peace (encompassing 12 targets), Planet (encompassing 46 targets), Prosperity (encompassing 45 targets), and Partnership (comprising 19 targets). As illustarted below, countries' national priorities are generated using machine learning to reveal the most prominent SDGs referenced in national policy documents. Assessing 5 strategic documents (National Development Plan 2030 ; Cooperation Framework Common Country Analysis ; Voluntary National Review) SDG 11, 8, 3 and 16 seem to be the most prominent goals.

In addition, by mapping SDG priorities to current SDG progress identified in trend analysis, help us to understand which SDGs are off track but potentially a low/high priority in national documents, thus providing an insightful starting point for national dialogues. For instance, SDG 11 has been identified as off track and ranks ver high in national development documents.

Figure 1. AI analysis of national priorities' aligned with the SDGs

Furthermore, through the analysis of synergies and tradeoffs, more than 20 synergy links with other targets, shared across 14 of the 16 SDGs, are found for indicator 11.1. Thus, getting this indicator back on track for 2030 through bold and innovative development policies could help elevate many other indicators are well, some of which are also currently lagging. For instance, improving the housing conditions and decreasing the share of people living in slums could help to get Target 3.3. back on track, as unsanitary housing conditions are known to be aggravating factors in the propagation of epidemics.

Synergy links allow to identify possible accelerators for SDG 11, for instance through Governance on Managing Water Quality. Having access to proper sanitation and clean water is a necessary condition for adequate housing and thus promoting integrated solutions and coordination mechanisms in the national and subnational departments in charge of these SDGs could have substantial acceleration effects.

Based on the conclusions of the scoping phase, several challenges linked to Indonesia's ongoing SDG journey can be enumerated as follows: (1) Ensuring consistent availability of data and information, which serve as the bedrock for targeting resources and gauging progress; (2) Navigating investments and development trajectories that can expedite the most critical SDGs in Indonesia while fostering an equitable and sustainable recovery from the impacts of COVID-19; (3) Fostering cross-sector collaboration and transcending boundaries to make SDGs 11, 3, and 8 pertinent to everyone.

Outlined in the scoping note are four focal priority areas:

- Enhancing access to essential services for the impoverished, encompassing education, healthcare, water and sanitation, and energy.
- Facilitating affordable housing and upgrading slum areas, alongside fortifying urban centers against climate change and other disruptions.
- Addressing land tenure and legal identity challenges.
- Advancing integrated transportation systems and efficient waste management.

Acceleration dialogues

Part of the SDG Push process is the incorporation of a series of systemic and multi-stakeholder dialogues. UNDP SDG Push Dialogue in Indonesia was held in partnership with Indonesia government counterpart, BAPPENAS, from December 12-13, 2022, hosting 36 participants from various ministries and one participant from the private sector. The dialogue process was focused on SDG 11 and other areas of interest related to access to basic services (education, water, sanitation, energy), affordable housing, land tenure, climate change, transportation and waste management. Based on topics, expert teams were created for each area of interest, eight in total.

The first phase of the dialogue assessed current issues, the underlying root causes for challenges, the reasons for those challenges not being addressed and interconnections with other issues (see Annex 1 for details).

The second phase explored current interventions where participanats interrogated both the intended solutions and beneficiaries, alongside an exploration of the bottlnecks for success and the role of different stakeholders experienced in implementing specific interventions. Participants selected up to three interventions which they think has the highest impact for its target audience, contributes to wider transformation, prioritizes root causes and has longer term implications and has cross-sectoral impacts.

The participants were introduced to Horizon scanning which is a foresight process focused on scanning the horizon for identifying and collating any emergent signals of change and the PESTLE + V framework (Political, Economic, Societal, Technological, Legal, Environmental, values) as a way to organize their analysis and ensure they are being comprehensive in their scanning efforts. Three Horizons foresight method. snythesized current state (Horizon 1), future state (Horizon 3), and a transitional state (Horizon 2).

These scenario/future states directly informed the policy scenarios created in the subsequent modeling phase, expanding the parameters normally included in scenario development to explore/design/propose transitional strategies, policies and programmes that can bridge between the current and future states for each of the issues.

Modelling phase

For the Government and policymakers to understand how interventions in a particular area impact the desired targets, it is necessary to use a comprehensive and systematic framework to analyse the entire economy, capturing the interconnections between various sectors, industries, and agents. This allows for a more holistic analysis of the economy's response to different policy measures and helps make informed decisions and design policies that are more likely to achieve desired economic outcomes.

The SDG Push exercise employs a CGE (computable general equilibrium) model to understand the potential impacts of these drivers and interventions. This model is used to build a case for policy intervention and assist policymakers in understanding the extent to which some sectors of the economy might be affected by change. Its main advantage is its flexibility which focuses on the structure and detail of agent-specific behaviour and allows to capture of detailed economic relationships and connections that would otherwise be missed in other models. This complexity allows the models to be applied to a wide range of 'what if' questions.

This model builds a baseline scenario and projects its outcomes up to 2030. Additionally, six articulated scenarios are identified through dialogues and evidence gathering during the scoping phase. The CGE model evaluates the impact of these scenarios on selected SDG indicators, considering wide economy effects.

Indonesia's SDG Roadmap and the Dialogue suggest the following main drivers of the SDG targets: free primary and secondary education; energy efficiency improvement; universal health coverage; and higher share of renewable energy, and transportation infrastructure. According to the Roadmap and the Dialogue, the above drivers will help to achieve the end goals of development, i.e. eliminate hunger and malnutrition, and achieve a more inclusive economic growth. The other important interventions, according to the Roadmap are to achieve universal access to urban housing and basic services; to provide safe drinking water; to reduce poverty; to eradicate epidemic diseases; to improve access to energy, and to increase the income of the poor. By analysing these scenarios, policymakers can better comprehend the short-term and long-term structural transformations needed to achieve the SDGs effectively.

The aim is to quantify the impact of policy scenarios (drivers identified in the Dialogue) on the SDG indicators, and thus to assess the efforts the country needs to mobilise to achieve specific targets. To this end, a country-specific dynamic computable general equilibrium (CGE) model, combined with survey-based microsimulation (top-down), has been developed. The CGE model is calibrated using a country-specific social accounting matrix (SAM) that captures the recent structure of the economy, and elasticity parameters drawn from the relevant literature. The framework we have developed differs from the standard CGE model in that it includes features that are essential to the policy scenarios of interest.

The next section describes the methodology and data, section 3 presents the scenarios, section 4 highlights the results, and the final section draws conclusions and key messages.

Methodology and data

Model

Our CGE builds off from the PEP recursive dynamic mode (PEP-1-t, Devalue et al., 2010).[1] The production nest is a Leontief aggregation of the value-added intermediate bundle. Value added is an aggregation of capital and labour. Standard assumptions regarding utility maximisation are considered, and household demand is modelled through the linear expenditure system (LES). Household income comprises income derived from the factors of production (capital and labour), as well as transfers from the Government. Household disposable income is obtained by deducting savings and direct taxes from income.

Regarding the government account, expenditure consists of consumption of goods and services, and transfers to households and the rest of the world. The income side consists of taxes and income from enterprises and the rest of the world. The difference between government expenditure and income is government savings, which is endogenously determined in the model.

As in a typical CGE model, imperfect substitution between domestic and foreign goods is assumed. On the import side, the Armington function is used to capture substitution possibilities between domestic and imported goods in response to changes in relative prices. On the export side, the constant elasticity of transformation (CET) function is used to capture substitution possibilities between domestic and foreign sales.

Market equilibrium is achieved by equalising demand and supply through price adjustments in commodity, factor and foreign exchange markets. Regarding macro closures, aggregate capital is fixed and fully employed, while a wage curve is used to model employment, implying the possibility of unemployment. Foreign savings is fixed, and the real exchange rate is flexible. Further, government consumption is fixed, and both direct and indirect tax rates are fixed. The household savings rate is also assumed to be constant.

The above model was extended to analyse the policy interventions related to education, infrastructure (transportation, renewable energy), health and housing. The extensions to the model are discussed below.[2]

Education

To assess the impact of public expenditure on education outcomes and labour markets, the authors relied on the study by Jung and Thorbecke (2003). The model has three categories of labour: unskilled (1), semi-skilled (2) and high-skilled (3). Unskilled labour includes individuals who have not completed primary school; semi-skilled includes individuals who have finished primary school but have not completed secondary school; and high-skilled labour comprises individuals who completed secondary and tertiary education.

The supply of educated labour is determined by agents' maximisation of their lifetime incomes. In a period, t, an agent selects one between the following two options: obtaining a higher-level education in period t to earn higher expected wage incomes from period (t+1), or continuing to work without a higher-level education and earning the wage incomes for the same education level afterwards. The expected value of wage income for an educated worker depends on the wage level and the availability of education facilities.

[1] This has similar features to IFPRI's standard model

[2] See Decaluwé et al. (2010) for more details.

The supply of educated labour can be specified approximately as:

$$MS_t^m = \varphi_1 ED_t^\rho + \varphi_2 \left(\frac{w_{t-1}^m}{w_{t-1}^l}\right)\left(\frac{1+g_{t-1}}{1+r_{t-1}}\right) = \varphi_1 ED_t^\rho + \varphi_2 \left(\frac{w_t^m}{w_t^l}\right)$$

MS = supply of educated individuals; ρ = an elasticity of supply to public expenditure (ED), and the authors used the value of 0.5, as Jung and Thorbecke (2003). φ_1, φ_2 are positive parameters calibrated using the data from the SAM and education return. *g* is growth rate of wages, and *r* is the discount rate (interest rate). w^m_t represents the wage rate for higher education, and w^l_t is the wage rate for lower education; ML is labour supply; and MS stands for educated people.

$$MS_3 = ML_3$$

$$MS_2 = ML_2 + MS_3$$

$$ML_1 = PA - ML_3 - ML_2$$

Labour supplied by non-educated individuals (ML_1) is determined residually, i.e. taking the difference between active population (PA) and labour supplied by other categories.

Infrastructure: Transportation and renewable energy

Theoretically, the supply-side effects of infrastructure investment stem from two potential mechanisms. First, greater investment in infrastructure (transport and energy sectors) means higher capital accumulation and production; consequently, the infrastructure sector is likely to increase its demand for inputs (supplied by other sectors). And second, the induced increase in infrastructure production can lead to lower transport and energy services costs, positively affecting the output of sectors that use these goods as inputs.

Following Cetin (2022), Montaud, Dávalos & Pécastaing (2020) and Boccanfuso et al. (2014), we include externality function ($\theta_{j,t}^{inf}$) in production function to capture the impact of public investment in infrastructure on private

$$VA_{j,t} = \theta_{j,t}^{inf}(LDC, KDC)$$

output.

$$\theta_{j,t}^{inf} = \left(\frac{KD_{inf,t}}{KD_{inf,t-1}}\right)^{\xi_{inf,j}}$$

F(.) is the function of composite labour and capital

$\xi_{inf,j}$ represents the elasticity of externality to public investment in infrastructure. The values from Montaud, Dávalos & Pécastaing (2020) were used. In addition, sensitivity analyses were conducted (see Annex).

Health

Like Savard and Adjovi (1998), it is assumed that health may affect private output through an increase in total factor productivity (due to improved human capital). This is captured by the variable $\theta_{j,t}^{health}$:

$$VA_{j,t} = \theta_{j,t}^{health} F(LDC, KDC)$$

$$\theta_{j,t}^{health} = \left(\frac{HG_{health,t}}{HG_{health,t-1}} \right)^{\xi_{health,j}}$$

$\xi_{health,j}$ represents the elasticity of externality to public expenditures ($HG_{health,t}$) in health; the elasticity values are from Savard and Adjovi (1998). In addition, sensitivity analyses were carried out (see Annex).

Housing

As mentioned by Maclennan (2019), housing should be considered infrastructure, because it is likely to have potential supply-side impacts by boosting labour productivity. First, developing better housing outcomes helps workers reduce their travel to work time so they may devote more time to their work, which constitutes a growth-inducing increase in the supply of labour (agglomeration effects and residential densities). Second, when households have access to affordable housing closer to jobs, education and services, this may result in better job matching and learning outcomes (human capital accumulation effects). To capture the labour productivity effect related to investment in housing, the authors relied on following equations[3]:

$$LDC_{j,t} = \theta_{j,t}^{house} G(LD_{l,j,t})$$

$$\theta_{j,t}^{house} = \left(\frac{KD_{house,t}}{KD_{house,t-1}} \right)^{\xi_{house,j}}$$

G(.) is the generalised constant elasticity of substitution (CES) of different categories of labour. $\xi_{house,j}$ is the elasticity of labour productivity to public investment in infrastructure. Unlike infrastructure, a credible estimation of $\xi_{house,j}$ was absent from the literature. A smaller value of $\xi_{house,j}$ (0.1) was used and a credible sensitivity analysis was run.

To run poverty analysis, the CGE model was linked with a microsimulation (top-down) using household income as the transmission channel. The microsimulation is based on the reweighting approach using the cross-entropy method (Fofana, Chitiga-Mabugu & Mabugu, 2023).

Data

The main source of data was the 2018 SAM for Indonesia developed by the International Food Policy Research Institute (IFPRI.) The SAM is a detailed representation of Indonesia's economy consisting of 41 sectors. Labour is classified by skill level (unskilled, semi-skilled and skilled); rural and urban households, by expenditure quintiles (five types each of rural and urban); and Government, investment and foreign accounts. The SAM was updated to 2021 using macroeconomic data of the same year. Further, some accounts of the SAM were divided using coefficients from the Indonesia Input Output Table 2016 (Statistics Indonesia). Specifically, sector of construction was divided into residential buildings; agricultural infrastructure; electricity and gas infrastructure; roads, bridges and ports; and other buildings. Electricity sector was divided into renewables and non-renewables. Refined oil industry was separated from manufacturing. And finally, mining was split into coal, oil, natural gas and geothermal, and other mining. The division was aimed at constructing alternative scenarios using the CGE model.

[3] This equation is similar to that of Savard and Adjovi (1998)

Scenarios

Baseline scenario

Under the baseline scenario, public expenditure over 2023–2030 is expected to follow past trends,[4] as observed in Table 1. Then, changes in SDG indicators that are directly and indirectly affected are computed.

Table 1. Annual public expenditure growth over the 2008–2019 period

Public expenditure (LCU Trillion)	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Average Annual growth rate (%)
Government expenditure on education [a]	143.6	197.6	193.0	249.8	293.6	320.7	347.5	413.1	434.1	362.8	445.2	449.9	10.0
General government expenditure on Housing and community amenities [b]	89.6	64.8	79.2	89.8	108.7	140.0	153.0	143.9	183.2	184.9	187.6	187.3	6.3
General government expenditure on health [b]	61.9	62.0	56.2	61.0	69.3	79.5	86.3	98.6	190.1	188.5	207.8	234.3	11.7
Environment function expenditure [b]	14.8	22.9	15.1	18.4	20.8	25.6	23.9	24.4	32.0	26.4	31.5	36.0	7.7
Infrastructure function expenditure [a]	15.9	20.7	18.9	18.1	28.0								11.9

[a] World development Indicators (2023); [b] International Monetary Fund (2023) , [c] authors' calculation.

[4] We computed the average annual growth rate over the period 2008-2019, i.e. before the pandemic.

Table 2 presents a selection of SDG indicators (over the 2008–2030 period) that can be directly affected by public spending. The selection is based on the outcomes from the Dialogue. As shown, the country is on track for the primary and lower secondary education SDGs. However, for health (essential health care coverage), the country is far from the target (100 per cent). For the other SDGs of interest, there are no specific targets; hence, the appreciation of progress is left to the discretion of decision-makers (or researcher).

Table 2. Selected SDG indicators over the 2008–2019 period

SDG Indicators	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Target, 2030
4.1.2 - Lower secondary completion rate, total (%) [a]	74.9	82.3	85.6	89.2	82.7	81.4		91.6	93.9	90.0			95-100%
4.1.2 - Primary completion rate (%) [a]	96.7	98.5	100.6		103.1	101.1	103.5			100.8	102.3		95-100%
4.2 - Educational attainment, at least completed upper secondary, population (%) [a]	26.2	27.8		28.9			31.1	32.3	33.7		34.6		>
11.1.1 - Population living in slums (% of urban population) [a]			23.0				21.8		30.9		30.6		<
3.8.1 - Coverage of essential health services(%) [b]			42.0					50.0		54.0		56.0	95-100%
7.2.1 - Renewable electricity output (% of total electricity output) [a]	13.3	13.2	15.9	12.0	11.2	12.3	11.5	10.7	12.1	12.6	17.0	16.2	>
9.1.1 - Road with good condition [c]				42.0	42.0	42.0	42.3	42.2	45.1	39.9	43.8	43.4	>

[a] World development Indicators (2023); [b] Global Health Observatory. Geneva: World Health Organization (2023), [c] Statistics Indonesia, Land transportation statistics (2011-2021)

Intervention scenario

To derive the public expenditure under policy scenarios, the process is as follows:

- Step 1: For each scenario, we compute elasticity parameter as the ratio of change in SDG indicator-to-change in related public expenditure, using data from Tables 1 and 2.

$$e = \left(\frac{\Delta sdg}{sdg}\right) \Big/ \left(\frac{\Delta g}{g}\right)$$

It is assumed here that these elasticities are stable over the 2023–2030 period.

- Step 2: For the intervention scenario, the SDG target by 2030 was set and the related changes (*Δsdg/sdg*) were computed; then the change in public expenditure was desired using estimated elasticities. For the baseline scenario, the projection of the public expenditure over the period of analysis was used and then the values of SDG indicators were derived using the same elasticity parameters.

Table 3 presents the growth rate of public expenditure under the BAU and policy interventions. Infrastructure, housing and the environment are drivers of public expenditure under policy interventions.

Table 3 . Projected annual growth rates of public expenditure under the business-as-usual and policy scenarios (%)

	BAU	Policy scenarios	Difference (percentage points)
Government expenditure on education	10.0	15.6	5.6
General government expenditure on housing and community amenities	6.3	16.7	10.3
General government expenditure on health	11.7	19.4	7.7
Environment function expenditure	7.7	16.9	9.2
Infrastructure function expenditure	11.9	22.7	10.8

Results

First, we present projections of the SDG indicators in areas affected by public spending. Next, we present a broad range of SDGs affected by public spending via the interaction between activities and institutions through the price mechanism. This is precisely one of the advantages of using the CGE model.

Table 4 shows that if the country maintains the same public spending trend on education, primary and lower secondary education targets will be achieved. However, significant progress needs to be made in upper secondary education. Coverage of essential health services would be 70 per cent (below the target) if the country were to maintain the same trend in public spending on health as observed in the past.

Under the BAU scenario, only 19.39 per cent of the country's electricity comes from renewable sources, more than half the roads are not in good condition, and 29 per cent of the urban population still lives in slums.

Table 4. Projection of SDG indicators under the business-as-usual scenario, 2030

	Value	Cumulative changes	Estimated value,2019
Lower secondary completion rate, total (%)	111.85	0.24	90.0
Primary completion rate, total (%)	107.63	0.05	102.3
Educational attainment, at least completed upper secondary (%)	52.90	0.39	38.1
Population living in slums (% of urban population)	28.95	-0.05	30.6
Coverage of essential health services	70.05	0.25	56.0
Renewable electricity output (% of total electricity output)	19.39	0.19	16.2
Road with good condition %	44.93	0.03	43.4

Table 5 shows that if the country increases investment in health (as presented in Table 4), the target will be reached by 2030. Furthermore, if the country invests more in education, the upper secondary completion rate will be 75.82 per cent, compared with 52.90 per cent under the business as usual (BAU) scenario. Further investment in renewable energy production, housing and transport would significantly improve the SDG indicators; the share of renewable electricity would be 30.06 per cent, and half of all roads would be in good condition.

Table 5. Projection of SDG indicators under policy scenarios, 2030

	Value	Cumulative changes	Estimated value,2019
Lower secondary completion rate, total (%)	111.85	0.24	90.0
Primary completion rate, total (%)	107.63	0.05	102.3
Educational attainment, completed at least upper secondary school, (%)	75.82	0.99	38.1
Population living in slums (% of urban population)	21.42	-0.30	30.6
SDG 3.8.1 Coverage of essential health services	99.68	0.78	56.0
Renewable electricity output (% of total electricity output)	30.06	0.85	16.2
Roads in good condition, %	49.95	0.15	43.4

Table 6 shows the SDG indicators that are affected by public expenditure under different scenarios. The indicators highlighted in red do not show any improvement; the indicators highlighted in yellow show a slight progress and those that are highlighted in green exhibit a good progress. Compared to the reference scenario, the policy scenarios under study can make significant progress on the SDG indicators. The main reason for this, is that, under the SDG push scenarios, productive public spending on education, transport and housing has triggered productivity growth and lower input and production factor costs.

In the BAU scenario, 2 indicators - labor productivity growth rate and labor share of GDP - out of 7 are not on track, while 5 indicators show slight progress. When the public spending scenarios are combined, the country can achieve an annual GDP growth rate of 7.12 per cent, which is higher than the target (7 per cent); if the country benefits from a stimulus from foreign funds, i.e. 35 per cent of the cost of the policy intervention, the growth rate could reach 7.72 per cent. The main reason for this growth is that, under the SDG Push scenario, productive public spending on education, transport and housing has triggered productivity growth, and lower input and production factor costs.

While the productivity growth rate could stagnate under the BAU scenario (no change in the labour productivity growth rate relative to the value observed in 2022), it could increase by over 4 per cent (per year) under the combined policy scenarios relative to the value observed in 2022. When all scenarios are combined and exclusively financed by domestic private savings (including public debt), the country could record good progress (green) for four indicators (SDGs 8.1.1, 9.2.2, 7.2.1 and 10.1.1) out of seven; it could also record slight progress for SDGs 8.2.1 and 9.2.1. Indeed, external financing can adversely affect the economy due to the appreciation of real exchange rates, which is particularly important for export-oriented sectors.

For all the policy scenarios explored here, the results show that the country would not be on track with respect to SDG 10.4.1 (labour share of GDP); the possible explanation for this is that the investment plan implemented under the policy scenarios has increased capital accumulation and productivity; as a result, production has become less labour-intensive.

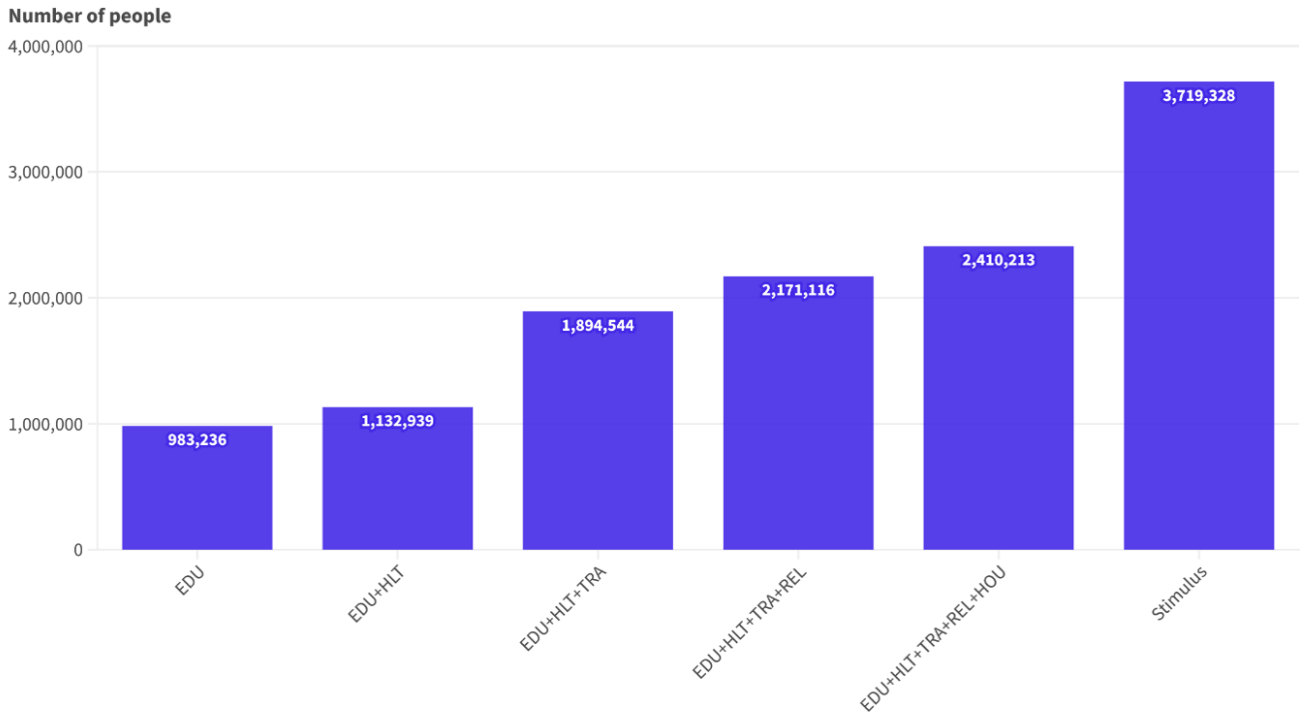
Table 6. Projection of SDG indicators under the business-as-usual and SDG Push scenarios

	Estimated value, 2022	**Annual average (2023–2030), per cent**						
		BAU	EDU [a]	EDU + HLT [b]	EDU + HLT + TRA [c]	EDU + HLT + TRA + REL [D]	EDU + HLT + TRA + REL + HOU [e]	Stimulus [f]
8.1.1 - GDP growth rate	5.29	5.70	6.26	6.35	6.77	6.92	7.12	7.72
8.2.1 - Labour productivity growth rate*	2.80	2.80	2.84	2.85	2.87	2.88	2.91	2.92
9.2.1 - Manufacturing value-added share of GDP	18.34	18.68	18.69	18.68	18.58	18.60	18.70	18.49
9.2.2 - Manufacturing employment share of total employment	11.60	12.29	12.52	12.53	12.51	12.52	12.63	12.28
7.2.1 - Renewable electricity share of total final energy consumption	13.67	13.77	13.49	13.47	13.38	14.01	13.98	13.73
10.4.1 - Labour share of GDP	29.49	27.10	25.66	25.65	25.59	25.57	25.35	25.52
10.1.1 - Growth rate of household expenditure (bottom 40%)	3.58	4.38	4.84	4.89	5.23	5.36	5.40	6.15

*The authors used the change in GDP per employed person from the World Indicators database (2023); [a] increase in public expenditure on education, [b] increase in public expenditure on education and health; [c] increase in public expenditure on education, health and transportation; [d] increase in public expenditure on education, health, transportation and renewable electricity; [e] increase in public expenditure on education, health, transportation, renewable electricity, and housing; [f] increase in public expenditure on all sectors, partly financed by external funding (35%).

Figure 2 shows that more than 2.4 million additional people will be lifted out of poverty if all scenarios are implemented; if the country benefits from foreign financing (stimulus), more than 3.7 million additional people will be lifted out of poverty by 2030, and the poverty rate should drop to 4.3 per cent.

Figure 2: Additional number of people lifted out of poverty, compared with the business-as-usual scenario



Costing of SDG accelerators

In this section, we present the costing of the SDG accelerators. Public expenditure is the sum of the government current expenditure and public investment by sector. For the base year (2021), current expenditures for education and health are directly observed in the SAM. Public investment by sector (education, health, transport, renewable energy, housing) is derived from sector-specific capital compensation, which is directly observed in the SAM[5]. We assume that education, health, transport, renewable electricity and housing sectors are public in Indonesia.

Table 7 below shows the required additional funding for the SDG accelerators, i.e. education, health, transportation infrastructure, renewable electricity and housing, for the period 2023 to 2030. The average additional fund needed is 2% of baseline GDP and the total estimated additional cost is $281 billion over the period 2023-2030.

Table 7. Public expenditures (LCU billion; 2021 prices)

		2023–2024	2024–2025	2025–2026	2026–2027	2027–2028	2028–2029	2030–2031	Total
ALL	Baseline	1,439,322	1,578,778	1,732,220	1,901,088	2,086,971	2,291,627	2,516,998	
	Intervention	1,527,923	1,779,398	2,073,151	2,416,435	2,817,773	3,287,181	3,836,441	
Gap	Value (LCU billion, 2021 price)	88,601	200,620	340,931	515,348	730,801	995,553	1,319,443	4,191,297
	Value (US$ billion)	5.9	13.4	22.8	34.5	49.0	66.7	88.4	281
	% Baseline GDP	0.4	0.8	1.3	1.9	2.5	3.2	4.0	

Based on the costs estimated in Table 7, Indonesia's Integrated National Financing Framework (INFF) in line with SDG finance strategy, could be used as a tool to explore options (plans) for mobilizing the financial resources needed to cover the costs of the SDG acceleratos. Based on the country's experience, these options could include mobilizing national public resources (fiscal policy, budget reallocation), partnering with the national private sector or mobilizing external funds (public or private).

[5] We refer interested readers to PEP-1-T model for more details on the calibration of sector specific capital stock.

Acceleration Pathways

As elaborated in the scoping phase, explored in dialogues and assessed in policy scenario modeling, there are critical drivers of SDG acceleration in Indoneisa which center around policy interventions in education, health, transport, housing, and renewable energy.

Overall, public interventions through productive investment in these areas could help the country get back on track with SDGs that may have regressed because of the COVID-19 pandemic. Specifically, we show that higher public spending in these areas, do not only improve SDGs indicators but they also have positive spillover effects on the entire economy.

Under SDG push, the country is expected to achieve SDG 3.8.1 and SDG 8.1.1 related to coverage of essential health services and GDP per capita growth rate, respectively. While the country would achieve the SDG 4.1.2 target related to primary and lower secondary completion rate under Business-as-Usual scenario, it would benefit more from SDG push since it would also record significant positive changes in upper secondary completion rate compared to BAU, in addition to reaching SDG 4.1.2 target.

We also find that SDG push framework allows significant progress on the transportation infrastructure as the country would have half of all roads in good condition (SDG 9.1.1) while experiencing higher use of renewable electricity (SDG 7.2.1), and a lower proportion of the urban population living in slums (SDG 11.1.1). When the required investments under SDG push framework are partially funded by external funding, the GDP growth rate could reach 7.72% with a significant reduction in inequality (SDG 10.1.1). Adding up public investments in areas identified in the Dialogue, pushes further SDG 8.1.1, SDG 8.2.1 and SDG 10.1.1.

Finally, 2.4 million additional people will be lifted out of poverty if all scenarios are implemented and funded domestically (compared to baseline); if the country benefits from foreign financing (stimulus), more than 3.7 million additional people will be lifted out of poverty by 2030, and the poverty rate should drop to 4.3%. To achieve this, the average financing requirement is 2% of baseline GDP and represents $281 billion over 2023-2030.

However, we recognise that our methodology has some limitations mainly related to data issues. Because of that, we compute the ratios of relative changes as proxy of elasticities, which should be estimated consistently. In the CGE model, we rely on elasticities that are from literature, while they should be country specifics. However, we have conducted a credible sensitivity analysis (see Annex).

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Annex 1 - Dialogue report

Understanding how issues are presented on the ground.

Noting outputs for Teams 1,2,3,4 were captured and shared below. Outputs for teams 5-8 were not captured.

DISCUSSION NOTES TABLE 1 - ACCESS TO EDUCATION

- Target 4.3 Technical, vocational, and tertiary education
- Indicator 4.3.1 Youth and adult participation rates in formal and non-formal education and training (Data source: Susenas Module, BPS 2018)

Current progress

- Rural: Teenagers (45.72%), Adults (1.67%)
- Remote: by province?
- Urban: Youth (50.90%), Adult (2.78%)
- Bottom 40%: Teenagers (42.69%), Adults (0.89%)

2015 situation

- In the education sector, the 2015-2019 RPJMN has not yet touched the target for vocational education and training. The baseline for tertiary education is the gross enrollment rate for tertiary institutions of 28.5%.
- In the field of increasing human resources, there is a target of increasing training and certification as well as the number of state-owned training institutions.

Changes in the last 7 years:

- In the 2020-2024 RPJMN, the issues of vocational education and training have been integrated towards revolution 4.0.
- RPJMN 2020-2024, there has been a target for the number of vocational training graduates from 1.4 million (2019) to 2.8 million (2024).
- The number of training institutions until 2018 = 4,039 units
- PT APK 2021: 31.19%.

Challenge:

- Mismatch between the competencies of vocational education and training graduates and industry needs.
- In addition to being limited in number, infrastructure facilities at government-owned training institutions also have not been updated.
- Efforts to encourage informal workers to formal are not entirely bad, because the phenomenon of informal workers has several advantages in the form of flexibility in working hours, higher income (Gig Worker), not depending on one industry or expertise so that they have opportunities in many fields.

Attempts to overcome challenges:

- Currently there is Presidential Decree No. 68 of 2022 concerning the revitalization of vocational education and training.

Interlinkage:

- Target 4.3 conditions are related to Target 8.5. However, it cannot be separated from the target condition 8.6.
- In 2021, the number of unemployed reached 9.10 million people with the open unemployment rate dropping to 5.86 (2022) from 6.49 (2021), the

underemployment rate to 6.32 (2022) from 8.71 (2021),

- The percentage of young people who are not in school, working or attending training (NEET) is 22.40 (2021) from 22.28 (2020).

DISCUSSION NOTES TABLE 2 - HEALTH, WATER AND SANITATION

Current Situation

- Problem of stunting (4th countries with highest burden) (2013: 37.2%, 2021: 24.4%) shows improvement but still high
  - Urban: 21.70% vs Rural: 27.80% (2021)
  - Poorest: 34.70% vs Richest: 14.30% (2021)
  - Despite the pandemic COVID-19, and disruption to the national development of health, social and the economy, the stunting rate has reduced from 31% in 2018 to 24,4 % in 2021

- Related factors:
  - maternal health (hypertension, pre-eclampsia, diabetes, anemia, chronic energy deficiency, pregnancy at younger age)
  - unsafe water and sanitation
  - poverty
  - education attainment

- Target: 14% in 2024

- Stranas Stunting - Indonesia has a strong commitment and multiform interventions to tackle stunting since 2017 by launching the National Strategy to Accelerate Stunting Prevention (Stranas Stunting)

DISCUSSION NOTES TABLE 3 - ENERGY

How does this issue currently appear on the ground in different national contexts (rural, remote, urban, urban poor)?

- Issues related to energy today are regarding the provision and access to energy sources for the community. The provision of electricity to rural and remote areas is carried out through the expansion of the electricity network by PLN which is limited by geographical conditions, costs and the economic situation in the target areas, and through the installation of off-grid systems by developing electricity networks.

- There are still 433 villages that do not yet have electricity, according to the KESDM report for 2021. Of the 433 villages that do not yet have electricity, only 117 villages have been completed with a total of 13,477 household customers.

- Other issues related to the supply of electricity need to also include context, for example reliability and affordability (people's purchasing power).

- In relation to the provision of fuel, it is still difficult for the 3T area and several other border areas to get access to fuel at an affordable price due to the distance constraint which causes the cost of fuel transportation to become more expensive.

- The Funding Strategy for the Development of the Physical Special Allocation Fund is used to support the development/procurement of local public service facilities and infrastructure and also encourage other non-government actors within the framework of multi-stakeholder cooperation such as increasing connectivity and electrification for inclusive development in target areas, one of which is Renewable Energy Infrastructure (IET).

How would you describe the reality of these issues in 2015?

- The number of villages that have not yet been electrified is greater, the provision of renewable energy or alternative energy, for example solar panels, biomass has not been massively distributed/evenly distributed.

What has changed in the last 7 years? Better, worse?

- Provision of access to electricity is gradually increasing so that the electrification ratio is increasing, more villages are electrified, better in terms of developing electricity supply infrastructure and alternatives support from non-government is starting to be seen even though it only exists in a few areas, including the ability of farmers to utilize and organize solar panels themselves are better (there is an economic improvement) on Sumba Island, NTT. In addition, the construction of gas stations in border areas has also been increased so that access to energy can be more equitable. However, in the last 7 years, the use of energy still uses a lot of fossil energy so that it has a negative impact on the environment, especially in tackling climate and the greenhouse gas effect.

What are the root causes of the challenges we experience with these problems?

- In terms of the development of electricity infrastructure and new and renewable energy, development in Indonesia is currently still constrained by the cost of developing the required EBT infrastructure and technology, which costs are still very high and limited.
- The community's economic aspect is also a determinant of the community's ability to access energy availability.

Why have we not been able to overcome these challenges?

- In terms of developing EBT infrastructure, financing is a big challenge that must be solved. Currently, many government allocations are still given to the payment of energy subsidies that are not environmentally friendly. If the subsidy allocation can be reduced and diverted to increase the allocation for EBT infrastructure development, it can certainly accelerate the development of EBT infrastructure in Indonesia and assist in mitigating the impacts of climate change.
- The approach taken is not multi-stakeholder so that the settlement of root causes is still incomplete.

How does your issue relate to other issues?

- Energy utilization, which currently still uses a lot of fossil energy, has a negative impact on the environment, especially in terms of increasing CO2 and the greenhouse gas effect.
- The economic capacity of the community affects utilization in obtaining access to energy (electricity)
- Access to electricity also affects the education, health, and economic activities as a whole.

DISCUSSION NOTES TABLE 4 - AFFORDABLE PUBLIC HOUSING

How does this issue currently appear on the ground in different national contexts (rural, remote, urban, urban poor)?

- The issue of relocating/improving slum areas in Jakarta in the context of restructuring and repair (North Jakarta
- The location flats are less accessible

- In rural areas (Probolinggo), the transfer of land from paddy fields to low-cost housing (no one is interested with house complex in rural areas)
- The high price of buying a house or renting a house in big cities and changing interest in housing investment.
- The COVID-19 pandemic has hampered housing construction.
- In remote areas, houses are still not feasible in terms of building resilience.

How would you describe the reality of these issues in 2015?

- In rural areas there are still not many housing (Probolinggo)
- There are many issues of clearing slum areas for infrastructure projects.

What has changed in the last 7 years? Better, worse?

- Urban planning is more organized.
- There are many new city developments but not affordable, then also the design of the new city is mostly car centric.

What are the root causes of the challenges we experience with these problems?

- Inappropriate supply and demand. High house prices that do not suit the economy of the community.
- Ownership of land controlled by large developers.
- The flats were not on target (low-income people), causing the relocated residents to become squatters.

Why have we not been able to overcome these challenges?

- Government commitment is lacking.
- The difficulty of land or a strategic location for flats, even if there is a high cost.

How does your issue relate to other issues?

- The slum areas have a lot to do with land ownership issues and are built on site.
- Housing development should be integrated with public transportation.
- Adequate water and sanitation facilities are part of adequate housing, which in turn affects public health.

Identifying current interventions

Day 1: Current Interventions - Identification of Indonesia National Policies per issue

Access to Education

- Presidential Regulation No 47 Year 2008 concerning the 9th Year Compulsory Education in Indonesia.
- Presidential Regulation No 68 Year 2022 on the revitalization of vocational education and vocational training, focusing on vocational revitalization intervention.
- Regulation of the Minister of Education and Culture the Republic of Indonesia No 10 Year 2020 on the Implementation of Smart Indonesia (Indonesia Pintar).
- Regulation of the Secretary General of the Ministry of Education and Culture No. 22 of 2021 on Indonesian Smart Card for Higher Education

Health, Water and Sanitation

- Law No. 36 of 2009 concerning Health, including directions and goals improving community nutrition.
- Indonesian National Strategy on Food Security and Nutrition 2020 - 2024.
- Indonesian National Strategy (STRANAS) Year 2017 on Stunting.
- President Regulation No 42 Year 2013 concerning National Acceleration on Improving Nutrition.
- President Regulation No 72 Year 2021on stunting policy lens.
- Regulation of Minister of Health No 492 Year 2010 and No 736 Year 2010 on drinking water quality.
- Regulation of Minister of Health No 3 Year 2014 concerning sanitation community-based.
- Regulation of Minister of Health No 32 Year 2017 concerning standard on environment, water and sanitation.

Access to Energy

- Law No 30 Year 2007 Concerning Energy
- Government Regulation No 79 Year 2014 Concerning National Energy Policy
- Regulation of the Minister of Energy and Mineral Resources No 50 Year 2017 on the Renewable Energy for Electrical Supply

Affordable Housing

- Government Regulation No 12 Year 2021 on Management of Housing and Housing Settlement Area.
- Regulation of the Minister of Public Works and Public Housing No 7 Year 2022 on Grant for Housing Development and Providing Special House.

Protecting cities to climate change and other shock

- Law No 16 Year 2016 concerning NFCCC agreement
- Law No 32 on the protection and management of natural environment
- The Job Creation Act No 11 Year 2020
- Government Regulation No 46 Year 2017 on the economic instrument for natural environment
- Government Regulation No 24 Year 2021 on Environmental Strategic Study.
- President Regulation No 77 Year 2018 on Management of Natural Environment Fund
- President Regulation No 98 Year 2021 on Carbon Economic Value.

Land Tenure and Legal Identity

- Government Regulation No 18 Year 2021 on Management Rights, Land rights, Apartment, and Land Registration.
- Regulation of Minister of Home Affair No 73 Year 2022 concerning Civil Registration Data.

Integrated Transport

- Regulation of Minister of Transportation No 76 Year 2021on Management System of Smart Transportation

Waste Management

- Government Regulation No 27 Year 2020 on Plastic Waste Management.
- Regulation of Ministry of Environment and Forestry No 14 Year 2021 on Waste management in waste bank.

Table Day 1 and Day 2 of the Dialogue

Analyzing current interventions using guided prompts

	Question #1 What is it solving and who is this benefiting from this? What are those benefits? What is it not solving, and who is not benefiting, and how?	#2 What is enabling the current intervention? What are its strengths?	#3 What are the gaps in the intervention? What are the barriers, bottlenecks to its success?	#4 What is the role different stakeholders to implement this successfully?	#5 Is this stop gap or is it addressing an underlying issue? What underlying issue is it addressing?	#6 Is this a sustainable intervention (apply to programs only)?	#7 Does this intervention support the country its transition to a circular development model?
TABLE 1 - Access to Education	Intervention will improve access of school age child and equal access for employability for adult Benefit: - Benefits the child's school fees- Improve adult competencies for employment Revitalization of vocational education and new vocational training in 2022. So, it is yet to be determined whether this intervention can successfully solve the problem? Is it beneficial?	Policies for vocational revitalization intervention are: Presidential Regulation no. 68 of 2022 on the revitalization of vocational education and vocational training Policies that support intervention- Technical Guidelines for ATS-ABPS Stranas ➔ as technical steps for stakeholders in handling out-of-school children (ATS) Policies that support the KIP program- Permendikbud no 10 of 2020 on the smart Indonesia program- Regulation of the secretary general of the Ministry of Education and Culture no. 22 of 2021 on KIP-College (-) smart Indonesia card helps poor school children for school needs (+) Strengths ➔ existence of rival stranasxx and funding	Adjusting competencies in research institutions with industry needs Gap intervention: MIS targeted bottle neck: update data on poor people by name and address Data Collection (Society & Governance) High budgetATS willingness to return to school is still below target availability of flexible learning system KIP program challenges: - Accurate data collection- Misuse of KIP- Government fiscal capacity Limitation ➔ KIP, ATS ➔ formal education➔ scholarship for minimal training	The role of non-government actors to increase education participation through KIP- Advocacy & Communication- Funding to increase capacity- Provision of government institutions, trainers, infrastructure, scholarships Non-government actors can play a role in: - Funding ->private sector- Data collection ➔ community, CSO- Advocacy, publication, communication ➔ CSO, community- Studies/research for program optimization ➔ academia, governance Role of state holder: - Gov: planning and monitoring program- CSO: support teacher competency inauguration- ....: workforce competency training	Yes, intervention breaks down the problem. Underlying ISO: Demand: - poor school children - adults education participation lacks competency Supply: provision of KIP assistance, training The ATS handling program is able to increase educational participation, but there is a phenomenon that the enthusiasm of ATS to return to school is quite low because they are already in other systems such as working. Provision of scholarships/ education assistance is proven to increase access to education for children from poor families	Yes, Sustainable intervention ➔ KIP program, formal and non-formal education (training) continue to run. The ATS handling program is still a priority for the government in the future. However, support from non-government actors is needed to optimize the scope of this program. This intervention is still the focus of the government	As per indicator 4.7.1Values of circular development have been mainstreamed into the national education system (policy, curriculum, student assessment, teacher training). The hope is that later they can be implemented when entering the workforce or create innovations in circular development. Vocational training adapts to the development of green jobs

	Question #1 What is it solving and who is this benefiting from this? What are those benefits? What is it not solving, and who is not benefiting, and how?	#2 What is enabling the current intervention? What are its strengths?	#3 What are the gaps in the intervention? What are the barriers, bottlenecks to its success?	#4 What is the role different stakeholders to implement this successfully?	#5 Is this stop gap or is it addressing an underlying issue? What underlying issue is it addressing?	#6 Is this a sustainable intervention (apply to programs only)?	#7 Does this intervention support the country its transition to a circular development model?
TABLE 2 - Health, Water and Sanitation	Plus: all citizens, universal access, equitable healthy water and sanitation Minus: Private sector (selling clean water) Current status: safe drinking water (ladder 4); Gap to sustainable safe drinking water status (ladder 5)	- there is no pollution of drinking water and proper sanitation in districts and cities- no joint commitment from the centre and regions- central policy encourages revenue generating LGs - policy induce SDG 6.1 and 6.2- Stranas stunting 2017- Perpres 72 of 2021(stunting policy lens)- Collaboration of 14 K/L stunting locus 2023 (1514 city districts) Budget: - K/L Expenditure -> not yet integrated- Transfer Fund -> specialized for stunting areas- Village Fund -> 1000 HPK target DAK SANITATIONDAK WATER SUPPLY- provision of piped and non-piped drinking water facilities- construction of septic tanks and Ipal PMK 492/2010PMK 736/2010 > water quality	- budget constraints- differences in priorities- community household behavior (siphon pam contents)- natural conditions STUNTING STRANAS SUCCESS a. collaboration of 14 ministries/institutions and non-ministries/institutions. regular monitoring and evaluation. good "political will" budget	- non-K/L, CSO, NGO must collaborate- academic -> safe water source mapping and sanitation and water source behavior change- build monitoring and evaluation system	Providing access to sanitation and safe drinking water is a national commitment such as the stunting policy.	Yes, it is sustainable until 2024	- Quality of human resources for the 2045 golden generation, -Stunting ⬇- PBHS⬆-Education⬆- Germas⬆

	Question #1 What is it solving and who is this benefiting from this? What are those benefits? What is it not solving, and who is not benefiting, and how?	#2 What is enabling the current intervention? What are its strengths?	#3 What are the gaps in the intervention? What are the barriers, bottlenecks to its success?	#4 What is the role different stakeholders to implement this successfully?	#5 Is this stop gap or is it addressing an underlying issue? What underlying issue is it addressing?	#6 Is this a sustainable intervention (apply to programs only)?	#7 Does this intervention support the country its transition to a circular development model?
TABLE 3 - Access to energy	Issues related to energy today are regarding the provision and access to energy sources for the community. The provision of electricity to rural and remote areas is carried out through the expansion of the electricity network by PLN which is limited by geographical conditions, costs and the economic situation in the target area, and through the installation of off-grid systems by developing electricity networks There are still 433 villages that do not yet have electricity, according to the MEMR report for 2021. Of these, only 117 villages have been completed with a total of 13,477 household customers. Other issues related to the supply of electricity need to also include context, for example reliability and affordability (people's purchasing power). In relation to the provision of fuel, it is still difficult for the 3T area and several other border areas to get access to fuel at an affordable price due to the distance constraint which causes the cost of fuel transportation to become more expensive. The Funding Strategy for the Development of the Physical Special Allocation Fund is used to support the development/ procurement of local public service facilities and infra and also encourage other non-gov actors w/in the framework of multi-party cooperation such as increasing connectivity and electrification for inclusive development in target areas, one of which is Renewable Energy Infrastructure (IET).	The number of villages that have not yet been electrified is greater, the provision of renewable energy or alternative energy, for example solar panels, biomass has not been massively distributed/evenly distributed	provision of access to electricity is gradually increasing so that the electrification ratio is increasing, More villages are electrified, Better in terms of infrastructure development for electricity supply and alternatives >> support from non-gov is starting to be seen even though it only exists in a few areas, including the ability of farmers to utilize and procure solar the panel itself is better off (there is an improvement in the economy) on Sumba Island, NTT. In addition, the construction of gas stations in border areas has also been increased so that access to energy can be more equitable. However, in the last 7 years, energy use still uses a lot of fossil energy, which has a negative impact on the env, especially in climate control and the greenhouse gas effect.	In terms of the development of electricity infrastructure and new and renewable energy, development in Indonesia is currently still constrained by the cost of developing the required EBT infrastructure and technology, which costs are still very high and limited. The community's economic aspect is also a determinant of the community's ability to access energy availability.	In terms of developing EBT infrastructure, financing is a big challenge that must be solved. Currently, many government allocations are still given to the payment of energy subsidies that are not environmentally friendly. If the subsidy allocation can be reduced and diverted to increase the allocation for EBT infrastructure development, it can certainly accelerate the development of EBT infrastructure in Indonesia and assist in mitigating the impacts of climate change. The approach taken is not multi-stakeholder so that the settlement of root causes is still incomplete.	Energy utilization, which currently still uses a lot of fossil energy, has a negative impact on the environment, especially in terms of increasing CO2 and the greenhouse gas effect. The economic capacity of the community affects utilization in obtaining access to energy (electricity). Access to electricity also affects the education, health, and economic activities as a whole.	

	Question #1 What is it solving and who is this benefiting from this? What are those benefits? What is it not solving, and who is not benefiting, and how?	#2 What is enabling the current intervention? What are its strengths?	#3 What are the gaps in the intervention? What are the barriers, bottlenecks to its success?	#4 What is the role different stakeholders to implement this successfully?	#5 Is this stop gap or is it addressing an underlying issue? What underlying issue is it addressing?	#6 Is this a sustainable intervention (apply to programs only)?	#7 Does this intervention support the country its transition to a circular development model?
TABLE 4 - Affordable housing	The 1 million housing program, housing for MBR, thematic integrated DAK: alleviation of slums. The housing availability issues. There are cash assistance interventions, but there are limitations on the coverage of interventions	Enabler: a clear legal framework and budget. Strength: a simple policy design	1) Land issues, location wise, public transportation. 2) Access to economic zone. 3) Tendency to live in landed house	1) Government: effective and responsible policy, commitment on the budget and allocation; evidence-based planning 2) Private sector: PPP (Public Private Partnerships); and CSR (Corporate Social Responsibility) on housing and sanitation. 3) Academia/ researcher: feasibility study/ pre-FS and policy recommendation. 4) Others: development partners, international standardization.	1) Middle income people are not touched wider the gap of economy; 2) Reducing housing back log.	There is the need for multi-stakeholder involvement	
TABLE 5 - Protecting cities to climate change and other shock	1) Slum areas, especially in urban areas, especially on the coast; 2) Disaster-prone areas are spread across the coast and disaster-prone areas (natural, social, health). 3) Impacts in rural areas related to erratic weather have disrupted social and economic activities of the community (agriculture, water resources), and disrupted access to marine resources in coastal areas. 4) The impact on urban slum areas on riverbanks and coasts is disrupted by flooding during the rainy season and high waves which can damage infrastructure (abrasion, houses, roads, places of work, etc.) Disaster-prone areas are spread across the coast and disaster-prone areas (natural, social, health).	1) Currently there are many improvements in various locations affected by climate change. 2) In addition, government and public awareness has increased, such as climate change management policies that are based on mitigation, which are currently increasing awareness of climate change adaptation. 3) Today's society is also increasingly aware of the impacts of climate change and disaster events.	Improved in terms of awareness, capacity, infrastructure and policies for dealing with climate change and disasters. However, in general disaster events due to climate change (hydrometeology) are occurring more frequently and resulting in losses.	Improved in terms of awareness, capacity, infrastructure and policies for dealing with climate change and disasters. However, in general disaster events due to climate change (hydrometeology) are occurring more frequently and resulting in losses.	Climate change can also disrupt people's access to economic resources, which has implications for increasing poverty and access to education, as well as access to adequate housing. Poverty and access to education can also affect public awareness to support climate change management programs (such as spatial planning, infrastructure, relocation etc.)	1) PN 6: PP2 Increasing Disaster and Climate Resilience; 2) KP 2 Increasing Climate Resilience (ProP: Coastal-Sea, Water, Agriculture, Health + DRR); PP3 Low Carbon Development (CE, FLW; 3) Transp; Forest & Land; Energy; Industry & Solid Waste);4) Enabling: Support sector, education, budget and regulation; 5) Difficulty: multisector; energy utilization transformation; budget Additional interventions: policy integration and program implementation, such as regional arrangement, transportation, waste management-BI policy through CE and capacity building (Protection of Vulnerability of the Coastal & Marine Sector; Water Security; Climate Resilience in the Agricultural Sector; Protection of the Health Sector from Climate Impacts); 6) Implementation of policy adjustments and strengthening regulations; Improved mitigation to reduce GHG emissions which trigger climate change; Increasing the capacity of the parties Infrastructure strengthening; Spatial planning and increasing access to basic community services	

	Question #1 What is it solving and who is this benefiting from this? What are those benefits? What is it not solving, and who is not benefiting, and how?	#2 What is enabling the current intervention? What are its strengths?	#3 What are the gaps in the intervention? What are the barriers, bottlenecks to its success?	#4 What is the role different stakeholders to implement this successfully?	#5 Is this stop gap or is it addressing an underlying issue? What underlying issue is it addressing?	#6 Is this a sustainable intervention (apply to programs only)?	#7 Does this intervention support the country its transition to a circular development model?
TABLE 6 - Land tenure and legal identity	Impacts in rural areas related to erratic weather have disrupted social and economic activities of the community (agriculture, water resources), and disrupted access to marine resources in coastal areas. The impact on urban slum areas on riverbanks and coasts is disrupted by flooding during the rainy season and high waves which can damage infrastructure (abrasion, houses, roads, places of work, etc.)	In urban areas, the lack of secure tenure and property rights is a major barrier to achieving domestic water, sanitation and waste management objectives. Due to the scarcity of land and the informality of rights, marginalized groups, including rural migrants to cities, are often found on public or limited land on hillsides or in areas prone to flooding, leaving a challenge for governments and development actors to decide whether to recognize and regulate these informal slums. by providing much-needed services, or displacing populations to protect the wider landscape and reduce vulnerability	These people are mobile and often do not have a clear address, making tracking their relationship with the health system a challenge. This dynamic reflects the huge gap between the urban poor and the urban rich that has changed the face of Jakarta and other big cities in Indonesia.	Rural residents face equally daunting challenges, though more related to the protection of their lands in dealing with concessions where small-scale land use and enterprise intersect and sometimes collide. High-profile conflicts over community land rights and the impact of large-scale timber exploitation and forest conversion for oil palm plantations have increased international scrutiny of Indonesia's agricultural and forestry sectors. While the opportunity to register community rights in this environment exists within the Indonesian legal framework and can help reduce conflicts with investors	There is a target to certify 126 million plots of land, based on 2021 data 72.2 million plots have been certified, 54 million have not been granted certificates	The root cause of the problem of land ownership is: -Still using a dual land certification system (using letter c/kirig); The willingness of the people to register their land is still low; Lack of sufficient archival system	
TABLE 7 - Integrated Transport	Problem: unintegrated transportation system inequality in infrastructure development and transportation system govt has built hard infrastructure across regimes Transportation services provider Lowest level HH rural Automotive industry in general, many get benefits	high level gov policy	inequality finance	policy enforcement	building comfortable environment		Halfway

	Question #1 What is it solving and who is this benefiting from this? What are those benefits? What is it not solving, and who is not benefiting, and how?	#2 What is enabling the current intervention? What are its strengths?	#3 What are the gaps in the intervention? What are the barriers, bottlenecks to its success?	#4 What is the role different stakeholders to implement this successfully?	#5 Is this stop gap or is it addressing an underlying issue? What underlying issue is it addressing?	#6 Is this a sustainable intervention (apply to programs only)?	#7 Does this intervention support the country its transition to a circular development model?
TABLE 8 - Waste Management	Bank Sampah- what it is solving -> recovering value of material/waste (plastic, cardboards), Beneficiaries -> Procurers, informal sectors Communities -> Support, waste collection- Gov -> Provide incentives - CSO -> Advocate the issue in community- Private -> support financially / Academic -> how to increase collection .... utilizing local government attention in waste management- budget- socialization Bank sampah - what not solved- only focus on valuable materials/waste solving to reduce waste for producer benefit -> environment & society prevent to generate waste disposal	Permen LKH 14/2021Waste management in waste banks IKPS = Waste management performance index Permen LHK 75/2019 Roadmap for waste reduction by producers single-use plastic banned Enables -> Policy (Permen 14/2021)- Collected waste from informal sectors Bank sampah strength -> Direct incentives Reduction of waste volume upstream (production) to not supply the market; Companies/manufacturers develop targets/roadmaps for waste reduction	exclusive- limited to local government - voluntary nature Gaps Barrier- alternative material substitution for packaging- behavioral change Gaps -> financial support, Barriers -> areas / little availability	Gove, budget, socialization, policy -> Pergub/Perwali- Community: managing facilities, compost house, waste motorbike- Private: hazardous waste management facilities, CSR -> waste- Academic? - CSO?	underlying issue: - unintegrated waste management- marine waste & pollution schedule waste management as a key issue to be resolved	sustain -> 2024 is included as KPI in the Environmental Pillar bank sampah policy -> ministry decree no 14/2021	YES

Horizon Scanning: Identifying Emerging Trends

	Political	Environmental	Economic	Social	Technological	Legal	Values
TABLE 1 - Education	revision of regional agreements 20% education funding		5% economic growth unemployment rate decreases	improving the quality of learners Increase in the number of training institutions unemployment rate decreases increase in secondary education mainstreaming of sustainable development education in the education system (indicator 4.7.1)	better access to internet and information adoption of technology in higher education (applied)	revision of regional agreements	mainstreaming of sustainable development education in the education system (indicator 4.7.1)
TABLE 2 - Health, Water, Sanitation	future interventions, sustainable city w/ community movement, (healthy living movement)	water, sanitation > good	sin tax Urgency: active mobilization citizen, better transportation, better housing and open space recession and unemployment daily, health, expenditure ⬆	health security availability of healthy and safe food BPJS, insurance ⬆ NCD disease ⬆ sports community ⬆ ..... NCD's risk factor screening (urgency) collaborative funding scheme screening, curative, rehabilitative	digitalization for health services and education new health tech		
TABLE 3 - Energy	Steam-electric power station usage until 2050, reduction of greenhouse gas by 35%	Increase use of E-money	Carbon footprint calculator offset	Usage of Big Data for government's decision-making process Social media campaign by youth	Increase of work from anywhere which is going to update the regulation regarding labor and working condition		

	Political	Environmental	Economic	Social	Technological	Legal	Values
TABLE 4 - Affordable housing		election hoax clean water more pollution & high emission waste management household/industrial level rising of hydrometeorology disaster	energy efficient home food scarcity, clean water, shortage sustainability focused industry preference to renting than buying a house skilled labor shortage upsurge of housing price more vertical housing	core-centre new city role flexible working arrangement healthy lifestyle skilled labor shortage Sustainable lifestyle as new identity gender equality tendency to stay single	telemedicine flexible working arrangement data leak depending on technology (AI development) emerging smart satellite cities	telemedicine	
TABLE 5 - Protecting cities to climate change and other shocks	coastal spatial planning	use of private vehicles housing environment arrangement EV using reducing the use of fossil fuels integrated waste management disaster incident use of mass transportation	increasing public awareness population growth disaster resilient infrastructure development green industry development smart city development low carbon financing disaster-resistant housing development mass transportation development GDP increasing	use of digital technology (manufacturing, commerce, education) urbanization			

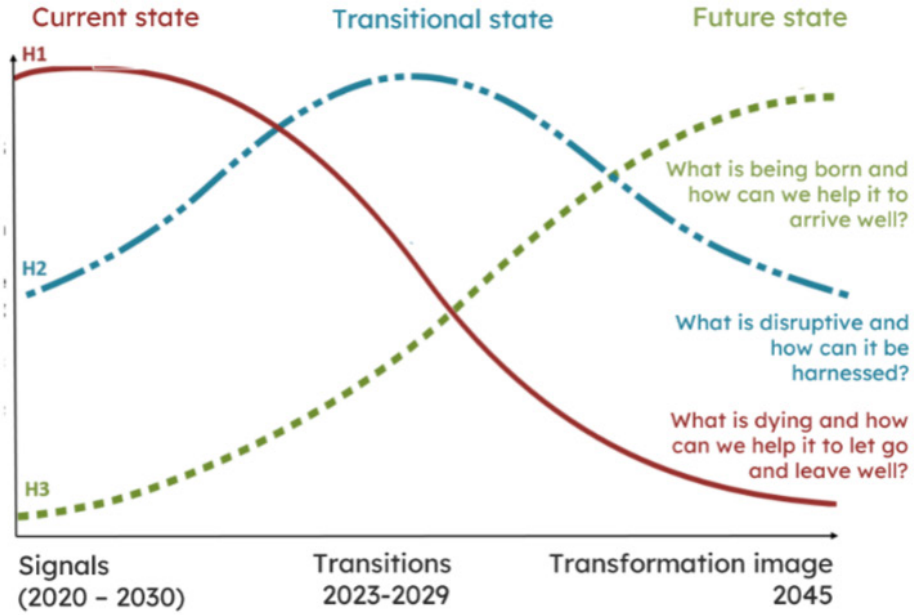
	Political	Environmental	Economic	Social	Technological	Legal	Values
TABLE 6 - Land tenure and legal identity	unstable democracy implementation of agrarian reform (Perpres 86/2018)	Rising levels	Transitioning job market/ industries (analog -> digital, an....)	single identity integration -> e-certificate education level increases	Improved community access to information SPBE -> integrated database	Discussion of the PA Law (Law No 5/1960) implementation of agrarian reform (Perpres 86/2018) Indigenous law (Recognition protection)	
TABLE 7 - Integrated Transport	Cancel culture due to political changes	Cancel culture due to political changes failure public transportation and EV development	deglobalization -> each countries promotes local products disruption in labor market due to tech transformation				

	Political	Environmental	Economic	Social	Technological	Legal	Values
TABLE 8 - Waste Management	have done CE=>- initial study related CE, stakeholder mapping, policy related CE mapping, public campaign - EPR implementation Permen LHK 75/2019 Presidential election 2024 SDGs -> initiatives to support SDG achievement increase RPJMN & RPJMD 2025 Synergy 2024 election, regime change -> policy (ultimate)	sustainable public procurement -> integrated eco-friendly material into LKPPs e-catalogue the use of plastic sachets for packaging is more economical industry mindset -> technology that creates more waste mixed waste treatment and open dumping disposal integrated household waste management => well-collected, well-managed & well-transported, digitalization of waste mgt - circular economy design, '- reusing material -> recycling & recovery rate increasing 2024 election, regime change -> policy (ultimate) legal & policy circular economy ⬆ start-up waste management masif (digitalisasi waste management) ⬆ Post -pandemic effect -> economic bounce back ⬇	Funding, platform, financial and incentive scheme legal & policy, circular economy circular economy action plan RPJMN & RPJMD 2025 Synergy industry mindset -> technology that creates more waste Public awareness increases as environmental impact decreases	SDGs -> initiatives to support SDG achievement increase Demographic bonus -> unemployment increases start-up waste management masif (digitalisasi waste management) ⬆	industry mindset -> technology that creates more waste start-up waste management masif (digitalisasi waste management) ⬆	SDGs -> initiatives to support SDG achievement increase RPJMN & RPJMD 2025 Synergy legal & policy ⬆ circular economy circular economy action plan ⬆	Public awareness increases as environmental impact decreases

Three Horizons: Identifying ‘new’ Interventions

3H Framework

- H1 (top left): populated with barriers, bottlenecks and other current system issues (Day 1)
- H3 (top right): You are standing in 2045- what do you see for your area?
- H3 (bottom left): populated with ‘seeds’ or initiatives which are not dominant but have potential
- H2: identify new intervention needs based on H1 & H3



The Three Horizons framework visualizes how a group views the present conditions of a topic and what they think is changing and declining from our current ‘normal’ (Horizon 1). The group then articulates what their ‘preferred/dream/ideal” state for the topic would be in the future (Horizon 3). Next the group acknowledges there has to be a bridge between what is today’s normal and the desired future state (Horizon 2). Horizon 2 is the transitional state, where group articulates what are the kinds of interventions (policies, programmes) we would need to go from where we are to where we want to be.

In addition to the above, participants use the framework to acknowledge that even in the present there are already seeds of the desired future (forward thinking cutting-edge innovative ideas, organizations, interventions, people). Sometimes we need new policies and programmes to support their development (for example).

It is worth stating that for most participants this was their first time using the Three Horizons framework as such it was not always clear if the responses were placed where they intended them to be. We took photos of each table’s Three Horizons template and transcribed them as we saw them in the chart below. This was then reviewed, synthesized, and simplified in Annex VIII to share with you two elements (a) What participants want in the future for their topic (Horizon 3) and (b) what are some interventions they think are needed to get us from where we are today to where we want to go (Horizon 3).

	Current State			Transitional State			Future State		
	First Wave (Horizon 1)	First Wave (Horizon 2 seeds)	First Wave (Horizon 3 seeds)	Second Wave (Horizon 2)	Second Wave (Horizon 1 decline)	Second Wave (Horizon 3 line)	Third Wave (Horizon 3)	Third Wave (Horizon 2 decline)	Third Wave (Horizon 1 decline)
TABLE 1 - Education	Percentage of students who hasn't finished their study: Senior high school - 21,47%, Junior high school - 6,71%	Percentage of youth within age of 19-23 who went to college: 31,9% Percentage of certified teachers: 53%	Unemployed: 5,86% Economic growth: 5%	Better access to internet and information Development of senior and high school merging Education budget: 20% Priority for 'access' on all policies	Curriculum Merdeka' also known as self-tailoring curriculum Programs for improving teacher's capabilities Bolstering numbers of training institute	Participation numbers of stakeholder (CSO, Philanthropist, CSR) Revising constitution of district autonomy to support senior-junior high school. Still discussed in parliament	Percentage of youth within age of 19-23 who went to college: 75% Percentage of high school accomplishment: 80% Mainstreaming education, sustainable development goals on education system (Indicator 4.7.1) Economy growth by 6-7%	Unemployed by 1,9% Increasing of certified teachers by 98%	No more unfinished student
TABLE 2 - Health, Water and Sanitation	Noncommunicable disease Increasing trend of Fast food and coffee milk Increasing daily health expenditure Increasing usage of health insurance Increasing mobility of citizen	Scattered data Limited human resources on health expertise Unhealthy diet, catalyzed by digital information flow Awareness of mental health issue Emerging of infectious disease		Development of One Big Data, insurance policy cross cutting with other ministries (new policy) Community empowerment for healthy lifestyle (current program) Regulation to assure the availability of sustained human resources (new policy) Regulation on food label (new policy) Capacity building for health provider (current program)	Collaborative funding scheme Digitalization for health service and education		Affordable healthy food and beverage One Big Data available Availability of integrated health service Health aspect in all policies in Indonesia Healthy Community Movement Inpres No 1 (2017)	New Health and Treatment Approach	

	Current State			Transitional State			Future State		
	First Wave (Horizon 1)	First Wave (Horizon 2 seeds)	First Wave (Horizon 3 seeds)	Second Wave (Horizon 2)	Second Wave (Horizon 1 decline)	Second Wave (Horizon 3 line)	Third Wave (Horizon 3)	Third Wave (Horizon 2 decline)	Third Wave (Horizon 1 decline)
TABLE 3 - Energy	433 villages are not yet acquired electricity		Fossil fuel vehicle	Current Policy: Acceleration of Renewable Energy development for power plant (Perpres No 112 Year 2022) Providing Off-grid Energy from various factors other than government	Campaign on developing renewable energy Big Data usage, satellite imaginary, to analyze the access of electricity Usage of electricity is considering the activity and economic potential from society	Regulation on renewable energy based on societies' economic and social conditions. Multi stakeholder collaboration President Instruction No 7 2022 for usage of electric car for government sector	Steam-electric power station usage until 2050, reduction of greenhouse gas by 35%	100% electricity access, with consideration of reliability and affordability Collaborative and innovative funding regarding energy sector	Increasing trend of electric car
TABLE 4 - Affordable housing	Digital divide, rising sea level, unstable democracy, disintegrated data, car centric new city, the preference to renting than buying a house			Political will, continuing or consistency for policy implementation, Land consolidation, strengthening PPP B2G and G2G	1) Support regulation on controlling housing price, incentive for beneficiaries, more attractive offers/ payment scheme and housing types. 2) Improving top-down policies and a clear standardization and guidelines	Improve infrastructure development, planning and development of new housing, and urge the issue to be a national focal point	Single identity integration, e-certificate database		
TABLE 5 - Protecting cities to climate change and other shocks	The use of private cars	The development of coastal areas, and housing complex	the development of disaster resilient infrastructure	The development of smart city, low carbon financing, the use of disaster resilient housing, the use of EV, the development of mass transportation, the development of green open space, the development of integrated waste management	The use of digital technology, manufacturing commerce, the development of green industry, and increasing awareness of the society	Increasing GDP	The use of mass transportation		

	Current State			Transitional State			Future State		
	First Wave (Horizon 1)	First Wave (Horizon 2 seeds)	First Wave (Horizon 3 seeds)	Second Wave (Horizon 2)	Second Wave (Horizon 1 decline)	Second Wave (Horizon 3 line)	Third Wave (Horizon 3)	Third Wave (Horizon 2 decline)	Third Wave (Horizon 1 decline)
TABLE 6 - Land tenure and legal identity		Disintegrate the data		Political will to support continuity of policy implementation on the long run Infrastructure support (ICT)	Digital Literacy improvement for civil service, from center government to district government Acceleration of database integration	Implementation of Agrarian Reform Reduction of digital divide Transitioning job market (automation)	Single Identity Integration		Unstable democracy Rising sea level
TABLE 7 - Integrated Transport	Pollution, congestion Suboptimal people and goods mobility		Improved transportation system in the big cities EV distribution, demand for affordable EV is high	Improved, integrated, and comfortable transportation in regional hub		EV Batteries and charging station investment	Sustainable fuels More integrated transportation system across region		Less pollution, less congestion, and more productivity
TABLE 8 - Waste Management	The use of plastic packaging; the industry mindset which increases the plastic pollution	Have done CE: initial study related to CE, stakeholder mapping, policy related CE mapping, public campaign	EPR implementation of PERMEN LHK 75/2019	Gap on funding, platform, financial and incentive scheme	Legal and policy on CE	EC action plan	Integrated household waste management	Well collected, well managed and well transported digitalization of waste management	CE product, reuse, recycle and waste recovery

Synthesis of the Three Horizons exercise: What did the participants want to see change for each issue (Desired goals, Horizon 3), and which interventions did they think can support this transition (New interventions, Horizon 2)

	TRANSITIONAL STATE	
	Second Horizon – What could help us transition from where we are to where we want to go	
	Desired goals for each topic as articulated by the groups	New Interventions proposed by audience
TABLE 1 - Education	• Increasing youth between age of 19-23 who went to college • Increasing high school completion • Increasing of certified teachers • Mainstreaming education, sustainable development goals on education system (Indicator 4.7.1) • Having economic growth • Reduced unemployment • Participation of different stakeholders in the education conversation and work (CSO, Philanthropist, CSR)	• Curriculum Merdeka' also known as self-tailoring curriculum • Initiatives that bring better access to internet and information • Development of senior and high school merging • Programs for improving teacher's capabilities • Bolstering numbers of training institute for teachers • Revising constitution of district autonomy to support senior-junior high school. Still discussed in parliament
TABLE 2 - Health, Water and Sanitation	• Availability of affordable healthy food and beverage • New Health and Treatment Approach • Health aspect in all policies in Indonesia	• Community empowerment for healthy lifestyle (current program) • Regulation on food label (new policy) • Availability of integrated health services • Healthy Community Movement Inpres No 1 (2017) • Capacity building for health provider (current program) • Collaborative funding schemes • Digitalization for health service and education • Development of One Big Data, insurance policy cross cutting with other ministries (new policy) • Regulation to assure the availability of sustained human resources (new policy proposed by gov)
TABLE 3 - Energy	• 100% electricity access, with consideration of reliability and affordability • trends of new energy efficient technologies • Steam-electric power station usage until 2050, reduction of greenhouse gas by 35% • Collaborative and innovative funding regarding energy sector • Regulation on renewable energy based on societies' economic and social conditions • Multi stakeholder collaboration • Usage of electricity is considering the activity and economic potential from society	• Develop Campaign on developing renewable energy • Big Data usage, satellite imagery, to analyze the access of electricity • Current Policy: Acceleration of Renewable Energy development for power plant (Perpres No 112 Year 2022) • Providing Off-grid Energy from various factors other than government • President Instruction No 7 2022 for usage of electric car for government sector
TABLE 4 - Affordable housing	• Political will, continuing or consistency for policy implementation, Land consolidation, strengthening PPP B2G and G2G, • Improve infrastructure development, planning and development of new housing, and urge the issue to be a national focal point	• Support regulation on controlling housing price, incentive for beneficiaries, more attractive offers/payment scheme and housing types • Improving top-down policies and a clear standardization and guidelines • Single identity integration, e-certificate database
TABLE 5 - Protecting cities to climate change and other shocks	• The use of digital technology, manufacturing commerce, the development of green industry, and increasing awareness of the society • The use of mass transportation	• The development of smart city • The development of low carbon financing, • The use of disaster resilient housing, • The increased use of EV, • The development of mass transportation, • The development of green open space in cities, • The development of integrated waste management
TABLE 6 - Land tenure and legal identity	• Political will to support continuity of policy implementation on the long run, • Reduction of digital divide, • Infrastructure support (ICT)	• Digital Literacy improvement for civil service, from center government to district government • Implementation of Agrarian Reform • Acceleration of database integration • Transitioning job market (automation) • Single Identity Integration
TABLE 7 - Integrated Transport	• Improved, integrated, and comfortable transportation in regional hub • Less pollution, less congestion, and more productivity	• EV Batteries and charging station investment. • Introducing Sustainable fuels • More integrated transportation system across region • More integrated transportation system across region

	TRANSITIONAL STATE	
	Second Horizon – What could help us transition from where we are to where we want to go	
	Desired goals for each topic as articulated by the groups	New Interventions proposed by audience
TABLE 8 - Waste Management	• Widespread CE product, reuse, recycle and waste recovery	• Legal and policy interventions on CE • EC action plan • Reduce gap in funding by introducing financial and incentive schemes • Well collected, well managed and well transported digitalization of waste management • Integrated household waste management

Annex 2 - Sensitivity Analysis

Our results of policy scenarios rely on the values of elasticities $\rho, \xi_{inf,j}, \xi_{health,j}, \xi_{house,j}$. $\xi_{inf,j}$ are taken from Montaud et al (2020); $\xi_{health,j}$ come from Savard and Adjovi(1998) and ρ is taken from Jung and Thorbecke (2003).

To run the sensitivity analysis, we decrease the elasticities by more than 50% (low bound) and increase them by 50% (upper bound) while keeping the model stability[1].

Although we observe improvement in SDG indicators under high elasticities of investments, the raking of investment stays the same.

[1] For some elasticities the increase is lower than 50% because of magnitude of shocks we are analysing.

Table A1. GDP growth under low elasticities (%)scenarios (%)

	ESTIMATED VALUE, 2022	ANNUAL AVERAGE (2023-2030)						
		BAU	EDU	EDU + HLT	EDU + HLT + TRA	EDU + HLT + TRA + REL	EDU + HLT + TRA + REL + HOU	Stim
8.1.1 - GDP growth rate	4.86	4.70	5.27	5.30	5.50	5.58	5.69	6.32
8.2.1 - Labor Productivity Growth rate	2.80	2.74	2.78	2.78	2.79	2.80	2.81	2.81
9.2.1 - Manufacturing value added share of GDP	18.34	18.71	18.74	18.73	18.69	18.70	18.79	18.55
9.2.2 - Manufacturing employment share of total employment	11.58	12.19	12.41	12.42	12.42	12.43	12.50	12.13
7.2.1 - Renewable electricity share of total final energy consumption	13.68	14.02	13.76	13.75	13.71	14.28	14.27	14.03
10.4.1 - Labor share of GDP	29.58	27.69	26.21	26.21	26.18	26.17	26.07	26.24
10.1.1 - Growth rate of households expenditure (bottom 40%)	3.29	3.65	4.11	4.10	4.26	4.32	4.38	5.17

Table A2. GDP growth under high elasticities (%)

	ESTIMATED VALUE, 2022	ANNUAL AVERAGE (2023-2030)						
		BAU	EDU	EDU + HLT	EDU + HLT + TRA	EDU + HLT + TRA + REL	EDU + HLT + TRA + REL + HOU	Stim
8.1.1 - GDP growth rate	5.56	6.38	6.95	7.11	7.74	7.96	8.11	8.67
8.2.1 - Labor Productivity Growth rate	2.80	2.82	2.86	2.87	2.91	2.92	2.94	2.95
9.2.1 - Manufacturing value added share of GDP	18.34	18.57	18.58	18.57	18.40	18.42	18.52	18.33
9.2.2 - Manufacturing employment share of total employment	11.59	12.22	12.44	12.46	12.42	12.44	12.52	12.19
7.2.1 - Renewable electricity share of total final energy consumption	13.67	13.60	13.30	13.28	13.13	13.79	13.76	13.51
10.4.1 - Labor share of GDP	29.52	27.22	25.77	25.74	25.66	25.64	25.51	25.69
10.1.1 - Growth rate of households expenditure (bottom 40%)	3.86	5.03	5.52	5.62	6.13	6.33	6.38	7.11

Table A3.

	RATIO OF CHANGES
Lower secondary completion rate	0.131522453
primary completion rate	0.028000105
Educational attainment, at least completed upper secondary, population 25+, total (%) (cumulative)	0.210023055
Housing	-0.055932636
health	0.105161706
Renew Energy	0.153757142
Transportation	0.014066807